# Meeting notes 01/08/2023

* Prototype - not product. What is the problem? E.g. to build ground station tracking antenna
* Subdivide problem into smaller elements
* Define them so that they can be tested individually (not dependent on other elements, modular). At least 3 major aims. Can list possible expansions (cum)
* Good design? Enough detail to be critiqued
* Report/Steps
  + Problem
    - Specifications e.g.
      * Data throughput of 80%
      * 25 km line of sight
  + Literature review
  + Multiple possible solutions
    - At least 2, 3 is better
    - Use selection criteria based on specific problem
    - Score them?
    - Sometimes if it just fits requirements that is good enough (availability, price)
    - Can somma use lab ones if it is a minor decision/component
  + Design/Implementation
    - Use appropriate path to implement a design
    - Don’t reimplement the wheel if there is an existing tool and it makes sense to use it
    - Record problems faced, mistakes, and decisions made
  + Experiments
    - Concrete measurable outcomes
    - Reflection - understanding limitations of process
    - Show ability to critique (self-critique)

* Some payload transmission on PQ unit side of things. Effective throughput measurements of differently sized payloads. I can count all 1000 bytes, and dropped 3 bytes. Evaluate quality of link. Small battery to make sure it lasts. Specific protocol? Command structure? Parameters that vary communication rates? (don’t do this dynamically e.g. always 9600 baud). Reliability is key! Antenna design to whatever level. Deployable? Antenna of some sort. 100 mW transmit - no licensing needed.. ISM limit. Null not in direction where you expect antenna to want to face
* “Tracking” ground station - transceiver also 100 mW. Directional. Steerable. Open loop with expectation - we generally actually know where the satellite will be. “Two-line element” orbital parameters. Orbital propogater program to track satellite. Can predict within the next week. Pertubations (magnetic field). Balloon satellite MUCH more uncertain (20-30 degree open-loop pointing accuracy). Active signal strength scanning - conical scanning. Maximize signal strength. Fall back to open loop if signal is intermittent. GPS? Broadcast location. Running through car
* Isosonde as backup. Replace battery with rechargeable. Reverse engineer receive. Software defined radio on ground station to manage Isosonde side. Close loop with Isosonde information
* PCB - JLC PCB and PCBway. Software - Siemens is another option