

Northwest Scale Aero-Modelers



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2023 Competition Guide and Rule Book

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Introduction

NorthWest Scale Championships

“Best in the West”

The NorthWest Scale Aero-modeler organization (NWSAM) was created primarily to provide those scale enthusiasts living in the North Western U.S. and bordering Canadian Provinces with an annual Scale Championship event that would be located exclusively in the states of Idaho, Oregon, Alaska, Washington, Montana, Provinces of British Columbia and Alberta. While the geographic region is defined, entrants from anywhere in the world will of course be welcomed and encouraged to attend.

What follows are the Rules and Guidelines for the 2023 NorthWest Scale Aero-Modelers season and Championships. The Championship event will take place on August 25th-27th, 2023 and is hosted by the Red Apple Flyers in Wenatchee, Washington.

Respectfully,

Dave Rawlings

For more information visit www.NWScale.org



Mission

The NorthWest Scale Aero-Modelers exist to promote and provide support and guidelines that radio controlled scale aero-modelers and event organizers need to develop the skills required for any National or World Scale Aero-modeling event. “While competition is the forum, the emphasis is on Learning, Fun and Sportsmanship.”

Concept

The concept is quite simple. This event is essentially 2 events running simultaneously. A contestant can participate in either the NorthWest Scale Championships, or the Scale Masters Qualifier, or **both**. A contestant becomes eligible for the NorthWest Scale Championships by competing in at least 1 other scale competition during the year and bringing that final score to the Championships. The eligibility event for the NW Championships may be a Scale Masters Qualifier, AMA scale contest, or a MAAC scale contest.

Scope

The scope of this document shall be for defining the rules, documents, and foundation necessary for the NorthWest Scale Championships. As with any competition, there needs to be rules! This Guide will serve as the rulebook for the ~~2022~~2023 NorthWest Scale Aero-Modelers Championships.

Goal

To provide a fair and level playing field by which to conduct this Championship. While the rules are necessary, it is not necessary to have a rulebook that is so complex and cumbersome, we forget to have fun! We want each contestant from beginner to expert, to have a positive experience. We also hope that you will meet many people that share your enthusiasm of this great hobby.

Section 1 ~ General Rules/Requirements

1.1 All contestants must have and show proof of current Academy of Model Aeronautics (AMA) or Model Aeronautics Association of Canada (MAAC) depending upon event location.

1.2 Any scale model airplane of a heavier than air, man carrying, fixed wing aircraft that was actually built and flown may be entered. If a pilot was visible in the full-scale aircraft, then a pilot figure of appropriate size and scale must be visible in the model during flight operations.

1.3 Each Expert and Team (Builder) contestant is required to sign a Builder of Model statement verifying that he/she is the builder of the model entered.

1.4 All models are subject to a general safety inspection before being allowed to fly. Additionally, any model that is involved in an incident that resulted in structural damage to the model, shall undergo an additional safety inspection before being allowed to fly and continue in the competition.

1.5 In order to be eligible for the NorthWest Scale Championships, each contestant must bring one (1) eligibility score forward in the event class he/she wishes to compete in. For the purposes of the 2023 NWSAM Championships, scores may be brought forward from events held after August 28th, 2022. The score(s) from the previous year's NWSAM Championships are not included as eligibility score(s). Additionally, you cannot bring a static score from one (1) event, and a flight score from another event. Both static and flight scores must have been awarded at the same event. The score that the contestant wishes to have counted toward the Championships must be verified by the Contest Director (CD) prior to the Championships. The score may be verified by a listing from an official web site, publication, or the CD of that event. If you are in doubt, contact the CD prior to the Championships.

1.6 Unless otherwise stated, the current NorthWest Scale Aero-Modelers Competition Guide shall take precedence on all matters.

1.7 The 55 pound weight limit may be exceeded if aircraft and pilot have completed inspection and certification process as defined in AMA rules. Pilot must have appropriate documentation of certifications.

1.8 Jet turbines may be flown only with a valid “AMA turbine waiver” and only when Jet flight is not prohibited due to burn ban.

1.9 There is no provision for a contestant to “re-fly” any round in competition unless authorized by the CD. **Mulligan's will be at the discretion of the CD during the first round only.** See Section 8.8 for further clarification.

1.10 A gyro may be used on rudder control only. Use of gyros on any other control surface will result in disqualification.

1.10a AS3X stabilization may be used in the **Pro/Am Sportsman** class ONLY.

1.11 Official Score: The official Championships score shall be the final score (static score plus averaged flight scores) from one (1) other scale event in your event class combined with the final score (static score plus averaged flight score from three highest flight rounds) flown at the Championships. Example:

Contestant Competed in the Cascade Scale Rally in the Advanced Class. The Contestant had a final score of **170** which was brought to the Championships. The contestant had a static score of **80** and the three (3) flight average total of **91** ($89 + 91 + 93 = \underline{273/3}$) at the Championships. The final Championships score would be **170 + 80 + 91 = 341**. To break a tie, the single best flight score will be added to the static score. If this does not break the tie, add the two (2) best flight scores to the static score. If this does not break the tie, add the three (3) best flight scores to the static score. In the event conditions prevent flying and the contest cannot be postponed, static scores alone shall be the official score. Ties shall be broken by the outline score plus color and markings followed by $\frac{1}{2}$ the craftsmanship score.

1.12 The U.S. Scale Masters Competition Guide and AMA Competition rule book shall be used for items not specifically addressed in this guide in that order.

1.13 New FAA regulations require that each aircraft have the owners/pilots registered FAA number on the exterior of every aircraft whether it is there or not will incur no judging penalty. It is a U.S. modelers responsibility. Display of the FAA number is not a NWSAM requirement however it may be required by a hosting airfield. **No deduction should be given for FAA Required markings.**

NOTE: Contestants should use discretion when adding FAA Required markings to their scale project. Suggested locations: where the pilots name would be located under the canopy, or under the horizontal stabilizer with no static judging penalty.

Section 2 ~ Event Categories Defined

This event will have six (6) event classes in which to compete:

Expert (AMA 512), Team (AMA 522), Advanced, Pro /Am Unlimited, Pro/Am Pro, Pro/Am Sportsman.

2.1 Expert: This category is for the builder-pilot. Those competing in expert may also enter as either the builder or pilot in one (1) Team class and/or Pro/Am Unlimited class at the same contest. At the same contest entry in Expert and entry in Advanced, Pro/Am Pro or Pro/Am Sportsman is prohibited. All contestants in this category must sign a Builder of the Model declaration.

2.2 Team: This category is available to allow a pilot and a builder to participate in a competitive environment. The Team is a pilot and a builder. The builder of the model must be present and must sign a Builder of the Model declaration. Neither the builder nor pilot of a Team entry may participate in another team entry at the same contest. However, either the builder or pilot of a Team entry may also enter in Expert or Advanced and/or in one Pro/Am Pro or Pro/Am Unlimited class. At the same contest entry by the Team pilot in Pro/Am Sportsman is prohibited.

2.3 Advanced: This category is open to any modeler built, purchased built, or factory built (ARF) R/C Scale model. This category is intended for top level pilots that are using aircraft that are not governed by the Builder of the Model Rule. Those competing in the Advanced class may also enter as either the builder or pilot in one Team class & may also enter one Pro/Am Pro or Pro/Am Unlimited class. At the same contest entry in Advanced and Expert and/or Pro/Am Sportsman is prohibited.

2.4 Pro/Am Unlimited: This category is open to any modeler built, purchased built, or factory built (ARF) R/C scale model. This category is intended for the very experienced modeler. If you have ever competed in NWSAM Expert, USSMA Expert or, AMA 523 Open- Expert, you must compete in this class. A contestant in this class may also compete in the Expert Class, Team Class (builder or pilot) and/or the Advanced Class. At the same contest entry in Pro/Am Unlimited and Pro/Am Pro or Pro/Am Sportsman is prohibited.

2.5 Pro/Am Pro: This category is open to any modeler built, purchased built, or factory built (ARF) R/C scale model. This category is intended for the experienced modeler. If you have ever competed in NWSAM Expert, USSMA Expert, AMA 523 Open- Expert, you may not compete in this class. A contestant in this class may also compete in the Team Class (builder or pilot) & the Advanced Class at the same event. If a contestant finishes in first place Pro/Am Pro at the NWSAM Championship, the contestant may not compete in this event class thereafter. At the same contest entry in Pro/Am Pro and Pro/Am Unlimited or Pro/Am Sportsman is prohibited.

2.6 Pro/Am Sportsman: This category is open to any modeler built, purchased built, or factory built (ARF) R/C scale model. This category is intended for the novice. If you have ever competed in NWSAM Expert, USSMA Expert, AMA 523 Open- Expert, you may not compete in this class. If a contestant in this category finishes in first place Pro/Am Sportsman at the NWSAM Championship, the contestant may not compete in this event class thereafter. At the same contest entry in Pro/Am Sportsman and Pro/Am Unlimited or Pro/Am Pro is prohibited.

Section 3 ~ Safety

3.1 The importance of safety is the highest priority at any event. A contest director must make themselves aware of all possible safety hazards and do his best to prevent any occurrence of any safety violations. It is recommended that a Safety Coordinator be appointed who can focus on the safe operation of model aircraft and be on the lookout for accident prevention during the event. The Safety Coordinator shall conduct the preflight safety inspection and record his findings on the Preflight Safety Checklist form (located on the last section of this Guide). Any contestant refusing to follow recommendations for correcting safety issues found shall be disqualified and not allowed to fly. The contestant must declare that the model to be flown has had at least 3 consecutive successful flights prior to attempting round one of the competition.

3.2 Runway Safety: To ensure safe operations there will be an **Air Boss** overseeing flight operations. In addition to the Air Boss, each pilot must have a **Caller** who will monitor other aircraft and advise the pilot of their positions and intentions; coordinating runway maneuvers with the Air Boss. All maneuvers requiring access to the runway must be cleared by the Air Boss. All maneuvers not requiring access to the runway to perform shall be placed beyond the far side of the "defined runway" on the *maneuvering line*. This is a notable change from descriptions provided by the AMA rules, which has certain flight maneuvers flown over the middle of the runway. Downgrade for drifting in over the defined runway in performing flight maneuvers will be proportional to severity. For example, a maneuver that violates one half the runway width (up to centerline of runway) will score no better than a five, etc. (This deduction is from the maximum 2.5 points for "placement" and a portion of the 5.0 points for "precision".)

Maneuvers requiring access to the runway will include Takeoff, Landing, Touch and Go, as well as Missed Approaches. For Safety reasons, no exception to these maneuvers will be made unless the C.D. formally announces the exceptions prior to the beginning to the flight round, preferably in the pilots' meeting. The start of an optional Traffic Pattern must also begin beyond the far edge of the defined runway but will be in alignment to the runway on final approach.

3.3 Deadline Infractions: The Deadline is; the designated AMA / MAAC Safety line or Flight Safety line which is normally the near edge of the runway to the pilots/judge's station.

Crossing the **deadline**, as observed and agreed by the judges, during any part of a flight will incur a warning to the contestant and score a zero for the maneuver being performed (or the previous maneuver if the occurrence is between maneuvers). A repeat crossing disqualifies the flight and the contestant must land immediately. 100% of the aircraft shall have crossed the deadline to be considered an infraction. Both flight judges must concur to the infraction.

3.4 Transmitter Control: An impound area for all transmitters may be set up. Due to improved technology, (2.4 Ghz) transmitter impound may not be necessary and shall be at the discretion of the Contest Director. Frequency control for FM transmitters shall be the responsibility of the Contest Director.

3.5 Pyrotechnics: No pyrotechnics will be permitted at any time.

3.6 Dangerous flying of any sort, or **poor sportsmanship** of any kind, shall be grounds for disqualification of the contestant involved. Contest Director's decision is the final word.

3.7 Weight Limit: See general rules Section 1.7

3.8 Metal propellers are not allowed for flying but may be used for static judging.

3.9 Recommended Site Set-Up. Judging stations should be at a minimum of 30 feet from the edge of the active runway. Barriers should be set up to keep spectators out of the pit areas and no closer than 65 feet from the edge of the active runway. Judges' stations should be at least 50 feet apart but in line with each other on the judges' deadline. Pilots are to stand 3 to 6 feet on either side of the judges' box and 1.5' behind the deadline. Callers are to stand in an area behind the Pilot. A protective fence or barrier should separate the judges from the engine start up area and from the active runway. See www.modelaircraft.org/files/706.pdf for AMA event site guidelines.

It is recommended that the GPS coordinates for the flying site be posted in several areas around the contest site and also given to the nearest Emergency Medical Response Team office along with the dates of the event in case of emergency.

3.10 Traffic Pattern: All maneuvers must start in the same direction as the traffic pattern as determined by the "Air Boss" or wind direction.

Section 4 ~ Static Judging

Static Judges will compare the model to the documentation the contestant has provided. If the documentation is insufficient, the judges have no choice but to judge according to what they have been given by the contestant and their understanding of the process outlined in this Guide.

The static judges shall not examine the models closely prior to the start of static judging. Static scores for Expert, Team and Advanced class shall be from 0-10 points for each sub-category on the score sheets with the exception of Color, and Landing Gear under Craftsmanship. Color and Craftsmanship Landing Gear shall be 0-5 points each.

4.1 Expert/Team/Advanced (Max points 100):

Accuracy to Outline 40 points

Finish-Color-Markings 25 points

Craftsmanship 35 points

The static portion of the contest is very important since it makes up a significant portion of your overall score. Good documentation gives you the edge over a similar model with poor documentation. We would like to point out some common frustrations shared by contestants and static judges alike. We all have a favorite airplane that we want to build and fly; however, pick a color scheme that can be documented. Remember it is your choice on what you bring to the contest and Proof of Scale and Color is the contestant's responsibility. Please don't blame the judges for down grading your model if the documentation is poor, or if your model is poorly documented. Plan ahead and pick documentation that clearly shows outline, color, and markings of the aircraft you intend to model. The ideal situation would be three steps: 1) you decide to compete in the top level of the Championships; 2) you find documentation of the very aircraft you would like to build, and; 3) you build your model to perfectly match the documentation. If you already have an airplane built and you then decide to enter in Expert, Team or Advanced, all you can do is to try and alter your model to match the documentation. The judges will in turn do the best they can with the information you provide them. Remember...it is your choice of model and documentation, not the judges. Color paint chips for proof of color are not a requirement but simply one of many optional methods to document color.

Static judging shall take place prior to flight judging. It is recommended that the documentation package be contained in a 3-ring binder so that each section can be removed and presented to the respective judge to allow simultaneous judging. The static judging process starts after the contestant places the various documentation pages in the judges' box on the table arranged according to the judge function, e.g. one three-view set is placed in the box labeled "Outline Judge" and another set is placed in the Finish-Color-Markings box. Color photos and/or color chips are also placed in a box labeled "Color-Markings", etc. A box will also be provided for Craftsmanship related documentation. The contestant then places the model on the judging stand/table and points it straight at the Outline judge. The Outline judge sets the pace and calls the position he wants the aircraft displayed in, starting with the front, head on view. The Craftsmanship judge walks around the aircraft, no closer than 4 feet, but does not talk to the contestant. If he has a question that needs clarification, he may refer to the photo documentation that the Finish-Color & Markings judge has, or the additional separate pages for Craftsmanship provided by the contestant. When

the judges are ready, they will ask the contestant to re-position the model as necessary. The viewing order is as follows:

1. Straight (head on) view
2. Side View (the side that matches the documentation)
3. Top View
4. Bottom View

Feedback comments from the judges are required for any deductions and should be written on the generic 3-view diagram on the score sheets or extra copies of the outline drawings if they are provided (1 for each judge type). The judge will highlight the area of mismatch and write in a couple of key words that denote the finding. If comments are not noted for any deduction, the deduction shall not be considered.

Use of transmitter to operate mechanical scale operations during static judging will not be allowed.

Cockpit and cabin interiors, excepting those visible items called out in 4.1A Accuracy of Outline, or the interior of landing gear wheel wells, even if partially visible from the judging distances are not to be considered in scoring the model. All other visible features will be judged. Simultaneous judging is a process where all three static judges evaluate the aircraft at the same time.

4.1.1 Documentation: A maximum of eight (8) pages equivalent in size to 8.5 x 11 inch paper is allowed, except the three or more view published or approved outline drawings may be on larger size sheets (max size 11x17). The outline drawings will count as one page of the eight permitted. If a conflict exists between outline drawings and submitted photographs, the photos shall take precedence. Extra 3-views for judges' feedback, the cover page, index and signed Builder of the Model Declaration statement will not count toward the 8 maximum pages. Emphasis is placed on the quality of the documentation presented to the judges. Poor or hard to interpret drawings make it difficult for judges to compare to the model and will not enable a good score. Many examples of excellent models that score poorly due to poor quality documentation (or not enough) happen each year. Be careful not to fall into the trap of "less is better" as the judges must have adequate documentation to compare each item they see on the model to some reference shown on the presented documentation (including views of the aircraft's underside).

The Ideal Documentation Package should Contain;

- a. Cover Page and/or index page
- b. 3 or more view drawing(s) showing the aircraft outlines, color scheme and markings location. Separate drawing(s) may be used to show outline and color/markings scheme.
- c. Three ring binders work well for being able to quickly separate outline drawings from color and marking references such that each judge can have their own document to work with for Expert, Team and Advanced class.
- d. Photographs of the actual aircraft being modeled
- e. Paint chips or other proof of color for each color used
- f. Signed Builder of the Model **Declaration** statement (*see forms*) for Expert and Team class.
- g. Your regional AMA Scale Contest Board member can approve, by his signature, documentation that may not be from a published source. See AMA Model Aviation Magazine for name of your CBM.

4.1.2 The flying spinner must be presented to static judges for comparison if it replaces the static spinner in flight. Any exposed flight “droppable” must also be presented including those that may be different from static display examples. No changes may be made between static judging and flying which alter the scale appearance except:

a Propeller. A flying propeller of any diameter and color may be substituted for a scale or static prop for flight.

b Radio antenna of any type may be added.

c Takeoff dollies may be used for models of seaplanes or flying boats in the absence of suitable water conditions. If dollies are used, they must not remain attached to the model in flight. Deviations from scale appearance through the inclusion of permanently mounted recessed wheels, skids, or similar devices, if visible, result in downgrades in both static outline judging and overall realism during flight judging. Takeoffs or landing of such aircraft will be judged by the same criteria of Precision, Placement, and Realism except that the surface area such as rough grass may disrupt the Realism portion of the score of which the judges are to ignore for this situation only. The contestant may choose another optional maneuver to take the place of takeoff or landing for seaplanes if desired.

d If bombs, rockets, drop tanks, etc., are to be dropped or released during flight, they must be in place at the time of static judging. A scale “droppable” may be replaced during the flying portion of the contest as long as they are of the same size, shape, and color as those presented during static judging. The opposite is also in affect, if the documentation shows no “droppable” these items may not be added and used as a maneuver. **Static judges will make a note on the static-judging sheet of all observed “droppable” or “no droppable” stores in place or not in place on the model at the time of static judging.**

e Pitot tubes projecting from the wing or fuselage should be removed for flying without scoring penalty (unless damage to the model would be incurred); however, these must be installed during static judging for optimum static score.

f Subjects that provide no opportunity to conceal the engine or exhaust system (such as water cooled in-line engines like the Spitfire, P-39, etc.) will not be downgraded by the **outline judge** if: **1)** part of the model engine or exhaust system is exposed or: **2)** non scale openings that facilitate model engine cooling are visible. **However, a higher Craftsmanship score may be awarded to those who conceal the engine and exhaust system as compared to those who don't.**

g Dummy fan blades in jets or turboprops may be used in the intake and exhaust regions where applicable during static judging and removed prior to flight with no scoring penalty. No plugs may be used to obscure these regions. Static presentation shall be as if the aircraft were ready for flight. No other changes may be made to intake or exhaust openings between static judging and flight. Documentation details of these regions are the responsibility of the contestant for static judging.

h No pilot(s) need be in the cockpit during static judging but must be in place for flight. If no pilot(s) are properly located in the cockpit during the flight, a downgrade in realism shall be given (see section 6.3c for further details).

Static judging will be conducted by a team of three (3) judges. The judging team shall consist of an **Accuracy of Outline judge**, a **Finish-Color-Marking judge**, and a **Craftsmanship judge**.

4.1A Accuracy of Outline:

Judging for Outline shall be at a distance of 15 feet.

Documentation for Outline shall remain on the judge's table.

Outline consists of all major geometry features (location and proportion) of the full-size aircraft including features of the cockpit or cabin that may be visible from the side view such as headrests, gun sights, etc. Other major geometric features, that may be located inside of the aircraft's profile, include control surfaces, wheel wells, exhaust stacks, pods, air louvers, gun troughs, windows, and doors. The Outline judge will compare the outline profiles from the provided three-or-more view drawings (from an approved source) with the features on the model that include the outline of landing gear, tail wheel outline, and other profile features that show on the drawings. Any surface detail features of the aircraft shall NOT be considered when scoring Outline features such as panel lines, inspection panel doors, and methods of hinging, connector detail, or any other feature listed for Craftsmanship in 4.1C herein to avoid double jeopardy. If no three-or-more view drawing exists, photos of the actual aircraft modeled may be used that are sufficient to show the outlines of the aircraft in side, front, and plan (top) view details. For optimum score, drawing/s and or photographs used for 3-views need to be taken from 90-degree angles to the side, front and top view to show true outline. Landing gear shall be considered only for size, angles and outline.

Additional items such as panel lines, brake lines, jack points, fill ports, and tie-down hooks or any other detail features described under paragraph 5.4 for "Criteria for Craftsmanship" shall only be considered under that separate scoring category to avoid double jeopardy. Computer generated drawings or computer printed photos will be allowed if they have **not** been altered from their original published form. If any alterations have been made from published sources to reflect greater accuracy they must be approved by an AMA Scale Board Member or other recognized authority with supporting documentation for those changes

made. If no proof of Outline is presented, no points can be awarded for Accuracy of Outline.

4.1B Finish, Color and Markings

New FAA regulations require that each aircraft have the registered owners/pilots FAA number on the exterior of every aircraft. This FAA number may be added to locations such as where the pilots name would be located under the canopy, or under the horizontal stabilizer with no static judging penalty.

Judging for Finish-Color-Markings shall be judged at a distance of 15 feet.

Documentation for Finish-Color-Markings shall remain on the judge's table.

The intent of this section is to verify the contestant has properly researched the full-size aircraft to prove that the model they are presenting matches the full-size aircraft. The contestant may provide photographs, published artist conceptions, or published photos that show color, finish, and marking details of the actual aircraft being modeled. Proof of color may also be in the form of either; paint chips from approved sources such as Federal Standard 595, FTE Color Guide, Monogram Color Guide, factory color chips or other published color documentation sources.

Your AMA Scale Board Member can approve unpublished color documentation samples with supporting written documentation. Some vintage aircraft were flying before color film existed so modelers must rely on artist conceptions, black and white photos, or colored line drawings of the subject to document color and markings. If black and white drawings and/or photos are used, a description from an approved source of the colors used for the aircraft color and markings and their location on the aircraft must be included in the documentation package. For subjects in which it is difficult or impossible to document more than one side or view of an aircraft, there shall be NO penalty for failure to show the other side or bottom of the aircraft.

For the judge to determine location, color, size, and graphic content, documentation of markings specific to the aircraft being modeled need to be provided. However, the judging of color in these markings will be included only in the score provided for overall Color described previously (5 point maximum) to ensure the color score is not over emphasized. See Static Judging score sheets at the end of this Guide for Finish (10 points), Colors (5 points), and Markings (10 points). If no proof of Finish, Color, and/or Markings accompanies the model, no points can be awarded for Finish, Color, and/or Markings section of the score sheet.

4.1C Craftsmanship

Craftsmanship shall be judged from no closer than 4 feet.

Documentation for Craftsmanship will not be placed closer the 4 feet from aircraft.

Craftsmanship consists of judging the quality of workmanship on the model that is being presented. The Craftsmanship judge should consult with the Outline and Finish judge to ensure an item is not double downgraded (once by the Outline or Finish judge and once by the Craftsmanship judge). The quality of panel lines, brake lines, jack points, fill ports, inspection panels, tie-down hooks or any other scale detail feature will be considered by the Craftsmanship judge. Items such as non-scale exposed control horns would be a source of downgrade for craftsmanship. Craftsmanship will be separately itemized on the score sheets for wings (10 points), fuselage (10 points), and Tail Group (or their equivalent by design) (10 points) and Landing Gear (5 points). Emphasis is placed on how well the modeler created the illusion of scale detail on the model as compared to the documentation (NOTE: Close proximity photos or other documentation of the full-size aircraft may be beneficial to include for emphasizing applicable subtle

features. Published 3 views may lack sufficient detail that may otherwise benefit a contestant's craftsmanship effort).

4.2 Static Scoring Pro/Am Classes A static score of five (5) points shall be awarded to contestants that show proof that a full-size aircraft of this type, and in this general paint/markings scheme did exist. The contestant may provide a single photograph, plastic kit box, profile painting, google photo, etc. Contestant prepared documentation or a photo of the model is not considered proof of scale. If no proof is shown, a static score of zero (0) will be awarded.

Section 5 ~ Flight Judging

Credit to N.A.S.A. for all diagrams.

Flight scoring will be the same for all classes. The intent of the flying portion of the contest is to determine the pilot's ability to match the model aircraft's flight performance to that of the full-size aircraft in the most realistic manner possible.

Flight Judges will compare the models flight to the written maneuvers described within this guide, the contestants approved Maneuver Declaration Sheet, or other approved Guides such as current AMA Competition Regulations and/or SM Competition Guide.

Time limit: Each contestant will have **15 minutes** to complete their flight. (See Section 8.1 for official delays).

NWASM has emphasized this in the creation of maneuver combinations where mechanical operations must be combined with a flying maneuver to enhance realism. It is recommended that a theme or mission be established in choosing flight maneuvers so the flight routine's order is easier to track and is more pleasing to watch. The emphasis will be placed on scale realism, so be aware that your chosen aircraft type will determine your maneuver's parameters such as speed for correct attitudes, geometry, and positioning with respect to the judges' centerline. Contestants should indicate if their aircraft type is designated either Aerobatic capable or Non-Aerobatic by checking the appropriate box on the flight score sheet. To document maneuvers not contained in this guide or AMA or USSMA Competition Guide a Maneuver Declaration Sheet should be each flight. Each flight will be judged by two (2) flight judges whose scores will be averaged for the contestant's flight score for each round.

5.1 The contestant is encouraged to brief the flight judges when handing them the score sheets by going over atypical maneuvers and explaining exactly what the judges are to expect. This is the opportunity to clarify the particular maneuvers the contestant has chosen, **not a license to tell the judges how to judge each maneuver**. The information provided to the judges is what they will inspect for. During the flight the pilot will be responsible for calling the beginning and ending of each maneuver. However, some maneuvers will be judged in accordance with the maneuver criteria as set forth in the maneuver description. If the contestant says nothing, the judges will judge according to what they understand a maneuver should look like based on this guide and other guides such as AMA and USSMA Competition Guides. **Remember, your 15 minutes starts when you hand them your score sheets!**

5.2 The Flight Judge will not downgrade items that are beyond the pilot's control such as when a tailskid aircraft is slowing down from a landing, at the point where the model *takes control* and turns into the prevailing winds. The judge will stop judging at the point the model takes over and calculate the score. This is also true during wind conditions, which may adversely affect the aircraft. The judges will make every attempt to be familiar with areas of the flying field that exhibit these unstable air conditions and take this into consideration in scoring.

5.3 Tailskid aircraft will be allowed to attach a non-scale functional tail wheel for flying off paved surfaces only. Anti-scuff tape, scuff plates, & wing tip skids may also be applied to the bottom of the wing tips to protect the covering when flying from paved surfaces with no loss in points.

5.4 Each maneuver will start with a score of 10 points and the flight judge will deduct for errors noted

during the execution of the maneuver. Errors will include mismatches noticed in precision, placement, and realism for each maneuver.

5.5 Judges are to *remain independent* in their scoring and are not expected to arrive at the same maneuver score. Judges are not allowed to communicate or check with each other in routine scoring during flight and are encouraged to sit at a sufficient distance from one another to maintain the integrity of statistically independent judging for subsequent score averaging. **However, if a “0” is given for a score, flight judges must confer, and in this case identical scores are required.** At the conclusion of the flight, judges will confer on the Overall Flight Realism qualities and again need *not* award identical scores.

5.6 The following are examples of mandatory zero scores for specific maneuvers or sequence of maneuvers:

- a) Crossing the deadline at any time during flight (0 for the maneuver being performed or for the previous maneuver).
- b) Maneuver(s) performed out of sequence (0 for the skipped maneuver(s) but judge the rest normally).
- c) Touching the model after any maneuver starts such as when restarting an engine after the takeoff roll has begun (10 point loss), see 8.5 for engine restarts (unless directed to do so by the CD or Air Boss).
- d) Model flips over on its back on landing (except tailskid aircraft, see 5.3).
- e) Use of similar or redundant flight options for maneuvers or scale operations in maneuver combinations, e.g. Roll, then Military Roll, then 2 point Roll, etc.
- f) If the aircraft becomes airborne with flying speed and is forced to land immediately or anytime thereafter before the flight is complete, any maneuvers not performed before landing have effectively been skipped and will be scored zero as in item 5.6b above.

5.7 Replacement of damaged parts is limited to props, spinners, wheels, tires, landing gear units, cowls, canopy, tail wheel units, antenna, flying wires, and struts as long as the replacements are of the same size, shape and color as those on the model when it was presented for static judging. If a flying spinner cannot be replaced or safely repaired, the Contest Director may allow the aircraft to continue to fly in competition (without the spinner), however, the flight judges will make a 2 point reduction to the continuity of flight portion of the overall flight realism score for each round that the aircraft flies without the spinner. Any other damaged components will need to be repaired and retained as original equipment by the modeler. Damaged aircraft which have been repaired may require a new safety inspection before being allowed to re-enter competition.

5.8 With the exception of electric motors and turbine aircraft, the engine must be equipped with an effective muffler or silencer to limit noise output in flight. Tuned pipes are considered silencers.

5.9 Maneuver scoring content: Maneuvers and *maneuver combinations* with scale operation elements will be scored for three basic content considerations as listed below. These are similar to those found in the AMA Competition Regulations Rules Governing Model Aviation Competition in the United States, except provision is now made for *maneuver combinations* as further explained in section 5C.

Each of the contents is scored to the nearest ½ point. A maneuver starts at 10 and then deductions occur. A *maneuver combination* is primarily scored with equal emphasis between the maneuver and the scale operation feature.

The three contents are:

5.9.1 Precision Content (Max 5 pts.): The pilot's ability to perform the defined maneuver geometry, and when applicable, the Precision of scale operation features within a *maneuver combination*.

5.9.1.A A *maneuver combination's* precision content will be equally divided between maneuver and scale operation (or maximum of 2.5 points each). Should scale operational feature(s) fail to operate or deploy within a *maneuver combination* in a realistic and timely manner due to either mechanical malfunction or pilot error within a *maneuver combination*, the result will be a 50% downgrade in the score for "Precision".

5.9.1.B Precision of flaps, slats, and retracts is demonstrated by their prototypical operation and will only be judged on the pilot's Precision in the "Overall Flight Realism" score. They may also be judged as part of the "Slow Speed Dirty Inspection Pass" maneuver.

5.9.2 Placement Content (Max 2.5 points.): Most in-flight maneuvers (including those with a "droppable") will optimally be placed directly in front of the judges (judges' centerline) on the maneuvering line. This will typically be at 10 to 50 feet *beyond* the far side of the defined runway area for fly-by type maneuvers. There are times when the contestant will be allowed to offset maneuver to either side of judging center as long as the contestant informs the judges before the maneuver, otherwise the judges will have to default to the judges' centerline for placement. Judges may request maneuvers be offset to aid in visibility. The contestant is not obligated to offset the maneuver if asked, but he should be aware that if the judges cannot adequately view his maneuver it will be difficult to score. A *maneuver combination's* placement content will be approximately divided between maneuver and scale operations.

5.9.2.A Maneuvers with horizontal symmetry (Cuban Eight, Loop, Roll, Figure 8, etc.) should have their midpoints on the judges' centerline with equal distance on each side for optimal score.

5.9.2.B Some maneuvers due to their asymmetry are offset from judging center for best viewing, such as a Stall Turn or Wingover. Also, the Procedure Turn is positioned where the initial 90 degree turn away from the runway begins *before* reaching judging center, and the remaining 270 degree turn starts at judging center to the left or right.

5.9.2.C Although the placement of a maneuver normally represents only 2.5 points content, a greater penalty deduction will be imposed in the interest of safety when maneuvers are performed unnecessarily close to the flight line (over the runway) as described in "Runway Safety and Deadline Infractions" of this Guide.

5.9.2.D Optimum placement of bomb drops will be defined as the point of **impact** in front of the judges at the far side of the defined runway. When discussed with judges prior to flight, the maneuver may be performed slightly to the left or right of the judges' centerline for best viewing. Parachute or empty tank drops will be scored for optimum placement as point of **release** rather than impact, since wind conditions may unpredictably affect point of landing.

5.9.2.C "The optimum placement of flaps, slats, and retracts deployment is only included in Overall Flight Realism "Continuity" unless the optional *maneuver combination* of Slow Speed Dirty Inspection Pass is also selected.

5.9.3 Realism Content (Max 2.5 pts.):

The realism content of the score is based upon the pilot's skill in performing maneuvers with the model like the full-size aircraft in actual flight. The size, shape, and speed of aerobatic maneuvers performed by a contestant should reflect the capabilities of the full-size prototype. For example, it would be expected that a loop performed by a J-3 Cub would be smaller in diameter and egg-shaped compared to a loop of a P-51 Mustang if both models were of the same scale. The speed at which each maneuver is performed should also reflect the capabilities of the prototype. Consideration should also be given to throttle position during flight. In many full-scale aircraft, power must be reduced on the descent portion of that maneuver. Execution of such maneuvers by a model at a constant full throttle setting should be downgraded in realism portion. A particular maneuver may be downgraded for realism content if it is apparent, it exceeded the performance capabilities of its full-size counterpart. Maneuvers that have been classified **only** for non-aerobatic aircraft will still be judged for all maneuver contents without downgrade for all aircraft. However, the "Overall Flight Realism" score may be penalized if such maneuvers were chosen as options by high-performance aircraft.

For *maneuver combinations* the realism score content will be appropriately divided between maneuvers and scale operations. See section 5C for maneuver combination examples.

5.9.3. A Consider the stability or "smoothness" aspect of each maneuver as well as the power management (throttle) expected for that specific maneuver of the model compared to its full-size counterpart. Both of these considerations will be influenced by aircraft design and wind conditions. Since slow, lightweight aircraft will be much *more visibly influenced by wind* than fast heavier aircraft, wind conditions should be taken into account during judging.

5.9.3. B Maneuvers should appear realistic in scale size of performance (site and conditions permitting). Attitude, bank angle and g-loading appearance through turns should be consistent with those generally observed in the full-size. With scale-size maneuvers, these prototypical attitude features are achieved through use of an optimum speed relationship to the full-size aircraft. Also see Definitions section later in this Guide for Optimum Speed.

5.9.3. C The realism content of a *maneuver combination* will also have approximately the same emphasis between the maneuver and the accompanying scale operation feature(s) regarding realistic motion or other intended activity displayed for realism. For a droppable," this will include the manner in which the droppable was secured and carried in flight as well the trajectory likeness to that of the full size.

Section 5A ~ Mandatory Maneuvers

The contestant must perform 5 mandatory maneuvers (includes Overall Flight Realism) and 5 optional maneuvers unless the CD indicates the Takeoff and Landing may be replaced with other options. They can be presented in any order except Flight Realism, which will be scored at the end of the flight. Models of pure seaplanes or other aircraft that do not have wheeled landing gear may select two other optional maneuvers in place of Takeoff and Landing as scored maneuvers.

5A.1 Takeoff

Takeoff shall *continue* to be scored until 30 feet elevation.

In strong crosswind situations, it will be up to the discretion of the CD to allow Takeoff and/or Landing as scored maneuvers to be optional. Other maneuvers must be selected to replace takeoff or landing maneuver should this occur.

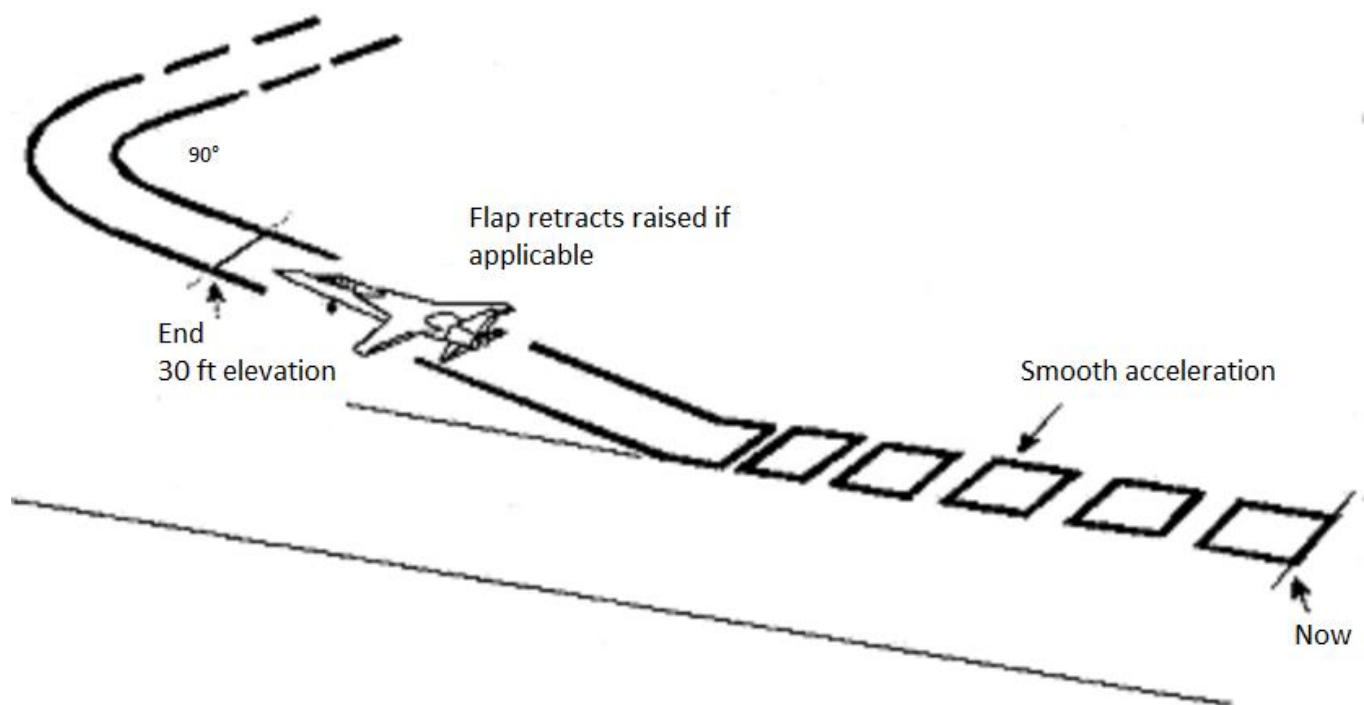
Judges are to evaluate:

- Roll out straight and down the indicated centerline (see exception for “tail skid” aircraft).
- Gentle lift off, wings level, tracking straight, climb out angle consistent with prototype. NOTE: The CD will announce at the pilots meeting if there will be exceptions for takeoff or landing becoming optional for various aircraft.
- Gentle and steady climb out to 30 feet altitude.
- Observe mechanical operations, i.e. retracts, gear door sequencing, flaps (when applicable) for Overall Flight Realism.

Judging for Takeoff and Landing scores will not consider wheels off or on runway location regarding Judges Centerline (some contestants felt lifting off at Judges Centerline was not possible to practice due to their club’s short field).

5A.1.1 The takeoff maneuver shall be scored after heading position is initially established with a brief hesitation near the lengthwise centerline of the active runway. (Exception: When safe operation permits, tail-skid aircraft can establish a heading more into the wind so the judges need to establish an imaginary centerline based on the initial path started at takeoff). This new established heading ***shall not be directed toward the judges or deadline.***

A full stop may be made but is not required between the end of the taxi and the beginning of takeoff. The contestant must announce that “takeoff maneuver is starting now” prior to starting the takeoff roll. For optimum scoring, the roll must be parallel to, and in close proximity to lengthwise centerline of the runway. The roll distance and tracking prior to lift-off should be realistic in scale to that of the full-size aircraft (runway permitting). During climb out, the wings should remain reasonably level with original heading maintained. The takeoff optimum heading and prototypical ascent angle should be maintained to an elevation of at least 30 feet to complete the maneuver prior to making the initial turn away from the flight line. For optimum "Continuity" score in Overall Flight Realism if the prototypical aircraft design has retractable gear, gear retraction should be initiated sufficiently soon after lift-off to allow completion (or near completion) of retraction prior to initial turn away from the flight line for optimum “Continuity” score in Overall Flight Realism. If the gear fails to retract and remain down during flight, a severe downgrade will apply to Overall Flight Realism “Options” and “Continuity”. Flaps and slats (if applicable) may be used during the takeoff maneuver but are not required for most available runway lengths. Retracts, flaps or slats shall not dilute any of the scoring contents for pilot Precision, Placement, and Realism in takeoff. Also see item 8.7 for Aborted Takeoffs.



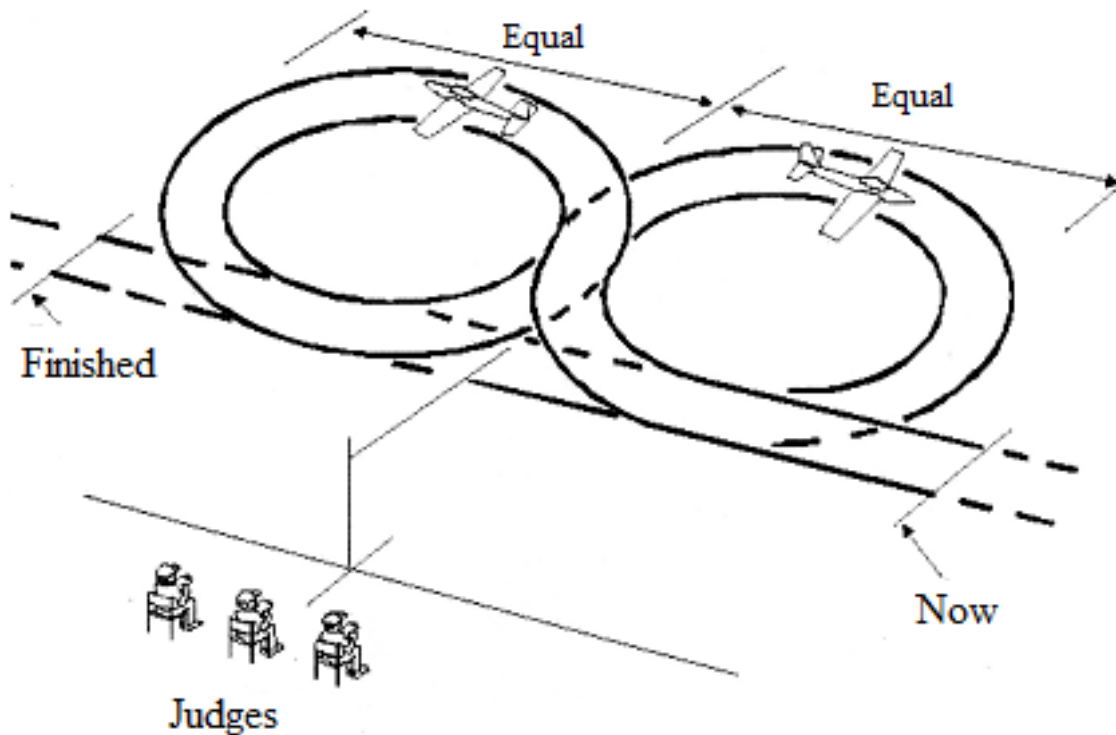
5A1.2 In strong crosswind conditions, it will be the discretion of the CD to make Takeoff an optionally scored maneuver that would then require replacement with another maneuver.

5A.2 Figure Eight

Judges are to evaluate:

- Maneuver called at 45 degrees from Judges' Centerline (left or right of judges).
- Bank angle typical of full-size aircraft at speed.
- Crossover points on Judges' Centerline (directly in front of Judges).
- Crossover points at same altitude and location.
- Symmetry same, left circle same size/diameter as right circle.
- Exit altitude same as entry altitude.

Perhaps more than any other maneuver, the horizontal figure 8 best reveals how well a pilot can position and control the aircraft with a prototypical attitude and precision over a large horizontal area in various environmental conditions. The maneuver starts with a straight and level entry. It can be flown from either direction depending on the wind. Usually it is flown starting into the wind. At a 45-degree angle to the judges the contestant calls, "maneuver beginning now." He then begins a 90 degree turn away from the judges followed by a 360 degree turn in the opposite direction, and then a 270 degree turn back toward judging center and completes with a straight and level fly past calling the "maneuver complete" at the judges' centerline. The prototypical bank angle used during the figure eight is anticipated to vary in windy conditions to maintain a figure eight pattern with respect to the ground and judges. Be aware that an optical illusion occurs, as the aircraft flies away from the judges as the aircraft, if altitude is perfectly maintained, will appear to lose altitude. Experienced pilots understand this and overcome the urge to climb on the backside, that otherwise would place the aircraft higher than it should be when it comes back around.

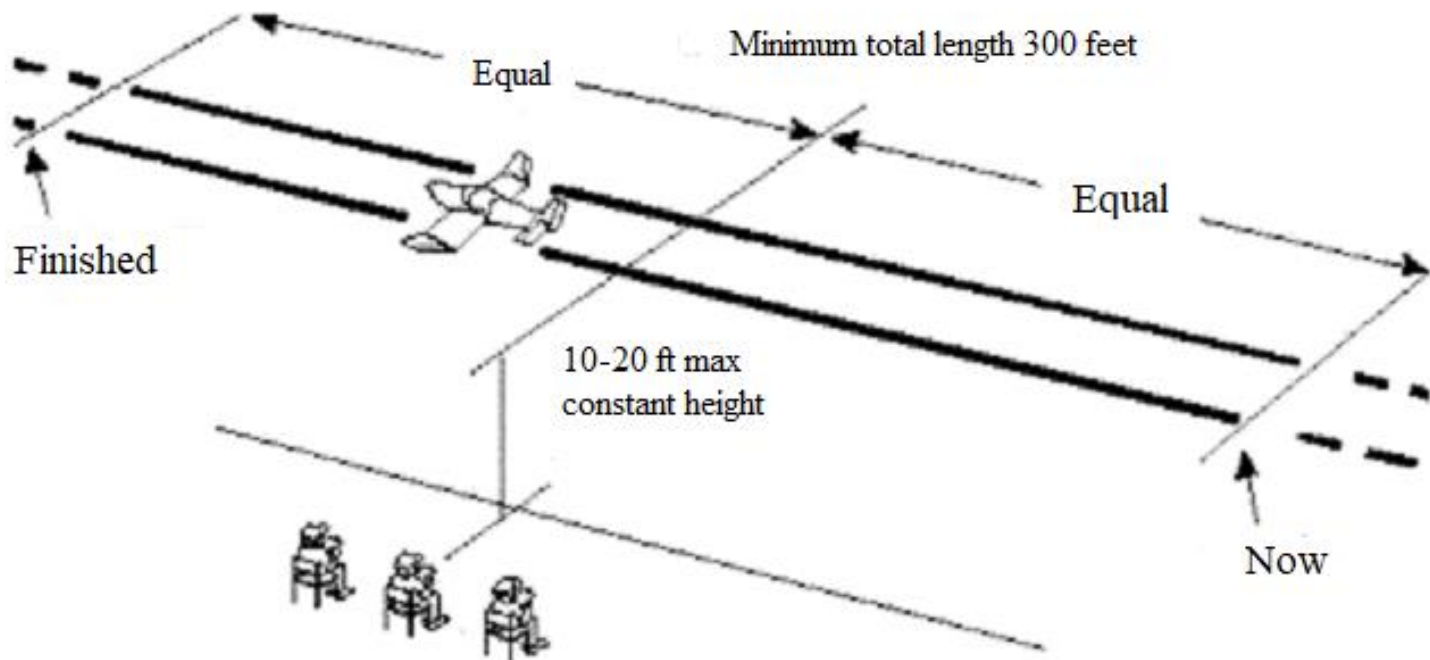


5A.3 Fly Past

Judges are to evaluate:

- Direction is same as takeoff (into the wind).
- Altitude between 10 and 20 feet.
- Heading is straight and tracks down the maneuvering line.
- Maintains constant altitude.
- Equal distance on Judges' Centerline, minimum 150 feet to left and right.

The mandatory 10 to 20 foot elevation fly-past will be centered in front of the judges and located over the maneuvering line (see Definitions). Direction will be the same as designated takeoff unless otherwise specified by the CD or Air Boss. Downgrading will also start occurring if the maneuver is too far out beyond the maneuvering line, or over the defined runway. For optimum score, the maneuver should track straight and level over the maneuvering line for at least 300 feet (not 5 seconds as AMA describes). Allowances shall be made for any aircraft for slight corrections due to gusty-wind conditions. No ***maneuver combination*** can be included with this maneuver.



5A.4 Landing

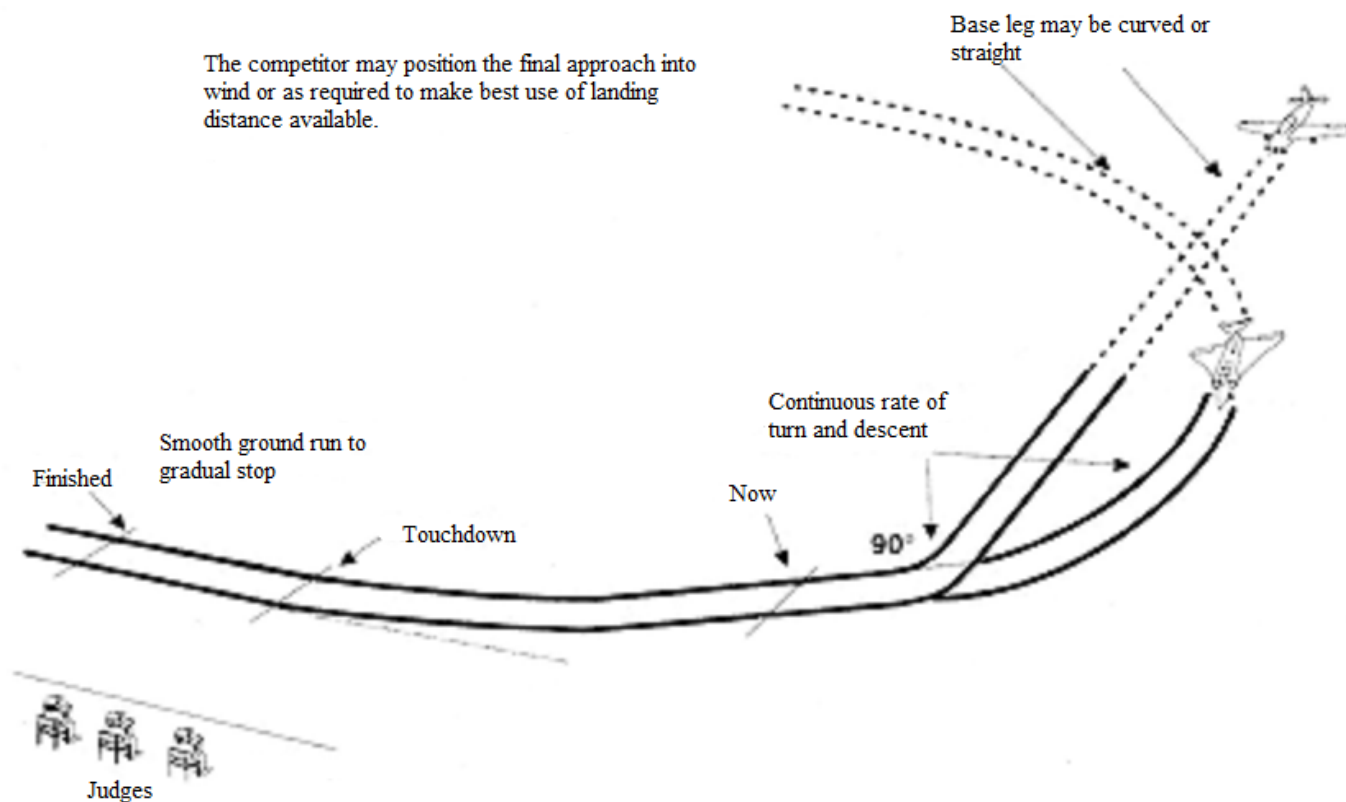
Judges are to evaluate:

- Observe mechanical operations, i.e., slats, retracts, partial flaps on base leg, full flaps on final (Overall Flight Realism).
- Pilot calls maneuver when turning to final.
- Wings level, gentle glide angle, constant rate of descent, tracks on runway centerline on rollout.
- Smooth flare, gentle contact with ground both wheels simultaneously, minimal bounce on touchdown.
- Straight roll out, down runway centerline (see exception for “tail skid” aircraft).
- Slows to taxi speed before turning.

NOTE: The CD will announce at the pilots meeting if there will be exceptions for takeoff or landing becoming optional for various aircraft.

5A.4.1 The Landing maneuver will be scored from the time the aircraft enters the final approach to landing to the point at which the aircraft sufficiently slows to permit a safe turn from the runway.

5A.4.2 For optimum scoring of any landing, the roll out must be parallel to, and in close proximity of the lengthwise centerline of the runway. Tailskid aircraft are anticipated to experience visible corrections for crosswinds. Low speed aircraft such as WW-1 and civilian types like the J-3 Cub are permitted a flare and touchdown that may be directed more into the wind after an aligned approach. In any case their speed and momentum in roll out shall not be allowed to produce a safety hazard or deadline infraction. All other placement criteria apply. Bounces or deviations in described optimum roll out alignment will be downgraded depending on severity of applicable skill contents. Uncontrolled premature turns will similarly be downgraded. "Nose overs" will be downgraded depending on severity. **However, a complete "nose-over" onto the back will score zero.** A touchdown or roll out into any area outside of the defined runway will only be downgraded depending on severity or scored entirely *zero* for the maneuver on a ***deadline infraction***. Such downgrades will not be given for short runway facilities where roll out carries the aircraft beyond the end of the runway and touchdown and roll out commenced in the first half of the runway. If the aircraft touches down in the latter half of the available runway and then rolls off the defined runway, all applicable contents will be downgraded accordingly. As stated in “Maneuver Scoring Content,” skill related precision and placement may be combined in scoring emphasis for this placement critical maneuver. The judging of roll out and overall landing maneuver is not complete until the aircraft has sufficiently slowed to permit a safe, controlled taxi from the active portion of the runway. Also see item 8.7 for Takeoff and Landing Aborts.



5A.4.3 Scale operational features affecting landing can be complex in many aircraft (for past as well as present scoring methods). Some of them will be described as part of Overall Flight Realism in the following section 7.5, but others may be new. These judging considerations are as follows:

- If flaps, slats, and/or retracts are prototypical features of the aircraft, they must be properly deployed prior to landing for optimum "Overall Flight Realism" qualities. In strong wind conditions the amount of flaps and/or slats may be reduced but not eliminated.
- Flaps, slats, and retracts will not influence or share in the scoring content expected for landing. However, their operation will influence the "Overall Flight Realism" score. Wheel brakes may be used within or after the landing maneuver but will also be primarily judged in "Overall Flight Realism" for optimum judging.
- If a landing gear failure occurs due to inadequate pilot precision or realism in "flare" the landing will be downgraded accordingly. If a "belly landing" is performed skillfully with a smooth touchdown and accurate placement after a gear malfunction during or prior to deployment, the landing may still be scored "optimally" in all of its content features, but not in Overall Flight Realism. As will be described in the next section for Overall Flight Realism, the scale operation "Option" mechanical precision or "Continuity" content for gear, flaps, and slats is in Overall Flight Realism and are not a content element to the landing maneuver. (NOTE: Calling an emergency landing will help alert the judges to score the landing accordingly, but it will not save optimum points for Overall Flight Realism score.)

5A.4.4 Scale operation of a drogue chute/s deployed in a timely and realistic manner during the landing roll out shall be scored as a *maneuver combination*. This *maneuver combination* of “landing with drogue chute” will partially share the precision content in piloting skill with an accompanying scale operation feature described in “Maneuver Scoring Content”.

- Inclusion of a drogue chute (or chutes) for optimizing Overall Flight Realism “Options” in the landing maneuver will be dictated by prototypical roll out and the “scale-length runway” facilities available. No downgrade in score will occur for not selecting the drogue chute option, if well-placed landings can be executed on longer runway facilities. The incentive for the use of drogue chutes(s) in modeling will therefore be the same as that in full scale.

5A.4.5 In strong crosswind conditions, it will be the discretion of the CD to make Landing an optionally scored maneuver that would then require replacement with another maneuver.

5A.4.6 Emergency Landing: In the event of a mechanical failure (engine out, failure of retractable landing gear to extend), the pilot may elect to declare an emergency landing. Such landing shall be substantially downgraded in realism content but will be scored “optimally” in placement and precision content if the pilot calls out “Emergency Landing” to the flight judges.

5A.5 Overall Flight Realism

Judges are to evaluate:

- Model performs smooth transitions through each axis (roll, pitch, and yaw) consistently throughout the entire flight (including in-between maneuvers).
- Bank angles consistent with full-size aircraft.
- G-loading consistent with full-size aircraft.
- Management of power appropriate with performed maneuvers.
- Chosen maneuvers consistent with full-size aircraft's capabilities.

The **Overall Flight Realism** score shall be an objective summary based on three fundamental questions outlined in the following. A quick summary for judging or “policing” Overall Flight Realism can perhaps be remembered best as **COP** or Continuity, Options, and Power management. Scoring will be 2.5, 5.0, and 2.5 points respectively with Options having the greatest emphasis for potential deficiencies. Also see “Flight Realism and Score Sheet Review” in this Guide.

5A.5.1 Continuity of Flight (2.5 pts.): Has the pilot demonstrated a flight performed with realistic continuity, from the moment the “show starts” as the aircraft taxis out to the time it taxis back?

- This shall primarily include how well the aircraft maintains a general realistic appearance on the ground and in the air before, between, or after selected maneuvers. Continuity includes taxi, airborne turnarounds, altitude, smoothness or stability, etc. except when such features are included in defined listed options such as Traffic Pattern, Procedure Turn, etc. It also includes takeoff and landing if not listed as part of scored options as ruled by the CD. When any maneuver option listed for score is started, the applicable deduction(s) will apply to that specific maneuver-realism content and not the Overall Flight Realism “continuity”. (NOTE: Any unrealistic actions achieved from flaps, slats, or retracts due to poor timing will be deducted in Overall Flight Realism for continuity, except when used for the optional scored *maneuver combination* of Slow Speed Inspection Pass.)
- Trim passes are permitted without deduction to continuity.
- If the aircraft design and vintage permits, it should taxi to and from the runway under its own power (with reference to the judging area) for optimum consideration in scoring the basic continuity to overall Flight Realism. Exceptions will be granted for aircraft with conventional gear and tailskids or float planes with removable “dollies” if they remain under power from time of initial transport to the runway through the final pickup or transport back.
- Taxi anomalies to and from the runway due to excessive wind or ground conditions are also accepted without deduction to the continuity portion of realism. These may include manually correcting or carrying the aircraft to or from the runway after such wind or ground conditions have become evident to the flight judges or have been announced by the CD. If conditions are **not** a factor for skipping or avoiding an unassisted taxi for applicable aircraft or, if **any** aircraft requires an engine restart after initially departing the immediate judging area, a 0.5 point deduction applies to flight realism for the departure. The 0.5 point deduction may occur again for a repeat occurrence after landing and return. The clock will not be extended for engine restarts. See “Time Limit and Official Delays” See Section 8.1 for exceptions caused by traffic.

5A.5.2 Options Selected or Demonstrated (5.0 pts.): Have the notable prototypical characteristic features of the aircraft been well selected and demonstrated for its intended design mission by choice in Flight Maneuvers and complementing Scale Operations?

- The applicable scale operations of retractable gear, flaps, and slats shall primarily be inspected in flight for demonstrating mechanical precision in form-fit-function of operation. This also includes the prototypical gear retraction, secured stowage qualities, and realistic mechanical deployment prior to entering the defined landing maneuver. This may also include inspection of other basic control features to assure they are operable such as ailerons, elevator and rudder when such prototypical features are also in question.
- If a model does not have the notable characteristic design features of the full-size aircraft (such as retracts or flaps) or if they fail to operate when required in realistic flight, a corresponding downgrade of 2 points will be made to the Overall Flight Realism Options score.
- If flaps, slats, and retracts are used with the Slow Speed Inspection Pass the maneuver shall also be scored for precision for these scale operational content features per *maneuver combinations*.
- Aircraft entries that are rated non-aerobatic must be indicated on the flight sheet checkbox. Similar to FAA practices, NWSAM considers an airplane non-aerobatic when it is rated *not* to exceed 60-degree bank angles and 30-degree pitch angles.

5A.5.3 Power Management (2.5 pts.): Has skill in throttle and power management been demonstrated? Power variations are anticipated to fly an aircraft at moderate speeds in interim flight for turnarounds compared to other fast or slow speeds applicable to the maneuvers performed. Consider that many early vintage (WW1) aircraft were not able to throttle in the conventional sense. Also determine if an idle control (for all prototypical engine arrangements) is adequate to permit a realistic, safe taxi and landing.

Aerobatic aircraft should adequately reflect power capability in engine selection, particularly when vertical maneuver options are performed. Scoring of throttle management skill should be included in Overall Flight Realism (see definition section for optimum speed for flight realism as defined within this Guide in the Definitions section 7).

Section 5B ~ Mechanical Options

Mechanical Options will be evaluated continuously in mechanical performance throughout the flight.

The only approved mechanical options permitted for a scored flight option are Multi-Engine, and Swing or Folding Wings. All others (including scale operations) must be used with a maneuver identified as “maneuver combinations”.

5B.1 Multi-engines: The mechanical option of multi-engines will be judged entirely for its mechanical fidelity in configuration and size to duplicate the performance of its full-size counterpart. Emphasis on desired mechanical-operational similarity and reliability as it may affect flight performance will be judged a score of 10 only if all engines continue to run smoothly, reliably, and in reasonable synchronization throughout the flight.

If one (or more) engines quit(s) before the flight has concluded, a downgrade will be given which is proportional to that part of the engine arrangement, which did not continue to run. For example, if one engine quits in flight on a twin-engine configuration, a score of five may be expected. A loss of one engine on a four engine configuration may result in a score of 7.5, etc. A lesser downgrade may be made if an engine (or engines) becomes so notably marginal in power contribution as to impair flight performance i.e., NOT operating in a synchronized fashion with the remaining engine(s). A lesser downgrade may also apply for an engine or engines quitting very late in the flight, such as on final approach or landing, if the power loss is not a vital part of remaining flight performance.

The ability of the contestant to fly the aircraft with one or more engines malfunctioning (or dead) will not be considered for scoring this MECHANICAL scale operation

After taxi back from flight, the judges should verify ALL engines are still operating. If not, a ½ point deduction is applicable to this mechanical option even if no other anomalies were noted prior to the conclusion of the flight.

NOTE: Taxi back is also a requirement for Overall Flight Realism with a ½ point consideration. Fast idling engines that inhibit realism during a taxi shall also be downgraded as part of “power management” in “Overall Flight Realism”. Such an idling problem or anomaly to Overall Flight Realism also applies to single engine aircraft.

5B.2 Swing or Folded Wings: This option will be judged in two parts, as the aircraft is taxiing away from the judges before takeoff (up to 5 points) and after the aircraft lands and has begun the taxi back (up to 5 points for a total of ten).

The wings do not have to be synchronized in operation but should not "flop" unrealistically as they travel over center. On swing-wings, both wings should operate together in a synchronized manner, and be extended on the taxi out and retracted on the taxi back.

Section 5C ~ Maneuver Combinations

Scale operations are only scored as *maneuver combinations* with pilot skill and scale operation score (10 point total) divided accordingly. For example, flaps and retracts may not be used as individual scale operations and would only be scored as part of Overall Realism, unless they are used in the “Slow Speed Dirty Inspection Pass (maneuver combination)”.

All other scale operations that are briefly used or deployed for independent scoring must be presented, or complemented, with a skill related optional flight maneuver. Each maneuver or maneuver combination must be a different recognized selection (non-redundant). These optionally selected “maneuver combinations” will frequently be referred to in this Guide for a contestant to define a 10-point scored option. This is further described in Maneuver Scoring Content.

Examples:

Any *maneuver combinations* shall adequately be named and listed by the accompanying maneuver and scale operation feature(s) on the flight sheet for scoring. For example: Cuban Eight *with* Smoke, Rectangle Pattern *with* Parachute Drop, etc., should be listed. The contestant can expand upon these as may be applicable to the full size aircraft operation.

A straight and level *strafing run* is not permitted as a maneuver with or without a scale operation.

Options that include a "droppable" **must** be performed in conjunction with some non-redundant form of an applicable flight maneuver other than simply straight flight. For example, this may take the form of a rectangular or triangular pattern maneuver using the leg nearest the judges to execute a bombing run and bomb drop for a typical non-aerobatic loaded bomber. This might then be identified for example as a *rectangle pattern with bomb drop*. Other unique agile bombing runs may consist of a descending or “reverse Chandelle with bomb drop” on to the target area. Also, a sustained bomb run with notable descending angle greater than 30 degrees may be used such as *glide descent with bomb drop* or near vertical greater than 70 degree *dive with bomb drop*. This can be further complemented with applicable high drag aerodynamic scale operational features. Tank drop maneuvers must also be combined with some action entry or exiting maneuver. For example, these could include *tank drop with Immelmann turn*, *tank drop with procedure turn*, *tank drop with split S*, or each reversed in order, etc. A *torpedo drop with escape* must be low in approach and release must be immediately followed by a gradual ascending notable turn of 90 degrees or more away from the intended target. This may take the form of a Chandelle if the turn is 180 degrees.

Crop dusting (or smoke) must also be simultaneously complemented within the listed maneuver by some form of non-redundant and notably realistic flight skill precision. For “obstacles with crop dusting”, this would include descending abruptly for a low pass near crop level. After a brief period of spray, it must again ascend quickly to clear obstacles. A crop dusting low pass could also be immediately followed with a procedure turn or Chandelle, i.e. *crop dust with Chandelle*, etc.

Parachute drops by a non-aerobatic aircraft could also be complemented by a rectangular pattern, or by deploying at the end of a procedure turn for any aircraft.

5C.1 Mechanical and *Maneuver combinations* Limited to 3 Total: The maximum total number of mechanical and *maneuver combination* options permitted in any flight will be 3. However, the same mechanical option or scale operation that supports a maneuver combination option may be used only once for scoring in a flight.

5C.2 Maneuver variations based upon type of aircraft. The type of aircraft presented will determine the size, shape, and content of a maneuver. Flight judges will be open for verbal explanations of maneuvers that may vary slightly from those described in this publication. If not the case, a signed Maneuver Declaration Worksheet as described in section 10.26 should be shown to the flight judges. The following illustrations show some examples of maneuver variations based on aircraft types.

Note: “Maneuver Combination” is a concept that addresses the concern of the “flip a switch for 10 points” and the advantages it had previously offered to various aircraft. This had also handicapped many vintage aircraft that had no retracts, flaps, slats, sliding canopy, tail hook, or other such items for corresponding exclusive scale operations on the score sheet. These scale operations also had little regard for true piloting skills. So, while these neat mechanical options are still enjoyable to watch, it was very questionable these items represented true piloting skills unless they were further combined with some flight maneuver. Hence the “Maneuver Combination” was implemented to place further emphasis on piloting skills.

Section 5D ~ Optional Flight Maneuvers

All optional flight maneuvers are to be selected from the following list. Unless authorized by the CD prior to the event, the following are maneuvers that may be selected as Optional Flight Maneuvers:

- 1. Procedure Turn**
- 2. Loops and More Loops**
- 3. Inside Loop**
- 4. Outside Loop**
- 5. Vintage Loop**
- 6. Immelmann Turn**
- 7. Stall Turn**
- 8. Wingover (Aerobatic)**
- 9. Wingover (Non-Aerobatic)**
- 10. Split-S**
- 11. Rolls and More Rolls**
- 12. Rolls With a Break: Snap Roll-Inside, Snap Roll-Outside**
- 13. Rolls Without a Break: Slow, Axial, Vintage and Barrel.**
 - 13.1 Barrel Roll**
 - 13.2 Snap Roll- Inside**
 - 13.3 Snap Roll- Outside**
- 14. "N" Turns Spin**
- 15. Cuban Eight and variations**
- 16. Touch-and-Go (Two Maneuvers)**
- 17. Missed Approach**
- 18. Standard Traffic Pattern Approach to Landing**
- 19. Military Traffic Approach to Landing**
- 20. Slow Speed Inspection Pass**
- 21. Chandelle**
- 22. 360 Descending Circle**
- 23. Lazy Eight**
- 24. Derry Turn**
- 25. Spot landing**

26. Flight in a Triangular Pattern

27. Flight in a rectangular pattern

28. Side Slip

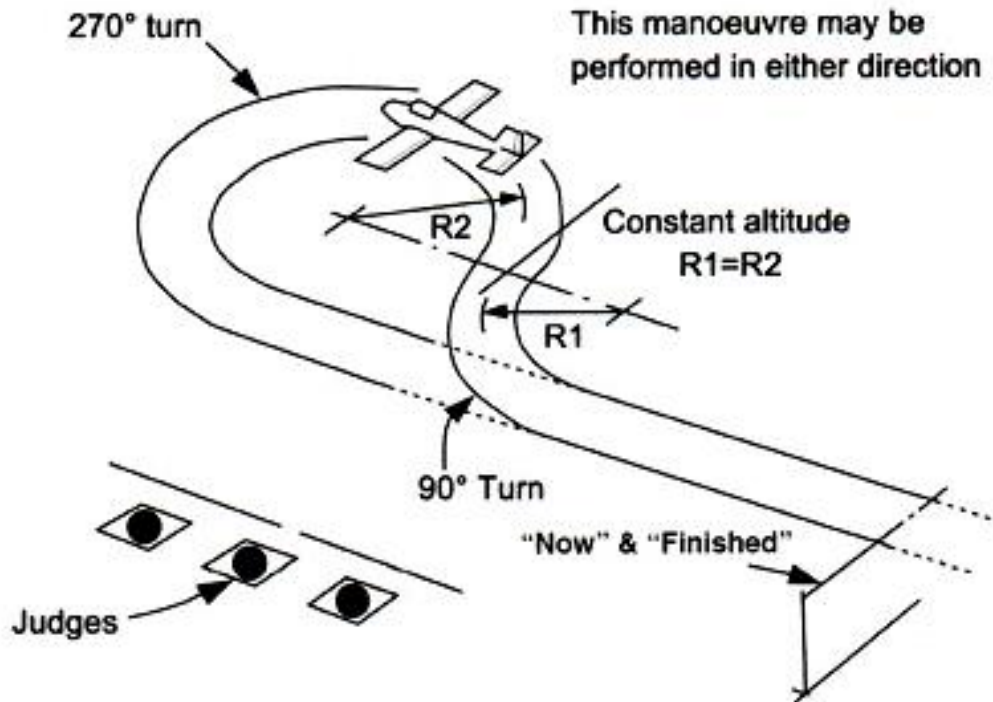
29. Circle of Death

30. Other Maneuvers

5D.1 Procedure Turn~

The options of *straight flight out*, *procedure turn*, and *straight flight back* shall be scored as only *one* flight maneuver or “Procedure Turn”.

This individual maneuver may be done by any aircraft similar to that described by the AMA rules. However, it shall not include the straight-flight entry or exit as additional scored options. The Procedure Turn is positioned where the initial 90 degree turn away from the runway begins *before* reaching judging center, and the remaining 270 degree turn optimally starts at judging center to the left or right. (NOTE: This is identical in desired position as the start of the mandatory figure eight for optimum judging view.)

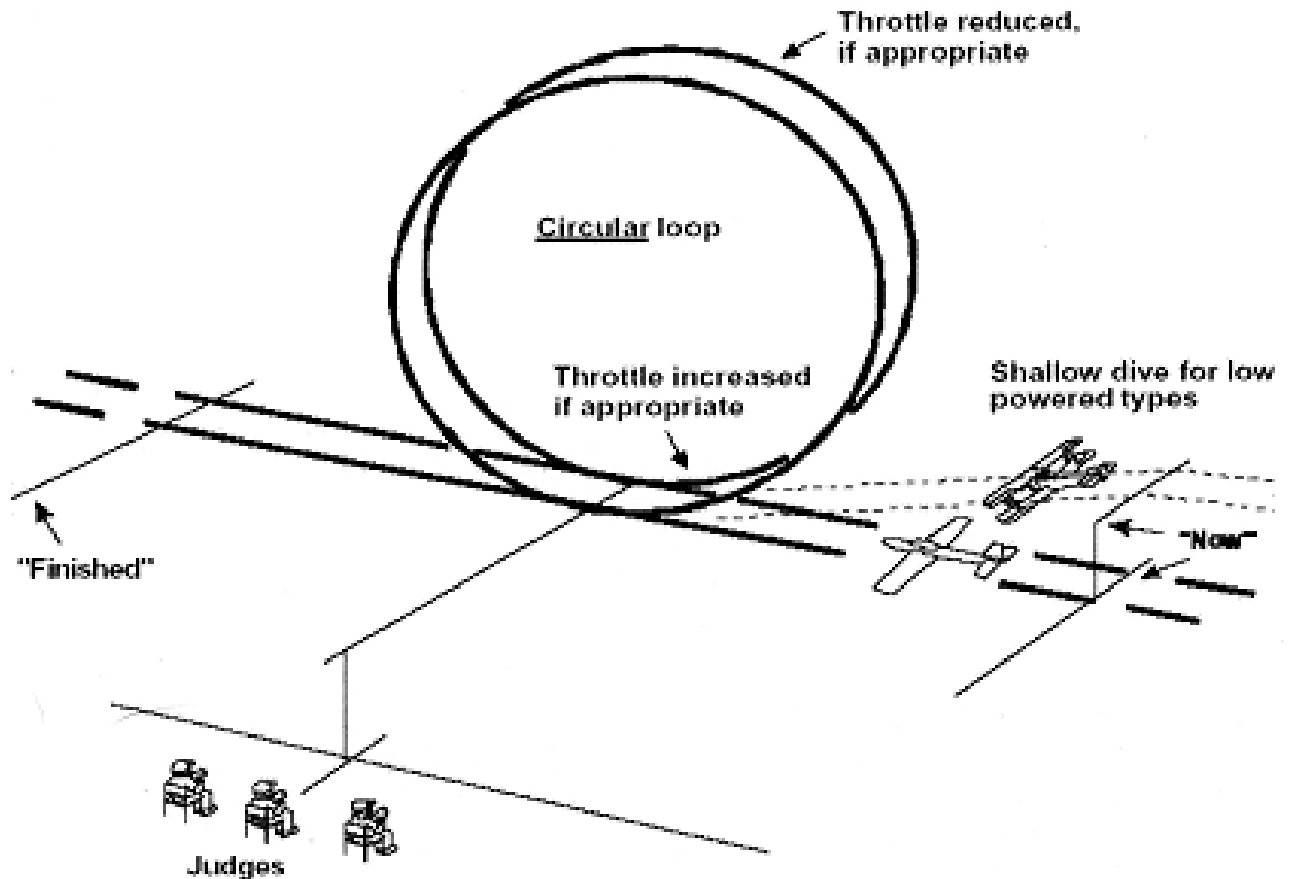


Errors:

- 1. Altitude varies.***
- 2. Heading changes during straight runs.***
- 3. Radius of 90-degree & 270-degree turns dissimilar.***
- 4. Model does not make full 90-degree or 270-degree turns.***
- 5. Initial 90 degree turn is not centered on the judges.***

5D.2 Loops and More Loops~

The contestant should nominate which type of loop that will be performed, e.g. Inside, Outside, Vintage, etc. While the loop is intended to be a circular maneuver, the ability of a low powered aircraft to achieve a perfect circle will be less than that of an aerobatic airplane. A slightly elongated loop (a "Vintage loop") by the former would therefore expect to score as well as a circular loop. This maneuver must be centered on the judges.



5D.3 Inside Loop~

From straight flight, the aircraft pulls up into a circular loop and resumes straight and level flight on the same heading as the entry. The throttle should be cut back at the top of the loop and opened when normal flight is resumed. Non aerobatic or low powered aircraft types would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the loop. This maneuver must be centered on the judges.

Errors:

- 1. Maneuver does not begin or end in level flight.***
- 2. Light aircraft type does not execute shallow dive before commencing the loop.***
- 3. Wings are not level throughout the maneuver.***
- 4. Loop is not round or is executed endwise.***
- 5. Light aircraft type does not execute shallow dive before commencing the loop.***
- 6. Throttle is not cut back at top of loop and opened when normal flight is resumed.***
- 7. Maneuver is not centered on the judges.***

5D.4 Outside Loop~

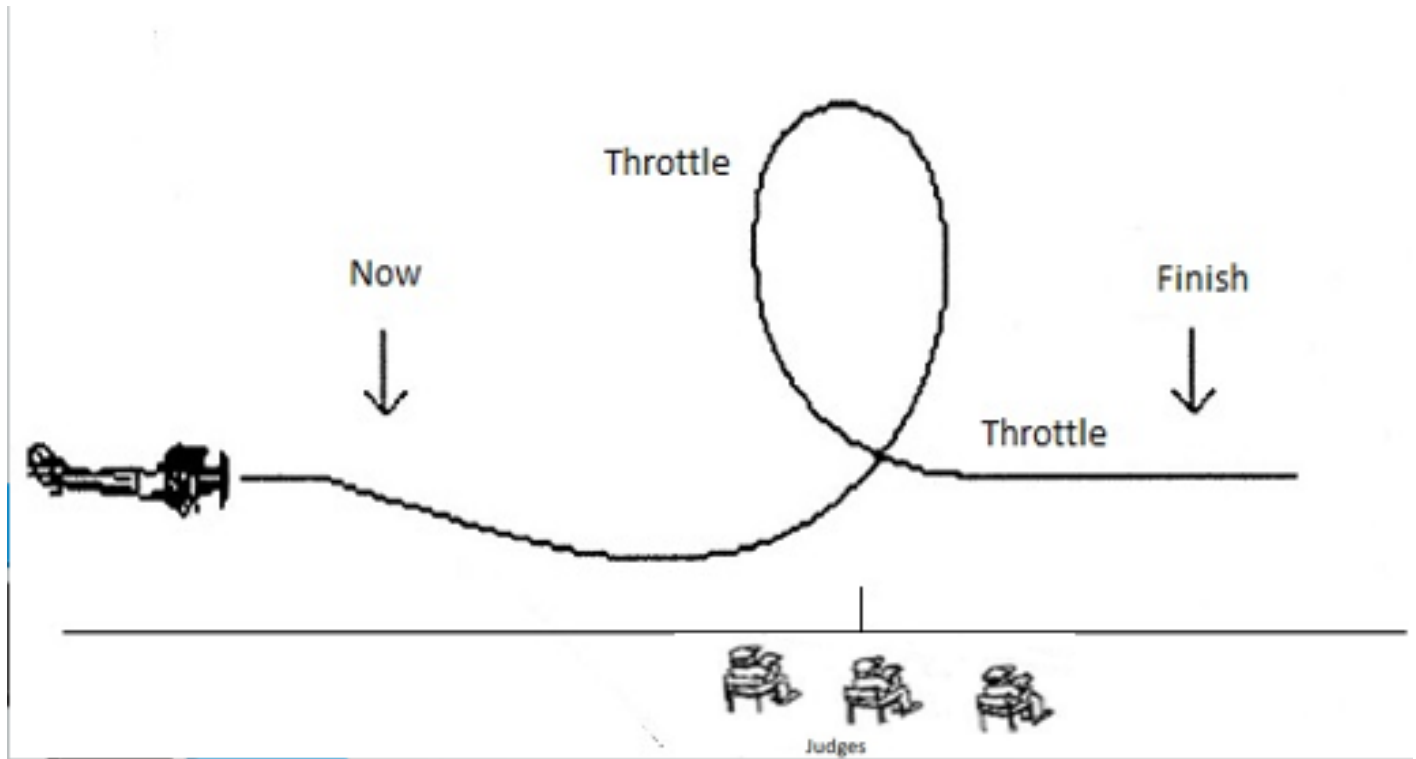
Starting in level flight, the model the model noses down to perform a smooth, round, outside loop which is completed when the model regains its starting altitude and exits in level flight on the same heading as the entry. The throttle should be closed at entry and should be opened after completion of the first half of the loop when the model is inverted and is at a point closest to the ground. This maneuver must be centered on the judges.

Errors:

- 1. Maneuver does not begin and end in level flight.***
- 2. Exit altitude is not same as entry altitude.***
- 3. Model does not begin and finish on the same heading.***
- 4. Loop is not round.***
- 5. Wings do not remain level during the maneuver.***
- 6. Throttle is not closed during first half of maneuver.***
- 7. Maneuver is not centered on the judges.***

5D.5 Vintage Loop~

The maneuver should begin with a shallow dive at full throttle to pick up speed. The aircraft then pulls up into a smooth elliptical loop and resumes straight and level flight on the same heading as the entry. The throttle should be cut back at the top of the loop and opened when normal flight is resumed. This maneuver must be centered on the judges.

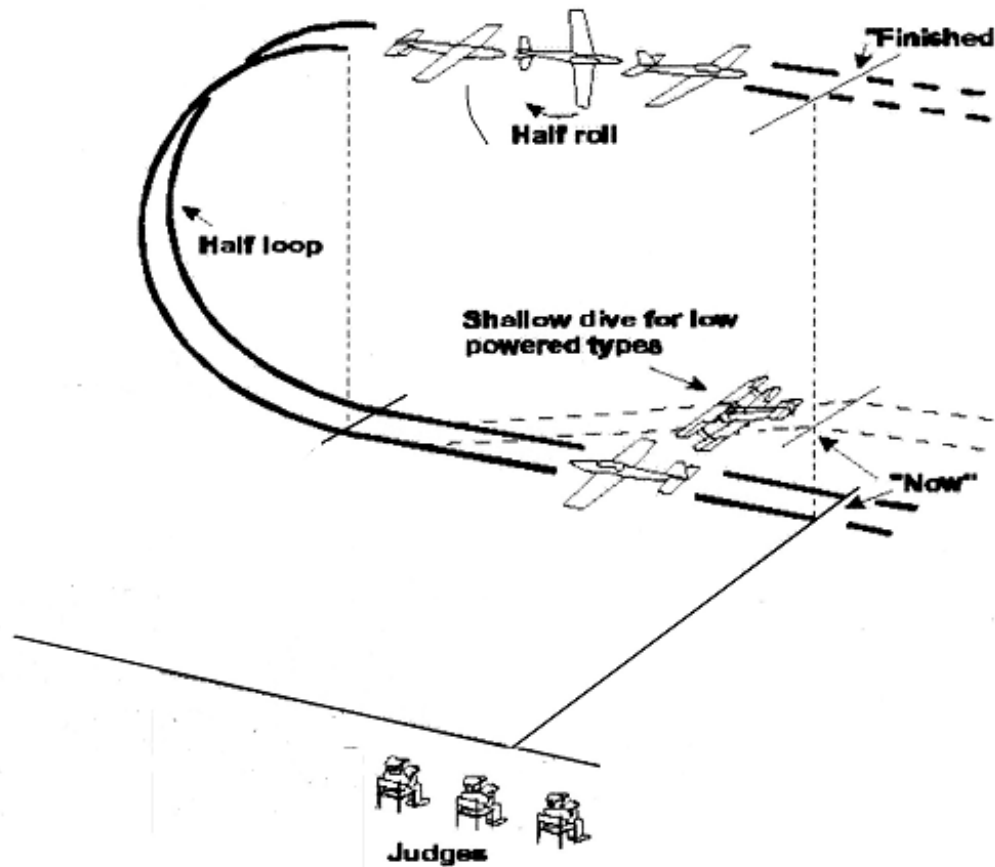


Errors:

- 1. Maneuver does not begin or end in level flight.*
- 2. Wings are not level throughout the maneuver.*
- 3. Aircraft does not execute shallow dive before commencing the loop.*
- 4. Loop is not elliptical or is executed endwise.*
- 5. Inappropriate use of throttle.*
- 6. Size and speed of Vintage Loop not in manner of prototype.*
- 7. Maneuver is not centered on the judges.*

5D.6 Immelmann Turn~

From a straight and level flight, the model aircraft performs the first half of a circular loop (commensurate with the performance of the subject type), and when inverted, performs a half roll before resuming straight and level flight on the opposite heading. Light aircraft types would be expected to commence the maneuver by executing a shallow dive at full throttle in order to pick up the necessary speed. This maneuver may be centered or offset.

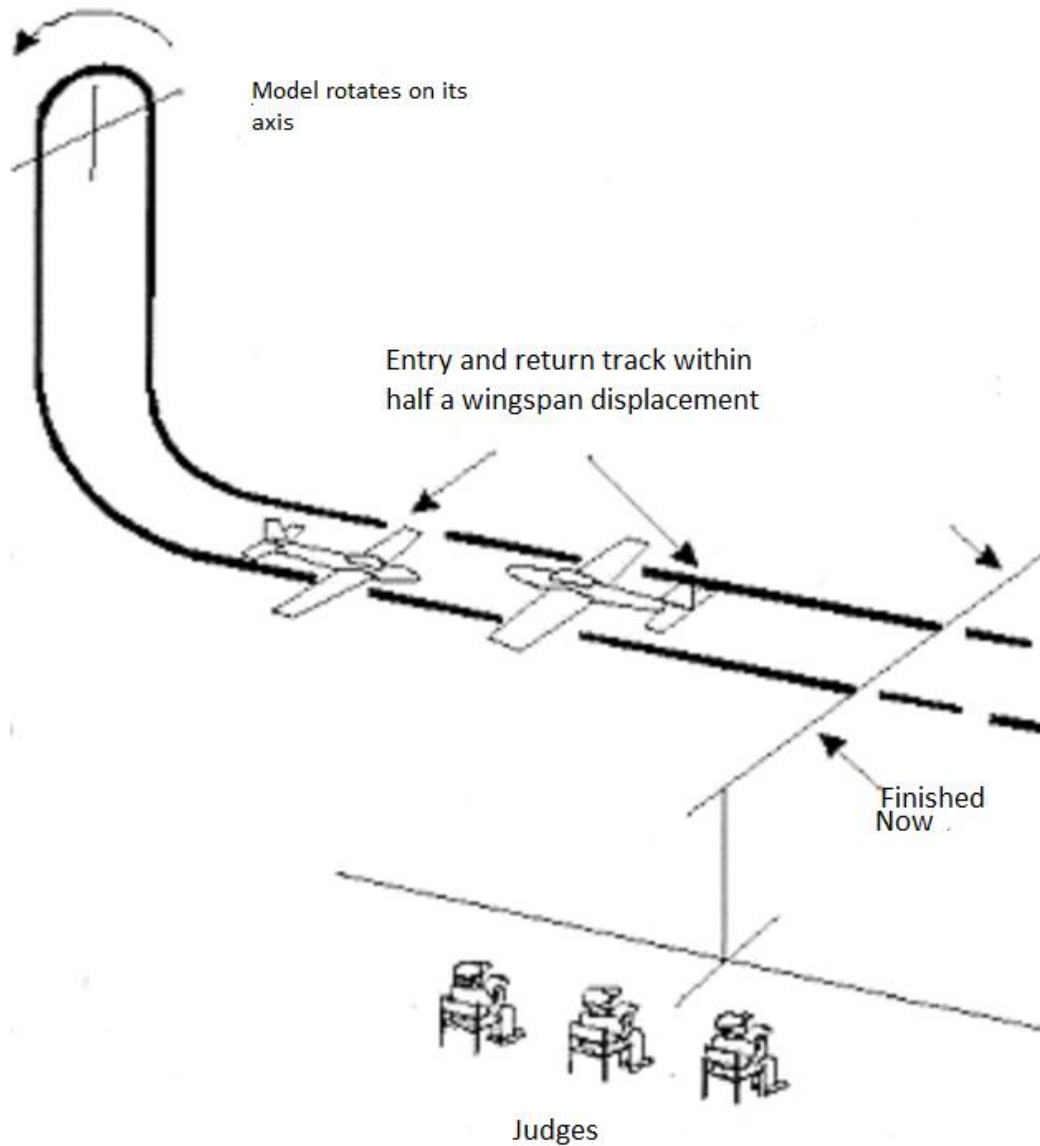


Errors:

- 1. Wings are not level during half loop.***
- 2. Model does not resume straight and level flight on the correct heading.***
- 3. Model is climbing or diving during half roll.***
- 4. Roll is begun too early or too late.***

5D.7 Stall Turn~

From a straight and level flight the model aircraft noses up to the near vertical attitude, at which point the throttle is closed and the model yaws through 180 deg., then dives and finally recovers straight and level flight on a heading in the opposite direction to the entry. The contestant should specify if the turn will be to the left or right. This maneuver must be offset.



Errors:

- 1. Model does not assume the correct attitude.***
- 2. Throttle is not closed.***
- 3. Model turns in wrong direction.***
- 4. Model does not exit from the maneuver on the correct heading.***

5D.8 Wingover (Aerobatic)~

Model starts in level flight and noses up to the near vertical attitude, at which time it is flown through a 180-degree arc, using rudder to end up on a near vertical dive. Throttle should be closed at this point and the model pulls out of the dive at the same altitude as the entry on a parallel path, but on a 180- degree opposite heading. Note that this is an offset maneuver.

Errors:

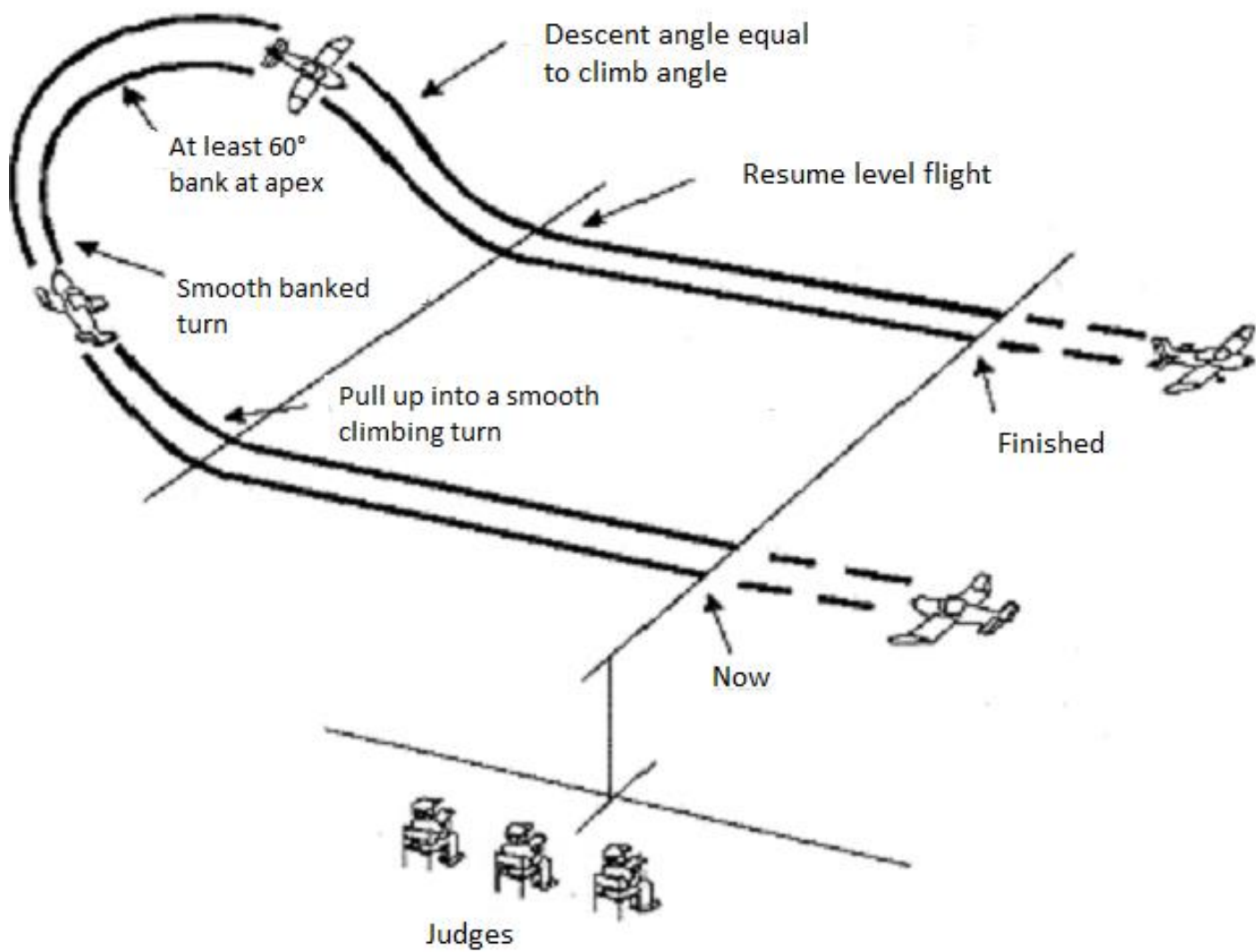
- 1. Model not level at start.***
- 2. Model rolls left or right during pull-up.***
- 3. Model tucks under a wing during 180-degree turn.***
- 4. Throttle not closed during dive.***
- 5. Return path not parallel to entry.***
- 6. Recovery not at same altitude as entry.***
- 7. Model does not fly straight and level to complete the maneuver.***

5D.9 Wingover (Non-Aerobatic)~

The aircraft approaches in straight and level flight on a line parallel with the judges' line. After passing the judges position, a smooth climbing turn is commenced away from the judges. At the apex of the turn the bank should be no greater than 60 degrees. The nose of the aircraft then lowers and the bank comes off at the same rate as it went on. The turn is continued through 180 degrees to recover straight and level flight at the same height and on a heading opposite to that of the entry. A low powered aircraft would be expected to execute a shallow dive at full throttle to pick up speed before commencing the maneuver. Note that this is an offset maneuver.

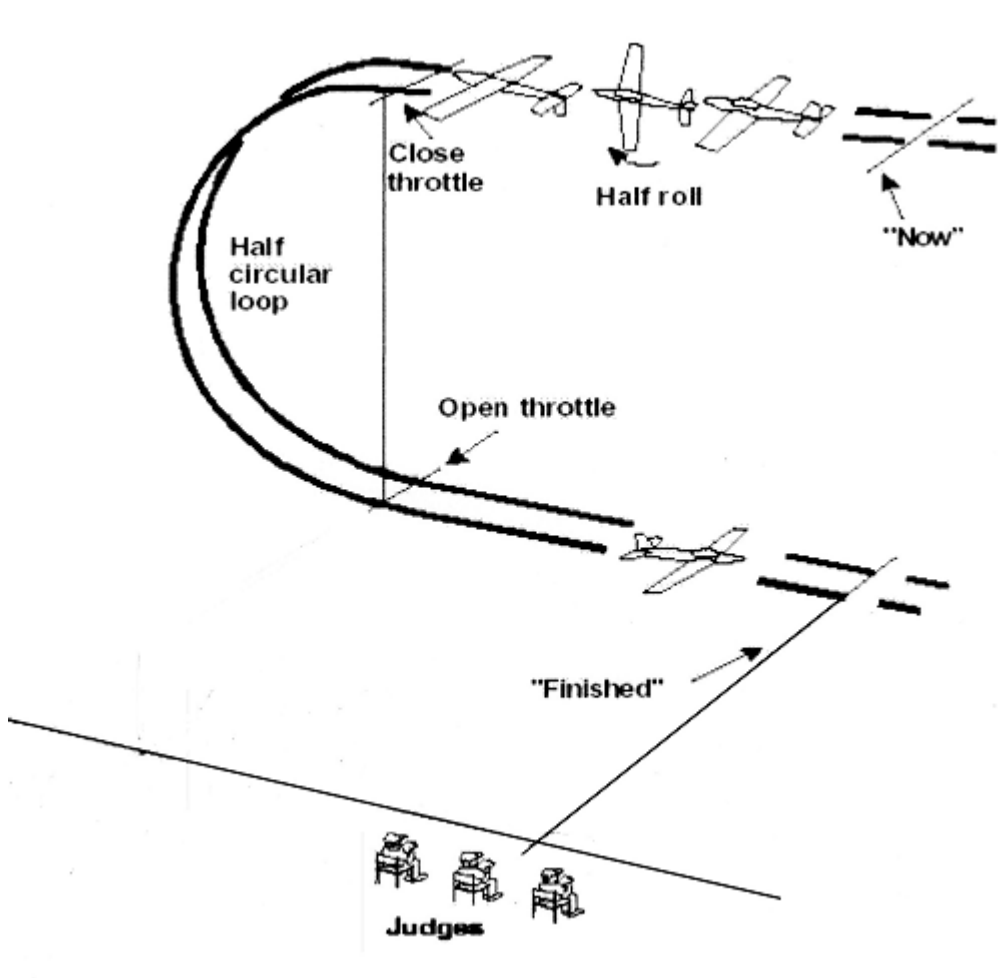
Errors:

- 1. Start and finish not centered on judges' position.***
- 2. Insufficient climb achieved.***
- 3. Climb is not smooth and continuous.***
- 4. Insufficient bank achieved.***
- 5. Climb and descent angles not equal throughout maneuver.***
- 6. Aircraft does not fly a smooth and symmetrical arc.***
- 7. Entry and exit paths not in straight and level flight.***



5D.10 Split-S~

From a straight and level flight, the model performs a half roll and when inverted, performs the second half of a loop and resumes straight and level flight on a heading opposite that of the entry. **The throttle should be closed at the inverted position and opened when normal flight is resumed.** Note this is an offset maneuver.

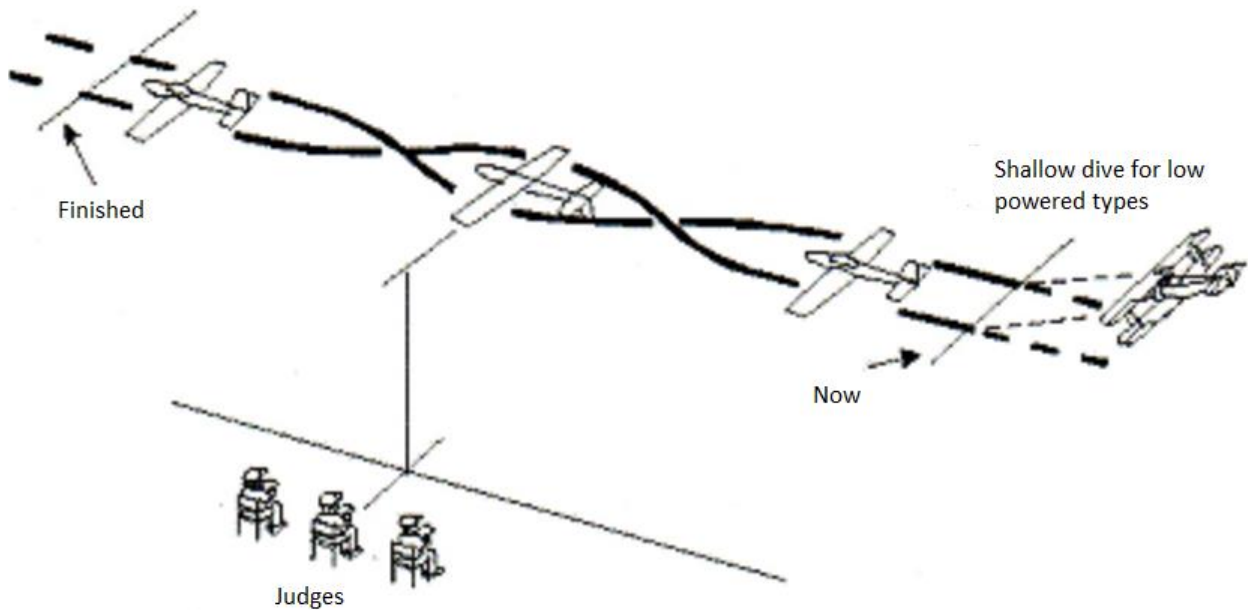


Errors:

- 1. Model changes heading (track) during half roll.*
- 2. Wings are not level during half loop.*
- 3. Throttle is not used.*
- 4. Track of half loop not on line or vertical.*
- 5. Model does not exit from maneuver on the exact opposite heading to entry.*

5D.11 Rolls and More Rolls~

There are three styles of rolls that may be performed: A roll with a break, a roll without a break, and a slow roll. A roll without a break means that the maneuver is a continuous roll about an axis with no hesitation through its 360-degree of travel. Examples are a military roll, victory roll, axial roll, barrel roll, and snap roll. Rolls with interruption or breaks include a two-point, and the four- or eight-point roll. The last type of roll is the slow roll which is done for the approximate length of the flight line. Note all rolls are to be centered on the judges.



5D.12 Rolls With a Break (2, 4 and 8 Point Rolls) ~

Rolls with interruption or breaks include a two-point, and the four- or eight-point roll. Only the four point roll is described. However, the two and 8 point rolls are performed in a similar manner and judged accordingly. The model starts in level flight, then assumes a slight climb, makes a quarter-roll in a nose up attitude, then makes another quarter-roll bring it to a level inverted position. It then makes another quarter-roll, slightly diving, and then makes the last quarter-roll into level upright flight. Each point is held for approximately one second.

Errors:

- 1. No arc (trajectory) during maneuver.***
- 2. Points held too short or too long.***
- 3. Altitude at finish different from beginning.***
- 4. Wings not level or vertical at point (8-point roll would also include 45-degree points).***

5D.13 Rolls Without a Break (Slow, Axial, Vintage and Barrel) ~

From straight and level flight, the aircraft rolls at a constant rate through one (1) complete rotation and resumes straight and level flight on the same heading. Non-aerobatic or low powered aircraft would be expected to execute a shallow dive at full throttle before the maneuver. The contestant should nominate which type of roll that will be performed, e.g. Slow, Axial, and Vintage.

Errors- Slow, Axial, Vintage Rolls:

- 1. Model does not begin and end in level flight.***
- 2. Roll rate is not constant.***
- 3. Model does not finish maneuver on same heading and/or altitude as entry.***
- 4. Style of roll not as nominated.***

5D.13.1 Barrel Roll~

The maneuver should begin with a shallow dive at full throttle to pick up speed, the nose should then pull up and the aircraft begins what appears to be a climbing turn. Continued application of ailerons in the turn will roll the aircraft which when inverted, may be as much as 90 deg. off its original heading. No down elevator is applied in the inverted position so the nose will fall as both turn and roll continue until the aircraft returns to the upright position at the same altitude and on the same heading as the entry. The barrel roll orbit should be big and fat like a beer barrel.

Errors:

- 1. Roll rate is not constant.***
- 2. Model does not finish maneuver on same heading and/or altitude as the entry.***
- 3. Maneuver is not centered on judges' position.***
- 4. The barrel roll orbit is not big and fat like a beer barrel.***

5D.13.2 Snap Roll-Inside~

Model begins in level flight. As the nose is pulled up to the point where the wing will stall, rudder is applied to roll the model in the desired direction. The nose of the model should break the line of flight in a direction towards the pilot's cockpit, indicating that a stall has occurred. While most models will roll faster in a snap roll than in an aileron-induced roll, roll rate should not be a factor in judging. The roll should stop precisely when the model is again upright and the maneuver should be completed in straight and level flight. Snap rolls may be performed vertically or on a 45-degree climbing or diving flight path, but such maneuvers should always begin and end in straight and level flight.

Errors:

- 1. Model does not begin and end in level flight.***
- 2. Wing does not stall during roll.***
- 3. Roll is not terminated precisely after 360-degree rotation.***
- 4. Model does not exit from maneuver on the same heading as the entry.***

5D.13.3 Snap Roll-Outside~

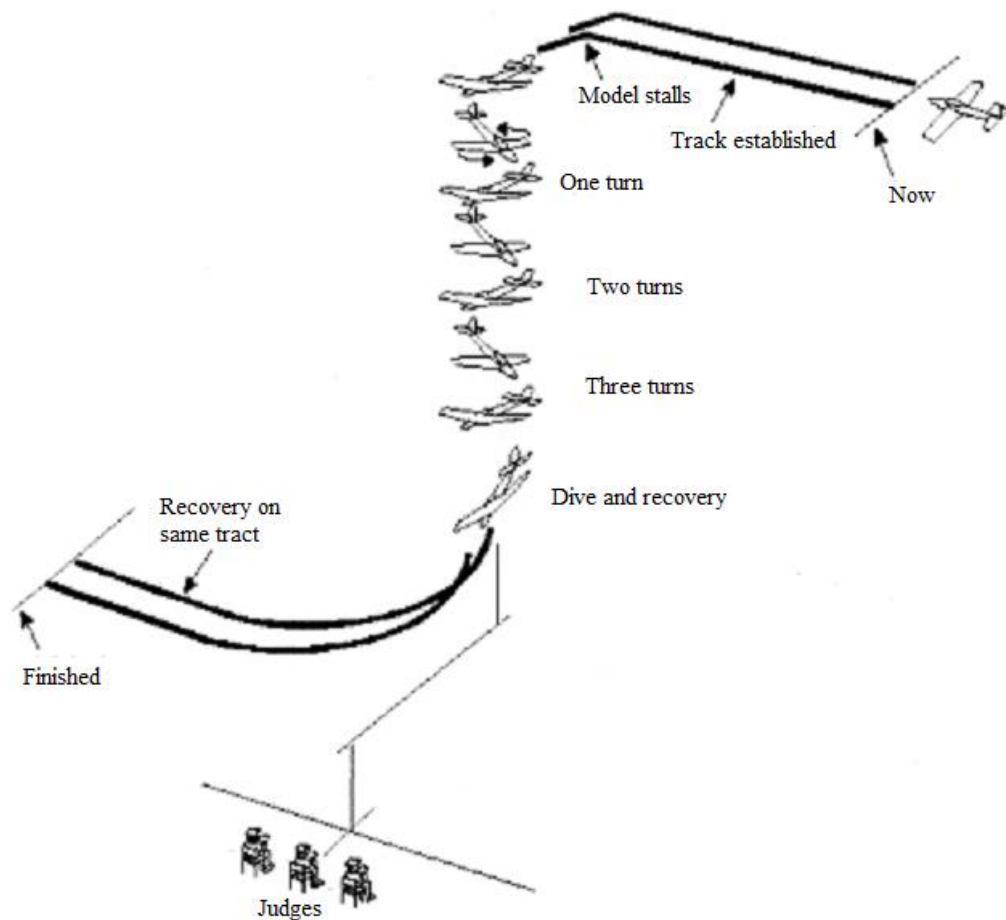
This maneuver should be performed in a similar manner to the inside snap roll except that, as the break occurs, the nose of the model moves away from direction of the pilot's cockpit indicating that a stall was induced by the application of down elevator control.

Errors:

- 1. Model does not begin and end in level flight.***
- 2. Wing does not stall during roll.***
- 3. Roll is not terminated precisely after 360-degree rotation.***
- 4. Model does not exit from maneuver on the same heading as the entry.***

5D.14 "N" Turns Spin~

The number of turns to be performed shall be noted on the judges' score sheets. The contestant may choose any whole number. The entry shall be from straight and level flight parallel to the runway. Power shall be reduced and the aircraft should remain on heading in a slightly nose high attitude until it stalls and commences to spin. The model should auto-rotate through the prescribed number of turns and recover on the same heading at a lower altitude. The rate at which the model rotates in the spin will depend on its size and type, but judges should be alert to observe models which are performing a spiral dive rather than a true spin. This maneuver must be centered on the judges.

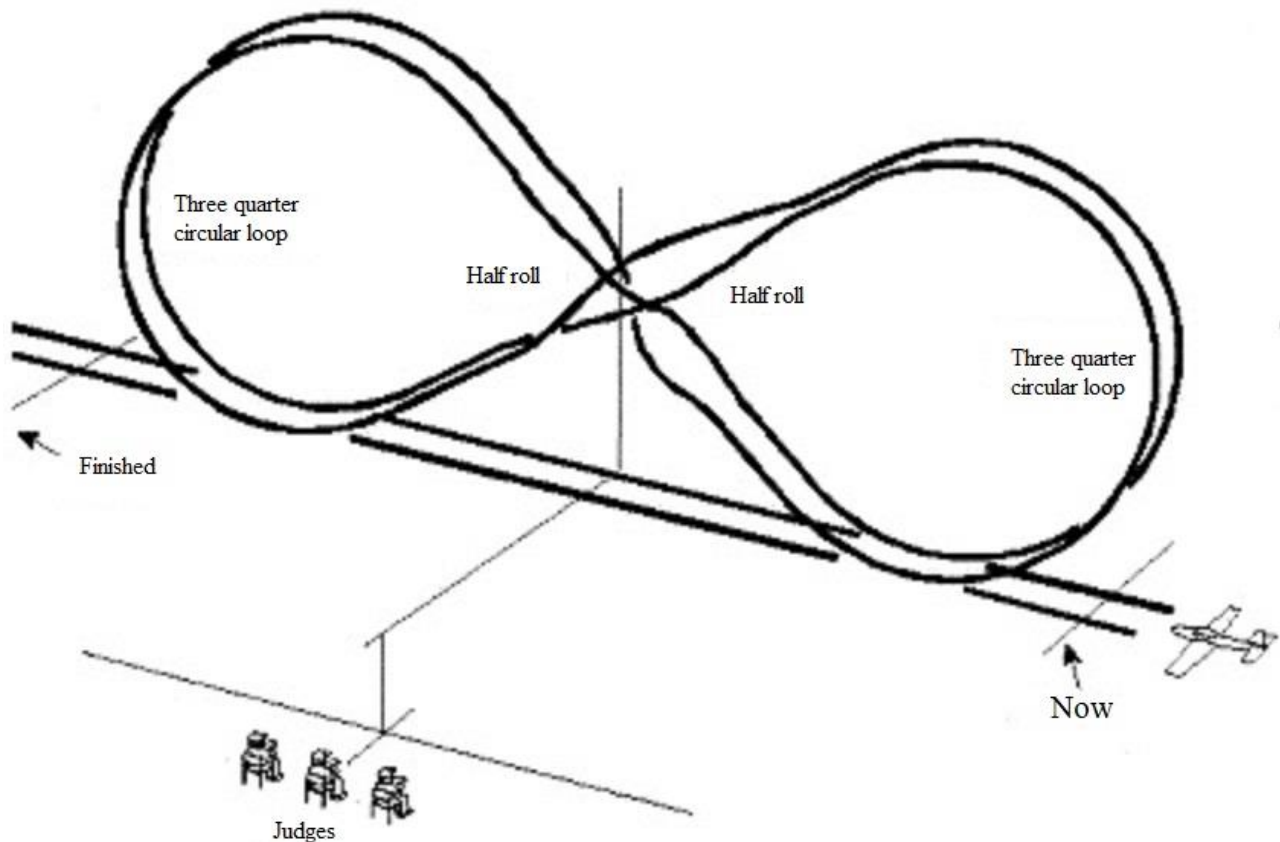


Errors:

- 1. Entry not from level flight parallel to runway.***
- 2. Entry into spin not clean and positive.***
- 3. Start of spin not centered at judges' position.***
- 4. Does not perform the prescribed number of complete turns.***
- 5. Does not recover on the same heading as entry.***
- 6. Wings not level on recovery.***
- 7. Not a true spin, but a spiral dive performed.***

5D.15a. Cuban Eight, Reverse Cuban Eight~

The model approaches in straight and level flight on the maneuver line. After passing the judges' position, the model pulls up into a circular inside loop and after completing half the loop, heads inverted downwards at 45-degrees and when halfway down, does a half roll followed by another half inside loop to the inverted downwards 45-degree heading, then does another half roll and when again half way down, pulls out into straight level flight at the same altitude as the entry and on the same heading. A light aircraft type would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the maneuver. Throttle may be closed at the top of each loop and reopened during each descent. ½ Cuban maneuvers should be offset to the left or right of judging center depending on wind conditions and should end at judges' center.

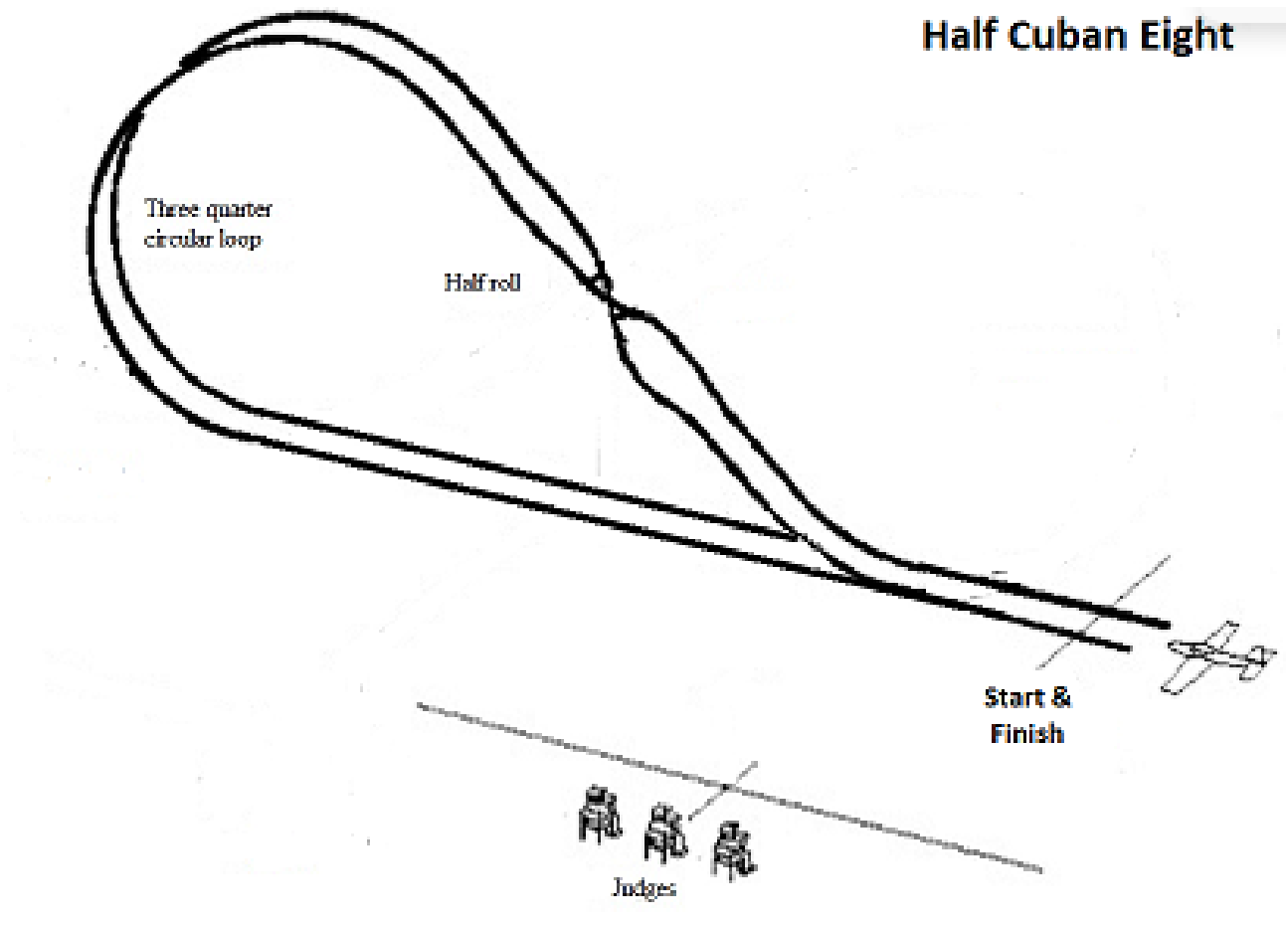


Errors:

- 1. Maneuver is not performed in a constant vertical plane or is executed endwise.***
- 2. Loop(s) are of unequal diameter.***
- 3. Half roll(s) are not executed at the correct point in the maneuver.***
- 4. Model does not exit from the maneuver at same height as entry.***

5D.15b. Half Cuban Eight, and Reverse Half Cuban Eight~

The model approaches in straight and level flight on the maneuver line. After passing the judges' position, the model pulls up into a circular inside loop and after completing half the loop, heads inverted downwards at 45-degrees and when halfway down, does a half roll pulling out into straight level flight at the same altitude as the entry and on the same heading. A light aircraft type would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the maneuver. Throttle may be closed at the top of each loop and reopened during each descent. ½ Cuban maneuvers must be offset to the left or right of judging center depending on wind conditions and should end at judges' center.



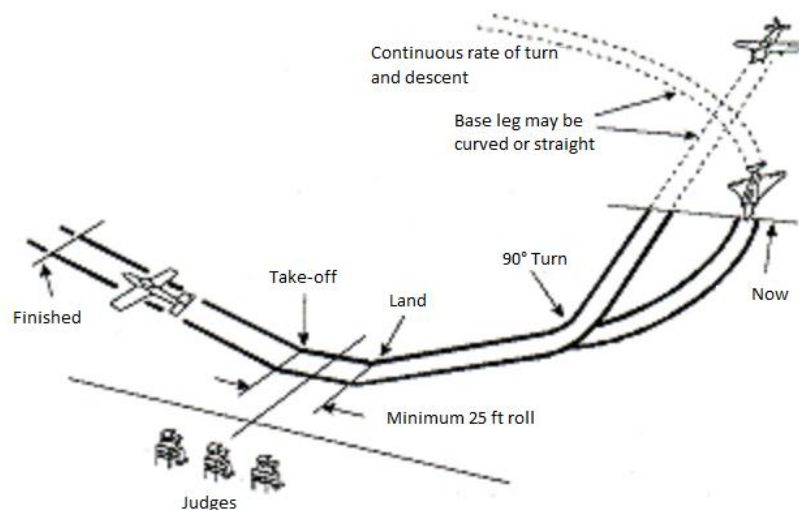
Errors:

1. *Maneuver is not performed in a constant vertical plane or is executed endwise.*
2. *Half roll(s) are not executed at the correct point in the maneuver.*
3. *Model does not exit from the maneuver at same height as entry.*

5D.16. Touch-and-Go~

The “Touch and Go” maneuver shall be scored as two (2) maneuvers.

The Touch-and-Go option requires the aircraft to slow sufficiently after landing to *below flying speed*, before again accelerating for the "Go" prior to take-off. This does *not* require that the tail wheel or skid settle to the ground for "tail draggers". ALL other qualities expected of landing and takeoff will prevail including the start of this maneuver at the beginning of the final approach. The start of the "Go" maneuver will coincide with the throttle acceleration after previously being slowed. On prototypes so equipped, flaps and retracts would be used on both sides of the maneuver. When coming in, the flaps and gear should be down. When departing, the flaps and gear should be retracted in the same sequential manner as would be expected for a Takeoff where flaps are retracted last to avoid stalls. Maneuver should be scored using the same criteria as a Landing and Takeoff. The maximum score for this maneuver sequence is 20 points, 10 for the "Touch" and 10 for the “Go”. Each maneuver will be listed on two consecutive lines on the scoring sheet. One as “Touch” and the other as “Go”.

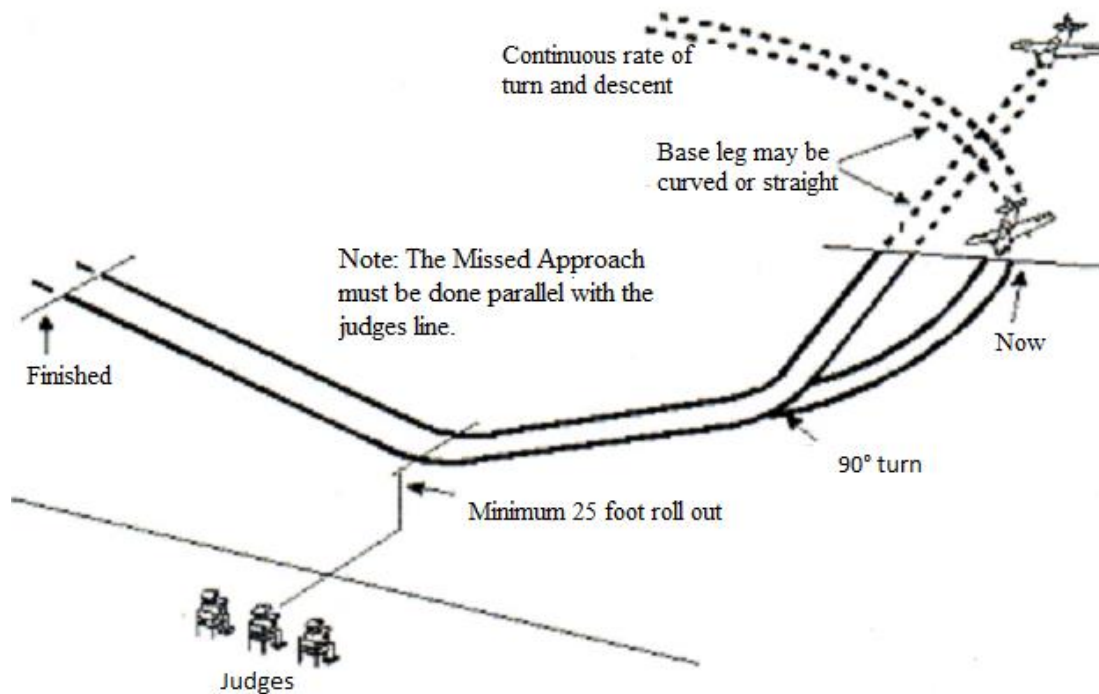


Errors:

- 1. Maneuver does not commence when entering final approach.***
- 2. Descent from base leg not smooth and continuous.***
- 3. Model does not maintain a constant rate of descent and flare to touchdown.***
- 4. Model impacts or thuds on to ground due to lack of flare out.***
- 5. Model bounces on landing.***
- 6. Model does not slow sufficiently after landing to below flying speed.***
- 7. Takeoff roll and climb out not smooth and realistic.***
- 8. Inappropriate use of flaps and gear.***
- 9. Model does not roll a minimum of 25 feet during the “Touch” portion of the maneuver.***

5D.17 Missed Approach~

The model makes a landing approach at low throttle to below 10 feet altitude without touching down, followed by a climb out at full throttle to resume level flight. Model should commence by flying a final crosswind leg followed by a turn onto a normal landing approach at a low throttle, using flaps and gear if applicable, until it reaches a point over the center of the runway at a point immediately opposite the judges at a height of 10 feet or less. At this point, full throttle is applied and the model climbs straight ahead to resume level flight. On prototypes so equipped, flaps and retracts would be used on both sides of the maneuver.

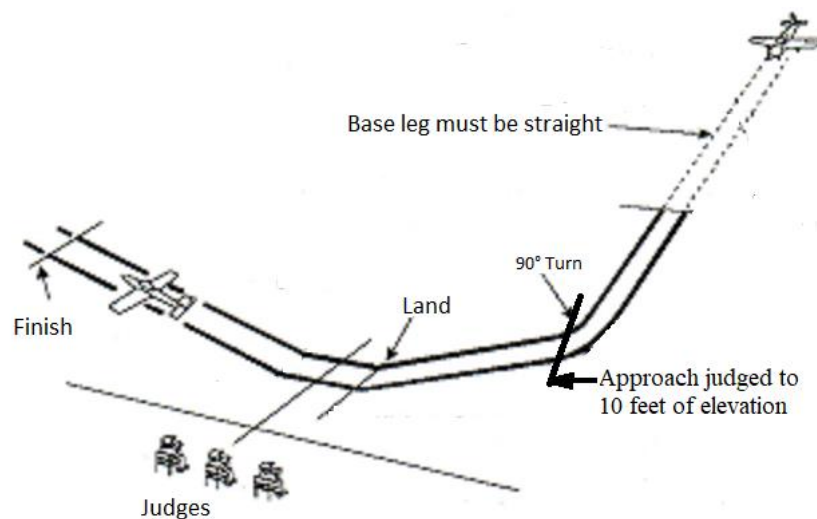


Errors:

- 1. Model does not commence maneuver with the correct landing approach.***
- 2. Model must be descending until full power is applied.***
- 3. Lowest point of maneuver not achieved in front of judges.***
- 4. Model does not climb away smoothly.***
- 5. Model simply dives or dips toward runway and climbs away.***
- 6. Inappropriate use of flaps and gear.***

5D.18 Standard Traffic Pattern Approach to Landing~

The primary objective is to fly a rectangular shaped maneuver. The model begins on an upwind heading on the far side of the runway. After passing in front of the judges, it should continue, straight and level, and at a constant altitude for approximately 200 feet before making a turn away from the flight line onto the crosswind leg. A second turn begins a downwind leg with the model flying at a constant altitude and again passing in front of the judges. A third turn towards the flight line begins the base leg during which the model may begin its descent. A fourth turn, into the wind, should line up the model with the runway centerline, and straight descending flight should continue. Traffic Pattern is complete when the model is at 10 feet altitude, at which time a landing maneuver begins. Note that in some cases the third and fourth turns are joined to become one continuous 180-degree turn. When retractable landing gear and/or flaps are used, these should be deployed at appropriate points of the pattern. If this maneuver is selected by the contestant, it cannot be a standalone maneuver. This maneuver must be followed by a Touch & Go, or a full stop landing.

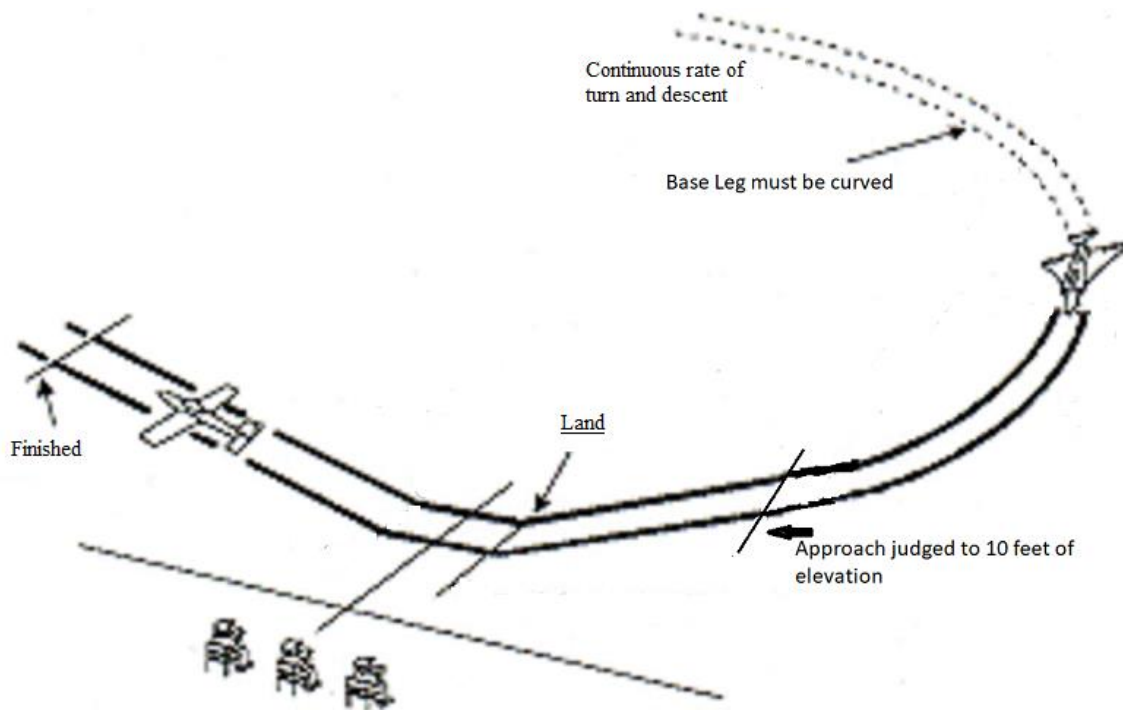


Errors:

- 1. The upwind and downwind legs are not parallel to the runway.***
- 2. First turn not 90-degrees.***
- 3. Model does not reduce speed during the downwind leg.***
- 4. The gear/flaps are not deployed at appropriate points in the pattern.***
- 5. Model does not make a smooth, constant descent during the base and final legs.***
- 6. Model not lined up with centerline after turn to final.***
- 7. Excessive use of throttle during the final approach.***
- 8. Maneuver is not followed by a Touch & Go, or a full stop landing***

5D.19 Military Traffic Pattern Approach to Landing~

The model begins with an upwind pass on the far side of the runway with a 180-degree turn away from the judges followed by a 180-degree turn to final. The traffic pattern ends at 10 feet altitude. An alternate military traffic pattern commences with a low entry approach on the far side of the runway with a climbing pitch out away from the judges culminating in another 180-degree turn to final. As before, the traffic pattern ends at 10 feet altitude. Flaps and landing gear are extended at the beginning of the 180-degree turn to final.

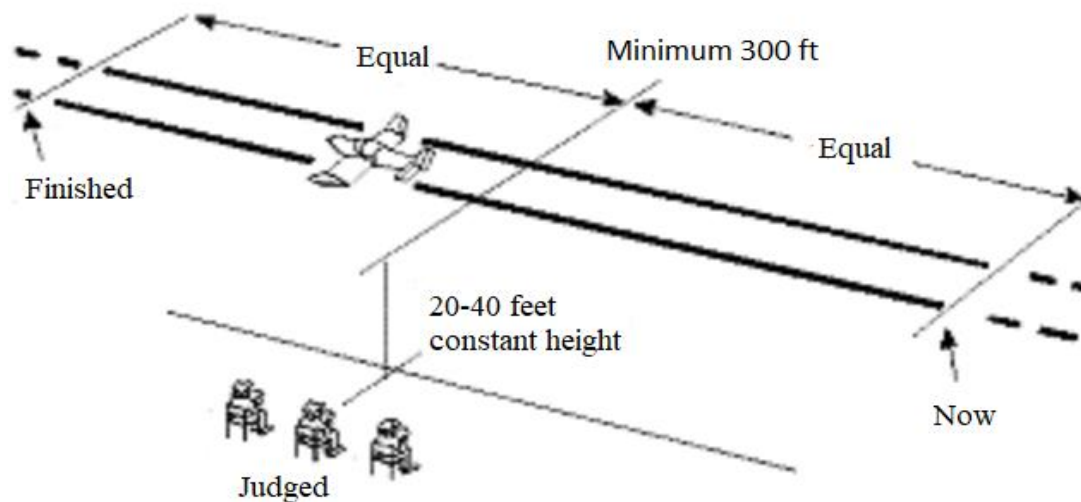


Errors:

- 1. The upwind and downwind legs are not parallel to the runway.***
- 2. Excessive use of throttle during the approach.***
- 3. Varying turn rate and glide path especially during the final 180-degree turn.***
- 4. Model does not reduce speed during the downwind leg.***
- 5. The gear and/or flaps are not deployed at appropriate points in the pattern.***
- 6. Model does not make a smooth, constant descent during the base and final legs.***
- 7. Model not lined up with centerline after turn to final.***
- 8. Maneuver is not followed by a Touch & Go, or a full stop landing***

5D.20 Slow Speed Inspection Pass (Dirty Fly-By)~

This maneuver is only allowed for aircraft with flaps as a minimum. This maneuver includes the described transition periods on a common heading and elevation to enter and exit slow flight. The model will transition smoothly into and out of a high lift and high drag aerodynamic configuration using the applicable features of the aircraft. As a minimum, this maneuver must include the use of fully deployed flaps as the model is progressively brought to its slow fly by speed. This will be along a straight and level path parallel and over the far edge of the runway at an elevation of between 20 and 40 feet for a minimum of 5 seconds. This slow midpoint period of the maneuver should be opposite the judges. The model's flying speed should be much slower than the mandatory Fly Past, to the extent that the apparent stall speed has been effectively reduced by use of flaps and other applicable features. The model will often require some low level power to "drag" it through this high drag period. The model will then slowly transition out of this high lift and high drag profile while speed is again increased. This transition should not include immediate lifting of flaps prior to increasing speed, which could otherwise stall the model. This maneuver must be centered on the judges.

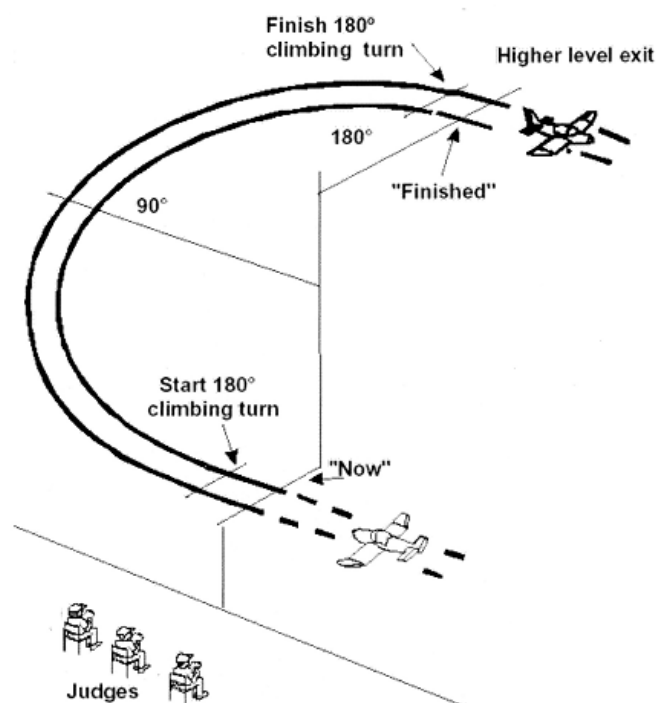


Errors:

- 1. A smooth, straight and level flight at a constant altitude is not provided to transition into, during, and out of the Slow Speed Inspection Pass.***
- 2. The model is not on the same heading.***
- 3. Allowances should be made for corrections in gusty wind conditions.***
- 4. Altitude is not between 20 and 40 feet.***
- 5. Maneuver is offset to the left or right of the judges.***
- 6. The 5 second slow speed portion is not remarkably slower than the Fly Past.***
- 7. All applicable high lift or high drag features such as flaps and retracts were not deployed.***
- 8. If flaps were not deployed, the maneuver will score a zero.***

5D.21 Chandelle~

This maneuver is an exaggerated maximum performance climbing turn in which the aircraft changes direction through 180- degrees. The model may begin with a shallow dive to pick up speed, the nose should then pull up and the model begins a climbing turn proceeding away from the flight line. The maximum climb and bank occur at approximately the midpoint during the change in direction. The maximum may only be 45 to 60-degrees for non-aerobatic aircraft and up to 90-degrees for fully aerobatic aircraft. Entry speed should be sufficient to prevent visible slipping or skidding and maintain the same turn rate throughout the maneuver. The degree of bank angle and rate of climb are constantly changing as the speed continues to decline through the maneuver. As the 180-degree point is reached in the turn where the aircraft is traveling in the opposite direction from which it entered, the wings are brought level for the maneuver completion. At this time, the aircraft would be flying at reduced speed (just above stall speed) compared to entry. **The maneuver must start and finish centered on the judges.**

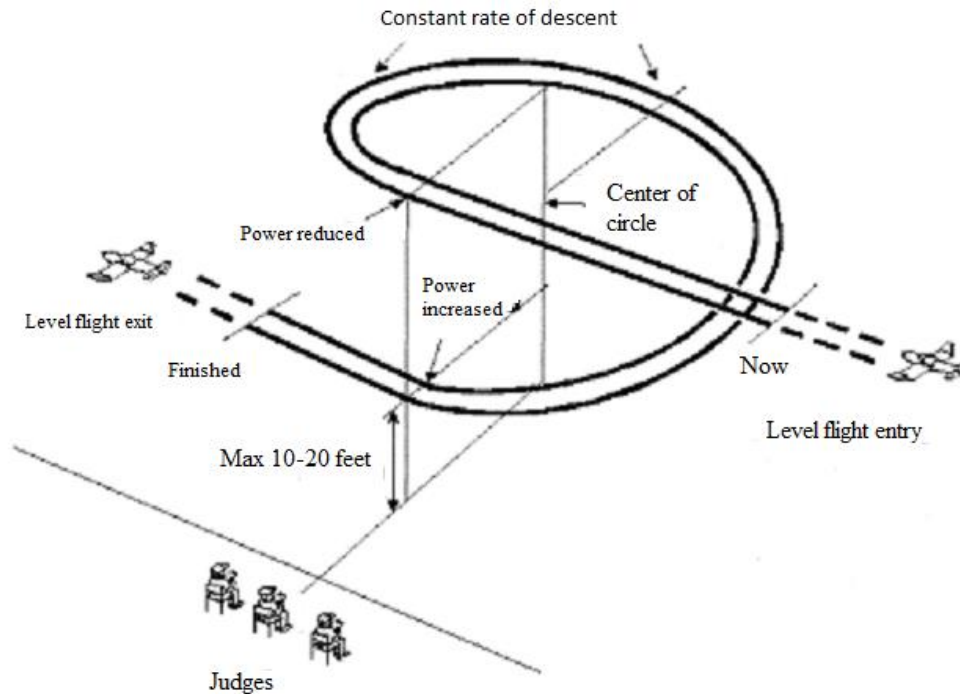


Errors:

- 1. Same turn rate is not maintained throughout the maneuver.***
- 2. The model slips or skids***
- 3. The model does not provide a notable climb rate***
- 4. The model does not finish with wings level on a heading opposite to that entered***
- 5. Full power is not used though out the maneuver.***
- 6. Entry & exit locations are not in front of the judges.***

5D.22 360 Descending Circle~

Commencing from straight and level flight, the model performs a gentle 360-degree descending circle in a direction away from the judges, at a constant low throttle setting. The maneuver terminates at a height of between 10 and 20 feet resuming straight and level flight on the same path. This maneuver must be centered on the judges.

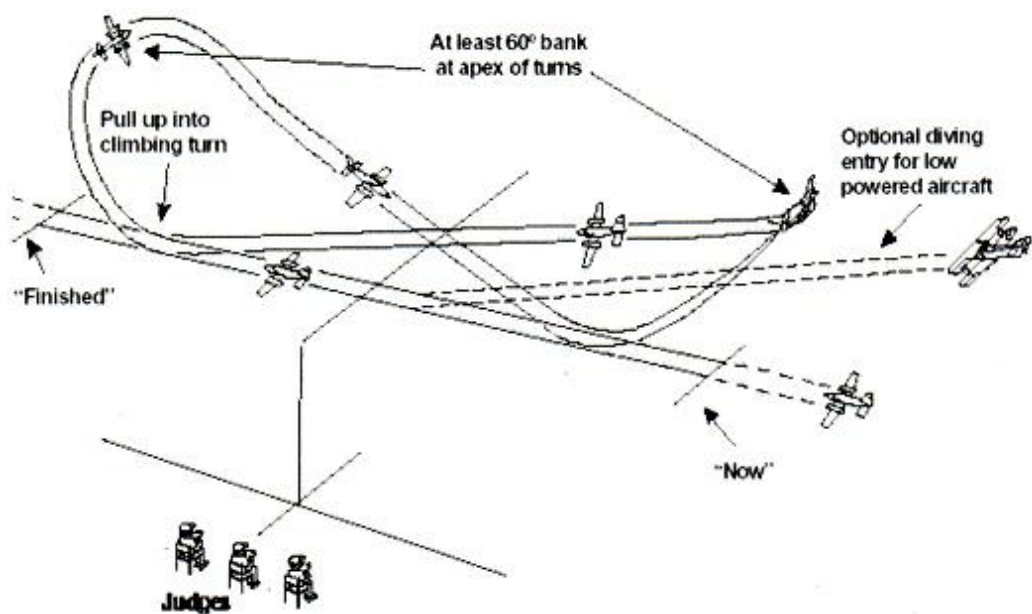


Errors:

- 1. Rate of descent not constant.*
- 2. Descent too steep.*
- 3. Throttle not constant or low enough.*
- 4. Circle misshapen.*
- 5. No significant loss of height.*
- 6. Descent not to a height between 10 and 20 feet.*
- 7. Circle not centered on judges' position.*
- 8. Entry and exit paths not on the maneuver line.*
- 9. Start and Finish not called in straight and level flight.*
- 10. Too far away, too close.*

5D.23 Lazy Eight~

The model aircraft approaches in straight and level flight on a line parallel with the judges' line. After passing the judges position, a smooth climbing turn is started away from the judges. At the apex of the turn, the bank should be at least 60 degrees. The nose of the model aircraft then lowers and the bank comes off at the same rate as it went on. The turn is continued beyond 180 degrees to cross in front of the judges with wings level before intercepting and turning on to the reciprocal of the original approach track. This completes half of the figure, which is then repeated in the opposite direction to give the full symmetrical maneuver about the judges' position. Intercepting the original approach track parallel with the judges' line completes the maneuver. A low powered aircraft would be expected to execute a shallow dive at full throttle in order to pick up speed before starting the maneuver. This maneuver is essentially two wingovers in opposite directions and should be capable of being flown by most aircraft. This maneuver must be centered on the judges.

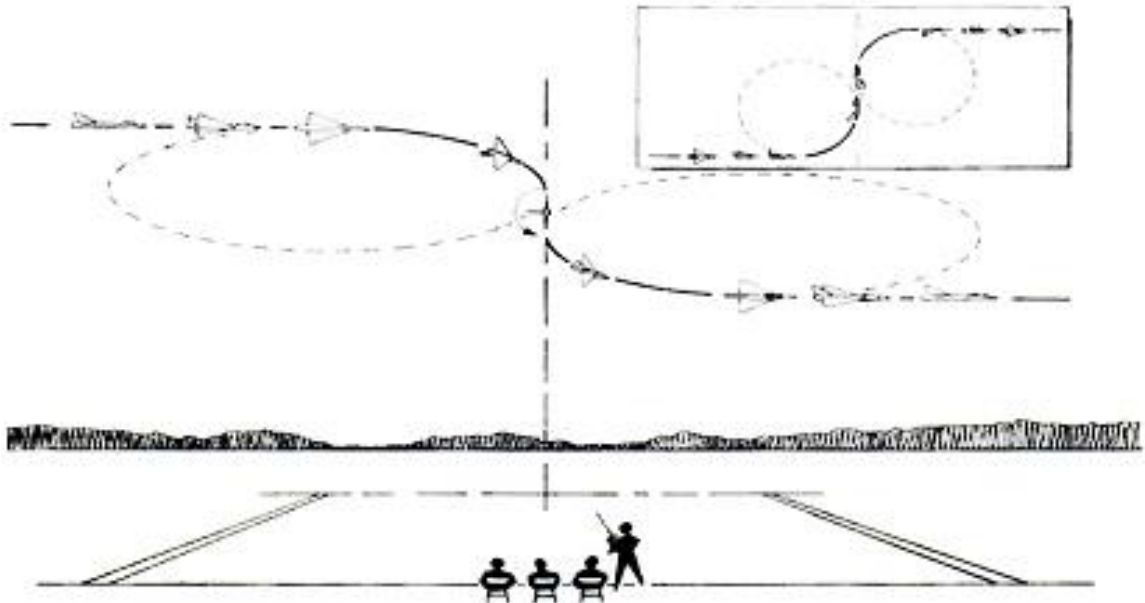


Errors:

- 1. Entry and exit paths not parallel with maneuver line.*
- 2. Insufficient climb achieved.*
- 3. Insufficient bank achieved.*
- 4. Climb and descent angles not equal throughout the maneuver.*
- 5. Arcs misshapen.*
- 6. Maneuver not centered about judges' position.*
- 7. Start and finish positions not as indicated.*
- 8. Overall size of maneuver not realistic for prototype.*
- 9. Aircraft flight path not smooth and steady.*
- 10. Too far away/too close/too high/too low.*

5D.24 Derry Turn~

The model approaches at a high speed in straight and level flight on a parallel line with the maneuver line. The model then makes a steep bank (in excess of 60 degrees) one-quarter circle turn in a direction away from the judges without losing height. When centered in front of the judges, the model makes a half roll in the same rolling direction as the entry, again directly followed by a steep one-quarter-circle turn in the opposite direction, and then flies off straight and level on a line parallel with that of the entry maneuver. This maneuver must be centered.



Errors:

- 1. Entry not parallel with maneuver line.***
- 2. Maneuver not centered in front of judges.***
- 3. The rolling maneuver in front of judges not axial on a line directly away from judges.***
- 4. The roll in center is not in the same roll direction as the entry to the maneuver.***
- 5. Any hesitation between the end of the first quarter turn, the roll and/or the start of the second turn.***
- 6. Exit not parallel with entry.***
- 7. Significant height difference during maneuver.***
- 8. The maneuver misshapen (as seen as part of a figure eight).***
- 9. Maneuver is too low or too high to be easily judged.***

5D.25 Spot Landing~

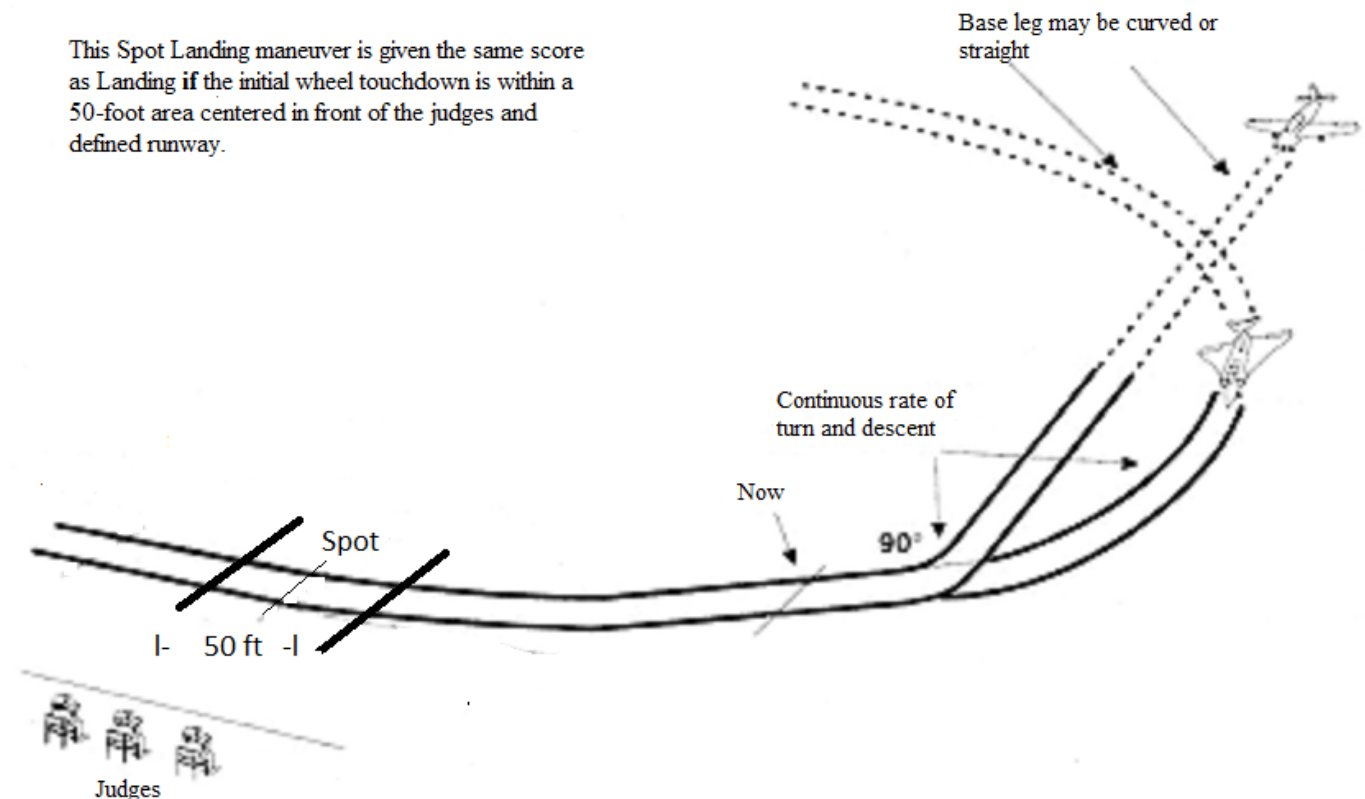
The “spot landing” maneuver option has been narrowed to 50 feet. The 50 feet shall be measured 25 feet on each side of a line centered on the judges.

This Spot Landing maneuver is given the same score as Landing **if** the initial wheel touchdown is within a 50-foot area centered in front of the judges and defined runway. If the runway width prohibits this defined area, then the judges and contestant must agree that the spot landing area be a rectangle whose width is that of the defined runway and length is 50 feet centered in front of the judges, i.e. 25 feet to the left and right. **If** the aircraft initially touches down inside this defined area, the score for Spot Landing option becomes the *same as* that given for Landing. If the initial touchdown is outside this defined region, the Spot Landing option score becomes zero and the Landing is scored in the same manner it would have been without spot landing considerations. Both judges must agree as to whether or not the aircraft touched down in the defined region. This maneuver may not be listed as a **combination maneuver** with flaps/slats or retracts to dilute pilot precision. All other requirements of the Landing maneuver apply including starting this maneuver at the beginning of the final approach.

Due to difficulties in judging regions offset from *judges' centerline*, no offset centering of the defined 50-foot region will be permitted, unless approved by the CD.

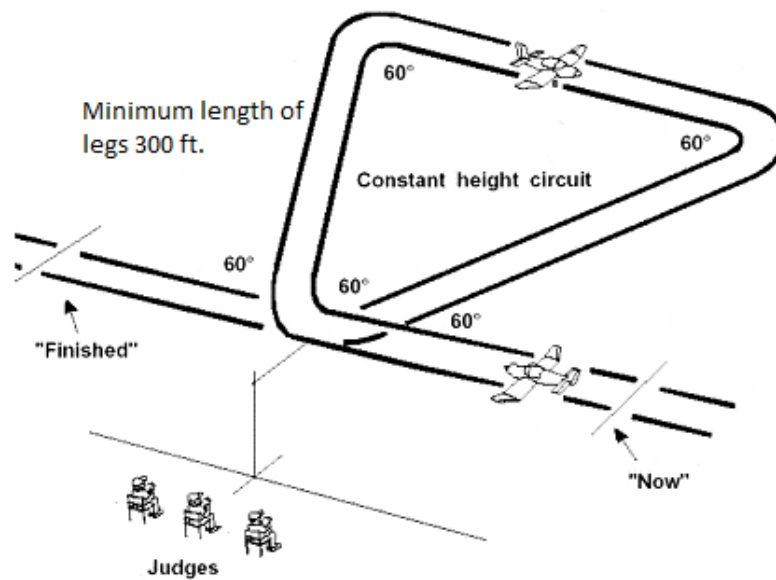
NOTE: Contestant Beware: With limited runway length, this maneuver option may not be very practical for certain aircraft when runway facilities are not optimum. In such cases, the C.D. may preclude this option entirely at the event to preserve a high level of overall judging accuracy.

Judges Beware: This is the most frequently misjudged maneuver when different scores are given for Landing and Spot landing when the wheels did touch in the 50' area.



5D.26 Flight in a Triangular Pattern~

The model approaches in a straight and level flight to a point directly in front of the judges. It then turns away to track 60° away from the judges' line. It then flies straight and level for a minimum of 300 feet, turns to track parallel with the judges' line, flies a further minimum of 300 feet, then turns to track towards the judges and flies a further minimum of 300 feet to a position above the center of the landing area, which completes an equilateral triangle (i.e. a triangle with sides of equal length and angles of 60°), before making a final turn to intercept the original entry track. This option may only be nominated for non-aerobatics aircraft. This maneuver must be centered on the judges.

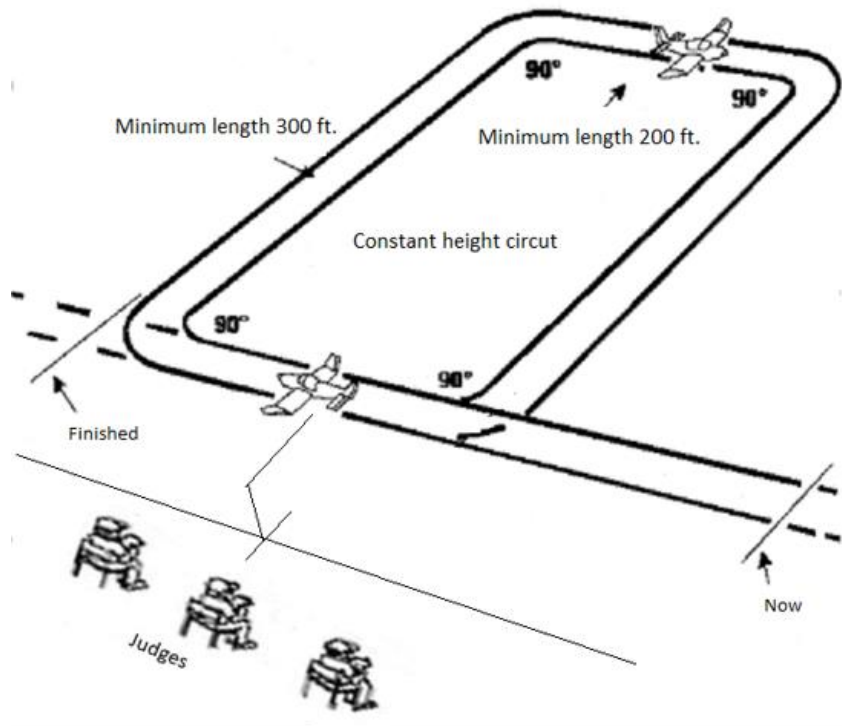


Errors:

- 1. Not commenced and finished at points equidistant from the judges.**
- 2. Model aircraft changes height.**
- 3. Rate of turn at corners not constant or inside corners of triangle not 60° .**
- 4. Sides of the triangle are not straight.**
- 5. Sides of triangle are not equal lengths.**
- 6. Sides of the triangle are too long or too short.**
- 7. Apex of triangle not centered on judges' position.**
- 8. Correction for drift not properly made.**
- 9. Start and finish tracks not the same.**
- 10. Start and finish tracks not parallel with judges' line.**
- 11. Too far away / too close / too high / too low.**

5D.27 Flight in a Rectangular Pattern~

The model aircraft approaches in straight level flight to a point directly in front of the judges. It then continues for a minimum of 100 feet before it turns away to track 90° from the judges' line and flies straight and level for a minimum of 300 feet before turning to track parallel with the judges' line for a further minimum of 200 feet. It then turns to track directly towards the judges for a minimum of 300 feet, to a point in front of the judges, before completing a final turn to intercept the original entry track. This maneuver describes a rectangle over the ground. This option may only be nominated for non-aerobatic aircraft. This maneuver must be centered on the judges.

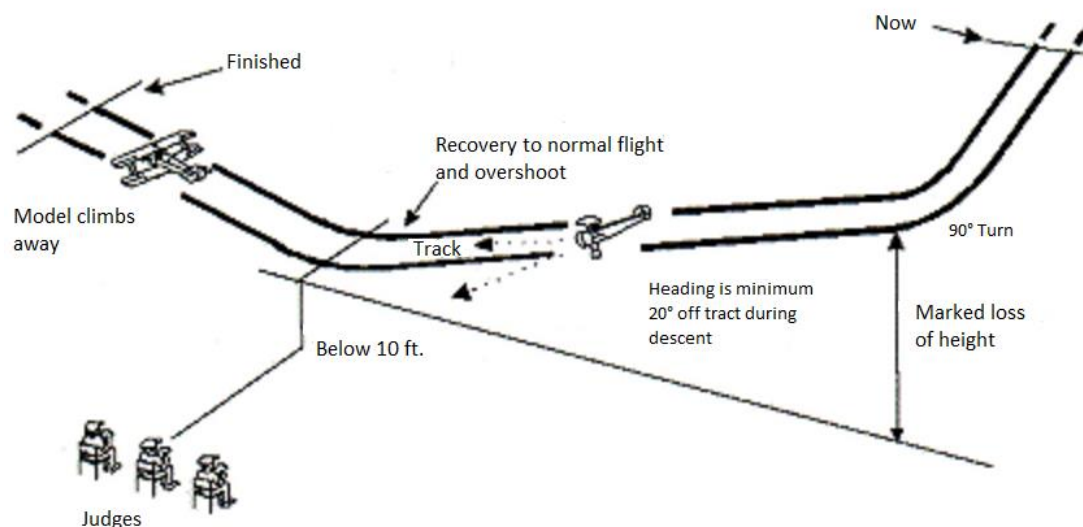


Errors:

- 1. Not commenced and finished at points equidistant from the judges.**
- 2. Model aircraft changes height.**
- 3. Rate of turn at corners not constant or corners not 90° .**
- 4. Legs are not straight.**
- 5. Legs too long or too short.**
- 6. Opposite sides of rectangle are not of equal length.**
- 7. Correction for drift not properly made.**
- 8. Final leg of rectangle not centered on judges' position.**
- 9. Start and finish tracks not the same.**
- 10. Start and finish tracks not parallel with judges' line.**
- 11. Too far away / too close / too high / too low.**

5D.28 Side Slip~

The model aircraft commences the maneuver in level flight by reducing power on base leg, and then turns onto a higher than normal final approach that is parallel with the judges' line. As model aircraft enters the turn it starts a Side-slip by the application of opposite rudder to the direction of turn, achieving a yaw of at least 20° off track. A marked loss of height must be apparent while maintaining final approach speed. Before reaching judges' position, the Side-slip is corrected, normal flight is resumed and the model aircraft carries out an approach from below 10 feet before climbing away. Purpose of this maneuver is to demonstrate a marked loss of height on final approach without an excessive buildup of speed or the use of flap. This maneuver may be selected by all types of model aircraft. The aim of the Side-slip would be to affect a landing in front of the judges. This maneuver may be used in conjunction with a Touch & Go, Missed Approach, or a landing. This maneuver may only be used once.

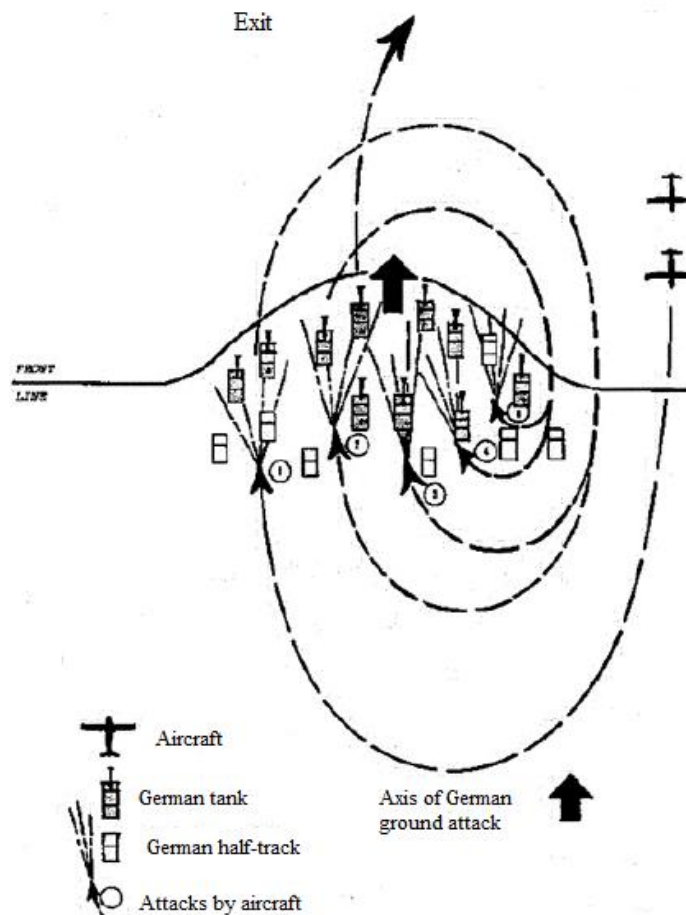


Errors:

- 1. Model aircraft does not smoothly enter Sideslip upon turning final approach.**
- 2. Model aircraft is not yawed at least 20° off track during Sideslip.**
- 3. Rate of Sideslip and descent are not constant.**
- 4. There is insufficient height loss.**
- 5. Excessive speed is built up during descent.**
- 6. Approach track not maintained or not flown parallel with judges' line.**
- 7. The Sideslip is not corrected before passing the judges.**
- 8. Missed Approach is not below 10 feet.**
- 9. Not a smooth transition during return to normal flight and climb out.**
- 10. Too far away / too close / too high / too low.**

5D.29 Circle of Death~

The Circle Of Death was flown by the Soviet Air Force in WWII on the Eastern Front. The maneuver rational is to keep a constant rate of fire on a German tank column. The aircraft would attack in a circle flying in behind the tanks to penetrate the back side of the Tigers. By the whole squadron attacking at once they could keep at least one plane's guns on the column either until it was destroyed or all ammunition stores including 37 mm cannon and bombs had been expended and then they returned home. The aircraft should fly in a level circle dropping bombs on the tank column while flying low over the battle field. For a scale model to be flying this maneuver they must fly low over the "battlefield" and drop bombs directly in front of the judges on the first pass. Continuing on into a second 360 degree circle, the aircraft comes back to "target" and drops more bombs on the target then flies back home to maneuver completion.



Errors:

- 1. Failing to maintain consistently low (20' to 30') altitude.**
- 2. Failing to drop bombs directly in front of judges on to make believe target.**
- 3. Unequal halves of circle left & right of "target".**

5D.30 Other Maneuvers~

Our intent is not to define the **only** maneuvers that can be performed at an event. Our intent is to define maneuvers that are typical or common in scale modeling events. As there are no K-factors with regard to maneuver difficulty, the modeler must be the judge as to what maneuvers best showcase the overall realism of the aircraft modeled. The AMA rulebook is a good source of flight maneuvers. Optional maneuvers to be considered could be:

- Simulated pylon lap or speed run.
- Rolling circles.
- Any other maneuver that the full size aircraft could perform and you can explain and execute.

Section 6 ~ Judges Certification

Prerequisites

- ** Read and understand the NWSAM, USSMA, and AMA Competition Regulations
- ** Have 20-20 eyesight (correctable)
- ** Color Judge must pass Color Blind exam given at local DMV or health clinics or, online at:

<http://waynesword.palomar.edu/colorbl1.htm>

- ** Pass the corresponding Certification Exam with at least 90% score

6.1 Certification Process

A. Study the information contained within this guide. If your eyesight is good (and if Color Judge, pass the colorblind chart available from <http://waynesword.palomar.edu/colorbl1.htm>) proceed with filling out the on-line application located at NWSAM website and take the exam, which is open book. At present the NWSAM judging Director is Mike Ingram and can be reached at firercer@cs.com The honor system is used throughout the program.

B. Your exam will be graded and the results will be put in the mail within 1 week. If your score is 90% or better, a letter will be sent to the NW Scale Aero-modelers Director indicating your status.

C. The CD may contact you and schedule the judges' "calibration" session to be held sometime before the event start date. During the session, you will be filling out a flight sheet along with the others and your score will be compared to a reference score determined by the CD. If your scores after the first flight are within 1 point of the reference score (for each maneuver) the CD will sign your score sheet. A copy of this is then sent to HQ for the file. You are then qualified to judge at the event. The CD will ensure you are assigned to another Certified Judge for judging the contest.

D. After the contest, the CD will sign off your application as training complete and a copy is sent to NWSAM Director.

The Judging process to someone untrained can seem complicated. It is easy to fall back to one's own standards or background knowledge and fail to judge objectively. Failure to judge objectively is dangerous and is guaranteed to fan the flames of emotion with any contestant.

The trained Judge will set his/her background knowledge aside and only compare the model with the documentation provided. Arriving at a score is simply subtracting the downgrades you find from 10. Each element starts at 10 and is downgraded as mismatches are found. A minor (m) mismatch is 1/2 point and a Major (M) mismatch is a full point. If this sounds too easy, relax - it actually is IF you follow the process.

There will be times when there is no documentation provided. No score can then be given for that element. This is the subjective part and every effort should be made to follow a set of standards available to everyone so that the default is the same for the judge and the contestant.

Training is the key to judging success and the NorthWest Scale Aero-modelers is committed to develop and train to these standards. There is still much work to be done and your input is valued. Feel free to contact NWSAM with any suggestions or ideas that could help with this effort.

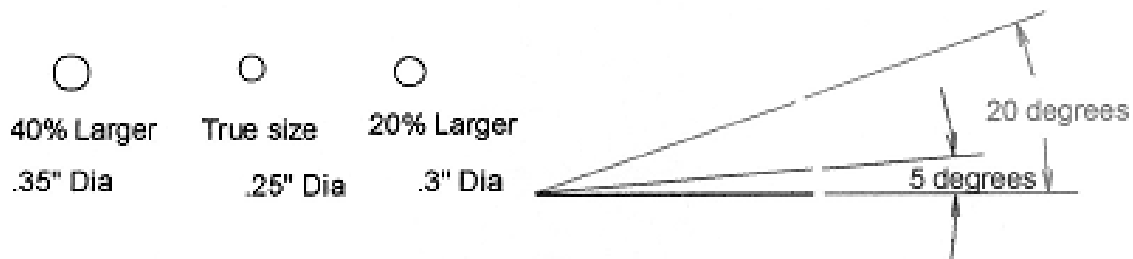
The Outline judge will study the documentation item starting at the tip of the rudder then look up at the model. Does it match? If yes, proceed to the next element in a clockwise rotation. If not, look at the photos provided to see if the item shows up in the pictures as photos take precedence over 3-view drawings. If it matches, go to the next item. If the judge cannot find a photo that clearly shows the mismatch the judge downgrade for that particular item and go to the next item.

6.2 Static Judging Criteria

The following sections outline the criteria to objectively static judge a model. Develop your system and use this for every model. Judges who follow the judging process arrive at a consistent and accurate score each time.

6.2.1 Criteria for Accuracy of Outline

As an example of outline criteria, if the vertical stabilizer shape at the tip on the model does not match the 3-views, photo documentation (if supplied) will be reviewed for evidence supporting the model. Since photographs of the actual aircraft being modeled take precedence over 3-views they should be used as the final determination as to whether the vertical stabilizer matches or not. If there is no photo that clearly shows this view, downgrade ½ point if the size/location discrepancy is minor to moderate and a full point if major. A minor deduction (1/2 point) is typically where the mismatch is 5% to 10% in relative size of the linear dimension relation and for angular relation 2 to 5 degrees. Major deductions of 1 point are for mismatches greater than 10% and 5 degrees. No deductions will occur for errors less than 5% or 2 degrees. To determine percentage, consider the following diagrams:



6.2.2 Criteria for Finish, Color, and Markings

A minor deduction (1/2 point) is typically given where a mismatch is noted but is minor. Moderate or major deductions (1/2 to 1 points) will be typical where the mismatch is readily apparent.

A. Finish: This is to include the sheen or reflective properties of the finish, weathering details, and the application of materials e.g.; many WWI aircraft were painted with a brush and brush marks were easily seen even from a distance. If the documentation shows brush marks in certain areas, the model should also show this artifact. The Finish judge should consult with the Craftsmanship judge to ensure an item is not double downgraded, once by the Finish judge and once by the Craftsmanship judge.

B. Color: It is the contestant's responsibility to authenticate the model colors by providing documentation such as color photos, published artist conceptions, paint chips, color reference guides, or factory paint samples. Color and hue of the model need to be checked against the color reference provided in the documentation packet. The "sheen" or reflective properties may also be verified from

these same samples but will only be used for scoring the Finish qualities as previously described. Black, Flat Black, or natural aluminum does not need paint reference samples.

C. Markings: This inspection verifies size and placement of markings to match the documentation. Ideally, the documentation would show the placement of all markings. However, if no documentation is available, a typical view showing that squadron's markings from references other than the aircraft modeled may be used to depict typical marking locations (these items need to be noted as TYPICAL MARKINGS for the judge in the documentation packet).

6.2.3 Criteria for Craftsmanship are as follows:

- A.** Inspect parting-line area of control surfaces for visibly unrealistic hinging, uneven fit, or gap on both top and bottom.
- B.** Inspect for inadequately disguised model-related disassembly sections in wings, cowls, empennage, etc., checking for poor fit or unrealistic appearance including large screw heads in conspicuous areas or “model” type exposed control horns that are not scale.
- C.** Inspect for correct prototypical choice in hidden or exposed control arms or linkages to elevator(s), rudder(s), ailerons, etc., as depicted in the documentation.
- D.** Inspect quality of simulated metal-skin features for applicable three-dimensional panel lines, scale rivets (raised or flush), or fastener detailing. Verify approximate scale uniformity in size, spacing and correct three-dimensional effects of these features top and bottom.
- E.** Inspect for applicable fabric-covered surface sections in cosmetic appearance. Also verify “taping” appearance when applicable for fabric-covered surfaces.
- F.** Inspect for quality in rigging or connector detail on externally braced aircraft such as biplanes.
- G.** Inspect for quality in detailing any applicable small protruding pitot tubes, antennas, air scoops, hooks, pods, etc.
- H.** Inspect for quality in visible dummy engine detail including exhaust and stains where applicable.
- I.** Inspect for any unrealistic model damage anomalies regarding shrinkage, scuffing, scraping, peeling, tears, or gouges. Simulated wear such as realistic metal dents or exposed bare metal in painted regions for high-wear areas common to aircraft may enhance the model rather than be cause for downgrade.
- J.** Inspect for applicable window or canopy EXTERIOR detail quality insofar as framework and their resolution from the transparent window regions. Also verify overall exterior fit to airframe or adjoining multiple canopy sections when applicable. A functional sliding canopy is not required, but the described cosmetic static appearance is.
- K.** Inspect for realistic quality detail features of the landing gear, which are generally additional to the basic machined, stamped, or wire drawn strut components. A downgrade is applicable only if the gear struts are void of realistic detail qualities independent of materials used. Typical off the shelf landing gear do not include items such as brake lines, tie down hooks, fill ports, scissors, drag links, or wheel covers (front and back) that match full size aircraft. These are the “extras” that a modeler can detail out

to affect the craftsmanship score in this area.

L. Inspect for applicable wing tip and taillight (etc.) feature qualities for their realistic detailed appearance. Functional illumination is not a requirement for optimum score.

M. Inspect for unrealistic surface defects like wood grain, sanding marks, fillet defects, cracks, voids, pinholes, etc.

6.3 Flight Judging Instructions and Automatic Downgrades

Most of the criteria have already been called out in the maneuver descriptions. There are a few items to ensure before and during the flight:

- Ensure the flight sheet has been completely filled out by the contestant when they hand this to you. Common items that are missing are the checkbox in Aerobatic or Non-Aerobatic aircraft type, their name and registration number in each flight round box.
- Check the flight sheet for any comments by the CD about items attached to the aircraft during static judging such as wing tanks, bombs, torpedoes, etc. These items if presented at static should be on the aircraft for flight.
- Next, make sure there is a pilot visible in the aircraft if there should be one visible.
- List of Automatic Downgrades are as follows:
 - a) No Retracts. If the model does not have retractable gear when the full size did, then deduct 4 points from the Overall Flight Realism score.
 - b) No Flaps. If the model does not have, or the pilot does not use flaps during the flight where applicable, deduct 4 points from the Overall Flight Realism score.
 - c) No Pilot Figure. A pilot figure must be visible during flight (if the full size was visible) or the score will be downgraded by 2 points for Overall Flight Realism.
 - d) Flying through the sun. If the pilot flies his aircraft directly into the sun during the scoring portion of a maneuver, the flight judge downgrades that maneuver by 2.5 points (zero score for placement).
- Remember that the contestant starts each maneuver with 10 points. Each maneuver is scored against the three elements; Precision, Placement, and Realism with downgrades according to the severity of the mismatch in each element.
- Be fair and be consistent. With each score, ask yourself is this fair? Is this consistent with other scores I have given for similar aircraft/maneuvers? Establish your own system of keeping track of the downgrades for each of the elements during the maneuver.
- A Feedback Symbol key is provided on the bottom of the flight sheet and is used to point out the major source of downgrade for each maneuver. The flight judge should write in the box just to the right of the score box one (or more) symbols as feedback for the pilot so they can improve their score on the next flight. Examples of feedback symbols below:

N.W. Scale Aero-Modellers Flight Judges - Feedback Symbol




















Flight Realism: Continuity, Options, Power Mgmt (2.5, 3, 2.5)

Feedback Symbols are used to point out the major source of downgrade.

Scores must be to the nearest .5 point (for example 8.5).

Multi-engine: Score entirely for Mechanical Content, and reliability in flight.



Precision (5pts)	Placement (2.5pts)	Realism (2.5pts)
 Heading Off	 Too High	 Bank Angle extreme
 Symmetry Off	 Too Low	 Bank Angle - too shallow
 Off Center	 Not Centered - too right	 Jerky, Abrupt
 Wings not Level	 Not centered - too left	 Throttle not Managed
 Entry altitude different than exit	 Not Centered	 Landing Gear Realism
 Roll Rate not Constant	 Placement too Close	Too Fast S +
 Turn not 90 degrees	 Placement too Far	Too Slow S -

Note 1: There is no symbol for “scale speed”, instead the optimum speed required is determined by maneuver realism and speed sensitive “realistic bank angles in turns” as described within the definitions section of this guide.

Note 2: There may be other symbols used particular to a judge. It is okay to ask them what it means for clarification.

Note 3: Judges are encouraged to share their symbols with NWSAM to include in the next revision of the Guide.

Note 4: There is no symbol for "scale speed", instead the optimum speed required is determined by maneuver realism and speed-sensitive "realistic bank angles in turns" as described within the Definitions section of this Guide.

Section 7 ~ Definitions

Builder of the Model is the individual who constructed the airframe from raw materials or from prefabricated components as found in a kit such as fiberglass formed skin components, foam cores, canopy or plastic molded exterior details, wheels, etc. The same individual, with material of his or her choosing, shall also perform all final assembly and finishing (painting) of the model. Any other commercially advertised products may also be used without penalty to the modeler at the various stages of construction. Hardware independent of airframe (visible or not) requiring machining or welding to assure reliability, safety or the required operations of the scale model aircraft such as radio, engine accessories and, undercarriage gear commercially acquired or designed by the modeler for optimum outline accuracy, may be commissioned independently when in the judgment of the modeler commercially available items are not adequate. No other airframe construction may be commissioned in this manner.

Optimum Speed for overall flight realism is defined as that optimum speed which provides maneuver realism for realistic flight attitude appearance including bank angles in turns, realistic g-loading appearance and with appropriate maneuver size. For example, the model should not be flown excessively fast where it may demonstrate unrealistic high bank angle attitudes and high g-loads.

Also, the model should not be flown too slowly where unrealistic shallow bank angles or flat turns do not simulate the full-scale aircraft.

CD: Contest Director, as certified by the AMA/MAAC (depending on contest location). The CD is responsible for overall safety, organizing and running the contest.

Air Boss: The person in charge of the active flight line. Ensures safety of aircraft, pilots, crew, and spectators. Stages the aircraft up next on each flight line. Gives pilot's clearance to runway accesses.

Aerobatic means the aircraft is rated to exceed a 60-degree bank angle and/or a 30 degree pitch angle.

Non Aerobatic means the aircraft was not capable of inverted flight or extreme attitudes that would endanger the aircraft and/or pilot. Similar to FAA descriptions, a non-aerobatic aircraft is not rated to exceed 60-degree bank angle or 30-degree pitch angle.

Judges' Centerline is an imaginary line straight out from the judges' position, perpendicular to the runway.

Maneuvering line is an imaginary line parallel to the runway, 10 to 50 feet beyond the far side of the active runway. The 10-foot line would be for slower flying aircraft and the 50-foot line would be for faster models like high-speed jets.

Judges' Deadline is an imaginary line parallel to the runway even with the near edge of the runway from judges/pilot station. It extends out to infinity both left and right directions.

Viewing Angle is defined as a 90-degree field of view for the judges equally spaced from the judges' centerline e.g., 45-degrees to the left and 45-degrees to the right of center.

Reference Documents

Federal Standard 595 Color Chip Book is used for color *reference*, available from the General Services Administration (GSA)1.

AMA Competition Regulations available for \$2.50 from Academy of Model Aeronautics, 5151 East Memorial Drive, Muncie, Indiana, 47302

FEDERATION AERONAUTIQUE INTERNATIONALE (FAI) Sporting Code. Avenue Mon Repos 24, 1005 LAUSANNE, Switzerland. As found on the World Wide Web at:

<http://www.fai.org/aeromodelling/documents/sc4>

General Services Administration, Rm. 6654, Attn: Specifications Section (3FBP-W),
7th and D Streets SW, Washington, DC 20407

Section 8 ~ Logistics

8.1 Time Limits and “Official” Delays: Time limit for each flight will start from the moment the contestant begins his/her preflight discussion with the judges and ends at the conclusion of the flight after taxi back (or carry back) to the judges. During the preflight discussion, the contestant can also present documentation he/she believes may be appropriate to explain or defend any unusual flight, mechanical, or scale operational feature(s) of the aircraft. However, this should be kept brief since the clock is running. The CD will designate actual time limit allowed as dictated by various logistical factors of the event at the pilots meeting. **This event will use a 15 minute flight window.** Once started, such time will be extended only for officially recognized delays (such as full-scale traffic). Also, an additional one-half minute (30 seconds) will be added for each “multi-engine” beyond the first engine.

8.1.1 If any maneuver is delayed or started and aborted due to an immediate and obvious traffic safety problem, the contestant will be granted a restart of that maneuver. In such recognized cases, the clock will be extended accordingly. An abort shall not have been deemed necessary for later restart if the maneuver was only *questionably interrupted as an afterthought*, and instinctively continued and completed by the pilot in such a manner that it could be scored in a complete and fair manner by the flight judges. The decision by the witnessing flight judges will be final on such infrequent and unpredictable events!

8.1.2 The clock will also be extended for prevailing ground traffic contest related delays or safety requests to hold in taxi or takeoff without penalty to maneuver or continuity. If “official delays” result in “engine loading” and subsequent engine restart, the clock will also be extended if done in a timely manner without further technical problem(s) and delay. Engine restarts caused by official delays will be put back on the clock after restart or one minute of added time (whichever is shorter).

8.1.3 If any unusual combination of these unpredictable events results in a “formally extended time clock” as to make it unlikely to safely complete a flight, the contestant will be permitted an out of sequence emergency landing for refueling or, in the case of electric powered aircraft, battery replacement. The CD shall be consulted immediately upon landing by the flight judges as to the status and unusual circumstances leading up to this extended flight and emergency refueling. Only those portions of the flight yet to be completed in sequence (including landing) will be permitted immediately or later in that same flight round. The CD for suitable logistical timing within the event activities will further decide this when refueling is completed.

8.2 Transmitter Rule: Touching of the transmitter by anyone other than the contestant to make control or trim adjustment during the scored flight interval (from taxi out to taxi back), will disqualify the entire flight. This shall *also* include such violations during “trim” passes. An engine restart during taxi out or prior to becoming airborne will briefly permit handling the transmitter by another person for restart. However, see “Engine Restarts” for other applicable penalties for such restarts.

8.3 Loudly Announce Each Maneuver Entry: The pilot is expected to loudly announce each maneuver and it’s beginning to assure the judges are prepared for the specific scored item(s) to follow. Judges should not conclude the “judging period window” until a satisfactory clean exit is recognized, in spite of the contestant abruptly calling... “Maneuver complete!” Most maneuvers are entered and exited in straight and level flight. Therefore, the Inverted Flight maneuver must include the half roll entry and exit. Also, the

combined maneuvers of tank drop entry or exit with other *action maneuvers* must also be considered.

NOTE: The judges should also be alert for realism features *throughout the flight* as described in Overall Flight Realism.

8.4 Ground Option Limitations: Flight options listed for scoring may not include any maneuver or maneuver combination done entirely on the ground. This ground restriction does not apply to Takeoff and Landing maneuvers that are considered important transitional maneuvers from ground to air or air to ground. The only exception to this ground option limitation is the demonstration of folding or swing-wings as a mechanical option done entirely on the ground (see 5B.2). As an alternative, the contestant may instead use swing-wings for scoring in a flight maneuver combination (see 5B.2) rather than a scored mechanical option on the ground. However, the contestant cannot do both options.

8.5 Engine Restarts: Engine restarts NOT caused by contest related or “official” delays that occur after departing the immediate judging area and prior to becoming airborne will have various deductions in score depending on when it occurs: A minimal 0.5 point deduction penalty will apply on the *informal* taxi out (or back) in the CONTINUITY portion of Overall Flight Realism (whether it is taxied or carried). A zero score also applies during the roll sequence in a formal listed “Takeoff” (10-point loss) prior to becoming airborne. **If the model becomes airborne with flying speed and then immediately lands with engine failure, it is an official flight and may not be restarted.** Engine restarts will remain on the clock and contestant will immediately be informed and reminded.

Note: While competing with an electric powered aircraft, if the propeller comes to a stop at any time, scoring will be the same as a nitro or gas engine failure, and subject to engine restart penalties.

8.6 Skipped Maneuvers: If any listed maneuver(s) are skipped from the order shown by the contestant on the score sheet, those skipped may not be retrieved once a subsequent maneuver has been entered or performed. If the aircraft becomes airborne with flying speed but is also forced to land immediately thereafter, it is an official flight and all other maneuvers have effectively been skipped without retrieval (regardless of aircraft and options).

8.7 Takeoff and Landing Aborts: In the interest of safety, a takeoff or landing may be aborted and restarted with 7 points (or 70% for each subsequent retry) rather than be given an automatic zero. The contestant will still be on the clock for these additional attempts. Example scoring: After the first abort, the *maximum* score for the first *retry* is 7 points, 2nd retry is 5 points (70% of 7), 3rd retry is 3.5 points, etc. Do not jeopardize the safety of the judging line because the pilot felt compelled to continue a bad takeoff roll or landing simply to avoid an automatic zero score.

8.8 Flight Line Sequence Changes or “Mulligans”: These are any contestant requested changes to the approved flight line order, or request to go to the end of a flight line **after** the contestant is on the clock.

8.8.1 The CD will announce in the pilots meeting which option is to be used as dictated by the number of contestants present and the logistical schedule of the meet. There are two options available:

A) The only flight order changes or second opportunities permitted are those for damage repair, technical anomalies, or transportation damage. All such anomalies used to justify changing the flight order must be declared by the contestant and be approved by the CD **after** the contestant has been put on the clock. **If**

more than 3 minutes have elapsed on the clock, the contestant cannot request a “Mulligan” to go to the end of the line. When a “Mulligan” has been granted and the contestant is still not ready to fly at the end of the flight round, the flight will be forfeited.

B) No exceptions to listed flight order or “Mulligans” will be granted.

8.9 Maneuver change: Selected maneuver options for any flight may be changed by the contestant for the next round flown. Such changes on the flight score sheets are the responsibility of the contestant prior to each flight. If dropables are used in static, they must be used in the first flight. They may be deleted in listing as a complementing option thereafter if desired.

8.10 Flight Realism and Score Sheet Review: After the flight has concluded, the flight judges shall confer to review the numerous Overall Flight Realism qualities as described in this Guide. Identical flight realism scoring is not required. Individual judgment scores will still be of value for statistical averaging similar to others. Any zero scores given for any maneuver shall be mutually agreed upon by both flight judges and both will give identical scores of zero.

8.10.1 If the contestant had declared the aircraft to be Non-Aerobatic, that should be so noted on the check box of the flight score sheet for future reference. Before the score sheets are picked up, each individual judge must put his/her initial in the upper column heading for the flight round just concluded *after verifying that all line item scores have been included*. The flight score sheet provides a space for each numerical digit (up to three spaces). Scores must be to the nearest ½ point (for example 8.5). With the exception of the perfect score of 10.0 only two of the three spaces provided are required.

8.11 Forms: Contestant forms

8.11.1 Builder of the Model Declaration

8.11.2 NWSAM Official Protest Form

8.11.3 NWSAM Flight Safety Inspection Checklist

Builder of the Model Declaration

All Expert and Team Builder contestants competing in North West Scale Aero-Modelers events shall agree to the following "Scale Builder of the Model Rule" and assure the Contest Director that they understand the requirements of this rule before entering his/her model in competition at the Championships event.

Scale Builder of the Model Rule- The builder and flyer of a scale model shall be one and the same person except in Team Scale. There shall be no Team entries in the Expert category. The Contest Director will make every effort to assure himself/herself that each Expert contestant or Team Scale builder contestant has constructed the model that he/she uses in competition. "Constructed" shall mean the action required to complete a model airframe with no more prefabrication than is contained in the commercially available kit chosen to model.

Kits containing a large amount of prefabrication are permissible so long as the builder completes the final assembly and finishing of the parts, covering, final painting and applying the markings. This includes Almost-Ready-To-Cover (ARC) models if the model still requires these actions by the builder. If not, the model is relegated to compete in Open or Fun Scale Classes. Reworking of an Almost-Ready-To-Fly (ARF) model, no matter how extensive, does not constitute being the "Builder of the Model". The Builder of the Model shall have satisfied the requirements of the Builder of the Model Rule if the individual has constructed the airframe from raw materials or from prefabricated components as found in a kit with fiberglass formed skin components, foam cores, canopy or plastic molded exterior details, wheels, landing gear, etc.

The same individual, with material of his/her choosing, shall also perform all final assembly and finishing (painting, markings) of the model. Any other commercially advertised products may also be used without penalty to the modeler at various stages of construction.

Hardware independent of the basic airframe (visible or not) requiring machining or welding to assure safety and/or reliability or the required operations of the scale model aircraft such as engine accessories and undercarriage components, may be commercially acquired or designed by the modeler for optimum outline accuracy and may be commissioned independently when in the judgment of the modeler commercially available items are not adequate. No other airframe construction may be commissioned in this manner.

I have read the above Scale Builder of the Model Declaration and hereby attest to the fact that I am the builder of the model entered in this Championships.

Scale Model Entered

Contestant Signature

Date

NorthWest Scale Aeromodellers



Official Protest Form

Purpose: To provide a forum for a contestant to log a complaint, request a review of a score, or to note a situation requiring investigation.

Process: Fill out the form and describe in detail the situation to review. Sign and date at the bottom. Five to the Contest Director. The CD will respond to you within the hour and may request additional information or present a solution. If you are not satisfied with the results, a copy of this can be sent to the NWSAM Director and Vice Director for further investigation.

Name: _____

Aircraft: _____

Contest: _____

Description of Situation: _____

Requested Action: _____

Signature: _____ **Date:** _____ **Time:** _____

Contest Director's Action/Solution: _____

Note to CD: Please report all Official Protests to NWSAM Director and Vice Director.

CD Signature: _____ **Date:** _____ **Time:** _____

☐ If issue referred to AMA. Date: _____



NorthWest Scale Aeromodellers



Pre-Flight Safety Inspection Checklist

Event: _____ Date: _____

Contestant Name: _____ Registration # _____

Aircraft: _____

I attest that this model has completed at least six successful flights prior to this contest.

Signed _____ Date _____

I. Mechanical Checks

- ☐ Elevator push rod straight to servo, no flexing of elevator push rod
- ☐ Aileron, elevator, rudder hinges secure
- ☐ Linkages attached securely
- ☐ Wing/empennage (if removable) attach mounts (blocks or tubes) secure.

II. Electrical

- ☐ Battery is charged
- ☐ Wires are routed away from receiver
- ☐ Receiver On/Off switch is mounted isolated from vibration components
- ☐ Wires supported away from any abrasive material i.e. fiberglass fuse - Look for possible metal-to-metal contact such as flying wires that could cause radio Interference when vibrated together

III. Fuel System

- ☐ Fuel tank supported in anti-vibration material
- ☐ Fuel lines are secure

IV. Engine System

- ☐ Spinner is secure
- ☐ Muffler is secure
- ☐ Flying propeller is free of nicks, cracks

V. Control Check - Request that this check be done before each flight.

- ☐ Left Aileron,
- ☐ Right Aileron,
- ☐ Up/Down- Elevator,
- ☐ Right /Left-Rudder

VI. Comments (Use back of form if needed)

Safety Coordinator: _____ Date _____