

# **SAM Warbird Racing Rules**

2017 racing rules

## **Purpose:**

The following is a description of the event and the rules that are to be followed in conducting Sacramento Area Modelers (SAM) Warbird Races.

## **Pilot Qualifications:**

**Pilots must show proof of current AMA membership.** Pilots operating transmitters on the HAM band must additionally show proof of a current FCC license. Each pilot will be allowed one caller/crew member per aircraft entry. *Pilots are able to enter up to a maximum of two classes. If entering more than one class the chosen classes must be one of the following two combinations Bronze/Silver or Silver/Gold. Pilots will not be able to enter a combination of Bronze/Gold.* All pilots and caller/crew members will be issued an armband granting access to the pit/flight line area. Only those workers and contestants wearing armbands will be allowed in the pit area. All spectators must be in approved spectator areas. All pilots must take off, fly the heat laps, and land the aircraft. In the event of an emergency, the aircraft can be landed by another pilot resulting in disqualification for the heat.

Pilots, callers, and crewmembers will not be permitted to consume alcoholic beverages and compete in the event. Flying or operation of an aircraft, in an erratic or unsafe manner will not be tolerated. Violations will result in a warning or black flag disqualification from the heat at the discretion of the flagman or Contest Director (CD). The CD's decision, in this regard, is final. The CD may require any pilot to demonstrate the safe flying characteristics of an entered aircraft, if the pilot's capability with that aircraft in the entered class is unknown.

No timing devices (watches, stopwatches, transmitter timers, etc.) will be allowed at the pilot station during the heat racing. Unsportsmanlike conduct by a pilot, caller, or crewmember is grounds for the pilot's disqualification from the event and possible future SAM Warbird events.

## **Model Aircraft Requirements:**

The only models qualified to be entered in a SAM Warbird event must be scale\* models replicating heavier than air, fixed wing, piston engine powered, man carrying, fighter or fighter-bomber aircraft that were in production (or prototype aircraft intended for production that were flight tested) after January 1, 1937, or scale models of non-military aircraft that have raced in the unlimited category of the Reno Air Races. To "have raced" means that the aircraft must have crossed the starting line while participating in an official heat. Observation or trainer aircraft that may have been modified to carry a weapon in unique circumstances do not qualify as fighter or fighter-bombers. In addition, Bronze pilots may compete with additional aircraft used as WW2 era or later military trainers such as, but not limited to, T28's and T34's. Bronze pilots that have questions regarding aircraft eligibility are encouraged to contact the CD(s) prior to the event.

A plane may only be flown in only one class per event. Once a plane has attempted take off for a heat in any class (Bronze, Silver, Gold) said plane may not be used in any other class for the event. Also, a plane may only be flown by one entrant. Planes that have attempted to compete or have competed in a heat race by a pilot cannot be used by any other pilot for the event. However, back up aircraft that have not been flown may be assigned to another pilot for the event. Once the assigned plane has attempted take off the assigned plane will have to be used for the remainder of the event unless damage to the plane occurs (see damaged aircraft procedures below).

\*scale – models that do not approximately resemble the scale outlines of their full scale counterpart are not permitted. One such example would be the Phoenix Models Strega (first generation). Pilots should contact the event CD(s) with questions regarding acceptable aircraft prior to the event.

**Engine and Wing Area Requirements:**

The maximum engine displacement for single engine aircraft is 1.40 cubic inches for 2 stroke engines and 1.80 for 4 stroke engines. The Maximum combined displacement for multi-engine aircraft is 1.80 cubic inches for 2 stroke engines, and 3.50 cubic inches for 4 stroke engines. The maximum engine size for a particular aircraft will be determined using the wing area/engine displacement tables provided below.

Wankel engines are classified as 2 stroke engines. Proof of engine displacement is the responsibility of the contestant. Wing area will be determined by average chord X span when requested by specific protest.

**Single Engine Displacement/Wing Area Table:**

2 Stroke Maximum Cubic Inches	4 Stroke Maximum Cubic Inches	Minimum Wing Area Square Inches
0-.50	0-.89	400
.51-.60	.90-.99	440
.61-.70	1.00-1.09	480
.70-.80	1.10-1.19	515
.81-.95	1.20-1.29	550
.96-1.05	1.30-1.39	565
1.06-1.10	1.40-1.49	580
1.11-1.15	1.50-1.59	595
1.16-1.20	1.60-1.69	610
1.21-1.30	1.70-1.75	630
1.31-1.40	1.76-1.80	650

**Multi Engine Displacement/Wing Area Table:**

2 Stroke Maximum Combined Cubic inches	4 Stroke Maximum Combined Cubic Inches	Minimum Wing Area Square Inches
0-1.00	0-1.50	500
1.01-1.22	1.51-2.00	600
1.23-1.40	2.01-2.50	700
1.41-1.60	2.51-3.00	850
1.61-1.82	3.01-3.50	1000

**Engine Requirements:**

Mufflers or tuned pipes are required on all 2 stroke engines. All engines must have an operational carburetor and demonstrate the ability to maintain an engine speed of 4000 RPM or less for a period 10 seconds prior to takeoff at the Starters discretion. During this "idle down" period and prior to take off, no contact will be made between the pilot or holder and the engine or fuel system (No needle adjustments, fuel line pinching, etc.).

### **Safety Inspection:**

The following criteria will be used to inspect all aircraft that are flown in SAM Warbird races. CD's, safety inspectors, and contestants should equally be aware that following these criteria to the letter is extremely important in helping to minimize individual liability during the course of the race. During registration, a safety inspector who is a knowledgeable individual appointed by the CD will examine each aircraft.

Specific items to look for are as follows:

1. Short pieces of rubber tubing used to secure all clevises to prevent them from becoming disconnected in flight. Clevises using a bolt and self-locking nut fastener, or other locking device do not require safety tubing.
2. All fasteners holding the engine to the engine mount, and the mount to the firewall, must be in place and secure.
3. Receiver and battery pack should be protected against vibration in accordance with the manufacturer's recommendations. Servos operating all flight surfaces shall be of sufficient size (torque) for the weight and speed of the aircraft. Airborne battery packs must be of at least 500 mAh capacities. **Li-Po and Li-Ion batteries are not allowed to be used in SAM Warbird racing events. Li-Fe (A123) batteries are allowed.**
4. Washers will be used on all screws holding the servos to the mounting trays, and also on all screws holding the tray to the rails (all washers will be approximately the same diameter as the grommets). Servos mounted directly to the rails will also have washers on the mounting screws. If screw head diameters are as large or larger than the grommet diameter of the servos being used then, or if with screws with the washer built into the head (such as those provided with Futaba, JR, and Hitec servos) are being used, separate washers will not be required. All servo trays, if used, will have at least one extra safety screw (not necessarily turned down tightly) placed between the grommets on the rear or front of the tray to prevent the tray from slipping out of the grommets in flight. Servos must be mounted by using fasteners as recommended by the equipment manufacturer. The use of servo tape to directly attach a servo into the aircraft is unacceptable in racing aircraft.
5. When servo manufacturers supply a grommet servo mounting system with brass eyelets, the brass eyelets must be correctly installed. The eyelet must be inserted into the grommet with the rolled end of the eyelet against the material that the servo is being mounted to. This will help prevent collapsing the grommet by over-tightening the fastener.
6. A keeper, or collar, will be on all push rods that have a right angle bend that connects them to the servo output arms. Z-bends are acceptable. If clevises are used at both ends of a push rod, one must be secured, so that the push rod will not turn. **EZ connector type fasteners are NOT permitted on servo output arms and push rod ends that control flying surfaces such as ailerons, elevator(s), and rudder(s).**
7. All control surfaces will be firmly attached on the hinge line without excessive play, (at the discretion of the safety inspector).
8. Positive thread type wing bolts or screws will secure the wing in place on all two piece aircraft.
9. The entire aircraft should be inspected for any stress cracks.
10. Every aircraft should have the owner's name, AMA number, and phone number affixed to the inside per the AMA safety code.

If an aircraft fails to conform to any of the above inspection criteria, it shall be repaired before it can be entered. Any aircraft damaged after it has been safety inspected, shall be re-inspected before it is allowed to fly again. Aircraft with a known history of safety or performance problems should be rejected unless acceptable changes have been made to eliminate the problems.

**Declared Racing Class: Breakout times:**

The following breakout times will be used in the fixed-bracket racing format. There are NO adjustments to these breakout times.

**BRONZE CLASS** 2 minutes, 30 seconds

**SILVER CLASS** 2 minutes

**GOLD CLASS** 1 minute, 30 seconds

In the event that a contestant is deemed to have grossly violated the breakout time for any class, the CD will issue a warning to said pilot. A second violation will result in the pilot being removed from further competition in the event. (The break out times have been established to enable a safe race environment for all pilots, workers, and spectators and anyone trying to just go as fast as possible with disregard for the breakout times will be deemed to be flying in an unsafe manner).

**Heat size, Matrixing, and number of rounds flown:**

Once the registration and safety inspections have been completed, and the number of entries in each class is known, maximum heat sizes will be set for each class, at the CD's discretion, between 3 – 4 maximum airplanes per heat. The maximum heat size decided before racing begins, and may not be changed thereafter. Matrixing, (determining which contestants will fly against each other in each heat), will be determined randomly except for the final heat of the event. The final heat will be determined by point position from the preceding heats, i.e. the 4 highest point positions will race against each other then the next 4, etc. The four highest point positions will be the final heat in each class. Racing will consist of as many rounds of heats in each class, as time will permit, over the duration of the event. Points in all rounds will be totaled to determine the winners in each class. In event of a tie, the tie will be broken by the following criteria in this order:

1. Black Flag for safety or rules violation (except for jumped start B/F which is considered DNS)
2. DNS (Did Not Start – includes DNS due to jumped start B/F)
3. DNF (Did Not Finish – which covers any plane that started a heat race but did not finish 10 laps)
4. Break Out (if multiple pilots have break outs then lowest number advances)
5. Accumulated event time (times for B/O will not be included)\*

**Matrix Setup:**

For a one day event, the matrix is setup as three rounds with an additional final round for each class.

For a two day event, the matrix is setup as three rounds for each class on day one, and two rounds plus an additional final round on day two.

**Engine Run-up area:**

Testing of engines must be conducted within the designated engine run-up area, and must be accomplished without the use of a transmitter once heat racing has begun, unless positive controls are in place to eliminate frequency conflicts with racing aircraft.

**Engine Starting Procedures:**

After aircraft flying in the heat have been identified to the pylon judges, and radios have been checked to insure they are operating, the starter will begin a 120-second timing device. Pilots and their callers will be instructed to start their engines and have the 120-seconds to get their engines running and launch their aircraft. Pilots are allowed one takeoff attempt. Once the aircraft main wheels leave the ground and/or the motor dies due to the propeller striking the ground or any object; the ruling will be that a takeoff attempt has been made. If during the 120 seconds the engine dies and a takeoff attempt has NOT been made, the plane may be restarted if it can be done prior to time expiring.

**Take off Procedures and Directions:**

Contestants may take off on a first come, first served basis, but the starter will control access to the runway.

Callers will carry, or guide, the pilot's aircraft onto the runway, and should take great caution when handling aircraft with the engine running, so as to not pose danger to themselves or others. Taxiing of aircraft onto the runway to take off is prohibited. The starter will determine what direction the aircraft must use to take off.

This will generally be dictated by the wind direction. If the takeoff direction is from right to left the aircraft must be carried to a position on the runway beyond the left most pilot station and released from there. This is a safety procedure to help compensate for aircraft that tend to turn to the left on takeoff, due to engine torque and/or wind

**Heat Start Procedure:**

After the 120-second engine start up time has elapsed, the 45-second countdown clock is started. The announcer will advise as the clock counts down to 30 seconds, 15 seconds, and then count down from 10 seconds to the start of the heat. The heat begins when the clock reaches zero and the starter drops the green flag. At this time, all aircraft are to be to the left of the start/finish line. Failure to meet this requirement is a jumped start and results in disqualification for the heat. Loops to avoid jumping the start are NOT permissible. Pilots, who find they are about to jump the start, can execute a legal sharp left pitchout turn and then circle back safely to the start/finish line.

**Heat Racing Procedure:**

The heat will consist of 10 laps in a racetrack pattern flown past and around each pylon pole without crossing the deadline. Pilots must also keep their aircraft above the tops of the pylon poles. Pilots who fly near the deadline, or who briefly drop below the top of the pylon poles will receive one warning from the flagman or assistant flagman. Any aircraft crossing the deadline will result in a black flag disqualification from the heat. Repeated infractions of the deadline, or flying too low, or other unsafe erratic flying can disqualify the pilot for the remainder of the day, and the pilot may be required to demonstrate flying proficiency on the race course before being allowed to fly on the second day. Victory rolls and other acrobatic maneuvers at any time during, or after the heat, are strictly prohibited, and are grounds for black flag disqualification for the heat. Any pilot not pulling off the racecourse after receiving the black flag for any reason will be disqualified from the rest of the event.

**Heat Finish Procedure:**

For each competing pilot, a racing heat will be concluded when the aircraft has flown 10 consecutive laps, and it has crossed the finish line in the air. Aircraft are not required to be under power when crossing the finish line to finish the heat, and may complete the heat by gliding across the line. The starter will wave the checkered flag as the lead aircraft crosses the finish line completing the 10<sup>th</sup> lap. When the heat is finished, the assistant flagman will record the finish positions of all aircraft then contact the pylon judges by radio to ascertain if any of the competing aircraft had pylon cuts. Noted cuts will be recorded on the heat card. The assistant flagman will also obtain the heat time for each aircraft from the timing device(s) and record those times on the heat card.

In the case of a "photo finish" the winner will be declared by the starter and is not reviewable.

**Heat Scoring Procedure:**

For the Gold and Silver brackets a four plane maximum heat size will be used. For the Bronze bracket a five plane maximum size will be used.

The first place finisher in the heat will receive the same number of points as the number of planes in the maximum heat size in the class. Each subsequent place finisher will receive one less point. For example, with a four-plane maximum heat size with the class, the 1<sup>st</sup> place finisher receives 4 points, 2<sup>nd</sup> place will receive 3 points, 3<sup>rd</sup> place

will receive 2 points, etc. Any aircraft that was unable to take off or that was to the right of the start finish line at the start of the heat receives no (0) points. Any aircraft that did not finish the heat receives no (0) points. Any aircraft that completes the heat in less than the prescribed break out time for its class receives no (0) points. Any aircraft that was black flag disqualified receives no (0) points.

Effect of Cuts on Points Awarded: If an aircraft cuts one pylon, by not flying past it, that aircraft will receive only 1 point for the heat regardless of finish position. Any aircraft cutting more than one pylon will receive no (0) points for the heat. Aircraft finishing without cuts behind aircraft receiving cuts will have their finish position advanced one place in the standings for every aircraft ahead of them that received cuts. The following four plane heat example illustrates the point scoring system.

1<sup>st</sup> place finisher with one cut 1 point  
2<sup>nd</sup> place finisher with two cuts 0 points  
3<sup>rd</sup> place finisher with no cuts 4 points  
4<sup>th</sup> place finisher with no cuts 3 points

### **Damaged Aircraft Procedures:**

In the event of a mid-air collision, the starter will signal both aircraft to climb off the racecourse. Both aircraft will be given a zero for that heat. The remaining aircraft in the heat will be asked to finish the race at a higher altitude. Both aircraft involved in the mid-air will be landed as soon as it is safe. Any other damage observed by the starter (flutter, loose control surfaces, etc.) will result in a black flag for that heat and the aircraft will be landed when safe. Before any damaged aircraft is allowed to fly in a subsequent heat, it must be re-inspected by an approved safety inspector and deemed airworthy.

If a pilot chooses to switch from the aircraft that they started the event with (for any reason - damage or otherwise) then the original plane will not be allowed to compete for the rest of the event (one day events) unless the backup aircraft becomes damaged and the CD grants permission to the pilot to re-instate their original aircraft.

Also, Pilots are encouraged to make the CD aware immediately if any aircraft are to be changed and/or pulled from competition in an effort to help the race administrators in their record keeping. For events that are held over multiple days, the start of each day will reset the pilot's ability to use aircraft that were used and then removed from service on a prior day only if are re-inspected by the designated safety officer.

### **Race Scoring Procedures:**

Race scoring shall be the sum of all heat scores. There will be no rounds thrown out.

### **Protests:**

It is unfortunate that sometimes disagreements arise when conducting any sporting event. Kindly remember to be calm and sportsmanlike when discussing disagreements with the contest director. If a contestant believes that he/she has a legitimate complaint regarding a specific aspect or incident, a protest should be registered with the contest director within a timely manner. Only contestants may file a protest and protests must be filed prior to the conclusion of an event. The CD(s) is (are) the only point of contact for the protests and his (their) ruling will be final.

**Safety/ Safety Equipment:**

All provisions of the Official Academy of Model Aeronautics National Model Aircraft Safety Code are incorporated into these rules by reference.

The Academy of Model Aeronautics requires that all contestants, callers, crew members, and event officials and workers participating in any organized racing event wear helmets (hard hats), that are approved by ASHA, DOT, ANSI, SNELL, NOCSAE, or a comparable standard, while “on the course”, in accordance with the AMA’s definition of “on the race course. Contestants, callers, and crew members are required to provide their own helmets (hard hats) that meet these requirements. SAM further recommends that pilots, callers, crew members, and event workers in close proximity to areas where engines are started, wear appropriate eye and hearing protection. Safety equipment is the responsibility of the participants and will not be provided by SAM. There are absolutely NO exceptions to these policies, and SAM requires that there be strict compliance and enforcement at all times. Willful disregard of these policies will result in ejection from the event.

**Race Awards:**

Each class will independently fund its own prize fund from its own entry fees. In addition, any addition funds raised and/or donated will be split between the classes as defined below:

Gold – 50%

Silver – 35%

Bronze – 15%

The awards will be divided using the following percentages for the winners in each class:

1<sup>st</sup> place – 50%

2<sup>nd</sup> place – 30%

3<sup>rd</sup> place – 20%

**Anything not covered in the rules above:**

The event CD(s) will have the ability to interpret the SAM Warbird racing rules and make any decisions needed not covered by SAM Warbird Racing rules.