



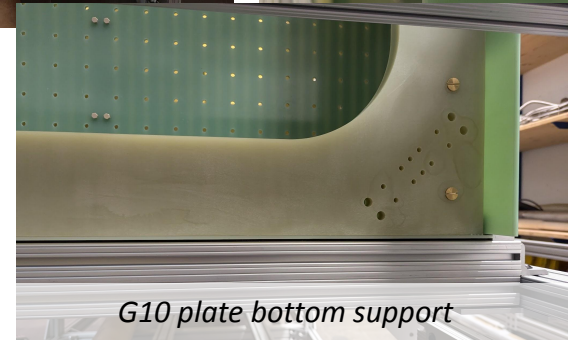
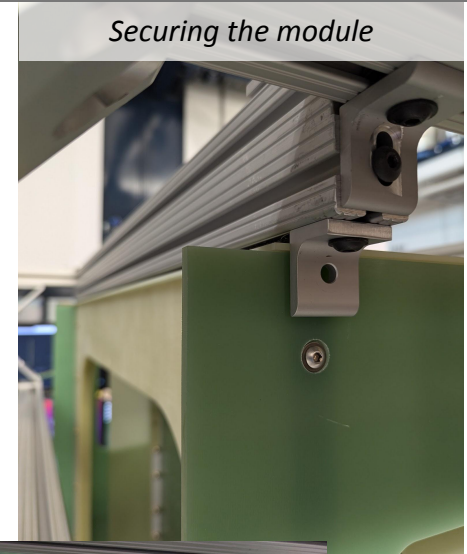
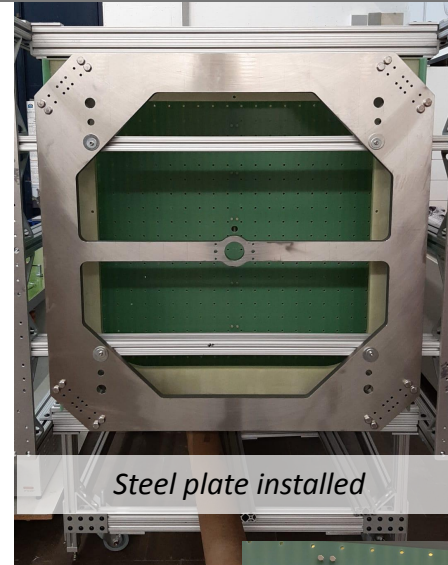
FSD Mechanical Mock-Up Update

ND-LAr Consortium Engineering Meeting

August 9th, 2024

Thursday 18.07 - Friday 26.07

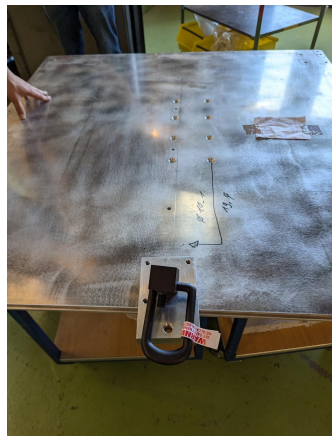
- Installed anode extensions and liquid containment
- Installed G10 and steel plates
- Removed brass standoffs



Monday 29.07

- Module rotated into vertical position. Operation was overall smooth. No module was harmed in the making of this rotation!
- Procedure took the entire day, mostly due to preparation work and to overcome a few hiccups along the way which forced us to deviate a bit from the original rotation plan. Next time should definitely be faster
- Originally planned to perform rotation using 2 cranes. Lori found in the morning that the crane rails in the hallway had lost some screws. Decided not to use second crane and stick to the original 1 crane plan

Reminder of rotation procedure:

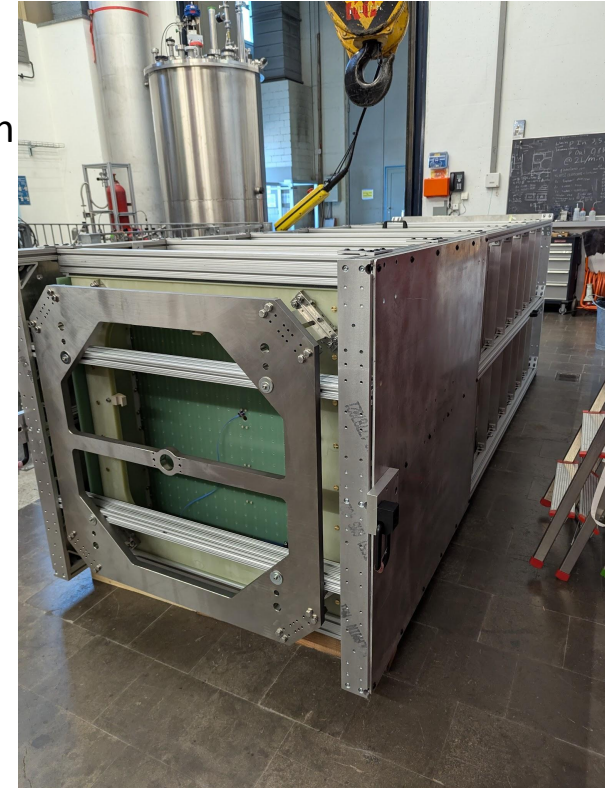


- Install hoists in this configuration, mount the plates on the assembly frame (anode plane sides, hoists facing up), centering them WRT the load center of mass
- Unbolt the frame from the handling cart, connect the 4 hoists to the crane and start lifting it up
 - If load is not perfectly balanced, set it back on cart and adjust lifting plates
- Lift the frame just enough to remove the cart from underneath, then lower load on the ground

- Shift plates to the edge of the assembly frame where the top of the module is, and reconfigure hoists installing only one per plate halfway along the height
- Connect the two hoists to the crane and lift the crane to rotate module

Rotation

- **Small issue:** couldn't install rotation plates while sitting on the handling cart. Bottom of the plate interfering with cart itself.
 - In-situ solution: craned on the ground putting slings directly on the 80/20 frame
 - Long term solution (if needed): shave a bit (like 0.5 mm) bottom of the plates



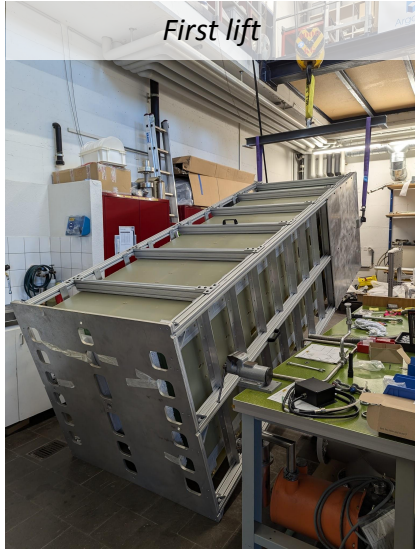
Rotation

- **Small issue:** Rigging configuration (swivel hoists directly connected to crane through slings) resulted in hoists having negative angle. Deemed not safe by Lori
 - In-situ and long term solution: use of a spreader bar which kept swivel hoists angle @ 0°

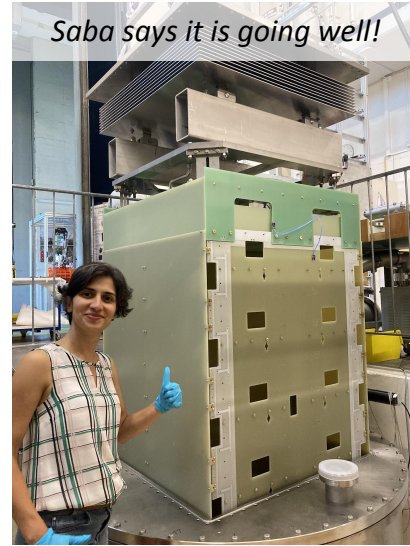


Rotation

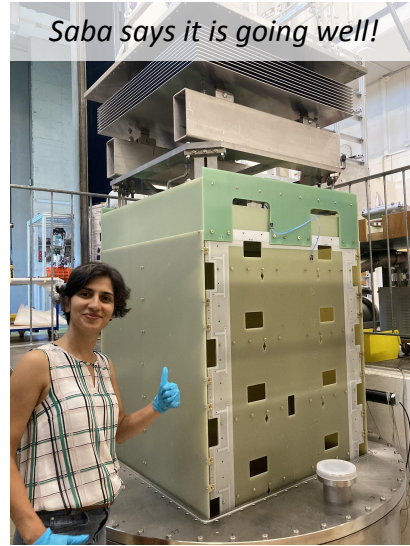
- **Small issue:** Rotation paused halfway due to concerns module inside the frame could be shaken too much when load becomes vertical.
 - In-situ (long term also?) solution: Plates shifted to the center of mass, load (one shackle per side only) lifted horizontally and rotated with the help of two people in the back
- **Things to remember:** Could use same configuration to lift frame off handling cart and rotate in one go



- Module inserted into the cryostat
- Once again, procedure took the entire day, mostly because it was the first time doing it. Should be faster next time



- **Small issue:** Not enough crane headroom to rig module flange above module with 2m-long slings
 - In-situ and long term solution: use square lifting fixture to reduce overall slings length
- **Things to remember:** Rotational frame is taller than the module. It may be necessary to shorten it as there's the risk we cannot lift the detector flange above it



- **Future issue:** It is a VERY tight fit. Passing the cables through the cryostat opening will be challenging. We will have to make sure dressing is done with cable kept as close as possible to the anode planes



Next steps

- August 1st was public holiday here in Bern, so not much happened last week after module installation
- This week we are focusing on filter regeneration - more from Saba
- We will resume module-related activities next week with cryostat pumping and leak checking