Proposal for a new class F3B-electric

The draft rules are now available and may show there capability during the next time.

Foreword

The number of F3B-competitors is decreasing in the last years; therefore the number of competitors at the individual competitions is going down with the risk that the one or other organizer will stop organizing competitions because of a too big financial risk.
The main problem is, that there are no youngsters at all; but this problem can´t be solved by the new class F3B-e.
Fact is that the class F5J which needs no winch (F3B) or no person for towing (F3J) has an extreme popularity.
Perhaps we have a chance to win back competitors for whom the handling of the winches was too troublesome, new pilots or pilots from other E-classes for this new challenging and multifunctional class.
A big advantage of the electrification is that the training is more efficient because there is no set up of winches and one is independent of the winch direction.
The tasks Duration, Distance and Speed should be taken, if possible, one-to-one from F3B; only the launch should be changed from the winch to electro-motor.
For the launch there should be the necessity to make also individual decisions depending on different weather conditions like it is at F3B.
A program with a constant altitude for all pilots at all tasks are not constructive; the individual skill of each pilot launching with an electrical motor should be not neglected.

To create goal-orientated rules there is a workshop of pilots and consultants from AUT, BEL, FRA, SUI, GER and LUX.

Preliminary tests

If we use an electric motor we should have learned our lessons from the long lasting and woebegone experience with the electric winch; therefore it´s necessary to fix verifiable basic data from the beginning.
With extensive preliminary test we found out that a maximal input power of N=800 W with a maximal amount of energy of E=400 Wmin is a good compromise for a safe launch at high wing-loading and an adequate altitude for Speed.
Also for Distance with medium to high wing-loading the altitude is comparable to F3B.
The only problem for Duration with a minimum wing-loading of F*=35 g/dm² is the big altitude with the consequence that all the pilots would have reached the same score. This problem exists since years at F3B; therefore we looked for a solution to solve this problem to spotlight the pilot´s skill again.
Therefore we decided to introduce an altitude quantitation comparable to F5J; that means the lower the altitude when cutting off the motor the lower the deduction of points.

Rules

Characteristic data:

Minimum wing-loading	35 g/dm²
Maximum wing-loading	75 g/dm²
Maximum flight mass	5 kg
Maximum energy	400 Wmin
Maximum “Average Input power”	800 W, Peak ≤ 900 W
Battery	Any type of rechargeable batteries
Motor	Any type of motor
Minimum nose-/spinner radius	7.5 mm

The model is only fixed by the minimum and the maximum wing-loading and the maximum flight mass.
The minimal wing-loading of F*=35 g/dm² needs no special construction and therefore no expensive material.
The power-unit is defined by the maximum “amount of energy”, the maximal “average input power” and the maximal “peak-power”.
The definition of the “average input power” is necessary because the power depends on the voltage of the battery and on the current and is therefore not constant.
The “average input power” of N=800 W is needed to have a save launch without any risk of a stall at high wing-loading for Speed.
The definition of a “peak-power” $N_{peak} \leq 900$ W is necessary to prevent that at the launch a significant higher power is used for a short time.
The same applies at the end of the run-time of the motor at Duration if there is a short-time height-gain needed.
The “amount of energy” E=400 W is needed to gain a reasonable altitude at high wing-loading.
The “average input power” and the „peak-power“ are logged and displayed. If the fixed values are overstepped points are subtracted; if there is an overstep of one Watt there is one point subtracted in both cases.
Because all relevant electrical values are measured it´s possible to use each motor and each rechargeable battery which fit to the fixed values; because all components from the stock have a high efficiency it´s not necessary to develop own parts at all.
At *Duration* the flight-time starts with switching on the motor because switching off of the motor can´t heard in all situations; the run-time of the motor is thirty seconds to reach the considered altitude.
The total flight-time is 600 seconds; therefore the time for the gliding flight is only 570 seconds; but also the reduced time is a challenge because the F3B-e models have a higher wing-loading than the F3B models.
At *Distance* and *Speed* the model must first fly in the direction of Base B until the motor has stopped automatically. At a downwind situation the model must do the same in the direction of the “virtual” Base B. With this procedure is guaranteed that the model enters the course gliding like in F3B.
For reasons of safety it´s not allowed to catch the model during a stopover. The reset of the logger must be done external, e.g. by a push-button.

The electrical components and the test-procedure

When selecting the motor and the battery there must be care on the facts that at one side there is enough power and at the other side restarts are possible.
The controller must only fulfil the requirements of the power-unit.
There are controllers which current limiting (current regulation) on the market which make the adjustment of the "average input power" easier. These controllers have the advantage that the power depends "only" on the battery voltage; in this case there are less iterative steps necessary to adjust the "average input power".
Controller producers see the possibility that in the near future there will be a firmware "constant power" available on the market. If you buy a new controller it seems to be useful that the firmware can be updated.
The basic values for the logger like battery voltage is measured directly and the current versus a calibrated resistor (shunt); this arrangement makes it relative easy to control the accuracy of the logger.
From SM-Modellbau („Unilog 2") there is contemporary an appropriate firmware available; the promise from AerobTec ("Altis v4") is still missed.
I will keep you informed concerning the logger.

Attached the momentary status of the rules is stated in "24.03.2018_Draftversion_final_model".

Transition period

At the beginning it should be possible preferable for a large number of pilots to use the wings and elevators of their existing F3B models in combination with an E-fuselage; therefore the minimum wing-loading until the end of 2019 is raised to F*=38 g/dm².
After the transition period there are definitely lighter wings available, to reach the minimum wing-loading of F*=35 g/dm²; there is no height-start and therefore the g-loading of a F3B-e model is significant lower.
A rule conform power-unit with N=800 W and E=400 Wmin has a calculated runtime of t=30 seconds. If the power-unit of a newcomer is less powerful he will get for "power compensation" a runtime of t=40 seconds.

What´s still planned for 2018?

I try to find organizers who are willing to add "Electric pilots" to their FAI-World Cup competition F3B in separate groups with a separate ranking.
Adding F3B-e pilots is at last the idea to increase the number of competitors of F3B competitions.
Of course standalone F3B-e competitions would be fine at the beginning to introduce the pilots and to eliminate teething troubles. But this falls through because there will be no organizer who will place the big infrastructure and the numerous number helpers on the disposal of a relatively small number of competitors.
A solution could be to organize a F3B-e competition only with Duration and Speed.
I hope that the one or other has an adequate model to be able to snuffle at the class F3B-e.
After contacting this year´s organizers I will publish the news promptly.
If there are any questions please let me know.
R. Decker Unterschleißheim den 26.03.2018