



# Control Line Scale

2024-2025



RULES GOVERNING MODEL AVIATION COMPETITION IN THE UNITED STATES

# Amendment Listing

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Amendment Topic	Publication Date	Description
Static Score total	01/01/2017	Section 6.3, 6.6
Retract and extension of landing gear	01/01/2017	Section 9.8.1
Clarify rule 3.3.4.2	01/01/2017	Section 3.3.4.2
Clarify Scale Rule 5.2	01/01/2017	Section 5.2
Eliminate error number 7 from section 9.7.1 High Flight	01/01/2017	Section 9.7.1
Climb angle requirement	01/01/2017	Section 9.6.1, d. e.
Change Overshoot option	01/01/2017	Section 9.7.4
Change error 5	01/01/2017	Section 9.7.4
Inside Loop	01/01/2017	Section 9.7.5
Horizontal Figure Eight	01/01/2017	Section 9.7.6
Extend and Retract Wing Flaps (option)	01/01/2017	Section 9.8.2
Realism in Flight	01/01/2017	9.6.4

Scale Documentation Color	01/01/2019	Section 7.1.1.4.1.f
Inverted Flight Option	01/01/2019	Section 9.7.8
Electric motors not allowed in ½ A Scale	01/01/2019	Section 3.3.6.5
Judging the Flight	01/01/2019	Section 9.5.2
Low approach/Missed approach	01/01/2019	Section 9.7.4
Multi-Engine Bonus	5/13/2020	Section 6.5.2 ½ A Scale
Delete reference to electric motors in ½ A scale	1/1/2022	Section 5.5
½ A Scale Points	1/1/2022	Section 6.5.2

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## **CONTROL LINE SCALE GENERAL**

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***NOTE: For FAI events see the FAI Sporting Code.***

(The FAI Sporting Code may be obtained from AMA Headquarters upon request. (When FAI events are flown at AMA sanctioned contests the common practice is to only use the basic model specifications and related items such as timing procedures, from the FAI rules. Contest management and procedures usually follow the basic rule structure found in the General sections and specific category sections of the AMA Competition Regulations book.)

### ***1. Applicability.***

All pertinent AMA regulations (see sections titled Sanctioned Competitions, Records, Selection of Champions, General, and Control Line General) shall be applicable, except as specified below.

### ***2. Objective.***

To provide competitive events for control line aircraft modelers of all skill levels where they can have the joy and satisfaction of designing and/or building scale replicas of aircraft and flying maneuvers and presenting scale operations performed by the aircraft.

#### ***2.1. Definitions.***

Model is a scaled down replica of an aircraft. Aircraft refers to the full scale subject aircraft that the model has replicated. Builder is the person or persons who construct and finish the model. Pilot is the person who flies the model. Helper assists the pilot in starting the model engine(s)/motor(s), and holding the model prior to start of the flight. Caller assists the pilot in verbally informing the flight judges of the upcoming maneuver or scale operation and the beginning and end of the maneuver or scale operation.

#### ***2.2.***

Normal Level Flight as presented on the flight diagrams is between contestant eye level and ten (10) feet. High Normal Level Flight is ten (10) feet. Low Normal Level Flight is at contestant eye level.

### ***3. Contestant and Event Classification.***

#### ***3.1. Entry.***

Contestant may make only one entry in each scale event, unless more are specifically allowed by the event rules. No model can be entered in more than one event within a contest.

### **3.2. Builder of the Model.**

The contestant shall be the builder and the pilot of the scale model. The Contest or Event Director shall make every reasonable effort to assure that each contestant is the builder and the pilot. The builder of the model must have constructed the model used in competition, with construct to be interpreted as the action required to complete a model with no more prefabrication than found in the usual kit. Kits containing a moderate amount of prefabrication of individual parts are permissible as long as the constructions of the basic structure, covering, and/or painting are done by the builder. Models which have major components prefabricated and finished by others, and which require only a few hours of effort to assemble and complete, such as "Almost Ready to Fly" (ARF) models, shall be excluded from competition. Exceptions to this rule are: Team Scale, wherein the pilot and the builder are separate individuals, Fun Scale wherein the scale model need not to have been constructed by the contestant and ½ A Scale where a proxy pilot is permitted if the builder of the model is present and is physically unable to fly the model.

### **3.3. Event Classifications.**

509 CL Sport Scale

521 CL Profile Scale

526 CL Fun Scale

527 CL Team Scale

528 CL Authentic Scale

529 CL ½ A Scale

#### ***3.3.1. Event 528 - Authentic Scale.***

##### **3.3.1.1. Intent.**

Authentic Scale is intended to be an event where the scale model very closely replicates the full-scale aircraft being modeled in all aspects - outline, color, markings, surface detail, and scale detail, as well as flight maneuvers and scale operations.

##### **3.3.1.2. Static Judging.**

Static judging will consist of rigorously evaluating all visible aspects of the model, including those visible upon close inspection, as described in Sections 5, 6 and 7. Thorough documentation allowing this evaluation is required.

### 3.3.1.3. Flight Judging.

Flight judging will be done with the expectation that all flight maneuvers and operations of the full-size aircraft being modeled will be replicated as realistically as possible, as described in Sections 8 and 9. The absence of operating landing gear and/or flaps, if present on the full-scale aircraft being modeled, will result in a reduction of points for Realism. The absence of a visible pilot figure in the model will also result in reduction of Realism points.

### *3.3.2. Event 509 - Sport Scale.*

#### 3.3.2.1. Intent.

Sport Scale is intended to be an event for scale models that closely replicate the full-scale aircraft being modeled, but that do not need to incorporate the high level of detail that is only visible on close inspection.

#### 3.3.2.2. Static Judging.

Static judging will emphasize accurate outlines, proportions, color and markings that can only be distinguished when viewed from a distance, as described in Sections 5, 6 and 7. Thorough documentation supporting this evaluation is required. Profile fuselages and/or engine(s)/motor(s) nacelles are not prohibited, but inaccuracies resulting from them will result in appropriate point reductions for Accuracy of Outline.

#### 3.3.2.3. Flight Judging.

Flight judging will be done with the expectation that the flight maneuvers and operations will be performed as realistically as possible; as described in Sections 8 and 9. The absence of operating landing gear, if present on the full-scale aircraft being modeled, and/or the absence of a visible pilot figure will result in a reduction of points for Realism.

### *3.3.3. Event 527 - Team Scale.*

#### 3.3.3.1. Intent.

Team Scale is intended to be an event wherein the model is built by and flown by separate individuals, although the pilot can also have been involved in the construction of the model. The Team consists of both the builder and the pilot of the model, and both individuals must be present when the event is being contested unless the contest publication has allowed proxy pilots.

### 3.3.3.2. Event rules.

Team Scale event will use the rules of Sport Scale Event 509.

### 3.3.3.3. Flight Judging.

Flight judging will be done using the rules of Sport Scale Event 509.

## 3.3.4. *Event 521 - Profile Scale.*

### 3.3.4.1. Intent.

Profile Scale is intended to be an event for scale models that requires models to employ profile engine/motor nacelles (if necessary) and profile fuselages.

### 3.3.4.2. Event Rules:

Profile Scale event will use the rules of Sport Scale Event 509 with the following exceptions. Due to the non-scale attributes resulting from the required profile components, inaccuracies in fuselage/nacelle widths will not result in point reduction for Accuracy of Outline. Any inaccuracies in model proportions resulting from these required profile components will not result in point reduction for Accuracy of Outline.

### 3.3.4.3. Construction.

A suggested method is to maintain the wing and horizontal tail scale profile and span. The leading and trailing edges and fillets of the wing and horizontal tail should be extended to the center line of the body. The location of the nacelle centerlines will remain fixed at their wing location with fillets moved to the nacelle. The builder may make adjustments to front view angles, flaps, slots and aileron lengths and locations of leading edge extensions and other wing and horizontal tail features. Judges are expected to reward the contestant for a model that most effectively represents the aircraft.

### 3.3.4.4. Flight Judging.

Flight judging will be done using the rules of Sport Scale Event 509. The absence of operating retractable landing gear will not be considered in Flight scoring.

## 3.3.5. *Event 526 - Fun Scale.*

### 3.3.5.1. Intent.

Fun Scale is intended to provide a Scale event which, while requiring a realistic Scale flight, minimizes the Scale



research and model construction efforts. The contestant is not required to be the builder of the model. The contest director may classify Fun Scale participation into two (2) separate events. The first event, Event 526, would be reserved for the more experienced control line scale fliers. The second event, Event 526N, would be for novices who are beginners in control line scale flying.

#### **3.3.5.2. Static Judging.**

Static judging requirements are minimal. The model needs only to be recognizable as a scale model, and minimal outline and color documentation is needed, as described in Sections 5, 6, and 7.

#### **3.3.5.3. Flight Judging.**

Flight judging will be done using the rules of Sport Scale Event 509. The absence of operating retractable landing gear, and/or the absence of a visible pilot figure, will not be considered in Flight scoring.

### **3.3.6. *Event 529 – ½ A Scale.***

#### **3.3.6.1. Intent.**

½ A Scale is intended to provide a scale event to encourage the building and flying of small (commonly called ½ A) scale models.

#### **3.3.6.2.**

Static judging requirements are minimal. Full fuselage models or partially or fully cowled engines/motors are permitted. They will have no scoring advantage. Models of jet or rocket powered aircraft using ½ A engines are permitted.

#### **3.3.6.3.**

The model needs only to be recognizable as a scale model of a piloted and heavier than air aircraft and have minimal outline and color documentation.

#### **3.3.6.4.**

Flight Judging will be done using the rules of Sport Scale Event 509 except that only section 9.6 Mandatory Flight Maneuvers will be judged. The absence of operating retractable landing gear, and/or the absence of a visible pilot figure, will not be considered in Flight scoring.

#### 3.3.6.5.

The use of electric motors for propulsion will not be permitted in 1/2A Scale.

### **4. Safety Requirements.**

#### **4.1. Safety Declaration.**

At all sanctioned contests, each designated pilot shall sign an AMA Flight Safety Declaration attesting to the fact that he or she has previously, and is now, capable of performing a takeoff, two (2) laps of level flight and a normal landing within the designated flying circle. Contestant shall also attest that all aircraft to be flown by the contestant in this contest have been successfully test flown prior to the start of the flying of the event, including all maneuvers the contestant intends to perform during the event. If during this test flight the model exerts excessive pull on the lines, creating a safety issue, the pilot should modify his aircraft configuration and/or flying speed to control excessive centrifugal loads on the flying lines.

#### **4.2. Dangerous Flying**

Dangerous flying of any sort, or poor sportsmanship of any kind, shall be grounds for disqualification of the contestant involved.

#### **4.3. Weight**

Models shall weigh no more than twenty (20) pounds ready for flight, except for fuel.

#### **4.4. Maximum Displacement**

Maximum total displacement of two (2) cycle engine(s) will not exceed 1.25 cubic inches and four (4) cycle engine(s) will not exceed 2.50 cubic inches. Electric motors of any size may be used to power the model.

#### **4.5. Metal Propellers**

Metal propellers are not allowed for flying.

#### **4.6. Pyrotechnics.**

Scale operations involving pyrotechnics (including, but not limited to, rockets, explosive bombs dropped from models, smoke bombs, all

explosive gases and any ground mounted device launching a projectile) are not permitted in Scale competition

#### **4.7. Field Marking.**

A ten (10) foot diameter circle will be marked on the center of the flying circle for use by the pilot to maintain his or her safety position under normal conditions.

#### **4.8. Control Line(s).**

CL Flying Scale						
		Single Strand		Multi-Strand		
Model Weight Pounds	Required Line Length	2 Lines	3 Lines	2 Lines	3 Lines	Pull Test
1/2A – 1.50	30' 50' – 70'	.008"	.008"	.008"	.008"	10G
0 – 1.50*	30'/50'-- 70'	.008"	.008"	.010"	.008"	5G
1.51 – 2.50	50' -- 70'	.010"	.008"	.012"	.010"	5G
2.51 – 4	50' -- 70'	.012"	.010"	.015"	.012"	5G
4.01 – 9	60 – 70'	.016"	.012"	.018"	.015"	5G
9.01 – 12	60' – 70'	.018"	.014"	.021"	.018"	5G
12.01 – 20	60'—70'	.022"	.018"	.024"	.021"	5G

\*Includes the 30/50 requirements for non-1/2A lightweight models. Models weighing 1.5 lbs. or less must use a minimum line length of 50 feet unless the total engine displacement is less than .130 cubic inches for a single engine model, or the displacement of each engine of a multi engine model is less than .05 cubic inches. In such cases, minimum line length is 30 feet. 1/2A will have requirements of a 10G pull test.

##### 4.8.1.

All CL Scale Events will use the same line diameters, line lengths and pull tests specified in the CL Scale Flying table that follows.

##### 4.8.2.

The line sizes, line lengths, and pull test are designed based on engineering analysis using ASME and other single and multi-strand wire line strength standards, of effects of maximum model weight, expected maximum flight velocity, wind on downwind side of the circle, distance from handle to model centerline,

limitations of pilot capability to withstand line pull and a safety factor of 1.1.

#### 4.8.3. Control Line(s).

The length of the control line(s) measured from the center point of the grip part of the control handle (device) to the fore and aft center line of the model shall be as specified in the CL Scale line size and pull test table.

CL Scale Flying Table: Line Length and Size, and Pull Test Requirements

#### 4.8.4.

The minimum wire diameter of the control line(s) depends upon the number and type of the lines which bear equal load.

#### 4.8.5.

All control lines bearing any part of the pull of the centrifugal force of the model in flight must meet the minimum diameter requirements as specified in the table above. Auxiliary lines which do not bear any part of the model's pull in flight (i.e., not connected to the bell crank) and are used solely to actuate components such as landing gear, flaps, etc., may be of any diameter.

#### 4.8.6. *Pull Test.*

Models shall be weighed during registration. Models that consume liquid or solid fuel during flight shall be weighed without fuel. Models which use batteries contained within the model during flight shall be weighed with those batteries in place. Pull tests will be applied before each flight, based on the preceding Table.

### 4.9. **Safety Examination.**

Models will be examined for safety issues by event judges prior to first flight and after any flight that might have caused structural damage.

### 4.10. **Line Check.**

Line diameters and model to handle length will be measured after a set of lines is attached to the model and prior to its first flight. Line clips, lead-outs and handles will also be safety inspected at this time.

## **5. Model Requirements.**

### **5.1. General Model Requirements.**

The scale model shall be a replica (copy) of a heavier-than-air, man-carrying aircraft. Only aircraft that actually made flights can be selected as subjects for competitive modeling. "Penguin" ground trainer types, not meant to leave the ground, proposed designs, mockups, and actually constructed functional prototype aircraft that were never test flown cannot be used. The Contest Director may disqualify any entry which, in his opinion, is not a bonafide scale model.

Enlargement of wing and tail area, changes in dihedral angles, changes in landing gear placement, simplification of structure, etc., are permitted, but with appropriate deductions during static judging. Extreme deviations from scale dimensions, particularly those which noticeably alter the resemblance of the model to its aircraft, will be heavily penalized. Models which only simulate scale appearance by component shapes resembling an aircraft, but whose basic design bears no relationship to it, are not permitted. The preceding sentence does not rule out profile fuselages in non-profile classes. The static scale judges will apply appropriate downgrading of scores for the non-scale fuselage cross section of the profile fuselage.

### **5.2. Profile Fuselages.**

Profile fuselages and nacelles are permitted in all scale events unless the rules for the particular event specifically state that they are not allowed. The scale judges will apply appropriate downgrading of scores for the non-scale fuselage(s) and/or nacelle(s) cross section(s) due to profile construction except in the following events: Profile Scale (event 521), Fun Scale (event 526), and 1/2A Scale (event 529).

The maximum width for profile fuselages and nacelles will be one (1.0) inch. Additional reinforcement may be added to the width of the fuselage(s)/nacelle(s) in the engine/motor area and may extend from the front of the fuselage(s)/nacelle(s) to a point twenty five percent (25%) of the wing chord aft of the leading edge of the wing at the fuselage(s)/nacelle(s) location.

For upright and inverted engine(s) the maximum reinforced fuselage(s)/nacelle(s) width will be no more than one half (.5) inch wider than the engine mounting lugs.

For horizontally mounted engine(s) the maximum reinforced fuselage(s)/nacelle(s) width will be no more than one and one half (1.5) inches.

### **5.3. Model Control.**

One or more control lines which use a mechanical system must be used to manipulate the elevator or stabulator control surface to provide aerodynamic control of the model's pitch during flight. Multiple means may be used for controlling flight maneuvers or scale operations, including, but not limited to, throttle, ailerons, flaps, retracts, landing gear doors, droppable stores (bombs, torpedoes, fuel tanks, parachutes, etc.). The use of 2.4 GHz radio control signals through the air, electronic signals through the control lines and/or mechanical control through control lines are allowed for other than pitch control except for restrictions outlined in CL General Rules. For ½ A Scale only the model's pitch can be controlled.

### **5.4. Mufflers.**

The engine must be equipped with a muffler to limit noise output except for ½ A engines. Ducted fan installations and electric motors are exempted from the muffler requirements.

### **5.5. ½ A engines.**

Individual engine displacement volume shall not exceed .061 cubic inch or 1 cc.

## **6. Contest, Scoring and Flight Plan.**

### **6.1. Special Events.**

The contest director may schedule special events restricted to scale models of specific classifications. (Examples: Event limited to certain engine; multiengine(s)/motor(s) only; aircraft that flew in World War I; or civilian airplanes of a certain time period.) The exact qualification for entry in special events must be clearly outlined in the AMA sanction application and in all pre-contest announcements and publicity.

### **6.2. Judging.**

An AMA Scale event consists of two parts—Static Judging and Flight Judging. Although the criteria for judging differ between the various events, an official scoring requires the summation of a static scoring and a flight scoring. If one of the scorings is not achieved by the contestant, then the contestant has no official scoring for that event. CL Scale score sheets for the events will be provided for use by the judges.

### 6.3.

#### 6.3.1 – 1/2a Scale:

1/2a scale maximum static scoring is eighty (80) points. Maximum flight scoring is forty-two (42) points per flight. If one or two rounds are flown, the single best flight score is doubled for a maximum flight score of 84 points. If three or four rounds are flown, flight scoring is the summation of the two best flight scores for a maximum value of 84 points. Total scoring has a maximum value of one hundred and seventy (164) points.

#### 6.3.2 - Fun Scale:

Fun scale maximum static scoring is ten (10) points. Maximum flight scoring is one hundred (100) points. Fun scale total scoring is a maximum of one hundred and ten (110) points.

#### 6.3.3 - Sport, Profile, Team & Authentic Scale:

Profile, Sport, Team & Authentic Scale maximum static scoring is one hundred (100) points. Maximum flight scoring is one hundred (100) points. Total scoring is a maximum of two hundred (200) points.

### 6.4. Static Scoring.

#### 6.4.1. *Authentic Scale Static Scoring.*

A maximum of one hundred (100) points is available from Static Judging and are allocated in the following seven categories. They may be awarded in 1/2 point increments:

Maximum Category Points:

a. Accuracy of Outline	
Plan View	15
Side View	15
End View	10
b. Craftsmanship	10
c. Complexity	10
d. Scale Detail	10
e. Surface Texture and Finish	10
f. Color	10
g. Markings	10

#### 6.4.2. *Sport, Profile, and Team Scale Static Scoring.*

A maximum of one hundred (100) points is available from Static Judging and is allocated in the following three (3) categories.

Maximum Category Points:	
a. Accuracy of Outline	40
b. Craftsmanship	30
c. Finish, Color and Markings	30

#### 6.4.3. *Fun Scale Static Scoring.*

A maximum of ten (10) points is available from Static Judging and is allocated in the following two (2) categories.

Maximum Category Points:	
a. Proof of Scale	5
b. Color and Markings	5

#### 6.4.4. *½ A Scale Static Scoring.*

A maximum of eighty (80) points are available from Static Judging and are allocated in the following five (5) categories.

Maximum Category Points:	
a. Accuracy of Outline	
End View	5
Plan View	15
Side View	20
b. Craftsmanship	
c. Finish	10
d. Color	10
e. Markings	10

### 6.5. ***Flight Scoring and Plan***

#### 6.5.1. *All Events except ½ A Scale.*

The flight plan shall consist of three (3) required maneuvers, six (6) optional maneuvers or scale operations, and one (1) over all judgment (realism in flight) listed in the sequence below for a maximum of 100 points. An exception is the Taxi option that will be sequenced after Landing. Each has a maximum award of ten (10) points. The only exceptions are two (2) optional maneuvers of Retract and Extend Landing Gear and Touch and Go. They have a maximum award of twenty (20) points each. Each will also fulfill the requirement for two options. Options selected by the contestant may be listed in rule books under AMA or FAI CL Scale rules or described by the contestant. But they must be typical of the aircraft and cannot include climb or dive.

1. Takeoff.
2. Ten (10) Airborne Laps.
3. Option.



4. Option.
5. Option.
6. Option.
7. Option.
8. Option.
9. Landing.
10. Realism in Flight.

#### 6.5.2. $\frac{1}{2}$ A Scale.

The flight plan shall consist of three (3) required maneuvers and (1) over all judgment (realism in flight) listed in sequence. A maximum of ten (10) points is allocated to each of these four flight plan elements. Airborne laps have one point is awarded for each lap completed with all engine(s) running up to ten (10) laps. The four (4) taken together have a maximum award of forty (40) flight points. Two (2) bonus points are awarded for multi-engine models, provided the additional engine(s) run during the majority of the flight, but excluding landing. The maximum number of flight score points is **forty-two (42)**. The maximum flight scoring of two flights is **84** points.

1. Takeoff.
2. Ten (10) Airborne Laps.
3. Landing.
4. Realism and Smoothness in Flight.

### 6.6. Contest Scoring – All Events.

#### 6.6.1 – *Fun, Profile, Sport, Team and Authentic Scale:*

If three (3) or four (4) official flight rounds are scheduled and flown, then the flight scoring is the average of the two highest flight scores. To break a tie, the best single flight score will be added to the static score. If this does not break the tie, the average of the three (3) best flight scores will be added to the static score. If this does not break the tie, then the average of four (4) flight scores will be added to the static score.

If only one (1) or two (2) official flight rounds are flown during the event, then the official flight score will be the total of the static points and the best single flight score. To break a tie, add the average of the two flight scores to the static scoring.

#### 6.6.1. 6.6.2 – *1/2a Scale:*

If three (3) or four (4) official flight rounds are scheduled and flown, then the flight scoring is the summation of the two highest flight scores. To break a tie, the average of the three (3) best flight

scores will be added to the static score. If this does not break the tie, then the average of four (4) flight scores will be added to the static score.

If only one (1) or two (2) official flight rounds are flown during the event, then the flight scoring will double the single best flight score. To break a tie, add the single best static score to the total score.

## **7. Static Judging.**

Static judging assesses the accuracy of the model as a representation of its aircraft. Static judging will consist of rigorously evaluating all visible aspects of the model.

### **7.1. Proof of Scale.**

To prove that the model resembles a particular aircraft, proof of scale documentation is required. In order to be eligible for maximum points, the model must replicate an individual full-scale aircraft, and not just be a "generic" example.

#### **7.1.1.**

Proof of Scale is the responsibility of the contestant and must be represented by documentation. To allow for efficient, yet thorough, judging the required documentation should be concise, yet thorough, and well organized. This proof may be a maximum of four (4) pages for Fun Scale (526), a maximum of four(4) page document for ½ A Scale (529), a maximum of eight (8) page document for Sport Scale (509), Profile Scale (521), Team Scale (527) and a maximum of twelve (12) page document for Authentic Scale (528 ).

The proof of scale documentation will be used by the judges to evaluate the quality of the model relative to its replicating the appearance of the full-scale aircraft. It is the sole source of information the judges will use in this evaluation and subsequent assignment of points. It should be comprehensive enough to document all aspects which will be judged. Inadequate or incomplete documentation will result in lower points being awarded. If no proofs of Accuracy of Outline, Craftsmanship, Complexity, Finish, Surface Texture, Color, Markings or Scale Detail accompany the model, then no points can be awarded for those specific aspects.

#### **7.1.1.1.**

Accuracy of Outline is the shapes and contours of the model, including, but not limited to, shapes of major and

minor components such as cross-sections, control surfaces and air foils. To be eligible for Accuracy of Outline points, one (1) of the following proofs must be provided by the contestant. The contestant may furnish any combination for the following three-views, photographs and plastic models, with at least one required.

a. A drawing, (line, tone or color) of the full-scale aircraft which is being modeled. This “three-view” drawing must show, at a minimum, a plan, side and end view of the full-scale aircraft. Additional views, both top and bottom plan views, both side views, etc., can be included.

Three-view drawings must be from a reliable source, such as the aircraft manufacturer, model or aviation magazine, book, etc. Commercially available three-view drawings are acceptable. Plans of non-flying solid or replica models, either from a kit or a magazine, are acceptable. Homemade or non-published drawings, corrected three-views, or drawings of flying models, are not acceptable unless approved in advance by an authoritative source, such as the AMA Technical Director, a Scale Contest Board member, museum curator, the manufacturer or builder, or other competent authority. Suitable photographs, historical background, and supporting data must accompany these drawings to permit verification when submitted for approval.

b. A selection of photographs of the aircraft, sufficient to show the outlines of the aircraft in side view, front view and plan view. These photographs must be composed in such a way as to allow the judges to accurately interpret and evaluate the accuracy of the model's shapes. The photographs need not be taken from directly overhead or at exactly 90 degree angles to the side or front of the outlines, but can be pictures taken from oblique angles which allow the judge to interpret the outlines.

c. A production plastic model and its documentation on or within the box from a commercial source may also be used for documentation.

The contestant may provide two or three types of documentation to assure that all categories of Scale Accuracy to be evaluated, and appropriate points awarded. In the event that the photographs and or the drawings and or plastic model differ, the photographs will generally take precedence. The use of three-view drawings,

photographs or plastic model for proof of Accuracy of Outline will only count as one (1) page of the Sport Scale documentation.

#### 7.1.1.2.

Craftsmanship and Complexity do not need aircraft-based proof, but the score may be increased if proof is available. To be eligible for Scale Detail, Surface Texture, Color, Markings, or Finish points, proof of each scale category for the aircraft is required. It is not the intent of the documentation rules to limit the choice of scale subjects to only those aircraft for which a large amount of data is easily available, or penalize the use of rare color or marking schemes. In many cases it is not possible for the builder to provide enough photographs of the aircraft to cover all aspects. In these cases no downgrading will be done for lack of proof of the “other” side, or bottom, etc. of the aircraft or for use of written proof in lieu of color photographs or drawings.

##### 7.1.1.2.1.

Craftsmanship is a reflection of the design and workmanship that is evident on the model. Craftsmanship is also making shapes and details as accurate, as well as close to flawless. A separate source of proof is not necessary to document judging. However, documentation provided for the other judging categories can be referenced to verify any areas that may appear to be poor craftsmanship, but still replicate the aircraft. Points will be awarded based on the completeness and accuracy, including colors, of the details. Successful efforts to conceal or otherwise minimize any model power plant or control mechanism components, will be awarded with higher points. Close fit for non-scale joints for cowls, hatches, removable wings, etc., will also be rewarded.

##### 7.1.1.2.2.

Complexity is an evaluation of the relative difficulty necessary to document and build a model of a particular aircraft. Evaluation and awarding of points will be based on the sophistication, elaborateness and intricacy of

the colors and markings, surface texture, and scale details, as well as the complexity of the aircraft that the model represents.

### **7.1.1.3. Scale Detail, Surface Texture and Finish:**

#### **7.1.1.3.1.**

Scale Detail includes any internal and external detail normally visible on the aircraft when at rest. This can include, but is not limited to, cockpits, passenger areas, wheel wells, landing gear struts and wheels, etc. Drawings, photographs or other verifiable sources can be used to provide proof of this category. Documentation provided for other scale judging categories can also be used to judge Scale Detail. Scale Detail will be judged up close for authentic scale only.

#### **7.1.1.3.2.**

Surface Texture is the type of surface the aircraft has - wood, fabric, metal, Plexiglas, rubber, etc. Surface detail such as rivets, exhaust buildup, fabric weave, panel demarcations, and the amount, or absence of gloss, will be evaluated. To be eligible for Surface Texture points some proof is required. This can consist of photographs, written descriptions, or published paintings or drawings. Samples taken from the aircraft being modeled can also be used. Points will be awarded based on how well the model's surface texture replicates that of the aircraft. Surface Texture is judged up close for Authentic Scale only.

#### **7.1.1.3.3.**

Finish addresses effectiveness in replication of the painted or bare metal or wood surface of the aircraft. For fabric, plastic film and balsa model surfaces, the level of gloss to flat finish, including weathering and exhaust deposits, will be assessed. Proof can consist of photographs, written descriptions, or published paintings or drawings. Samples taken from the full-scale aircraft being modeled can also be used. Finish is judged

from fifteen (15) feet except for ½ A Scale which is five (5) feet.

#### 7.1.1.4.

Color and Markings consists of the placement, shades, tones and shapes of both the basic color scheme and the various markings on the model. To be eligible for points in these categories, some proof of the color scheme and of the markings shown on the model is required. Color is documented by certified color chips or samples of paints used on the aircraft. If these are not available, colored photographs of the subject or published art of the subject may be included in the documentation. Consideration should be made for lighting effect on color in a photograph. If for an aircraft there is no subject or replica in existence and no color photograph or artist drawing, then a written rationale may be presented for the color used.

##### 7.1.1.4.1.

For Color, any and all of the following means of proof can be used:

- a. Color chips by the Federal Standard for government procured aircraft or other source, or verified paint samples.
- b. Photograph, or photographs, with the understanding that lighting conditions can have a significant effect on color in the photograph.
- c. Pictorial representation such as “Profile” and similar types of color paintings in three-view form, or published color painting or drawing.
- d. Notes, details and diagrams on three-view.
- e. A detailed written description from a reliable source.
- f. If color chips are provided, they must be from a published source, and not produced by the contestant. All colors used on the model must be represented. If both color chips and color photos are included in the documentation then the contestant must

specify in the documentation which is to be used for color judging. If not specified, the photos take precedence.

#### **7.1.1.4.2.**

For Markings, any and all of the following means of proof can be used.

- a. Three-views that show markings and their placement.
- b. Photograph, or photographs, that show size and placement of markings.
- c. Pictorial representation such as "Profile" and similar types of color paintings in three-view form, or published color painting or drawing or a detailed written description from a reliable source.

### **7.2.**

To facilitate rapid judging, documentary presentations are limited to (one (1) side) sized 8-1/2" x 11" pages in a binder or an equivalent area of some other arrangement. Three-views larger than 8 - 1/2" x 11" or more than one (1) page are permitted and will count as one (1) page of documentation. So that each judge can have a copy, multiple copies of part, or all, of the documentation is allowed, provided they are all identical.

### **7.3.**

Sport, Profile, Team, Fun or 1/2 A Scale static judging shall be done at a distance of fifteen (15) feet from the model except for 1/2 A Scale which is five (5) feet. It is recommended that two (2) lines fifteen (15) feet apart be used to establish a judging distance space except for 1/2 A Scale which is five (5) feet. The model is then placed behind one line with no portion allowed to intrude into the judging space. The judges will remain behind the other line during the judging except for the second part of judging of Authentic Scale. The owner of the model or his/her assistant, at the discretion of the modeler, will then rotate or move the model to positions requested by the judges in order to see all views of the model. The model may be placed on a table.

Authentic Scale static judging shall be done at a distance of fifteen (15) feet for accuracy of outline. There is no required minimum distance for judging craftsmanship, complexity, finish, scale detail color and markings, except that the model cannot be touched.

#### **7.4.**

Judges will not pick up the model or examine the models closely before or during the judging. This rule is not intended to prevent display of the entries before or after judging for the benefit of spectators.

#### **7.5.**

Cockpit and cabin interiors, even if partially visible from the judging distance, are not to be considered in scoring the model, except during Authentic Scale static judging. All other visible features will be considered.

#### **7.6.**

No scoring penalty will be applied by the judges when part of the engine(s)/motor(s) must be exposed or non-scale openings are made for engine(s)/motor(s) cooling for Sport, Profile, Team and Fun Scale. Typical configurations include uncowed radial engines or aircraft whose shape does not provide sufficient space, such as the Spitfire or P-63. Other causes are nose or cowling sizes dictated by the scale to which the model has been built, which cannot conceal a standard type model engine(s)/motor(s). No scoring penalty will be applied by the judges for a protruding or fully exposed muffler or for the hole in the cowl or fuselage, necessary for attachment of muffler(s) to the engine(s). For Authentic Scale, judges will assess scoring penalties for exposed engine(s)/motor(s) or non-scale openings which are made for engine cooling or exhaust and exposed controls.

#### **7.7. Configuration Changes between Static Judging and Flying.**

No changes shall be made between judging and flying which alter the scale appearance of the model except:

- a. A flying propeller of any diameter may be substituted for a scale propeller for flight.
- b. The propeller spinner used in flying must be the same size, shape and color as the one presented for scale judging except that it may have a different number of cutouts appropriate for the flying propeller.
- c. Models of seaplanes or flying boats are permitted to use non-scale devices or dollies for takeoff. If dollies are used, they must not be attached to the model in flight. Deviations from scale through the inclusion of permanently mounted, recessed wheels, skids, plug-in removable landing gear or similar devices, if neatly and inconspicuously executed, will not be penalized in the scoring of Accuracy of Outline points.



- d. If bombs, rockets, drop tanks, etc., are to be dropped or released, they must be in place at the time of static judging. The bombs or other armament in place at static judging may be replaced prior to flying if the replacements are the same size, shape and color as those submitted for static judging.
- e. Lead out guides may be removed for static judging and reinstalled prior to flight.
- f. Model pilots may be removed for Authentic and Sport static judging and reinstalled prior to flight.

## **8. Contest Procedure – Flight.**

### **8.1.**

It is suggested that static judging take place before flying. If this is not possible or desirable, the Contest Director may hold part or all of the flying before static judging. If the model is flown before being static judged, any damage sustained during flight shall be ignored by the static judges, provided the model is intact and it is practical to do so.

There is a maximum of four (4) official flights allowed per event. It is recommended that a minimum of three (3) rounds of official flights be scheduled, but it is at the discretion of the Contest Director as to the number of official flights to be scheduled. The Contest Director may allow one (1) attempt for each scheduled official flight. If the number of attempts to be allowed for an official flight is more than one, then this variation must be announced during the pilots meeting.

### **8.2.**

Any flight which has progressed beyond five (5) laps continuously airborne, with at least one (1) engine/motor running will be an official flight except ½ A scale which requires only one (1) lap to become an official flight. A flight of less than five (5) laps continuously airborne, with at least one engine/motor running, may be counted as an official flight at the contestant's discretion. Otherwise, it shall be scored as an attempt.

### **8.3.**

Flight timing starts when the contestant or helper signals for a start, begins the attempt to start an engine, or switches the motor start system on. The time limit for each flight is ten (10) minutes, inclusive of starting the engine/motor. In the case of multiengine/motor subjects, total flight time shall be ten minutes plus two (2) minutes for each engine/motor over one (1). The contestant has three (3) minutes in which to get a single

engine/motor model airborne. For multiengine/motor models, two (2) additional minutes will be allowed for each additional engine/motor to become airborne. An attempt will be charged if the model is not airborne within this time limit.

#### **8.4.**

After a contestant has been notified that a flight area is available, the contestant must provide the judges with a written maneuver and option sequence for that flight, and, if needed, discuss it with the judges.

#### **8.5.**

Each maneuver or scale operation must be announced prior to the commencement, and called on commencement by the word "NOW" (or its equivalent). Completion of each maneuver or scale operation must be announced by the word "FINISHED" (or its equivalent). Failure to do so, loud and clear, will result in the loss of score for that maneuver or scale operation. If a second person (caller) will be announcing the maneuver or scale operation, and calling its commencement and completion for the contestant, the flight judges must be notified, and give approval. The caller may be located with the contestant or outside the flying circle, but within hearing distance of the judges. Maneuver calling is not required for ½ A scale.

#### **8.6.**

Between the end of one flying maneuver or flying scale operation and the start of the next one, the contestant must fly the model a minimum of two (2) laps, except ½ A scale where one (1) lap is required before level flight judging begins. Less than two laps between the end of one flying maneuver or flying scale operation and the start of the next, will result in zero (0) points for the subsequent flying maneuver or scale operation. If a maneuver or scale operation is performed out of written sequences, zero (0) points will be awarded for that maneuver or scale operation.

#### **8.7.**

The contestant and/or helper can contact the model any time prior to a flight becoming official. If such contact is made at any time after the flight becomes official, and before flight judging is complete, then the maneuver or scale operation immediately preceding such contact will receive a zero (0) score. Such contact more than once within an official flight will result in a zero (0) score for the flight.

## **8.8.**

If the pilot is visible in flight in the aircraft, then a dummy pilot of scale size and shape must be present in the model during flight, except for Fun and ½ A Scale.

## **9. Flight Judging Guide.**

### **9.1. Purpose.**

To furnish guidelines for judging flight maneuvers and scale operations of control line models in accordance with the AMA Official Model Aircraft Competition Regulations. This guide is intended to:

- a. Inform a contestant on how the flight will be judged.
- b. Provide the flight judges with a method of judging the flying in both mandatory and optional maneuvers and scale operations.
- c. Supplement, but not supersede, the descriptions found in the AMA Competitions Regulations.

### **9.2. Principles.**

The principles of judging a scale model should be based on how well the model simulates the flight performance of the full-scale aircraft. Scale flight maneuvers are different from precision aerobatics flight maneuvers and scale operations should not be judged by precision aerobatic rules and diagrams. Each maneuver and scale operation must be announced and then signaled to the judges at the beginning and end of the maneuver or operation, except ½ A scale.

#### **9.2.1. Judges.**

The number of judges will be from one to four, depending on the number of available judges and decided by the event or contest director.

#### **9.2.2. Judging Criteria.**

The criteria to be used in judging maneuvers and scale operations are described and shown in the following Sections:

- 9.5. Judging the Flight,
- 9.6. Mandatory Flight Maneuvers,
- 9.7. Optional Flight Maneuvers,
- 9.8. Flight Scale Operations and
- 9.9. Flight Maneuvers/Scale Operations.

### **9.3. Accurate and Consistent Judging.**

The most important aspect of consistent judging is for each judge to have established standards and maintain them throughout the meet.

### **9.4. Meetings.**

#### ***9.4.1. Contestants-Event Director Meeting.***

Prior to the beginning of any flights, a meeting between the event director, judges and contestants should be conducted. The following items should be covered:

- a. The manner in which contestants will be called to the flight circle and how they are to move their models into and out of the circle.
- b. Contest flying hours. (Include lunch break.)
- c. Any interpretations of rules that may not be clear to the contestants.
- d. Methods of signaling for maneuvers or scale operations.
- e. Pit operations (model weighing, pull tests and line checks).
- f. Explain how scores will be tabulated and displayed for review by contestants.
- g. Answer questions from any contestant or judge.

#### ***9.4.2. Preflight Contestant-Judges Meeting.***

A brief meeting between the flight judges and the contestant and caller (if used) should be held prior to each flight to discuss the flight plan. In this meeting the contestant should present and discuss:

- a. The sequence of the flight maneuvers and scale operations (flight plan) on the scoring sheets.
- b. The signals to be used to announce flight maneuvers and scale operations and the calls of “Now” and “Finish”.
- c. The contestant should be prepared to convince the judges that all selected options were typical performance of the aircraft.
- d. Any other information that the contestant wishes the judges to know about the flight.

## 9.5. Judging the Flight.

Except for Level Flight, no maneuver or scale operation will receive an automatic maximum score. All will be judged and scored in relation to their scale-like flying or operation qualities. A judge should not wait until a maneuver is completed before trying to assign a grade. Judges should assume that a contestant is going to perform a perfect maneuver/scale operation which starts with award of ten (10) points. Any faults that are observed should be the cause of points deducted. In downgrading the score a judge should consider the number of defects and the number of times any one defect occurs. While a minor defect may result in the loss of less than a full point, a major defect could be cause for the loss of more points.

### 9.5.1. *Definition of Normal Level Flight.*

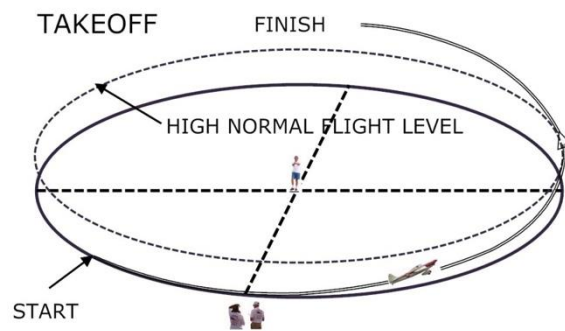
Normal Level Flight on the diagrams is between eye level and ten (10) feet. High Normal Level Flight is ten (10) feet. Low Normal Level Flight is at contestant eye level.

9.5.2. The maneuver diagrams and scale operation diagrams that are included in sections 9.6, 9.7, 9.8, and 9.9 are intended for use as a guide in determining what the applicable maneuver or scale operation should look like in general terms and shall not be used for specific judging criteria. Only the maneuver or scale operation written description along with its associated list of errors shall be used for specific judging criteria.

## 9.6. Mandatory Flight Maneuvers.

### 9.6.1. *Takeoff (Mandatory).*

The model must stand still on the ground with engine(s)/motor(s) running and without being held by a helper or stooge, except for ½ A Scale. The flaps are positioned at the takeoff angle (when applicable). As the throttle or motor speed is advanced, the model should roll smoothly at an increasing realistic speed along the ground, then rise smoothly into the air, followed by a gradual climb to and smooth leveling off above High Normal Flight Level. Landing gear is retracted upon lift off (when applicable). As the model reaches Normal Flight Level, the flaps are retracted (when applicable). The type and length of takeoff run



and the angle of climb should correspond to the modeled aircraft. Distances for takeoff are suggested and may differ based on local site conditions and scale of the model:

**a. Model Equipped with a Tail Wheel.** The pilot should, shortly after starting the takeoff roll, raise the tail wheel off of the ground. At the end of the takeoff roll, the pilot should slowly lift the nose of the airplane to make a gentle liftoff.

**b. Model Equipped with a Nose Wheel.** The pilot should leave the nose wheel on the ground throughout most of the takeoff roll. Near the end of the takeoff roll, the pilot should slowly lift the nose of the model and roll on the main gear to a gentle liftoff.

**c. \*Light Aircraft** (Piper, Cessna, etc.) – A model of a light aircraft or low-performance aircraft should use one half ( $\frac{1}{2}$ ) to three quarters ( $\frac{3}{4}$ ) of the circle for the ground roll.

**d. \*Heavy Aircraft** (Airliner or Cargo Type) — A model of a heavy aircraft should use three quarters ( $\frac{3}{4}$ ), or more, of the circle for the ground roll. Climb angle should be appropriate for the specific aircraft being modeled.

**e. \*High-performance Aircraft** (Fighter or Jet) — A model of a high-performance aircraft should use three quarters ( $\frac{3}{4}$ ), or more, of the circle for the ground roll. Climb should be appropriate for the specific aircraft being modeled.

**f.** Except for fixed gear models, retraction of the landing gear should commence immediately after takeoff, followed by flap retraction if equipped and used for takeoff. Flaps and/or landing gear retraction are not required for profile or fun scale models

#### **ERRORS:**

1. Beginning and ending of maneuver were not called out.
2. The unassisted model does not remain stationary at the start of the maneuver.
3. Takeoff acceleration and roll not smooth.
4. Tail wheel or nose wheel not lifting off correctly.
5. Climb erratic.
6. Climb not consistent with aircraft.

7. Level off not smooth.

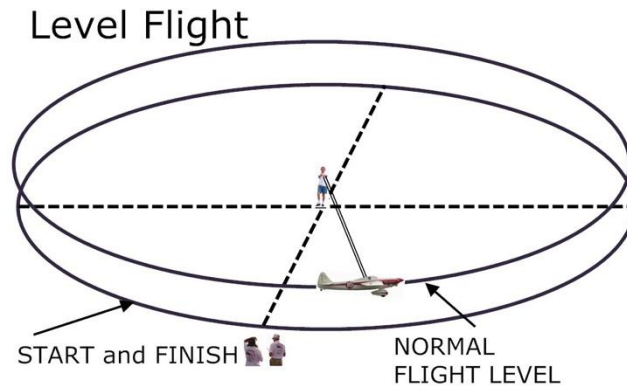
8. Level off not above High Normal Flight Level.

### 9.6.2. Level Flight (Mandatory).

The first maneuver after takeoff is ten level laps.

There must be at least two (2) laps after takeoff before Level Flight maneuver is

started, except for ½ A scale which has one (1) lap. The quality of level flight should affect the score for Realism in Flight. The model should be flown as level as possible. If model touches ground during the ten laps this maneuver is terminated and number of full laps flown determines the score. Other options that involve level flight may not be performed during Level Flight.



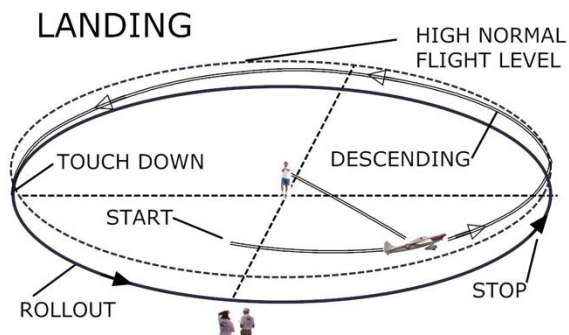
#### ERRORS:

1. Beginning and ending of maneuver were not called out.
2. Model flight path was not smooth and steady.

### 9.6.3. Landing (Mandatory).

Except for Taxi option, this is the last flying maneuver performed. The Landing maneuver will start from above High Normal Flight Level, the model smoothly descends

while throttling back and extending the flaps (when applicable). ½ A scale is an exception and requires at least one engine not running at touch down. Landing gear extension should be initiated just before landing (when applicable). A model may make a three-point landing or may touch the main wheels first and gently lower the tail wheel or nose wheel as speed decreases. The model should



touch down smoothly with no bouncing, and then roll to a complete stop without intervention by the helper.

**ERRORS:**

1. Beginning and ending of maneuver were not called out.
2. Landing maneuver not commenced from above High Normal Flight Level.
3. Not a smooth descent down to the touchdown point.
4. Gear/flaps not lowered in correct positions.
5. Excessive use of throttle.
6. Model too fast, not correct approach configuration.
7. Model bounces on touch down.
8. Model does not come to a gradual and smooth stop after landing.
9. Engine(s)/motor(s) stop(s) before the landing maneuver is finished.

**9.6.4. Realism in Flight (Mandatory):**

Realism in Flight score will be based on the impression of the judges on how well the overall model flight simulates the flight of the aircraft during maneuvers. The speed must seem realistic by subjective judgment, and the scale operations performed on the aircraft (flaps, retracts, etc.) are performed on the model at the appropriate times. The overall smoothness of the performance of all of the above will also be considered. ½ A scale is exempted from some aspects of realism judging since throttle and other scale operations are not permitted.

**ERRORS:**

1. An incorrect scale speed compared with the aircraft.
2. Maneuvers were not smooth.
3. Model level flight path not smooth and steady.
4. The smoothness of engine(s)/motor(s) power changes.
5. Model flies with wheels down but the aircraft being modeled has retractable landing gear. In which case one and on half (1.5) points



shall be deducted from the Realism in Flight scores except for Profile Scale and Fun Scale models.

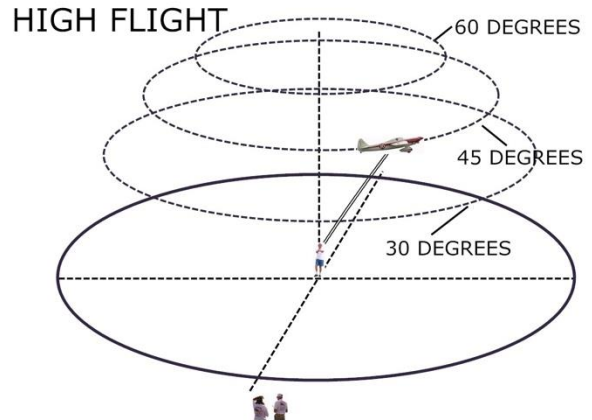
6. Model does not have operation flaps but the aircraft being modeled has operation flaps. In which case one and one half (1.5) points shall be deducted from the Realism in Flight score except for Profile Scale and Fun Scale models.

7. Scale operations were not realistic.

### **9.7. Optional Flight Maneuvers.**

#### **9.7.1. High Flight (Option):**

The model must be flown at an angle of 45 degrees to the ground with a minimum angle of 30 degrees to the ground and a maximum angle of 60 degrees to the ground, during three complete consecutive laps.



#### **ERRORS:**

Beginning and ending of maneuver were not called out.

2. Not three consecutive laps.
3. Not at a 45 degree line angle.
4. Major error if above 60 degrees.
5. Major error if below 30 degrees.
6. Great variations of height during the flight.

#### **9.7.2. Wingover (Option).**

Starting at Low Normal Level Flight, the model should make a near-vertical climb, pass nearly over the pilot's head, dive and then resume Low Normal Flight Level. The radius in the pull-up and the pull-out should be of equal size. The line of flight during the wingover should bisect the ground circle. Low powered aircraft types would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the maneuver. One wing-over is required.

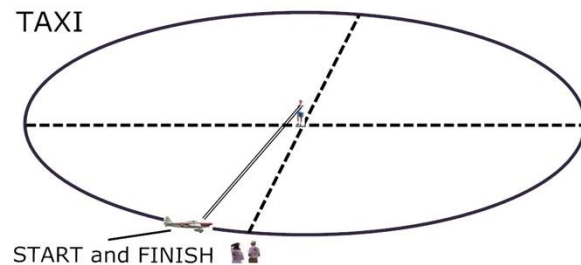
### ERRORS:

1. Beginning and ending of maneuver were not called out.
2. Not commenced from Low Normal Flight Level.
3. Not sufficiently steep climb (less than 60 degrees will score zero).
4. Not sufficiently vertical dive (less than 60 degrees will score zero).
5. Not equal shape in the pull-up and the pull-out.
6. The maneuver was not finished at Low Normal Flight Level.

#### 9.7.3. Taxi (Option).

The taxi demonstration shall be executed only after the mandatory Landing is complete. The model must land

with the engine(s)/motor(s) running, come to a complete stop without being held by a helper, and must taxi for a minimum of one (1) lap at a realistic speed and in a realistic manner. The model must then come to a complete stop, preferably at the same point as the commencement of the operation, without intervention by a helper. Models of multiengine/motor aircraft may shut down one or more engine(s) /motor(s) during taxi if that was normal for the modeled aircraft.



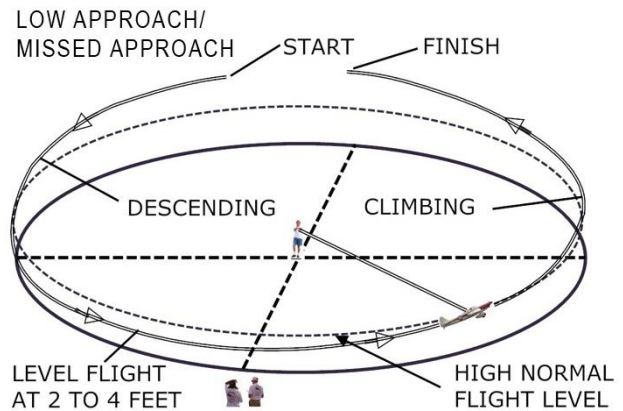
### ERRORS:

1. Beginning and ending of maneuver were not called out.
2. Taxi not completing the full circle.
3. Not a realistic taxi of the aircraft.
4. Not all engines/motors operating, except for multiengine/motor/model which may shut down one (1) or more engine(s)/motor(s) as part of a realistic taxi of the aircraft.

**9.7.4. Low Approach/Missed Approach (Option).**

From above High Normal Flight Level, model reduces speed and extends flaps and landing gear as applicable to the aircraft. The model descends to a height of between two (2)

and four (4) feet and immediately increases power smoothly and simultaneously initiates a climb. Flap and gear retraction should be consistent with the operation of the full scale aircraft. Typically this will be partial flap retraction immediately after power application followed by landing gear retraction as soon as positive rate of climb is established and then flaps retracted fully as speed increases. Climb should continue until above High Normal Flight Level. Flaps and/or landing gear extension are not required for fixed gear, flapless, profile scale, or fun scale models.



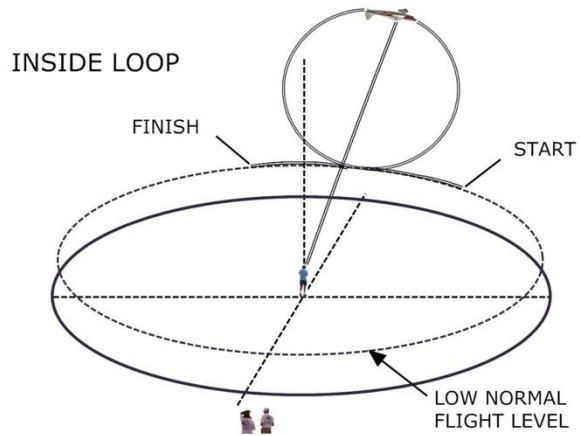
**ERRORS:**

1. Beginning and ending of maneuver were not called out.
2. Descent not commenced from above High Normal Flight Level.
3. Throttle, gear and flaps not operated smoothly during descent.
4. Throttle, gear and flaps not operated in the proper sequence per the full scale aircraft during descent and climb out.
5. Decent and climb erratic.
6. The maneuver not finished above High Normal Flight Level.

### 9.7.5. Inside Loop (Option).

One (1) inside loop should be performed. The model should start from Low Normal Flight Level and perform a smooth, round loop, resuming Low Normal Flight Level at the same point and at the same height as the entry. In

the case of models of light aircraft, in which the power available on the full-scale aircraft would prevent vertical maneuvers to begin from level flight such as a loop, a dive may precede the maneuver, if this was the procedure used by the aircraft. The aircraft modeled may require full throttle entering the loop and a decreasing throttle starting at the tip of the loop. Also models with throttled engines or speed controlled motors that require extra power to loop, a power increase may precede the maneuver and a power reduction after exiting the maneuver.

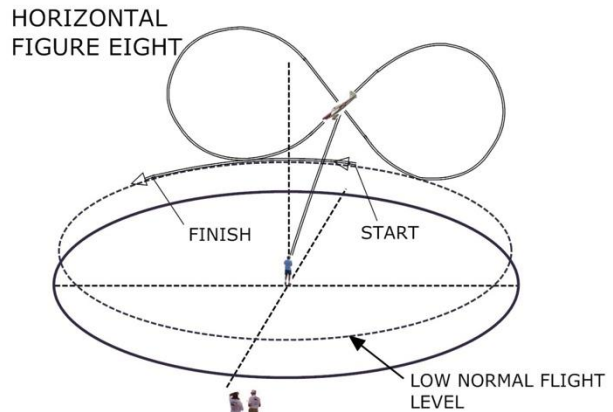


#### **ERRORS:**

1. Beginning and ending of maneuver were not called out.
2. Loop not as per aircraft.
3. Inappropriate use of throttle
4. Start and Finish not at Low Normal Flight Level

### 9.7.6. Horizontal Figure Eight (Option).

This flight maneuver is for models of aircraft that were capable of inverted flight. Many aerobatic aircraft qualify for this maneuver but piston engine fighters generally do not qualify for this maneuver. From Low Normal Level flight, the model aircraft



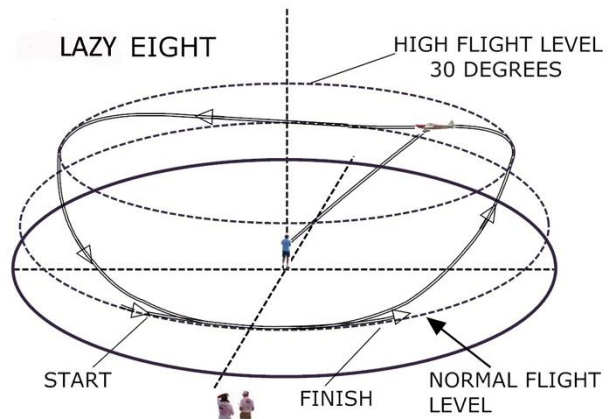
performs a near circular inside loop until it is at a 45 degree nose down attitude. The 45 degree inverted attitude is then held until the model transitions into a near circular outside loop, the bottom of which is at Low Normal Flight Level, and continues the outside loop until a 45 degree nose down attitude is again attained. The 45 degree upright attitude then transitions to an upright level flight attitude, at Low Normal Flight Level, and at the same point the maneuver was started. The tops of the two (2) near circular loops should both be at the same height. One horizontal figure eight is required.

**ERRORS:**

1. Beginning and ending of maneuver were not called out.
2. Maneuver not commenced from Low Normal Flight Level.
3. Loops not near circular for 270 degrees.
4. Not a 45 degree to horizontal intersection.
5. Loops are not the same size.
6. The maneuver not finished at Low Normal Flight Level.

**9.7.7. Lazy Eight (Option).**

Starting at Low Normal Flight Level, climb to 30 degrees then dive to Low Normal Flight Level. The climbing turn is then immediately repeated in the other half of the circle and finished in front of the judges at Low Normal Flight Level. This maneuver is for all types of aircraft.



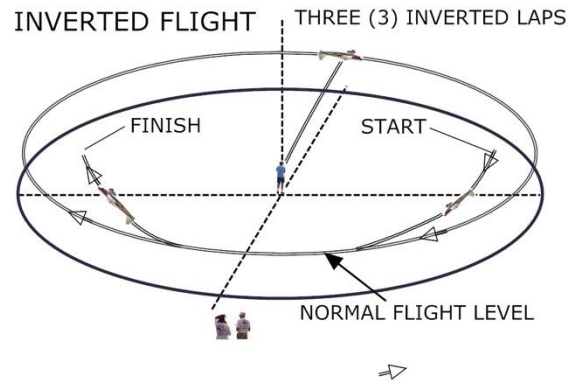
**ERRORS**

1. Beginning and ending of maneuver were not called out.
2. The maneuver not started, dive ended or maneuver finished, at Low Normal Flight Level.
3. The climbing turn not to high flight level of 30 degrees.

4. The second climbing turn not a copy of the first.
5. The maneuver not centered in front of the judges.

**9.7.8. Inverted Flight (Option).**

This flight maneuver is for models of aircraft that were capable of inverted flight. Many aerobatic aircraft qualify for this maneuver but piston engine fighters generally do not qualify for this maneuver. After two (2) upright laps following the prior maneuver, the model may enter inverted flight. The model should make three (3) smooth, stable laps in an inverted position at Normal Flight Level height before recovering to upright flight at Normal Flight Level. Inverted height should remain constant for optimum points.

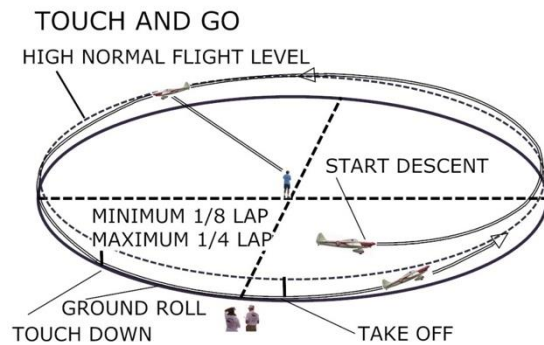


**ERRORS**

1. Beginning and ending of maneuver were not called out.
2. Less than three (3) laps.
3. Not smooth and stable.
4. Variations in height.

**9.7.9. Touch-and-Go (Option).**

The purpose of touch-and-go landings with full-scale aircraft is to teach pilots how to land and take off. The landing is not complete until the model is rolling on all wheels and tail skid (if applicable) and is under complete ground control by the pilot (steerable tail wheel, tail skid or nose wheel operating). The landing must roll with appropriate wheels and skid in ground contact for a distance of one eighth (1/8) to one quarter (1/4) of the circle. The model should land normally and take off again without



coming to a stop. Precision and smoothness of landing and takeoff will be judged.

From above High Normal Flight Level, the model smoothly descends while throttling back and extending the flaps (when applicable). Landing gear extension should be initiated just before landing (when applicable). A tail wheel or skid-type airplane should have the tail wheel or skid on the ground prior to takeoff. A nose wheel-type aircraft should have the nose wheel on the ground prior to takeoff. Immediately after takeoff the landing gear retraction should be initiated (when applicable). As speed increases the flaps are retracted to takeoff position and then fully (when applicable). The model will finish at above Normal Flight Level. Flaps and/or landing gear extension or retraction are not required for profile or fun scale models or models of aircraft with fixed landing gear.

**ERRORS:**

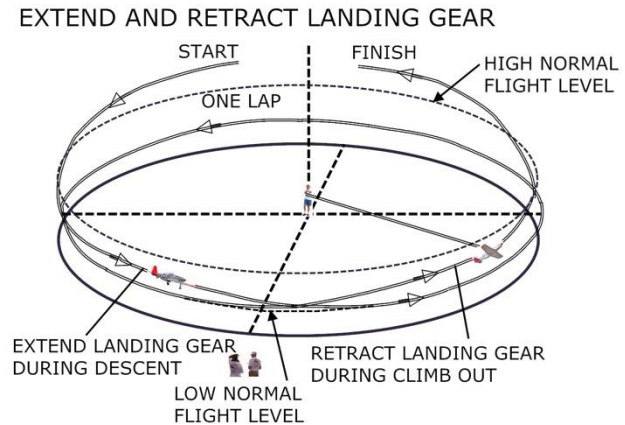
1. Beginning and ending of maneuver were not called out.
2. Descent not commenced from above High Normal Flight Level.
3. Throttle, gear and flaps not operated smoothly during the descent.
4. Model bounces on touch down and the continuing roll on the ground.
5. Nose wheel or tail skid did not make normal rolling/sliding contact with ground.
6. The roll on the ground is less than five lengths of the model.
7. Throttle, gear and flaps not operated smoothly during the ascent.
8. Not a normal take-off and climb-out through High Normal Flight Level.

## 9.8. Flight Scale Operations.

### 9.8.1. *Retract and Extend Landing Gear (Option)*

The “retract and extend landing gear” option will be demonstrated as part of other required and optional maneuvers and not performed as a separate

demonstration. The speed of gear operation and its action should approximate that of the aircraft. For example, “snap action” gear should be downgraded, but the model should not be expected to duplicate the cycle time of the aircraft. Similarly, if on the aircraft the gear folded inward (towards the aircraft center line), points would be deducted if on the model the gear folded outward. Models of aircraft with retractable tail wheels should be downgraded if the tail wheel of the model does not retract.



### **ERRORS:**

1. One or more landing gears fail to retract or extend (includes tail wheel, if this was retracted on aircraft).
2. Landing gear sequence is of the “snap up” action or moves too slowly.
3. Landing gear action is grossly different from aircraft.
4. Landing gear extends, or partially extends, during maneuvers that create high positive centrifugal force on the model.
5. One or more landing gear leg(s) collapse during landing.
6. Speed was not reduced prior to lowering landing gear.
7. Landing gear was not retracted during, or immediately after, climb out.
8. Gear doors, if present, did not activate realistically.



### 9.8.2. *Extend and Retract Wing Flaps (Option).*

If flaps are small in size and difficult to observe in a lowered position, the judges may request that they be lowered in a taxi maneuver prior to takeoff, or that they remain lowered in a taxi maneuver after landing. For maximum points, the flap action should resemble the prototype, i.e., split flap, fowler flaps, etc.

Wing flaps should be operated at such times and in as close a manner as possible to the times and the way in which they were operated on the aircraft being modeled.

#### **ERRORS:**

1. Speed and/or sequence of extension and retraction not realistic.
2. Failure to operate flaps when required.
3. Flap operation is grossly different from aircraft.
4. Model does not exhibit realistic trim change during flap operation.

### 9.8.3. *Engine and Motor Control (Option).*

This option requires the contestant to demonstrate dependable, scale-like engine(s)/motor(s) control throughout the entire official flight. If the model is equipped with diverse types, or widely diverse sizes of similar power plants (e.g., gas and electric, or all gas such as with two (2) large (.40 cu.in.) and two (2) very small (.010 cu.in.) the contestant must demonstrate to the judges that all power plant units are contributing significantly to the models performance. All engine(s)/motor(s) must operate through the entire flight and during the taxi lap if this option is called for unless the aircraft routinely had shutdown engine(s) in flight or on taxi. If the contestant desires to demonstrate engine(s)/motor(s) run-up prior to takeoff, a helper or stooge may be used to hold the model. Engine(s)/motor(s) shutoff is called and executed with the model at stationary at the end of the flight.

#### **ERRORS:**

1. If demonstration is made, the beginning and ending of scale operation were not called out.
2. An engine or motor quits before release for takeoff.
3. An engine or motor quits before flight is completed.
4. Engine throttle or motor speed changes are not smooth.

5. Major engine throttle or motor speed changes during flight not required by an option being flown or wind conditions.

6. Engine(s) or motor(s) do not stop when engine/motor cutoff is called.

7. Engine or motor cutoff is not called.

**9.8.4. Multiengine(s)/motor(s) (Option).**

Full points are awarded if all engine(s)/motor(s) run the complete flight including any taxi maneuver except for multiengine aircraft which may shut down one or more engines during taxi. Judges will track whether all engines or motors are running and when any stop running.

**ERRORS:**

1. One or more engine(s)/motor(s) stops prematurely and was not called, with penalty being determined based on percentage of lost running time.

2. Engine(s)/motor(s) sizes differ out of proportion to the full scale aircraft.

**9.8.5. Revolve or Move Turrets (Option).**

The operation shall be conducted through four (4) cycles. The operation will be demonstrated just prior to takeoff with the model at a standstill, engine(s)/motor(s) running, in front of the judges.

**ERRORS:**

Beginning and ending of scale operation were not called out.

Movement not complete for four (4) cycles.

Not positioned for effective viewing by judges.

Gun barrels don't raise or depress during turret movement.

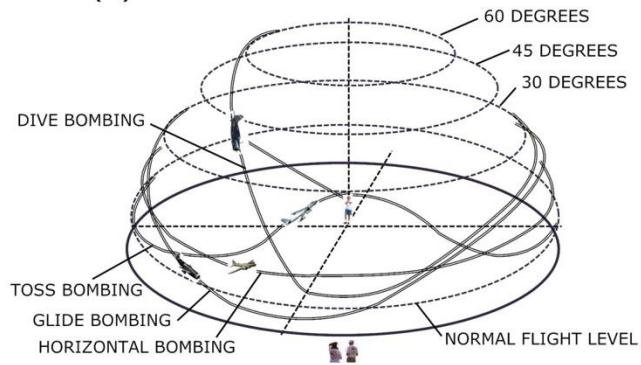
### 9.8.6. Bomb(s)

#### *Drop (Option).*

Bombs should be carried in the same manner as the aircraft. A contestant is permitted to substitute a different bomb

or bombs for the flight presentation, than was displayed on the model during static judging, provided that the size and shape is similar. For bombs carried internally, bomb bay doors should open, bombs should drop and doors should close for maximum score. If bombs are carried externally they should be securely attached with no noticeable oscillation in the slipstream.

#### BOMB(S) DROP



For maximum score the model should perform a bomb run in the manner of the prototype. Example types of bomb runs are:

1. Dive bomb (70 degrees) with dive brakes engaged with sharp pullout;
2. Toss bomb at mid pull-up used to avoid bomb blast;
3. Glide bombing (20 degrees) with sharp pullout;
4. Horizontal bomb (0 degrees) at higher altitude.

Unusual bombing techniques may be used if the contestant can verify them with written documentation. The bomb run type selected must be presented to the judges along with the intended area of impact. With the exception of napalm types, bombs should not tumble end-over-end after release.

#### **ERRORS:**

1. Beginning and ending of maneuver with scale operation were not called out.
2. Externally mounted bomb(s) wobble(s) in slipstream prior to release.
3. Bomb run and release not realist for type selected.
4. Bomb-bay doors did not operate in a realistic way.

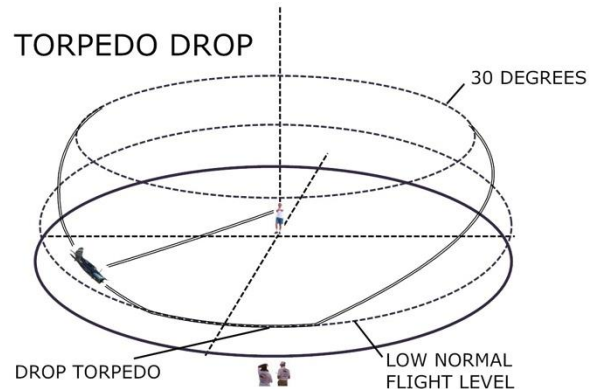
6. Finned bombs tumble erratically after release.
7. Bomb(s) not falling on the intended area.
8. Bomb(s) are not carried in the manner of the aircraft.
9. Bomb(s) drop immediately upon opening of doors.
10. Bomb run not completed before bomb(s) dropped.

#### 9.8.7. *Torpedo Drop*

For maximum points, a torpedo drop should be performed as a part of a torpedo run at low altitude.

Actual altitude of the model at release would depend on its scale and type, but it should be low enough

to enable the torpedo to strike the ground in a relatively flat attitude. Release should be performed with the model in a level attitude and followed by a rapid climb.



#### **ERRORS:**

1. Beginning and ending of scale operation were not called out.
2. Release is not preceded by a straight run.
3. Torpedo not released in front of judges.
4. Model is too high at release.
5. Torpedo does not hit flat.
6. There is no rapid climb out.

#### 9.8.8. *Fuel Tank(s) or Stores Drop.*

Fuel tank(s) capable of being jettisoned should be carried in the manner of the prototype. A parachute may drag a cargo from a rear door. A braking parachute may be deployed on landing cargo, if this was a feature of the prototype. The drop should be performed with the model in level flight in front of the judges.

## ERRORS:

### Drop Fuel Tank

Beginning and ending of maneuver with scale operation were not called out.

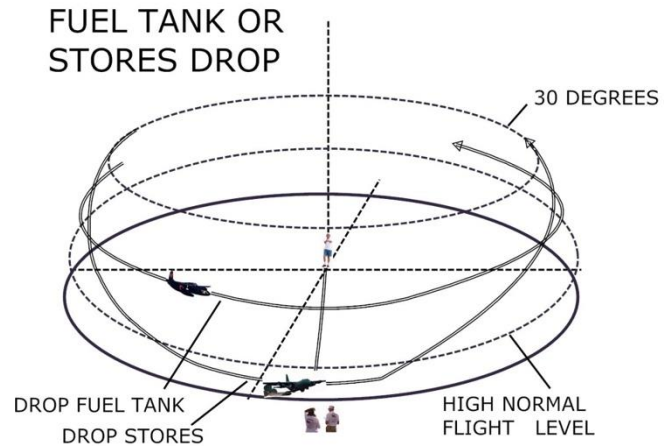
Tank(s) not securely attached to model, have visible oscillation in slipstream prior to release.

Tank(s) do not tumble.

Tank(s) do not fall clearly away from model at release.

Model not in level flight at release.

Fuel tanks(s) not released in front of judges



### Drop Stores

1. Beginning and ending of maneuver with scale operation were not called out.
2. Stores(s) not securely attached to model, have visible oscillation in slipstream prior to release.
3. Stores(s) do not fall clearly away from model at release.
4. Model does not perform a dive from near 30 degrees and leveling off just prior to dropping Stores.
5. Model not in level flight at release of Stores.
6. Model does not perform a sharp pull up immediately after dropping the Stores.
7. Model does not climb up to near 30 degrees to complete the maneuver.

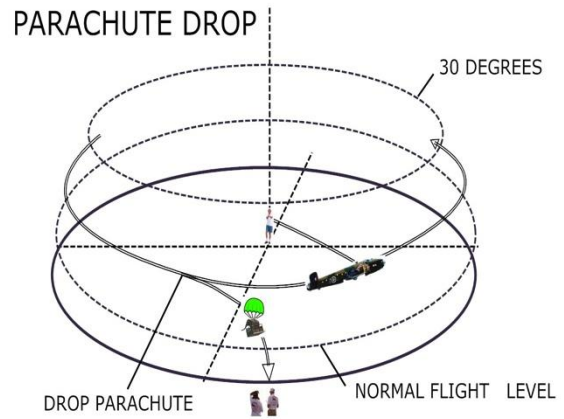
#### 9.8.9. Parachute Drop (Option).

A parachute drop, or ejection, should be performed in the manner of the prototype. Cargo should be dropped via doors, hatch, bomb bay, or from wing mounts. A man or men should be dropped via

doors, hatch (if the aircraft was so equipped), or by inverting the model. A single seat aircraft may not drop its pilot. The drop zone shall be a spot, or area, agreed upon with the judges.

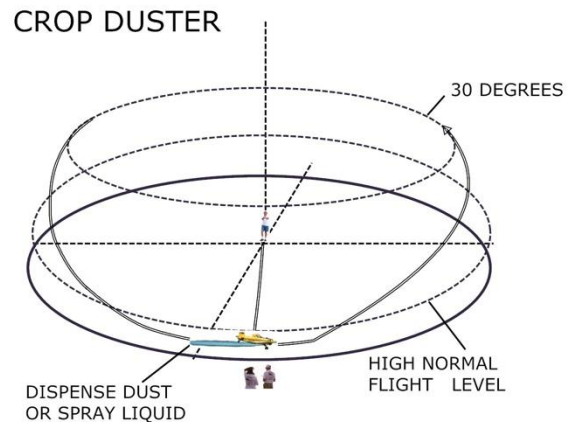
**ERRORS:**

1. Beginning & ending of maneuver were not called out.
2. Not a realistic way of dropping or ejecting the parachute.
3. Parachute does not open.
4. Parachute does not fall clear of aircraft.
5. Braking parachute rotates after deployment and tangles its rigging lines.
6. Parachute is emitted from the aircraft in a manner not typical of the prototype
7. The parachute with cargo not dropped at the agreed upon spot or area.



**9.8.10. Agricultural Dusting or Spraying (Option).**

This scale maneuver is for models of aircraft used for crop spraying or dusting only. The contestant should be prepared to document that the aircraft was used for this purpose.



Since the manner in which this operation was performed by full scale aircraft may differ according to aircraft type, and/or crop being covered, the contestant should describe to the judges his intended presentation. Generally the aircraft will be at low normal flight level to visibly perform its spraying or dusting mission on command by the contestant. An emergency dump of the hopper contents may be performed and

may be accompanied by a rapid climb to a higher level, to simulate avoidance of an obstacle.

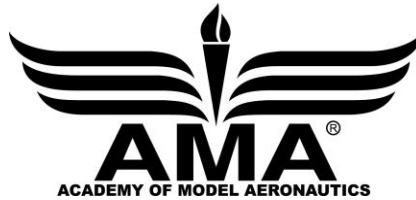
**ERRORS:**

1. Beginning and ending of maneuver with scale operation were not called out.
2. Model does not release visible spraying/dusting material.
3. Maneuver is not presented in full view of the judges.
4. Model flies erratic altitude during the operation.

**9.9. Flight Maneuvers/Scale Operations Not in 9.6, 9.7 or 9.8.**

A contestant may elect to perform flight maneuvers or scale operations not listed in this document, but only if they are within the capabilities of the aircraft. The contestant should be prepared to convince the judges that the choice was typical of the aircraft. The contestant should submit a written, graphic and/or video description of the maneuver or scale operation to the judges during the registration for approval, and also the preflight meeting.

Maneuver examples not listed might be in flight tail wag (rudder), vertical takeoff, hover and/or backwards flight for a VTO type aircraft, such as a Convair XFY-1 Pogo, tail slide for an acrobatic aircraft, a high speed buzz the field for any aircraft, a forest fire water drop, or wing-wag with ailerons. Scale Operations might be cockpit canopy close-open, braking demonstration before takeoff, drag chute on landing, or carrier model wing folding and unfolding.



# Control Line Static Sheet

**Use for the following AMA Sport Scale Events:**

#509 CL Sport Scale, #521 CL Profile Scale, #527 CL Team Scale

## Contestant Information:

Name:		Number:
Age:	AMA Number:	<input type="checkbox"/> Adult <input type="checkbox"/> Youth/Sr. <input type="checkbox"/> Youth/Jr.
Aircraft:		
Weight _____ lbs. _____ oz.	Engine Size: _____ 2-cycle _____ 4-cycle _____ Electric	

## Static Scoring

Authenticity	Score	Comments
<b>ACCURACY OF OUTLINE</b>		
A: Plan (top) View (0-15)		
Craftsmanship (0-10)		
B: Side View (0-15)		
Craftsmanship (0-10)		
C: End (front) View (0-10)		
Craftsmanship (0-10)		
<b>FINISH</b> (0-10)		
<b>COLOR and MARKINGS</b> (0-20)		
<b>OFFICIAL SCORE:</b>		

I hereby certify that I am the builder of this aircraft and have followed the **Builder-Of-The-Model** rules as they apply to the class my aircraft is entered in. I also certify that this model has been test flown prior to this event.

Signature: \_\_\_\_\_





# Control Line Static Sheet

**Use for #526 (C/L) Fun Scale Events**

**Contestant Information:**

Name:		AMA Number:
Aircraft:		<input type="checkbox"/> Adult <input type="checkbox"/> Youth/Sr. <input type="checkbox"/> Youth/Jr.
Weight _____ lbs. _____ oz.	Engine Size: _____ 2-cycle    _____ 4-cycle    _____ Electric	

**Static Scoring**

Authenticity	Score	Comments
<b>COLOR AND MARKINGS</b> (0-5)		
<b>PROOF OF SCALE</b> (0-5)		
<b>STATIC SCORE: Maximum Static Score (10 points)</b>		

I hereby certify that I have test flown this aircraft prior to this competition and that I have personally and am now capable of performing an unassisted takeoff, two laps of level flight, and a normal landing within the designated flying circle.

Signature: \_\_\_\_\_



# Static Sheet

**Use for #528 (C/L) Authentic Scale Events**

## Contestant Information:

Name:		Number:
Age:	AMA Number:	<input type="checkbox"/> Adult <input type="checkbox"/> Youth/Sr. <input type="checkbox"/> Youth/Jr.
Aircraft:		
Weight _____ lbs. _____ oz.	Engine Size: _____ 2-cycle    _____ 4-cycle    _____ Electric	

## Static Scoring

Judges have the option of using one-half (0.5) point increments in scoring.

Category	Score	Comments
Scoring guide for Judges:    Fair = 0-5    Good = 6-9    Excellent = 10-13    Outstanding = 14-15		
<b>ACCURACY OF OUTLINE</b>		
A.: Plan View (Top) (0-15)		
B.: Side View (0-15)		
C.: End View (Front) (0-10)		
Scoring guide for Judges:    Fair = 0-6    Good = 7-8    Excellent = 9    Outstanding = 10		
<b>CRAFTSMANSHIP</b> (0-10)		
<b>COMPLEXITY</b> (0-10)		
<b>SCALE DETAIL</b> (0-10)		
<b>SURFACE TEXTURE &amp; FINISH</b> (0-10)		
<b>COLOR</b> (0-10)		
<b>MARKINGS</b> (0-10)		
<b>OFFICIAL SCORE:</b>		

I hereby certify that I am the builder of this aircraft and have followed the **Builder-Of-The-Model** rules as they apply to the class my aircraft is entered in.

Signature: \_\_\_\_\_

I also certify that this model has been test flown prior to this event.



# Control Line Static Sheet

**Use for #529 (C/L) 1/2A Scale Events**

**Contestant Information:**

Name:	AMA Number:
Aircraft:	<input type="checkbox"/> Adult <input type="checkbox"/> Youth/Sr. <input type="checkbox"/> Youth/Jr.

<input type="checkbox"/> Weight _____ lbs. _____ oz.	<input type="checkbox"/> Engine Size (not to exceed 0.61 cu. in. 2-cycle) _____	<input type="checkbox"/> Replica of aircraft that made flight _____
<input type="checkbox"/> Proof of scale (3-view drawing, photo, plastic model)	<input type="checkbox"/> Proof of color scheme (photo, color paint, written documentation)	

**Static Scoring**

Authenticity	Score	Comments
Side view (0-20 points)		
Plan view (0-15 points)		
End view (0-5 points)		
Color (0-10 points)		
Finish (0-10 points)		
Markings (0-10 points)		
Craftsmanship (0-10 points)		
<b>STATIC SCORE: Maximum Static Score (80 points)</b>		

I hereby certify that I have test flown this aircraft prior to this competition and that I have personally and am now capable of performing an unassisted takeoff, two laps of level flight, and a normal landing within the designated flying circle.

Signature: \_\_\_\_\_



# Control Line Flight Sheet

Use for the following AMA Scale Events:  
 509 Sport Scale     521 Profile Scale     526 Fun Scale     527 Team Scale     528 Authentic Scale

**Contestant Information:**

Name:		AMA Number:	
Aircraft:		<input type="checkbox"/> Adult <input type="checkbox"/> Youth/Sr. <input type="checkbox"/> Youth/Jr.	
Weight _____ lbs. _____ oz.	Pull Test #	Engine Size _____ 2-cycle _____ 4-cycle _____ Electric	

**Flight Scoring - Round # \_\_\_\_\_**

Flight Plan	Score	Comments
<b>A: Takeoff</b> (0-10 points)		
<b>B: Ten (10) Airborne Laps</b> (0-10 points) (1 point per lap with engines running)		
<b>C: Options</b> (6 options maximum)		
Note: Retract and Extend Gear, Touch & Go = 2 options. Multi-engine (% of time all engines running during flight) & all other options = 1 option.		
<b>1</b> (0-10 points)		
<b>2</b> (0-10 points)		
<b>3</b> (0-10 points)		
<b>4</b> (0-10 points)		
<b>5</b> (0-10 points)		
<b>6</b> (0-10 points)		
<b>D: Landing</b> (0-10 points)		
<b>E: Realism In Flight</b> (0-10 points)		
<b>FLIGHT SCORE</b>		

<b>Maximum Average Flight Score</b>	(100 points)	
<b>Maximum Average Static Score (Except Fun)</b>	(100 points)	
<b>Maximum Average Static Score (Fun)</b>	(10 points)	
<b>OFFICIAL SCORE</b>		



# Control Line Flight Sheet

**Use for #529 (C/L) 1/2A Scale Events**

**Contestant Information:**

Name:		AMA Number:
Aircraft:		<input type="checkbox"/> Adult <input type="checkbox"/> Youth/Sr. <input type="checkbox"/> Youth/Jr.
Weight _____ lbs. _____ oz. x 10g's _____	Pull Test #:	Engine Size: (Not to exceed .061 cu.in. 2-cycle)

**Flight Scoring - Round # \_\_\_\_\_**

Flight Plan	Score	Comments
A. Takeoff (0-10 points)		
B. Ten (10) Airborne Laps (1 point per lap with engines running) (0-10 points)		
C. Landing (0-10 points)		
D. Realism and Smoothness in Flight (0-10 points)		
E. Multi Engine Bonus (2 points)		
<b>FLIGHT SCORE: Maximum Score (42 points)</b>		

**Two Highest Maximum Average Flight Score (84 points)**

**Maximum Average Static Score (80 points)**

**OFFICIAL SCORE:**