



Linear wire scanner mechanics update

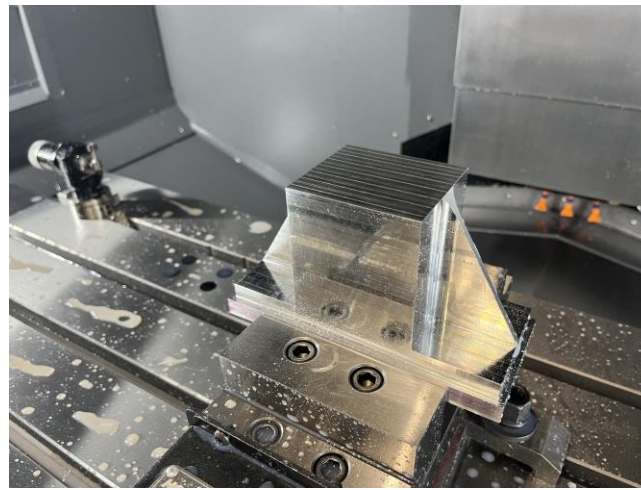
13th May

Project team meeting

Test rig update

- **Machined parts**

- 25% parts complete
- Estimated delivery 2nd week July
- Magnet yoke material not yet arrived



- **Ordered parts**

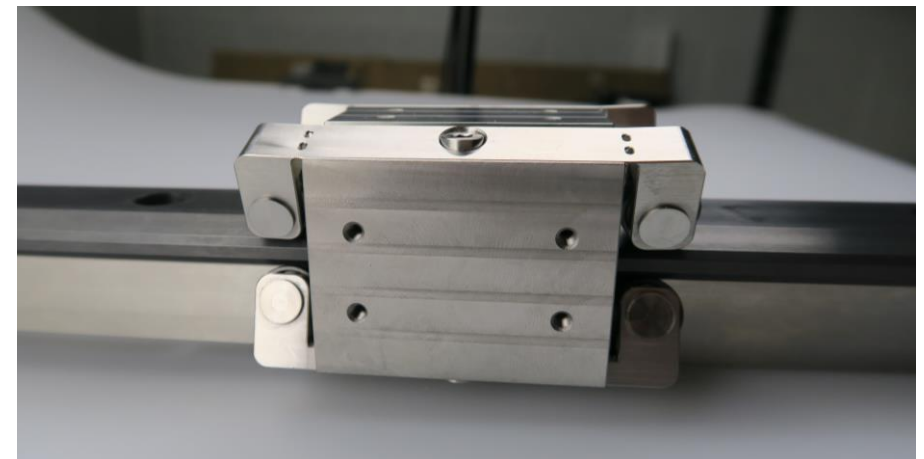
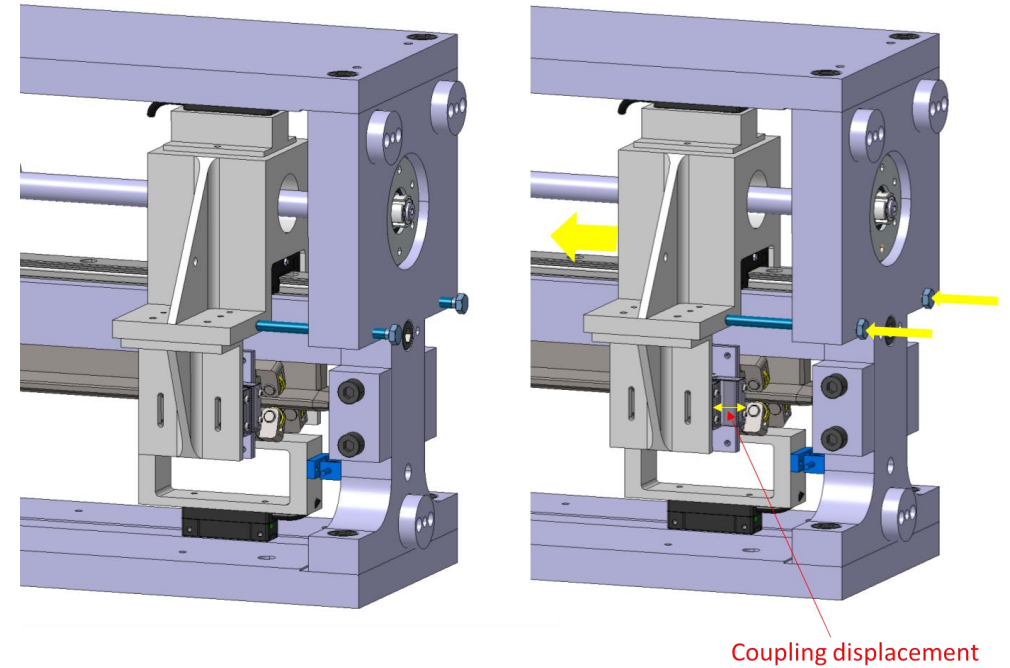
- Ceramic linear guide delayed by 2 weeks – estimate now 1st July
- "Out of vacuum" motion assembly **delivered**: ball screw, rail, carriage, bearings
- Linear encoders **due this week**
- Flexible coupling **due this week**
- Magnets **overdue**, being investigated
- Strain gauge estimated?
- Magnet spring **overdue**, being investigated



Test rig update

- **Testing plan**

- Location agreement: 867 or 865 new lab?
- **Test 1: Coupling force measurements – validating simulation model**
 - Fixing vacuum side to frame through strain gauge
 - Displacing the air side with pusher screws in small increments
 - Measure coupling force
 - Plotting and compare to simulated model
- **Test 2: Motion profile comparison**
 - Run the test rig with the same profile as a real beam scan
 - Plot the motion profile for air and vacuum sides
 - Compare the profiles to quantify the slack/delay
 - Complete for different arrangements (coupling mode 1&2, H&V)
- **Test 3: Ceramic guide lifetime test**
 - Run the instrument scan motion for 80k cycles
 - Plot the motion profile at regular intervals – 2k?
 - Compare the plots between vacuum and air side to see if there is degradation over time
 - Visual inspection of the ceramic guide after test to identify obvious damage
 - Potentially more detailed inspection if required



Test rig update

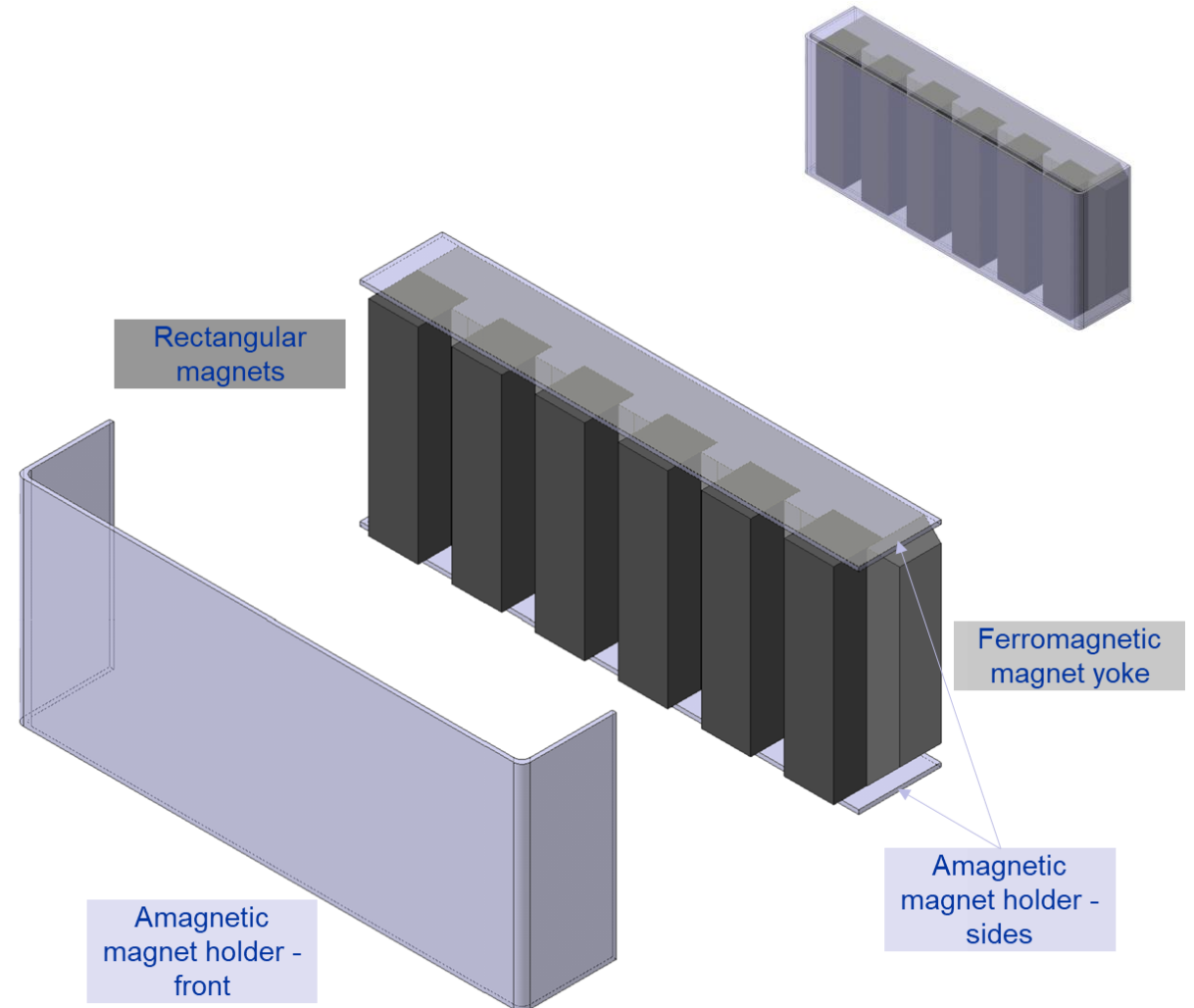
- **Magnet design**

- 2nd meeting with the magnet group. Outcomes:



Design of the magnet assembly was satisfactory. Some suggestions: alternative magnet arrays, 3D magnetic simulation with Opera (minutes on [indico](#))



- Design of the magnet tooling was satisfactory
- Recommendation to design a procedure for the assembly of the magnet holders on the test rig
- Recommendation to investigate the Eddie currents and do a study of the involved forces
- Recommendation to contact RP for the samarium cobalt activation
- Recommendation to contact the optics group for the influence of the magnetic field on the beam

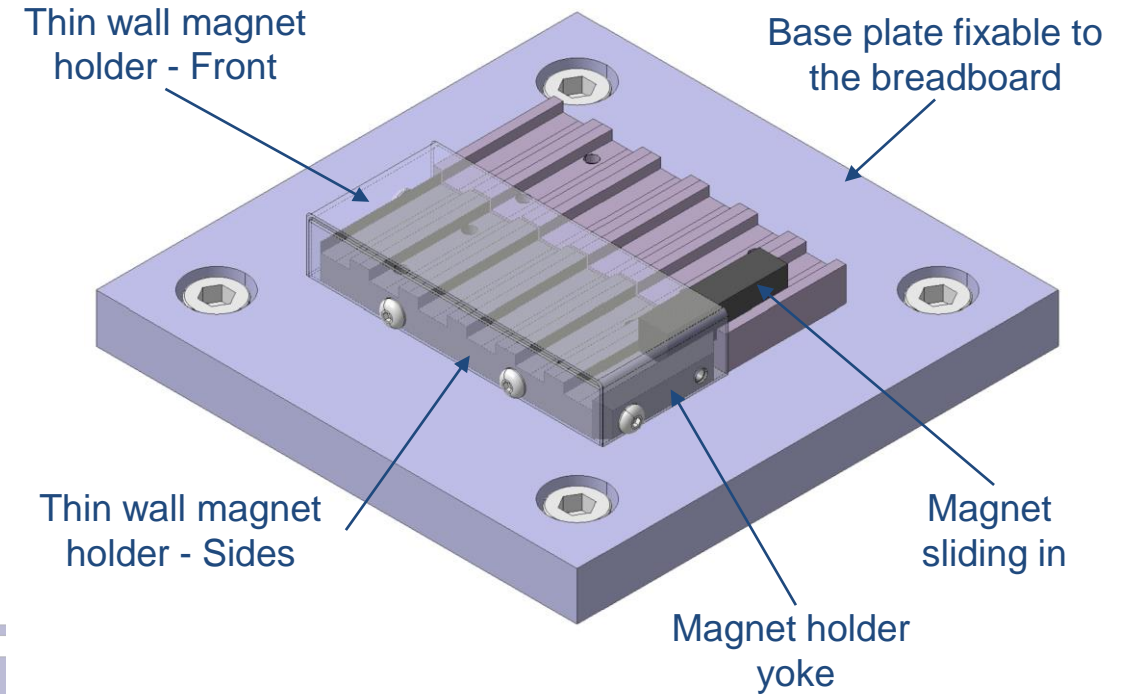
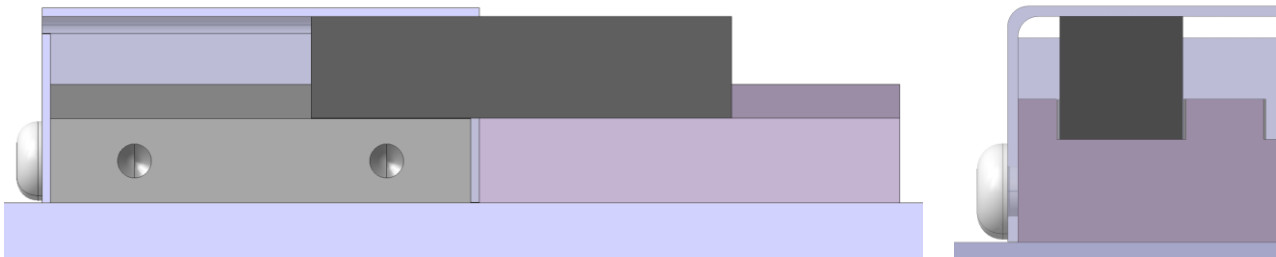


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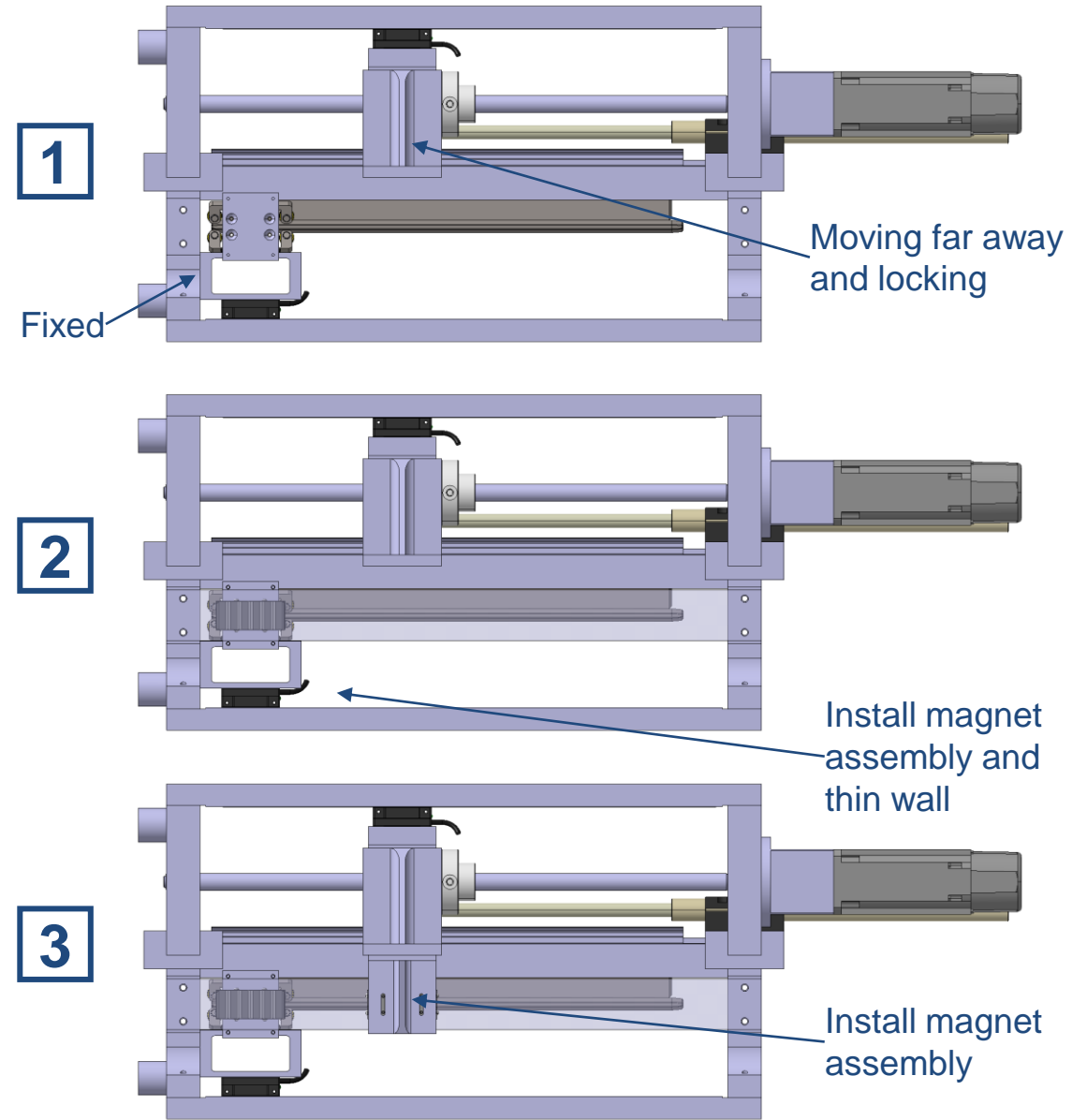


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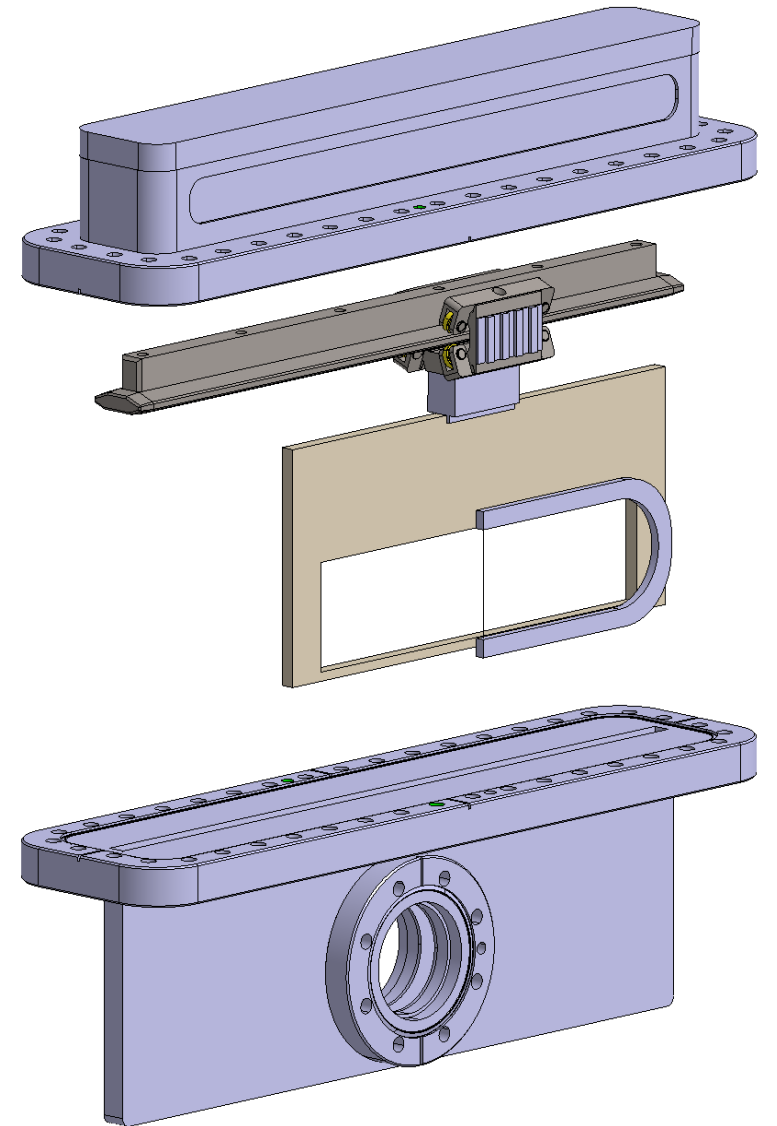


Instrument design update

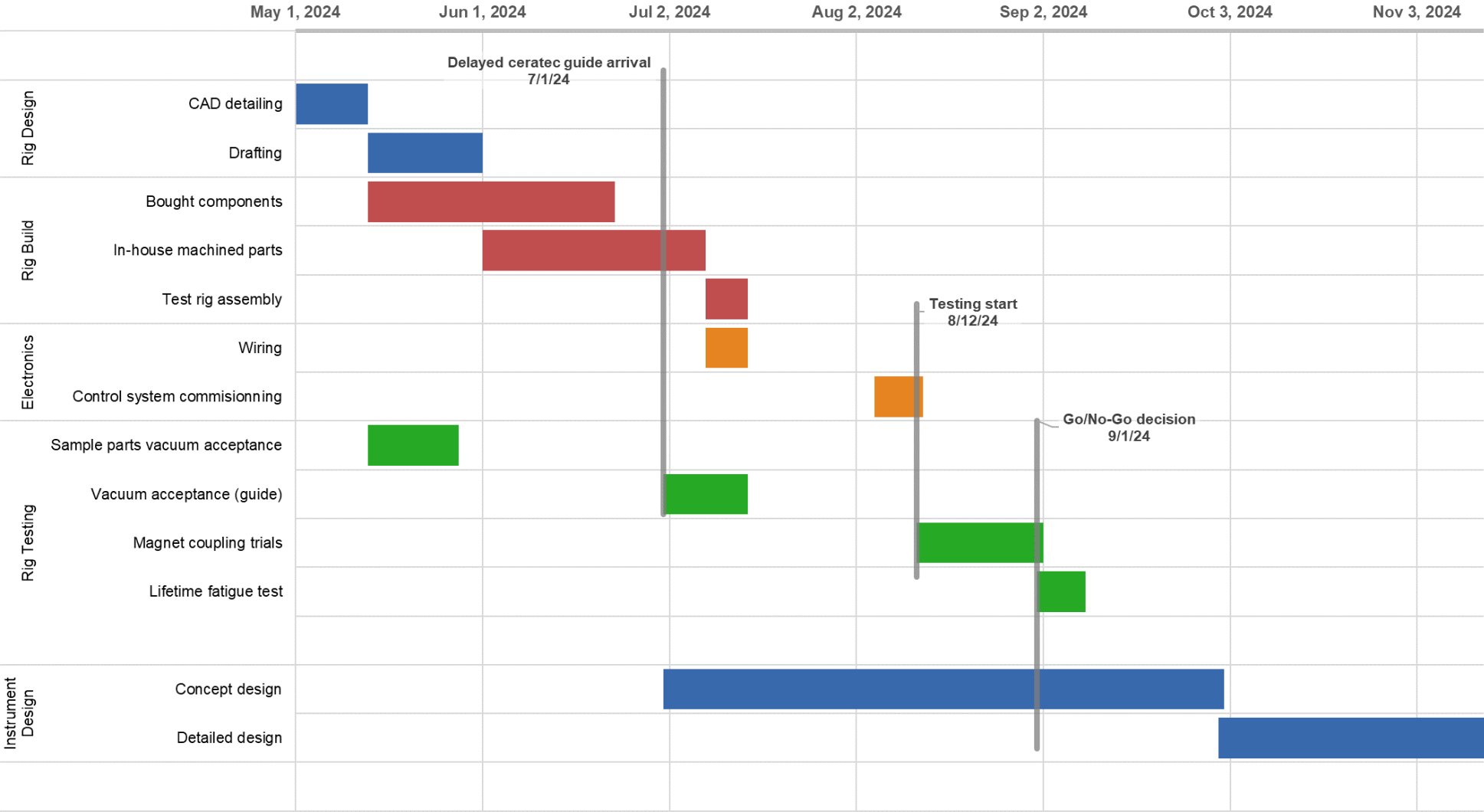
Instrument

- 1st meeting with Selba for the optical ruler (minutes on [indico](#))
 - Specification to be prepared and sent to Selba
 - Design of the card
- 1st meeting with RF group – preliminary results (minutes on [indico](#))
- 2nd meeting with RF group this week to discuss potential changes (minutes on [indico](#))
 - Mechanical feasibility of a moving RF contact inside the chamber to be investigated by ML
 - Adding ferrites into the design of the vacuum chamber

In parallel with the test rig design, manufacturing and assembly completion, ML will start developing the card and vacuum chamber designs



Project timeline



Long term planning

- **Initial instrument concept complete** – end of Q3 2024
- **Detailed Design with MME** – Q4 2024 & Q1 2025
- **Two prototypes to be produced in parallel** - Q2 2025
 - Simplified test version– used to commission and test in house
 - No need for CF, EB weld etc
 - Much quicker to manufacture and begin testing