Rule change proposal for section M by Germany

1. Maintaining the energy limit by battery weight. Gain further experience in the basic handling of the limiter system as an alternative at international events (EC & WC). At least until point 3 is met.

2. Extension of the limiter system to an energy counting systems.

   Reasons:

   - Generally simpler system in terms of handling and controllability (less complex)

   - No boats that can stop abruptly due to reaching the limit or an operating error (lower potential risk on the water due to obstacles)

   - Energy counting system is independent of the control range of the ESC.

     Control range (pulse signal) of the various ESCs is different -> down regulation of the throttle might be hardly recognizable for the driver. Also, appropriate water conditions and / or driving behavior can lead the driver to not being able to recognize the achievement of the energy limit in time -> higher potential risk on the water due to obstacles.

   - A penalty system can be determined by the magnitude of the energy overrun. Hierarchized system, low exceeding minor penalty (time penalty or round deduction), large exceeding high penalty (disqualification).

3. Development of an overall concept (basic rules) for the limiter system (energy counting system) taking into account the following points:

   - Process for the approval of a new limiter / counter

   - Practical test / calibration procedure for approval of a limiter / counter

   - Practical test / calibration procedure for checking at an International Competition (EC & WC).

   - Note: When limiting energy due to the battery weight, each battery has been checked thoroughly and comprehensibly for each run using a scale and a multimeter so far.

   - Determination of measures / possibilities if the energy limit value is ok, undercut or exceeded.

   - Practical way for each driver to check the correct function of the limiter / counter in advance at an international competition (EC & WC).

   That the idea behind the limiter system (energy counting system) is basically good and there are working devices is beyond question.

4. Determination of the permitted amount of energy for the limiter system (energy counting system) based to be published measurements and used measuring method (see attached example) of available battery packs and not based on label values and assumed mean voltage levels.

5. Increase of discharge voltage to 3.5V per cell, which has to be taken into account when determining the permitted amount of energy for the limiter system (energy counting system).

6. Use of existing hand lap counting to check / confirm the heat result, if there is any doubt by a driver about the correct lap counting by the transponder.

Example of documentation of energy value determination:

Used PC software: Schulze Soft
Lipo battery: RaoringTop 1700mAh 25c 3s
Charger: schulze next Gen II 14-500
Charing current   1.5A to 4.21V per cell
Discharger: schulze next Gen II 14-500
Discharging current: 8A to 3.3V worst cell
Discharged capacity: 1730 mAh
Mean voltage level: 11.035 V
Energy value: 19.04 Wh

RoaringTop 1700mAh 25c 3s LiPo   festE 8000mA t[min]:13:20 C[mAh]:1730 E[Wh]:19.04 Umit[V]:11.035