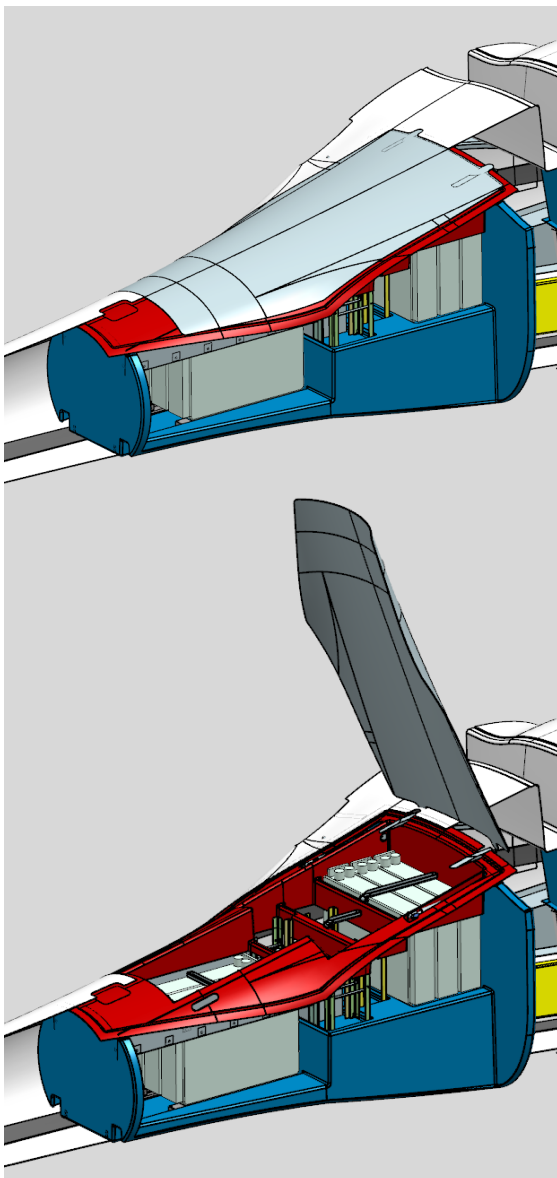


SPECIFICATIONS ANNEX 1 BATTERY SYSTEM



1. PERFORMANCE

The actual battery system has **21 kWh nominal value**.

Typical user profile is calculates for 85% = 18 kWh.

- Taxiing (3 min.), take-off and climbing to 500 m (1600ft) takes **4 kWh**
- Level flight with 130 km/h (70 kts) close to best glide ratio, takes **12 kWh** for 1 hour flight
- Climb to 3,000 m (10,000 ft) takes **16 kWh**

2. BATTERY SYSTEM

- Two packs à 60 kg/400V, each with 3 modules
- elfin starts already with one pack (e.g. for competition with max water ballast/ lowest wing loading after drop of water)
- Actual battery cells are Samsung INR 18650-30Q

3. SAFETY, LOCATION AT ELFIN AIRFRAME

- Safety is provided according EASA CS 22 special condition
- Tests with mechanical impact on cells inside the module have shown successful stop of heating
- Both packs are installed in a compartment of the tail boom, with free access from top, and fire protection inside

4. ENVIRONMENT – TEMPERATURE ISSUES

- At mission profiles (like 1.) internal heating of cells remains less than 10°C.
- Low temperatures reduce the power until the cells warm up by themselves.
- The loading of batteries at temperatures below 0°C is not recommended.

5. LIFETIME, COST, INCREASE OF PERFORMANCE

- At missions as shown in (1.) and below we expect 1000 cycles.
- We further expect the price of two packs today at 18 k€, decreasing within the next five years by ~30%.
- Prognoses show 6–8% improvement of battery capacity per year within the next 5 years. We finally get > six training take-offs to 500 m/1,600 ft and > 2 hours electric flight time.

6. LOADING

- The built-in recharger (5.5 kg) provides 3 kW; that offers a loading time to 85% capacity in about 6 hours. Additionally an external fast loader (2 hours for 85%) will be available.
- 20 m cable (2.8 kg) to plug internal recharger to the next socket-outlet can be carried on-board (adequate place is provided).

7. CONTROL MODULE IN PANEL

- The power and battery status will be indicated by an instrument in the panel (similar to the picture right hand).
- Includes also the indication of range at actual power setting.



In summary: We forecast that the new electric power technology fits perfect to soaring needs. Its evolution is driven by the strong pressure on the automotive world – for our all benefit.

For long distance flights our solution is the compact RangeExtender (65 kg). Easy to handle and with low harm on the “pure” high-end glider performance.