Determining capabilities for Cryowing Observer (RC)

- Cruise speed
    - Maintain approx. 120m (?) AGL (keep a safe altitude) and vary throttle input and see how aircraft responds to stick inputs at different speeds.
    - If aircraft can maintain good performance at a certain throttle input over a longer period of time, then this can be a cruise speed (read off airspeed indicator).
    - (Cruise speed can be chosen mathematically, but this is omitted in these tests)
- Stall speed
    - Flaps up and power off
        - Keep aircraft level as long as possible. When aircraft starts upset mode (stalling on one wing side), note this as stall airspeed.
    - Half flaps and power off
        - Keep aircraft level as long as possible. When aircraft starts upset mode (stalling on one wing side), note this as stall airspeed.
    - Full flaps and power off
        - Keep aircraft level as long as possible. When aircraft starts upset mode (stalling on one wing side), note this as stall airspeed.
- Max take-off weight (MTOW)
    - First with no payload and see how aircraft behaves with current weight and CG (centre of gravity)
    - Adjust CG if needed

- Then add 1 kg payloads (depending on standard empty weight)
- Check overall performance (throttle needed to stay level, manoeuvrability of stick inputs (is it slow/irresponsive?))
- If performance difference is unaffected, increase payload weight.
- When the aircraft becomes less responsive but controllable, decrease payload weight slightly (perhaps by 25% of current payload). This can be noted as MTOW (suggestive).

- Max useful load
  - $Max\ useful\ load = MTOW - empty\ weight$

$$(\boldsymbol{L = \frac{1}{2} C_L \rho v^2 s})$$

- C_L = Coefficient of lift
- ρ = density of air
- v = air speed
- s = Wing surface area

$$Wing\ loading = \frac{total\ weight}{wing\ surface\ area}\ [g/dm^2]/[kg/m^2]$$

$$Power\ loading = \frac{weight}{Motor\ power}\ ["g/W"]$$

$$Power - to - weight = \frac{Motor\ Power}{Weight}\ [W/g]$$

Calculate/approximate minimum battery ampere hours

Propeller size : TBD after testing. Most likely 1206.