



Competition Regulations

Rules Governing Model Aviation

Competition in the United States

Electric

Amendment Listing

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Update of event 607	5/5/2014	Paragraph 3.3
Establishment of Line Sizes	5/13/2014	After Paragraph 3.3

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Electric

ELECTRIC For events 604 through 630.

Purpose: The purpose of this document is to present in a single place a unified set of rules for electric model airplane competition.

1. Definition: Electric powered model airplanes are model airplanes which are propelled only by

electric motors which receive their power from onboard battery packs. No electrical connection to the ground is permitted during flight. In events other than record performances that specifically preclude on board battery chargers, except as specifically allowed by the contest director for competition purposes, no on board battery

charges (such as, for example, solar cells) shall be allowed.

1.1: General Characteristics:

Maximum surface area	2335 sq. in. (150 dm. sq.)
Maximum weight	11 pounds (5 kilograms)
Maximum surface loading	24.59 oz. per sq.ft. (75 gr/dm sq.)
Minimum surface loading	3.93 ounces per sq. ft.* (12 gr/dm sq.)
Maximum battery voltage	42 volts

*Except for event 627 and 629 (Indoor RC). (Individual battery cells can be of any commercially available chemistry type, and must be a rechargeable type).

2. Free Flight:

2.1: General Specifications. The use of gear boxes, folding propellers, and multiple motors are permitted. The propulsion system must be equipped with a means to cause the propeller to stop turning when the power is turned off. Free-wheeling propellers are not permitted. (This is to assure that the model is no longer under power.) The use of radio control is not permitted.

3. Control Line:

3.1: General Specifications. The use of gear boxes and multiple motors is permitted. Folding props are not permitted. No electrical power may be transmitted through the control lines. The use of radio control is not permitted. All applicable sections of Control Line General and Control Line Speed shall govern model and line construction and the timing of flights. There shall be no loading requirements for Electric Speed models.

3.2: Class A Control Line Speed

For event 606.

Any motor(s) allowed but the battery pack is limited to a maximum of 8.4 volts nominal of any battery type.

The model must successfully pass a 36G pull test prior to flight.

The flight speed will be calculated based on the six (6) laps of the circuit following two complete laps in the pylon. To compute the speed in miles per hour for A Speed, use the

formula: MPH = 1670.76/average time in seconds.

Two (2) control lines, ASTM A228 solid steel, shall be used and they shall be a minimum of 65 feet long. Multi strand lines are not permitted. The minimum diameter of each line shall be .016 inches. Maximum model weight shall be 30 oz.

The CD will determine whether hand launches are permitted.

3.3: Class B Control Line Speed

For event 607.

Any motor(s) allowed with the battery pack limited to a maximum of 42 volts nominal of any battery type.

The model must successfully pass a 28G pull test prior to flight.

Two control lines, ASTM A228 solid steel must be at least .020 inches in diameter and not shorter than 70 feet in length. Multi strand lines are not permitted. Maximum weight shall be 60 oz.

Flight speed will be calculated based on six (6) laps of the circuit following three (3) complete laps in the pylon.

The CD will determine whether hand launches are permitted.

ESTABLISHMENT OF LINE SIZES AND PULL TESTS IN CL SPEED

General: The AMA has adopted the following guidelines for determining minimum line sizes and pull tests in CL Speed. In all cases, wire strength shall be based upon minimum breaking strengths for ASTM A228 music wire as indicated in the chart. Maximum expected flight loads are based on record speeds in each class, and maximum weights where applicable. For Speed events permitting both single and two-line control systems, the established records shall be used for both monoline and two-line application unless separate records are established.

Maximum Expected Flight Loads.
Maximum expected flight load, in Gs, is calculated as shown:

$$\text{Max load (Gs)} = \frac{.0668 \times 1.2 \times V^2}{R}$$

where V = record speed in mph, and R = line length in feet. Maximum expected flight load in

pounds is equal to maximum load in Gs, times maximum model weight in pounds.

When calculating the expected flight loads for the "acceleration" events, 1/2A Proto, .21 Proto and F-40 speed, ect, use 107% of the Record Speed as a base. Multiple the Record Speed by 1.07 and use this number as "V" for calculating the Max Expected Flight Loads."

$$\text{Max load (pounds)} = \frac{.0668 \times M \times 1.2 \times V^2}{R}$$

M = maximum model weight (pounds), R = line length in feet.

Line Sizes: The line sizes for single line applications shall be such that the maximum expected flight load in pounds shall not exceed 56% of the minimum breaking strength of the wire size being utilized. If the maximum expected flight load exceeds this number, the line size shall be increased to the next standard wire size that will satisfy the above criteria. Additionally, for two-line control systems, the maximum expected flight load in pounds must not exceed 86% of the minimum breaking strength of one wire. In the event this number is exceeded, the line size shall be increased as described above.

Pull Tests: The pull tests for CL Speed shall be such that the pull test, in Gs, will be at least 1.10 times the maximum expected flight load in Gs. In the event the pull test is less than the prescribed value, the pull test shall be increased to a value where the pull test in Gs is at least 1.15 times the maximum expected flight load in Gs.

Implementation: In the event a new record is established which necessitates an increase in line size, pull test, or both, any changes will be published concurrently with announcement of the new record. Changes will become effective immediately upon publication in Model Aviation magazine. Changes are to be automatic, with no action required by the Electric Contest Board or the AMA Executive Council.

4. Electric Radio Control:

4.1: General Specifications. The use of gear boxes, folding propellers, and multiple motors is permitted. The operator must demonstrate the ability to start and stop the

motor(s) by radio command. For limited motor run events, the prop must come to a full stop to assure that the model is no longer under power. The Contest Director may specify that the motor cannot be run in the last minute of a flight. An optional landing task may be included at the discretion of the CD, and it shall account for no more than 25 additional points per flight. In the case of ties, a fly off will be defined by the CD.

At the discretion of the CD, Battery Allotment and Limited Motor Run events may be flown "Man-on-Man." Here, the best score in each flight group will be awarded 1,000 points, and all other scores in the flight group will be awarded a proportional part of the 1,000 points. (For example, a score of 74 percent as high as the best score in the flight will be awarded 740 points. The procedure is to take the score of the winner of the flight group and divide it into each of the scores of the other fliers, and then multiply the results by 1,000. This will give each contestant's score normalized to the score of the winner of the flight group.) When an event is to be run "Man-on-Man," all members of a flight group should be launched simultaneously. With Limited Motor Run (LMR) events, the motor run should not be included in the flight time. Rather, a launch master should time the motor run, and the flight timers should start flight timing at the signal, by the launch master, of "motor off." The minimum number of fliers per group should be four (4). If a landing is opted for by the CD in a "Man-on-Man" format, he may consider awarding up to 100 additional landing points rather than a standard 25; however, a separate landing circle must be provided for each member of a "Man-on-Man" flight group.

4.2.1 Radio Control Class 1/2A Sailplane Limited Motor Run (LMR):

For event 604.

- Any direct drive out-runner motor is allowed which meets the requirements of maximum flux ring dimensions of 28mm diameter and 16mm length as measured on the outside case of the motor.
- The motor may not be modified in any way.
- Gearboxes are not allowed
- The battery pack is limited to 8.4 volts nominal of any battery type.

- The motor run is limited to 30 seconds but may be made shorter at the discretion of the CD.
- The motor run time shall begin at launch.
- The prop must come to a full stop to assure the model is no longer under power.
- The flight task is an eight (8) to twelve (12) minute duration (or less at the discretion of the CD) with a precision landing time requirement.
- At the discretion of the CD, the timing will begin either at launch or when the motor is turned off and will stop when the model first contacts the ground or any ground based object.

4.2: Radio Control Class A Sailplane/Battery Allotment

For event 609.

Any motor(s) allowed but the battery pack is limited to a maximum 8.4 volts nominal of any battery type.

The flight task is eight (8) minute duration (at the discretion of the CD) with a precision landing time requirement. The eight (8) minutes duration shall include the motor run, which shall be, with the exception noted above, at the discretion of the contestant. Timing will begin at launch and will stop when the model first contacts the ground or any ground based object.

Three (3) to five (5) flights will be performed (the exact number will be the discretion of the Contest Director) with no battery charging between flights. Scoring will be based on the sum of the three (3) flights. Each second of flight time will be recorded as one (1) flight point. Each second in excess of the “target time” will result in one (1) penalty point.

4.3: Radio Control Class A Sailplane Limited Motor Run (LMR)

For event 610.

Any motor(s) allowed but the battery pack is limited to a maximum 8.4 volts nominal of any battery type.

The motor run is limited to 45 seconds or less of a single continuous motor run, but may be shorter at the discretion of the CD. The motor run time shall begin at launch. The prop must

come to a full stop to assure the model is no longer under power.

The flight task is an eight (8) minute duration (at the discretion of the CD) with a precision landing time requirement. At the discretion of the CD, the timing will begin either at launch or when the motor is turned off and will stop when the model first contacts the ground or any ground based object.

Three (3) or more flights will be performed (the exact number will be the discretion of the Contest Director) with battery charging between flights. Scoring will be based on the sum of the three (3) flights. Each second of flight time will be recorded as one (1) flight point. Each second in excess of the “target time” will result in one (1) penalty point.

4.4: Radio Control Class B Sailplane/Battery Allotment

For event 611.

Any motor(s) allowed but the battery pack is limited to a maximum 42 volts nominal of any battery type.

The flight task is eight (8) minute duration (or less at the discretion of the CD) with a precision landing time requirement. The eight (8) minute duration shall include the motor run, which shall be at the discretion of the contestant. Timing will begin at launch and will stop when the model first contacts the ground or any ground based object.

Three (3) to five (5) flights will be performed (the exact number will be the discretion of the Contest Director) with no battery charging between flights. At the discretion of the CD, the models may be impounded between flights. Scoring will be based on the sum of all flights. Each second of flight time will be recorded as one (1) flight point. Each second in excess of the “target time” will result in one (1) penalty point.

The “Builder-of-the-Model” rule will not apply to this event.

4.5: Radio Control Class B Sailplane Limited Motor Run (LMR)

For event 612.

Any motor(s) allowed but the battery pack is limited to a maximum 42 volts nominal of any battery type.

The motor run is limited to 30 seconds or less of a single continuous motor run, but may be shorter at the discretion of the CD.

The flight task is an eight (8) minute duration (at the discretion of the CD) with a precision landing time requirement. At the discretion of the CD, the timing for flight points will start either when the model is launched or when the motor is turned off and will stop when the model first contacts the ground or any ground based object.

Three (3) or more flights will be performed (the exact number will be the discretion of the Contest Director) with battery charging between flights. Scoring will be based on the sum all flights. Each second of flight time will be recorded as one (1) flight point. Each second in excess of the “target time” will result in one (1) penalty point.

The “Builder-of-the-Model” rule will not apply to this event.

4.6: Radio Control Class B Sailplane, Endurance

For event 613.

Any motor(s) allowed but the battery pack is limited to a maximum of 42 volts nominal of any battery type.

The motor run is unlimited and the motor may be turned on and off at the discretion of the pilot.

The flight task is a single flight of 25 minutes duration (or less as established by the CD) including the motor run with a precision landing time requirement. Timing will start when the model is launched and will stop when the model first contacts the ground or any ground based object. Each second of flight time will be recorded as one (1) flight point. Each second in excess of the “target time” will result in one (1) penalty point.

The “Builder-of-the-Model” rule will not apply to this event.

4.7: National RC Electric-Powered Sailplane Records

Procedure. Obtain from AMAHQ an application for RC Electric-powered Soaring sanction. This, when completed and signed by an AMA Contest Director, is returned to AMAHQ with the sanction fee. Record attempts may also be made at AMA sanctioned events with the Contest Director’s permission.

Classifications. For each of the AMA age classifications (Junior, Senior, and Open) and Class A Sailplane, and Class B Sailplane, records shall be recognized for Unlimited Motor Run Duration, and Limited Motor Run Duration;

Unlimited Motor Run Distance, and Limited Motor Run Distance.

General Rules. All record claims must be made by US citizens who are members of the Academy of Model Aeronautics. An AMA sanction is required for all attempts. Multiple records for any one class may be attempted with a single flight provided sanctions are obtained for each task. A minimum of two (2) officials must witness the record attempt, both officials must be AMA members and at least one (1) of the two (2) must be a current AMA Contest Director. The Definition and General Characteristics of electric-powered model airplanes shall apply to all record attempts.

Initial record claims will have no starting minimums. After initial records are established all subsequent records must simply better the existing records.

Timing of the duration record attempts will start at the release of the model and stop when the model touches the ground (or solid ground-based object) and stops, or disappears from the timekeeper’s sight for more than five (5) minutes. The point of landing must be within 300 meters (984.25 feet) of the launch point. The time is taken by two timekeepers. The registered times must be within on (1) percent of each other with the lowest reading considered official. The duration flight shall be sustained on thermal lift only, over essentially flat ground, and at no time shall the model fly in slope lift.

For LMR records, the motor run time shall be the same as the maximum allowed for event 610 for Class A Sailplane; and the maximum allowed for event 612 for Class B Sailplane. For Unlimited motor run records the motor run time will be at the discretion of the pilot.

The distance claimed shall be that on a straight line between launch and landing points as measured on a map with a scale of at least 1:100,000 for distance up to 50 kilometers (31 miles, 364 feet, 8.84 inches) and 1:200,000 over 50 kilometers, or Global Positioning System (GPS) coordinates for starting point and ending point of flight and straight line distance traveled, will be acceptable. The point of landing is where the model first touches the ground. For declared distance, the pilot must indicate in writing before the flight the place where the model will land. The actual point of landing must be within a radius of 300 meters (984.25 feet) of the point indicated. The record for this task shall be the longest straight line distance between the starting and finishing locations and shall be irrespective

of where those locations are. For open distance, no declared goal is required.

For goal and return distance, the pilot must specify in writing before the flight the turnpoint to be used as a goal and the place where the model will land. The record for this task shall be the sum of the longest straight line distance between the launch and goal positions added together with the longest straight line distance between the goal and landing positions. For goal and return, the point of landing must be within 300 meters (984.25 feet) of the launch point

Altitude – The maximum height of the model above the ground at the launch point may be measured by a barograph carried either in the model or in an aircraft following but never rising above the model, or by theodolites from the ground. An official observer must be present in the aircraft following the model. A full description of the methods and equipment used must be submitted with the claim containing sufficient proof of accuracy of the equipment and competence of the operators, the landing point of the model must be within 300 meters (984.25 feet) of the launch point.

4.8: Radio Control Class A Pylon Racing

For event 614.

Any motor(s) allowed but the battery pack is limited to a maximum of 8.4 volts nominal of any battery type. The complete model, ready to fly, must not weigh more than five and one-half (5-1/2) pounds (two and one-half (21/2) kilograms).

A maximum of four (4) models will be flown in each heat.

The Contest Director will determine whether ROG and/or hand launching are permitted.

Each race will consist of 10 complete laps of the race course. If one (1) pylon is cut, the contestant will receive a 10% penalty added to his flight time for that heat. If two (2) pylons are cut the contestant will receive no score for that heat, and will pull up and out of the race until that heat is over.

All laps will be flown in a counterclockwise direction, with all turns being to the left.

The race course will be triangular with a distance of 300 feet between pylon one and pylon two, 60 feet between pylon two and pylon three, and 300 feet between pylon three and pylon one.

Scoring: The winner is selected on the basis of the fastest times recorded for each 10-lap round. The raw score on each round will be the time in seconds required to complete 10 laps. The net score on each round will be 200 minus the raw score. The final score will be the sum of the net scores from each round. A minimum of two (2) rounds must be flown, but if more than two (2) rounds are flown, each contestant may discard his worst score. The winner will be that contestant with the highest final score. In case of ties, the winner will be the contestant with the fastest single round.

4.9: Radio Control Class B Pylon Racing

For event 615.

Any motor(s) allowed but the battery pack is limited to a maximum of 42 volts nominal of any battery type. The complete model, ready to fly, must not weigh more than five-and-one-half (51/2) pounds (two-and-one-half (21/2) kilograms).

A maximum of four (4) models will be flown in each heat.

Model may be hand launched.

Each race will consist of 10 complete laps of the race course.

If a pylon is cut, the contestant will receive a 10% penalty added to his flight time for that heat. If two (2) pylons are cut the contestant will receive no score for that heat, and will pull up and out of the race until that heat is over.

All laps will be flown in a counterclockwise direction, with all turns being to the left.

The race course will be triangular with a distance of 478 feet (180 meters) between pylon one and pylon two, 100 feet (40 meters) between pylon two and pylon three, and 478 feet (180 meters) between pylon three and pylon one.

Scoring: The winner is selected on the basis of the fastest times recorded for each 10 lap round. The raw score on each round will be the time in seconds required to complete 10 laps. The net score on each round will be 200 minus the raw score. The final score will be the sum of the net scores from each round. A minimum of two (2) rounds must be flown, but if more than two (2) rounds are flown, each contestant may discard his worst score. The winner will be that contestant with the highest final score. In case of ties, the winner will be the contestant with the fastest single round.

4.10: Radio Control Old Timer Texaco (Pre-1943)

For event 616.

Any motor(s) allowed but the battery pack is limited to a maximum of 42 volts nominal of any battery type.

The model must be a replica of a model airplane designed and published and/or kitted before 1943.

The motor run is unlimited and the motor may be turned on and off at any time at the discretion of the contestant.

The flight task is a single flight with the objective of a 25-minute duration (or less as established by the CD) with a precision landing time requirement. Timing will start when the model is launched (or when it leaves the ground in the case where ROG is required) and will stop when the model first contacts the ground or any ground based object. Scoring will be one (1) point per second with a penalty of one (1) point per second overtime.

4.11: Radio Control Class A Old Timer Battery Allotment

For event 617.

All models must have been designed, kitted, or published prior to December 31, 1942. Any motor(s) allowed but the battery pack is limited to a maximum of 8.4 volts nominal of any battery type.

The flight task is eight (8) minute duration (or less at the discretion of the CD) with a precision landing time requirement. The eight (8) minute duration shall include the motor run, which shall be at the discretion of the contestant. Timing will start when the model is launched (or when it leaves the ground in the case where ROG is required) and will stop when the model first contacts the ground or any ground-based object.

Three (3) flights will be performed with no battery charging between flights. At the discretion of the CD, models may be impounded between flights. Each second of flight time will be recorded as one (1) point. Each second in excess of the “target time” will result in one (1) penalty point.

4.12: Radio Control Class A Old Timer, Limited Motor Run (LMR)

For event 618.

All models must have been designed, kitted, or published prior to December 31, 1942. Any motor(s) allowed but the battery pack is limited

to a maximum 8.4 volts nominal of any battery type.

The motor run is limited to 60 seconds but may be made shorter at the discretion of the CD. Run time shall begin at launch (or when the model leaves the ground if ROG is required).

The flight task is an eight (8) minute duration (at the discretion of the CD) with a precision landing time requirement. At the discretion of the CD, the timing for flight points will begin either at launch (or when the model leaves the ground in the case where ROG is required) or when the motor is turned off and will stop when the model first contacts the ground or any ground based object.

Three (3) or more flights will be performed (the exact number will be the discretion of the Contest Director) with battery charging between flights. Scoring will be based on the sum of the three (3) flights. Each second of flight time will be recorded as one (1) flight point. Each second in excess of the “target time” will result in one (1) penalty point.

4.13: Radio Control Class B Old Timer/Battery Allotment

For event 619.

All models must have been designed, kitted, or published prior to December 31, 1942. Any motor(s) allowed but the battery pack is limited to a maximum of 42 volts nominal of any battery type.

The flight task is eight (8) minute duration (or less at the discretion of the CD) with a precision landing time requirement. The eight (8) minute duration shall include the motor run, which shall be at the discretion of the contestant. Timing will start when the model is launched (or when it leaves the ground in the case where ROG is required) and will stop when the model first contacts the ground or any ground based object.

Three (3) flights will be performed with no battery charging between flights. At the discretion of the Contest Director, the models may be impounded between flights. Scoring will be based on the sum of the three (3) flights. Each second of flight time will be recorded as one (1) flight point. Each second in excess of the “target time” will result in one (1) penalty point.

4.14: Radio Control Class B Old Timer Limited Motor Run (LMR)

For event 620.

All models must have been designed, kitted, or published prior to December 31, 1942. Any

motor(s) allowed but the battery pack is limited to a maximum 42 volts nominal of any battery type.

The motor run is 45 seconds but may be made shorter at the discretion of the CD.

Motor run timing will start at launch (or when the model leaves the ground in the case ROG is required).

The flight task is an eight (8) minute duration (at the discretion of the CD) with a precision landing time requirement. At the discretion of the CD, timing will start either at launch (or when the model leaves the ground in the case where ROG is required) or when the motor is turned off and will stop when the model first contacts the ground or any ground based object.

Three (3) or more flights will be performed (the exact number will be the discretion of the Contest Director) with battery charging between flights. Scoring will be based on the sum of the three (3) flights. Each second of flight time will be recorded as one (1) flight point. Each second in excess of the “target time” will result in one (1) penalty point.

4.15: Radio Control “Oldie” (pre-1960) “Texaco”

For event 621.

Any motor(s) allowed but the battery pack is limited to a maximum of 42 volts nominal of any battery type.

The model must be a replica of a model airplane designed and published and/or kitted before 1960.

The motor run is unlimited and the motor may be turned on and off at any time at the discretion of the contestant.

The flight task is a single flight with the objective of a 25-minute duration (or less as established by the CD) with a precision landing time requirement. Timing will start when a model is launched (or when the model leaves the ground if ROG is required) and will stop when the model first contacts the ground or any ground based object. Scoring will be one (1) point per second with a penalty of one (1) point per second overtime.

4.16: Radio Control Class A “Oldie” (pre-1960) Battery Allotment

For event 622.

Any motor(s) allowed but the battery pack is limited to a maximum of 8.4 volts nominal of any battery type.

The flight task is eight (8) minute duration (or less as established at the discretion of the CD) with a precision landing time requirement.

The eight (8) minute duration shall include the motor run, which shall be at the discretion of the contestant. Timing will start when the model is launched (or when it leaves the ground in the case where ROG is required) and will stop when the model first contacts the ground or any ground based object.

Three (3) flights will be performed with no battery charging between flights. At the discretion of the CD, models may be impounded between flights. Each second of flight time will be recorded as one (1) point. Each second in excess of the “target time” will result in one (1) penalty point.

4.17: Radio Control Class A “Oldie” (pre-1960) Limited Motor Run (LMR)

For event 623.

Any motor(s) allowed but the battery pack is limited to a maximum of 4.8 volts nominal of any battery type.

The motor run is limited to 60 seconds but may be made shorter at the discretion of the CD.

The flight task is an eight (8) minute duration (or less established by the CD) with a precision landing time requirement. At the discretion of the CD, timing will start either at launch (or when the model leaves the ground in the case where ROG is required) or when the motor is turned off and will stop when the model first contacts the ground or any ground based object.

Three (3) flights will be performed with battery charging between flights. Scoring will be based on the sum of three (3) flights. Each second of flight time will be recorded as one (1) point. Each second in excess of the “target time” will result in one (1) penalty point.

4.18: Radio Control Class B “Oldie” (pre-1960) Battery Allotment

For event 624.

Any motor(s) allowed but the battery pack is limited to a maximum of 42 volts nominal of any battery type.

The flight task is an eight (8) minute duration (or less established by the CD) with a precision landing time requirement. The eight (8) minute duration shall include the motor run, at the discretion of the contestant. Timing will start

when the model is launched (or when the model leaves the ground in the case where ROG is required) and will stop when the model first contacts the ground or any ground based object.

Three (3) flights will be performed with no battery charging between flights. At the discretion of the CD, models may be impounded between flights. Scoring will be based on the sum of three (3) flights. Each second of flight time will be recorded as one (1) point. Each second in excess of the “target time” will result in one (1) penalty point.

4.19: Radio Control Class B “Oldie” (pre-1960) Limited Motor Run (LMR)

For event 625.

Any motor(s) allowed but the battery pack is limited to a maximum of 42 volts nominal of any battery type.

The motor run is 45 seconds but may be made shorter at the discretion of the CD.

The flight task is eight (8) minute duration (or less at the discretion of the CD) with a precision landing time requirement. At the discretion of the CD, timing for points will start either at launch (or when the model leaves the ground in the case where ROG is required) or when the motor is turned off and will stop when the model first contacts the ground or any ground based object.

Three (3) flights will be performed with battery charging between flights permitted. Scoring will be based on the sum of three (3) flights. Each second of flight time will be recorded as one (1) point. Each second in excess of the “target time” will result in one (1) penalty point.

4.20: Radio Control Precision Aerobatics

For event 626.

Any motor(s) allowed but battery pack is limited to a maximum of 42 volts nominal of any battery type.

The flight task will be the 11 FAI turnaround aerobatic maneuvers listed below. No points will be given for takeoff and landing. Hand launching is permitted. Landing gear is not required and the model may be landed on its belly without penalty.

Flight Schedule.

1. One Inside Loop.
2. Reverse Cuban Eight.
3. Slow Roll.
4. Stall Turn.
5. Square Loop.

6. Immelmann Turn.

7. Outside Loop.

8. Split S.

9. Top Hat.

10. Stall Turn with two (2) Half Rolls (one (1) before and one (1) after.

11. Two-Point Roll.

Scoring will be based on the basis of 10 possible points for each maneuver. Any maneuver not completed will be scored zero (0). A panel of three (3) judges will be used and the total score for each round will be the sum of the three (3) scores from the three (3) judges. At least two (2) rounds will be flown, and the winner will be based on the sum of the scores for each round.

4.21: Indoor Electric Duration (RC)

For event 627.

Airplane shall not exceed two ounces flying weight. Maximum wing loading shall not exceed three and one-half (3 1/2) ounces/square feet. Battery size shall be one (1) 20 MAH Lithium Polymer battery. The airplane shall fly a circular or oval or figure-eight course as specified by the judges. Either ROG or hand launch is permitted. Total points will be the duration time in seconds. Contest Director will determine number of attempts allowed.

4.22: Electric ROW RC Seaplane

For event 628.

Taxi Slalom.

1. Entry must be able to fly the other events (Touch and Go, Two (2) Minute Timed Flight, Loop the Loop) as entered in this event. Nothing may be added or deleted on the plane for other events.

2. One (1) time around course.

3. Must pass through gate to start time and to stop time.

4. If floats leave water at any time, the attempt will be disqualified.

5. If pylon is missed, the airplane must go back and start the course over.

Touch-and-Go.

1. Must complete three (3) touch-and-gos.

2. Plane must make a 360-degree turn between each pair of touch-and-gos.

3. Time will be measured from when floats leave the water on takeoff to when floats leave the water on the third touch-and-go.

Two (2) Minute Timed Flight.

1. Must execute one (1) loop and one (1) roll during flight.

2. Must call out each maneuver to judges before executing maneuver.

3. Time will start from when floats leave the water until when the airplane has landed.

4. Contestant must do self-timing without the aid of mechanical or electronic devices.

5. Total flight time is to be as close as possible to two (2) minutes.

Loop the Loop.

1. Must take off, complete three (3) loops, and land.

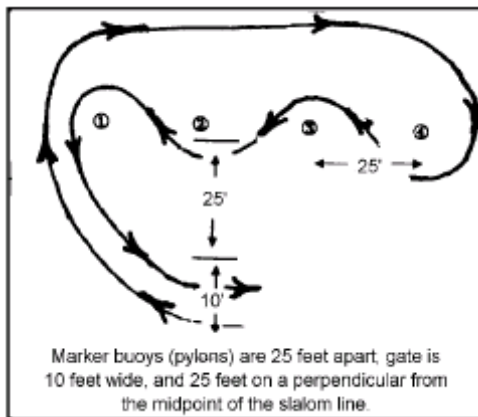
2. Time will be measured from the time the floats leave the water until the maneuvers are complete and the airplane has landed.

3. Judges will notify contestant if a loop was not completed; contestant will then do that one (1) loop over again.

The contestant's standing in the contest will be based on the sum of the event times in seconds, except for the two (2) minute timed flight, in which seconds over or under two (2) minutes will be added to the total as a penalty. The lowest total wins. The CD will determine number of attempts allowed.

Example: The contestant flies the Taxi Slalom in 90 seconds, the Touch-and-Go in 80 seconds, the Two (2) Minute Flight in 150 seconds, and the Loop the Loop in 50 seconds. The total score is then $90 + 80 + (150 - 120) + 50 = 250$. A score of 225 would win over this score, a score of 275 would lose.

4.23: Open Class Electric Indoor RC Duration



For event 629.

Airplane shall not exceed 21 ounces flying weight. Maximum wing loading shall not

exceed three-and-one-half (31/2) ounces/square feet. Battery size is limited to any combination of cells designated by the manufacturer as rechargeable. The airplane shall fly a circular or oval or figure-eight course as specified by the judges. Either ROG or hand launch is permitted. Total points will be the duration time in seconds. The Contest Director will determine number of attempts allowed.

4.24: Elexaco

For event 630.

Summary of Elexaco Competition Rules:

(Old-Timer or Open) The investment flying electric using a 400 motor is nominal as an existing radio with at least three channels is all that is needed. What makes it real interesting is that the performance of a seven-cell battery pack with a direct 400 motor system is outstanding.

Using alkaline battery cells in the transmitter makes the model always available for flight when stored in the trunk of your car. Because of the small size, it is stored assembled. In traveling where a field is sited (a football field will do) simply stop, charge the flight battery for motor and receiver power by BEC (Battery Eliminator Circuitry) and fly because the alkalines' for the transmitter are always ready.

Now to add interest, a simple endurance competitive event was designed that can be decided at the flying field. All that is required is a stopwatch.

To establish equity, the Elexaco event is offered making it easy as it defines specifically the hardware required. It is designed as an electric version of the ever-popular 1/2A Glo-Powered Texaco event and can be restricted to Old-Timer if desired by option.

Elexaco Event Rules

1. Any model with an aspect wing ratio of less than seven (7) qualifies (wingspan divided by center chord).

2. Any rated 400 Electric ferrite motor (not brushless or cobalt and not geared) qualifies.

3. A seven-cell 250- to 350-mAh, 8.4 volt nominal power pack of any battery type must be used.

4. Any motor shut-off device is acceptable.

Flight Rules

Timed from either take-off or hand launch, motor is allowed to run for two minutes and shut off by radio—if motor is shut off prior to two minutes, it is not to be turned back on—if turned back on score is 0. Flight is continued and timed

toward maximum flight time of 15 minutes to land at designated field. Score one (1) point per second (maximum 900 points). Exceeding maximum results in penalty of one (1) point per second.

4.25: Altitude Limited Electric Soaring (ALES) Event 631

The purpose of this category is to provide a Man-On-Man (MOM), electric launched, thermal duration soaring event with a consistent launch altitude for all competitors.

1. Any electric powered sailplane meeting the definition of an electric powered glider is permitted to fly in this event,
2. Launches will be accomplished by the competitor's on-board electric power system and will begin within a starting launch window,
3. The launching motor run will be limited by a 30 second timer or a designated launch altitude whichever comes first.
4. The designated launch altitude will be selected by the Contest Director and will be 200 meters (m), 150m or 100m.
5. The launch must be followed by pure gliding flight with no further motor assistance.

(X).1 General Specifications

1. Maximum surface area 2335 sq.in. (150 dm. sq.)
2. Maximum weight 11 pounds (5 kilograms)
3. Maximum surface loading 24.59 oz. per sq.ft. (75 gr/dm sq.)
4. Maximum battery voltage 42 volts
5. Model aircraft with variable geometry or area must comply with these specifications when the surfaces are in maximum and minimum extended mode.
6. Mechanical or chemical modification of the individual cells of a battery (e.g. to reduce their weight) is not allowed, except that insulation sleeves of individual cells may be changed.
7. Any device, fixed or retractable, intended to arrest the model aircraft on the ground, or which does arrest the model aircraft on the ground, during landing is prohibited.
8. No wing tip launches are allowed (discus, side-arm, etc.),
9. All ballast must be carried internally and fastened securely within the airframe.

(X).2 Altitude Limiters

All models must be fitted with an Altitude Limiter Switch (ALS) that will shut off the motor when it reaches the designated altitude above the ground. This device must also shut off

the motor 30 seconds after launch if the designated altitude has not yet been reached.

1. The ALS must not be enclosed in any material other than that recommended by the manufacturer. It may not be positioned in any part of the model which could result in distortion of actual air pressure variations (e.g. – near forward facing air scoops or venting ports),
2. Models must include sufficient static venting to ensure that outside pressure is duplicated inside the model at the ALS location. In the event of a launch exceeding 10% of the designated launch altitude due to insufficient venting, the Contest Director may assign a score of zero to the violator for that round.
3. The Electronic Speed Control must always operate via its series connection to the ALS and not with direct connection to the receiver.
4. The connectors linking the ALS to the receiver shall be readily accessible so that a check altimeter with appropriate interconnection can be installed on demand by the Contest Director. Such check altimeter will serve to verify Start Height while retaining the normal operation of the competitor's own installation.
5. 'Zooming' is defined as using kinetic energy (speed) stored in the plane during the launch to exceed the designated launch height by more than 10%. Zooming will be considered in violation of the intent of the altitude limiter rule and the Contest Director may assign a score of zero to the violator for that round.
6. Any attempt to subvert the intent of this Altitude Limiter rule set is grounds for disqualification from the event as unsportsmanlike conduct.

(X).3 Task

1. The task consists of a target time announced by the Contest Director (CD). 10 minutes is recommended. The CD may choose to change the target time based on local conditions. Target times ranging from 6 minutes up to 12 minutes are allowed for this event.
2. The flight is initiated with a 10 second launch buzzer. All pilots must launch their planes within the 10 second launch buzzer. A plane launched before or after the launch buzzer will receive 0 points for the round,
3. Launch direction will be determined by the CD or his/her designated Launch Supervisor. All pilots will launch in the direction specified. Pilots may re-direct their flight path during launch provided this is done in a safe manner and does not interfere with the other launching pilots. A collision or other significant disturbance to

another launching plane due to a pilot re-directing his flight path will result in 0 points for that pilot for that round,

4. Time will start when the model aircraft has left the hands of the competitor or helper. The model aircraft must leave the hands of the competitor or helper under the pull of the electric drive motor. The CD may allow a power-off launch for reasons of safety. However, the motor must be started within the launch window time,
5. The launching motor run must be a single continuous event. No motor re-starts are allowed at any time during the launch. A motor re-start will receive 0 points for the round,
6. At the end of the motor run (30 seconds or the designated altitude whichever comes first), no other activation of the motor is permitted for the remainder of the flight. A motor re-start will receive 0 points for the round,
7. Time will end when the model touches the ground or any ground-based object.
8. Landings will be scored as a maximum of 50 pts by any of the approved landing options noted in section (X).5.

(X).4 Scoring

1. Time will be recorded by the timekeeper/helper and will be truncated for scoring purposes,
2. Points are earned at the rate of +1 point/sec up to and including the target time and are reduced by -1 point/second beyond the target time (e.g. 600 possible points for a 10 minute target).
3. The flight scores will be normalized by taking the ratio of the contestant's score to that of the highest score for that flight group and multiplying by 1000.
4. The contestant's final score will be the pilot's normalized score plus landing points.
5. No flight points will be awarded if the model touches anyone other than the pilot once an official flight has begun

(X).5 Landing

No landing points will be awarded if:

1. The model sustains significant damage during landing and, in the opinion of the contest director or his designate, is not safely flyable,
2. The model loses parts during landing
3. The model comes to rest in an inverted position,
4. The model touches the pilot.

OPTION 1 – Landing Circle

1. The landing circle will consist of a 10 meter tape marked in 1 meter increments.
2. The score will be graduated by 5 points per meter. Landing within 1 meter of the spot earns a score of 50 points. Landing beyond 10 meters from the spot earns a score of 0 points.
3. Landing points will be measured from the center of the landing circle to the nose of the aircraft.

OPTION 2 – Reduced Landing Circle

1. The landing circle will consist of a 5 meter tape marked in ½ meter increments.
2. The score will be graduated by 5 points per ½ meter. Landing within ½ meter of the spot earns a score of 50 points. Landing beyond 5 meters from the spot earns a score of 0 points.
3. Landing points will be measured from the center of the landing circle to the nose of the aircraft

OPTION 3 – Graduated Runway

1. The runway is defined by a center line 15 meters long and as closely aligned with the wind as practical and extends 2.5 meters either side of this center line.
2. A model which comes to rest with its nose beyond the ends of the center line or more than 2.5 meters to the side of the center line receives 0 points.
3. A model which comes to rest within the graduated runway will receive a maximum of 50 points, with a loss of 5 points per 1/4 meter away from the center line as measured from the nose of the model to the centerline of the runway.
Recommendation: A 2.5 meter long piece of ½” or ¼” diameter plastic pipe (PVC) marked in 25 centimeter increments is a simple and effective method of obtaining landing scores with this option.

(X).6 General Requirements

1. Field boundaries will be established by the CD consistent with local terrain and good safety practices. An aircraft landing beyond the field boundaries will receive 0 points for the round. Any part of the aircraft touching the field boundaries will be considered in-bounds except that parts shed from the aircraft and landing within the field boundaries will not qualify as in-bounds.
2. The CD may establish safety zones (pit area, spectator area, etc) over which a model may not be flown unless at a safe altitude as determined by local conditions. A first violation of the safety zone(s) will receive a warning. Subsequent

violations will receive a zero score for that round.

3. The competitor may use up to three model aircraft in the contest. The competitor may combine the parts of the model aircraft during the contest, provided the resulting model aircraft conforms to the rules and the parts have been checked before the start of the contest.

4. Each pilot is allowed one timer/helper who may communicate with the pilot during the round. The timer/helper's responsibilities are to assure the safety of the flight and to record the time of flight and the landing bonus. The timer/helper may assist the pilot with launching, plane retrieval and advice (including time progression) that the pilot may request during the event.

5. Any device for the transmission of information from the model aircraft to the pilot or timer/helper which would assist the pilot in finding, locating or centering on thermal or slope lift is prohibited.

6. Any use of telecommunication devices in the field to communicate with competitors, their helpers or team managers while performing the competition task is prohibited.

7. Any device, other than the approved Altitude Limiter Switch, which is carried in or on the model and which enables total or partial independent control over the model, is prohibited.