5.5.7 F5E RC COMBINED SOLAR-BATTERY DISTANCE AEROPLANES (PROVISIONAL)

5.5.7.1 Definition

a) This is a closed-course energy accumulation, total distance, and landing event for radio-controlled electric-powered model aircraft using a combination of silicon solar cells and batteries. The flight shall begin and conclude with a measured state of battery energy. A penalty shall be applied for finishing with less than the starting battery energy. In this manner, the battery shall serve primarily as a buffer for solar energy.

b) Model Aircraft Specifications

General Specifications: See paragraph 5.5.1.3.

Solar Array: The solar array must be composed solely of silicon solar cells on the top surface of the model having area between 21 dm^2 and 43 dm^2.

Propulsion/Receiver Power Source: See paragraph 5.5.1.3 a) Maximum 42 volts.
The model's RC control system will use the same power source as is used for propulsion. No separate battery is allowed for the radio control system.

Either the battery's balance port or an extension of the battery's balance port must be accessible to a 2.54 mm spaced male header connector with model inverted. Alternatively an approved telemetry based system maybe used to determine the battery voltage.

c) Model Aircraft Telemetry and Electronics

Model aircraft must be equipped with either GPS telemetry to demonstrate the model's position relative to Base A and Base B planes to contest officials, or contest organizers may provide Base judges to document bases made, communicating this to the contestant's helper via flags or "walkie-talkie" radios or other suitable signaling devices.

All other forms of telemetry are specifically allowed.

5.5.7.2 Course Layout and Organization

a) The course shall be (2) parallel planes 150 meters apart per 5.5.4.2 except that there is no Safety Plane and contestants may fly on one or both sides of the sighting devices if the field boundaries permit it. Contestants shall be spaced 3 or more meters apart having the sun azimuth to their backs (if possible). At least 1 set of landing circles shall be provided at a comfortable walking distance from the distance course for each pilot.

b) Each round will start with model aircraft in the flight group placed inverted at the launch locations. The energy state of each model will be ascertained by measuring and recording the open circuit voltage at the battery balance port. The contest director will announce launch times at 5 to 15 second intervals for each pilot in the group so as to avoid midair collisions. A timer shall be used to mark the launch time for each pilot. The helper shall upright and launch the

contestant's model to begin a 400 second thermal loiter and energy accumulation task. The model may be flown anywhere within the boundaries of the field within visual line of sight of the pilot/helper. The model may not be flown beyond visual line-of-sight at any time.

c) After the thermal loiter, a distance task is automatically started. The task starts at the Base closest to the pilot and concludes 600 seconds after launch. When the model crosses the first base after 400 seconds elapses in the direction of the other Base, counting of legs begins. The model aircraft must complete as many legs as possible from the starting Base to the other Base and return. There is no restriction on use of motor during this task.

d) After the distance task, a 60-second precision landing task will automatically start. The objective of the task is come to rest within the 10-meter circle precisely 660 seconds after launch. Once the model comes to rest, it must be inverted by the helper within 10 seconds to end solar accumulation. The battery balance port should be measured in place or the model removed to a safe location shielding the solar array from additional energy accumulation. If the model comes to rest in a position/location such that it cannot be inverted within 10 seconds, the flight is scored 0. Alternatively an approved telemetry based system maybe used to determine the battery voltage at the end of the flight making inverting of the model unnecessary.

e) The flying order must be arranged in rounds sub-divided into groups. The flying will be arranged in groups with up to 6 pilots in each group with the number in each group to be determined by the CD. The general direction of the launch and landing approaches may be set by the Contest Director prior to launch.

5.5.7.3 Scoring

a) Every completed Distance leg will be awarded 10 points.

b) Precision duration points shall be awarded at the rate of one point/second after 630 seconds. Precision duration points shall be subtracted from 30 at the rate of one point/second after 660 with no precision points awarded if the total flight time is greater than 690 seconds.

c) An additional 30/20/10 points for landing shall we awarded if the model comes to rest in within 30-20-10 meter diameter circles as defined by a tape.

d) Points shall be subtracted from the score if system energy at the conclusion of the flight is less than at the beginning of the flight at a rate of 1 point per net 3 watt-minutes consumed according to the formula: (net open circuit voltage loss)*(battery pack nameplate capacity in Ah)*20.

e) The pilot with the most points in each flight group will be awarded 1000 points. The other pilots will be awarded points according to the formula: (Individual Score/Winning Flight Group Score)*1000.