By Lee Estingoy

We'll have an opportunity to expand our horizons next summer when the FAI F5B World Championships are held at the International Aeromodeling Center in Muncie Indiana. Yes, F5B is an event that involves soaring – albeit a very tortured definition of soaring. F5B planes are electric powered, that's true, but they fly with their motors more off than on. As far as I'm concerned, this meets the jurisdictional requirements of the Soaring columnist. Let's take a short lap around the course.

"F5B" refers to the rule classification of the Fédération Aéronautique International, the international group that gets to make the rules for this sort of thing. The competition is nominally a combination of two events, unpowered pylon racing and a soaring/landing task. Most F5B competitors operate at the intersection of the bleeding edges of aerodynamics, composite structures, and electric motor/controller/battery performance. Competitors in this event simply push their airframes, servos, and power systems to extremes simply not found in other segments of RC.

All of the rest of us in soaring and electrics today benefit from advances made by, and for, these guys. F5B is to electric powered soaring as Formula One racing is to the automobile industry.

There are three ways for F5B competitors to score points. The first is to fly as many unpowered legs around two pylons 150 meters apart in a 200 second window as possible. 10 points are earned for each leg. The second challenge is to achieve as much unpowered flight (soaring) in the 600 second duration window as possible. The competitors earn one point per second of unpowered flight.

All motor run time in the duration segment is time that cannot be counted for the soaring score, much like the time on the winch in F3J. The final task included in the soaring segment is a spot landing. The landing goal is a series of three concentric circles at 10, 20 and 30 meters on center. 30 points are awarded for landing in the 10 meter circle, 20 for the 20m circle and 10 for the 30m circle.

F5B aircraft have evolved to meet these tasks. They are incredibly high-powered machines that also have a certain ability to thermal. Today's Li-Poly cells and rules result in a bit less struggle to satisfy the power requirements without exceeding the weight limits than previous years.

Most of today's competitors opt to simply purchase a highly competitive airframe from one of a few manufacturers who specialize in this niche. Not surprisingly, the leaders are all European; Avionik, Stratair and Freudenthaler. The primary US importers for these airframes are Soaring USA and Esprit Models. Icare in Canada does a fair amount of business in this area as well.

Brushless motors made by long-time US Team member Steve Neu, are the choice of most of the world's pilots. Advances in brushless controllers and battery chemistry; Li-Poly cells allow the competitors to fly at much lighter weights, charge at their leisure and then release incredible amounts of power with little fear of failure. Today's systems are quite capable of 5 to 7,000 watts of power. Let's put that in perspective – 700 watts will make the average electric sailplane climb quite respectably, thank you.

The typical F5B flight profile has the airplane launched 180 degrees away from the line connecting the two pylons. They then climb under power for just a few seconds following a curving vertical path, much like an Immelman turn, so that the top of the climb finds the plane inverted and heading back along the course between the pylons. Course speeds average 120 to 140 mph and the planes generally enter the course somewhere over 300 feet above the ground. Remember, the motor may not be used on the course, so the planes essentially coast around the

far pylon and back to the start pylon. The pilots generally stand near the start pylon so that they can precisely control the application of power outside the pylons.

The rules allow a maximum of 10 motor starts during the pylon portion, so pilots' laps are coordinated with the motor run requirements. Top-level competitors are scoring upwards of 50 laps in the 200-second window. *These things are moving*. The strategy for the distance task is pretty straightforward. Produce as much power, and therefore speed, in as short a period as possible.

At the end of the 200-second window, a second 600-second window for thermal flight begins. Motor run time will not earn points, therefore the objective is to run the motor as little as possible so as to score the most points. The pilots use motor power as needed to rocket the plane to altitude sufficient to search for thermals. These climbs are impressive in that the planes' vertical energy at the end of the motor run results in several seconds of "zoom" after motor cutoff.

F5B ships are built with a high aspect ratio and they are extremely efficient so it doesn't take much lift, or in the absence of lift, a very short amount of motor run time, to achieve the duration component.

The final scoring opportunity is the spot landing. This is a bit nerve-wracking to watch as the pilot stands at or near the edge of the three concentric landing circles and brings the plane in towards the target using the ailerons as spoilers to both slow and shed altitude. Note that the term "slow" is used pejoratively here. There's nothing slow about these approaches, the planes are honking along and the landings look more like carrier traps than a nice 3-point landing.