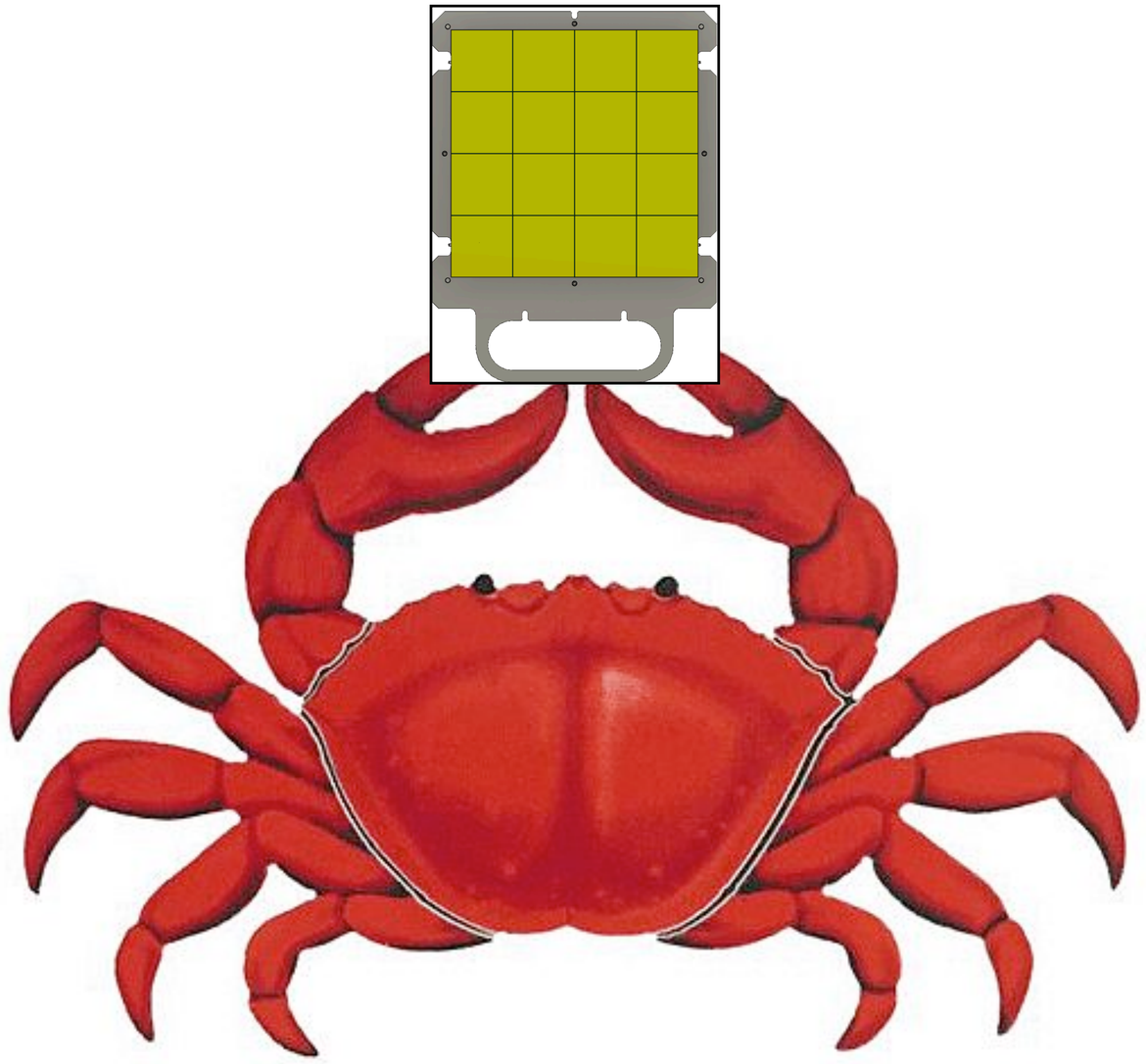
The PDU-handling Crab tool

- General idea
- Use sequence
- Some details
- Discussion items



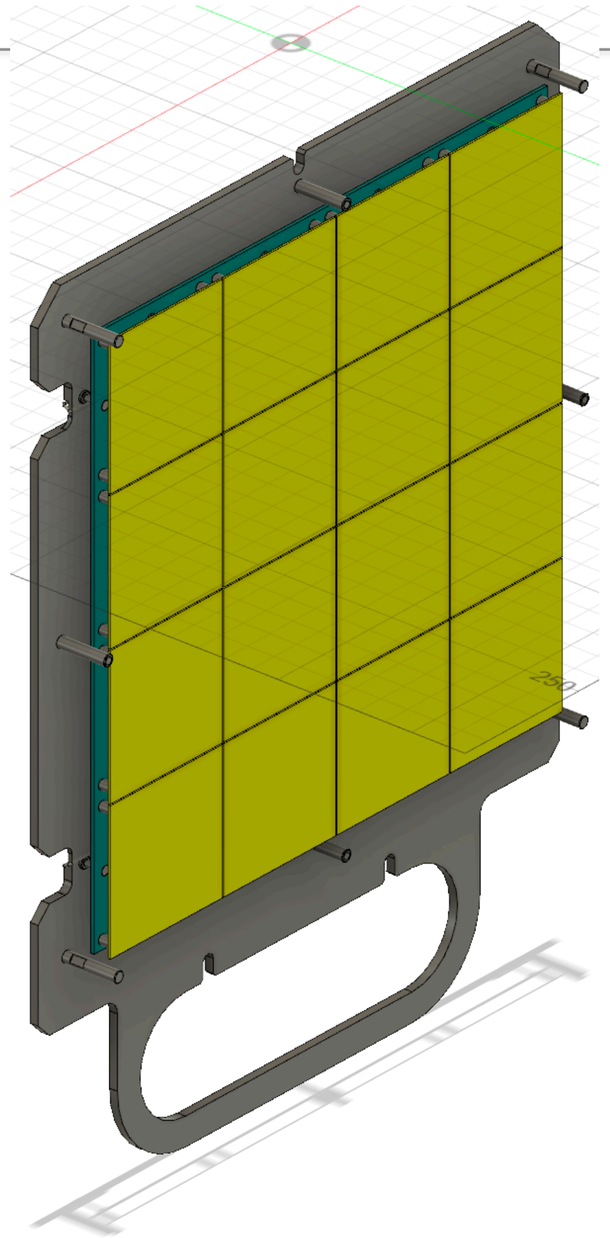
Andrea Pocar

Optical planes meeting

January 24, 2024

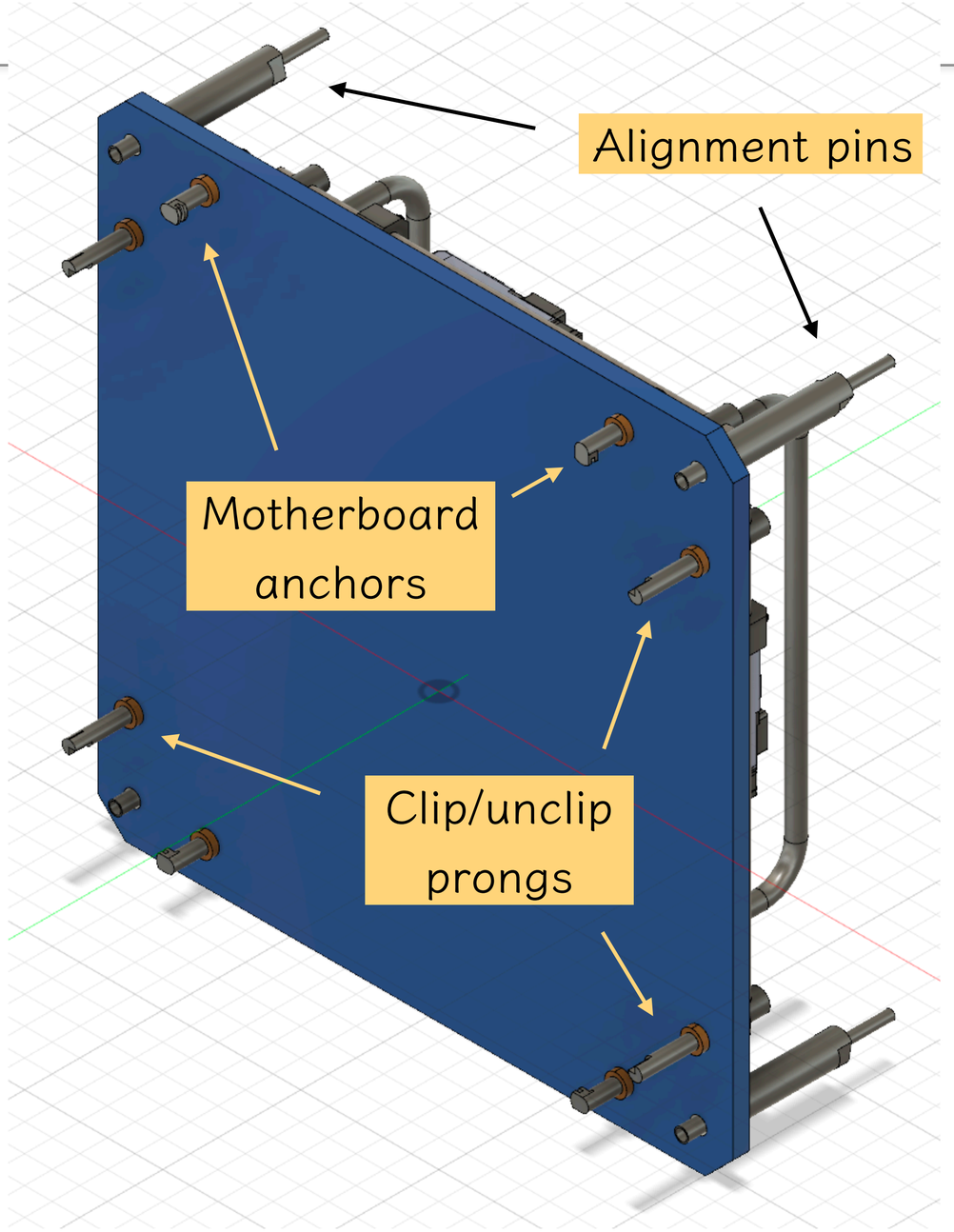
General context

- PDUs will be delivered for installation in the Optical Planes secured on metal transportation handlers
- We need to remove PDUs and safely install then onto the Optical Planes
- Not shown in this rendering is an acrylic protective cover

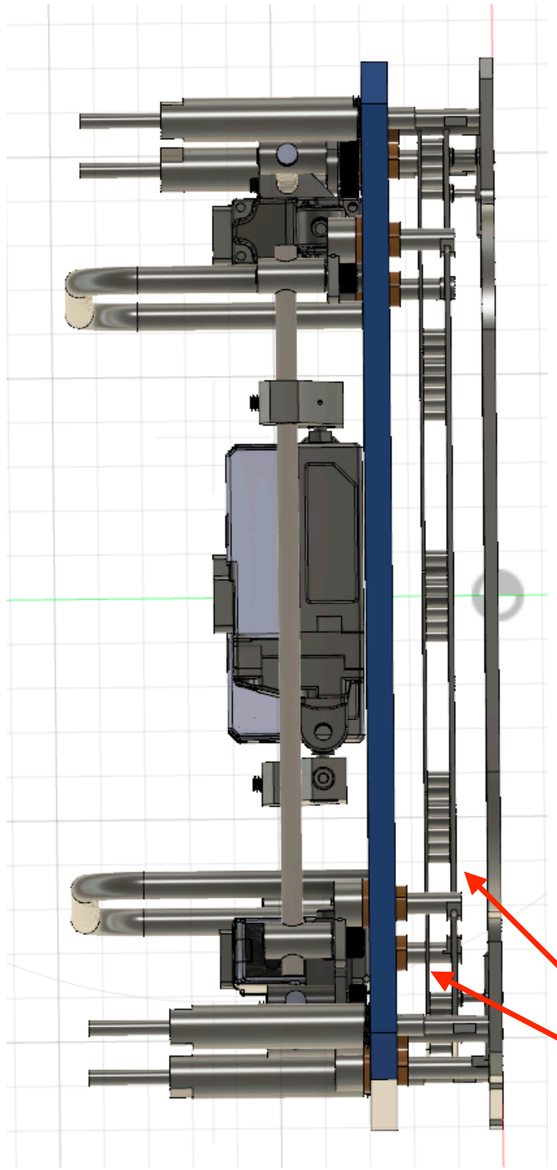


Sequence of operations

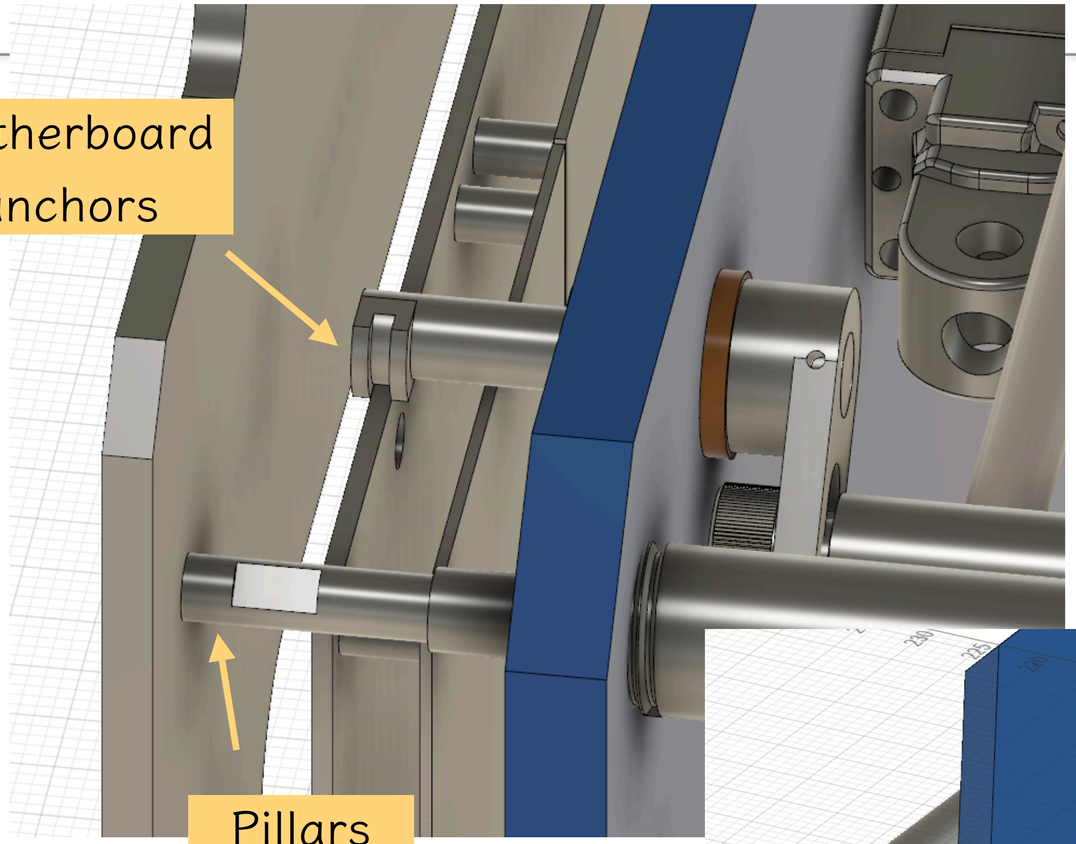
1. Receive PDU from PE folks on metal transporter, equipped with acrylic cover
2. Remove acrylic cover
3. Align crab, grab PDU on motherboard
4. Unfasten the retaining clips and remove from transporter
5. Move PDU+crab and lower onto Optical Plane
6. Reverse operations: align, clip PDU, release grip on motherboard
7. Move crab away
8. Repeat



Details



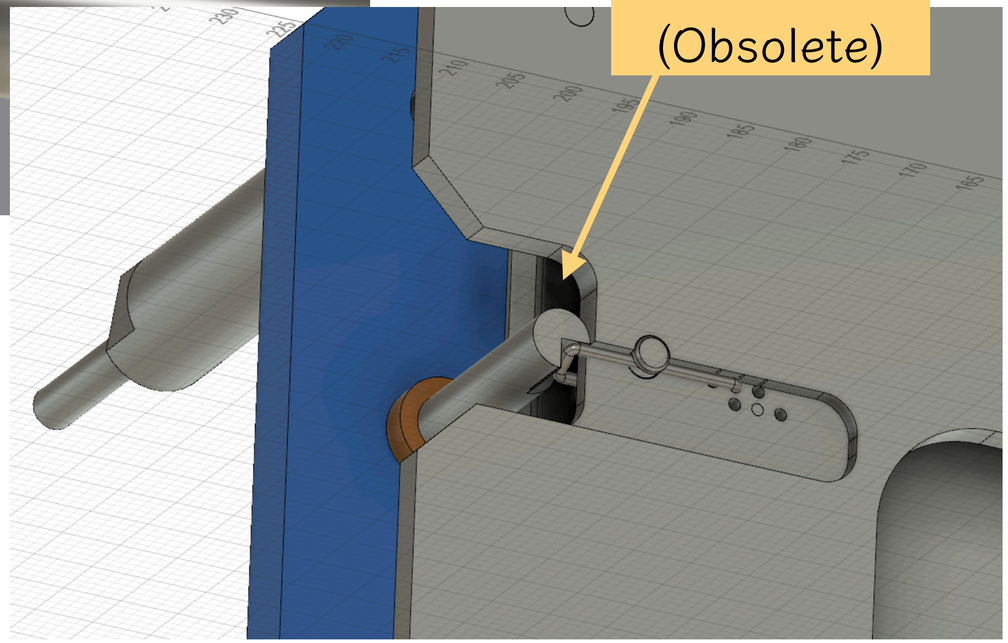
Motherboard anchors



Pillars

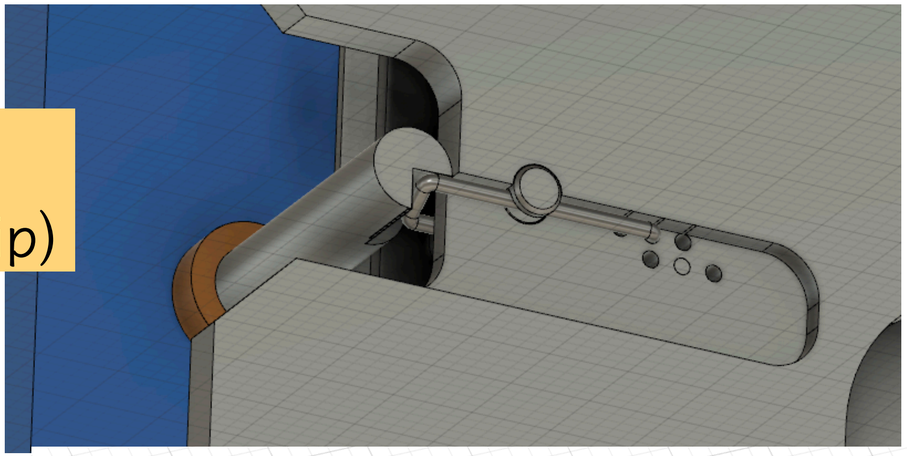
PDU + motherboard

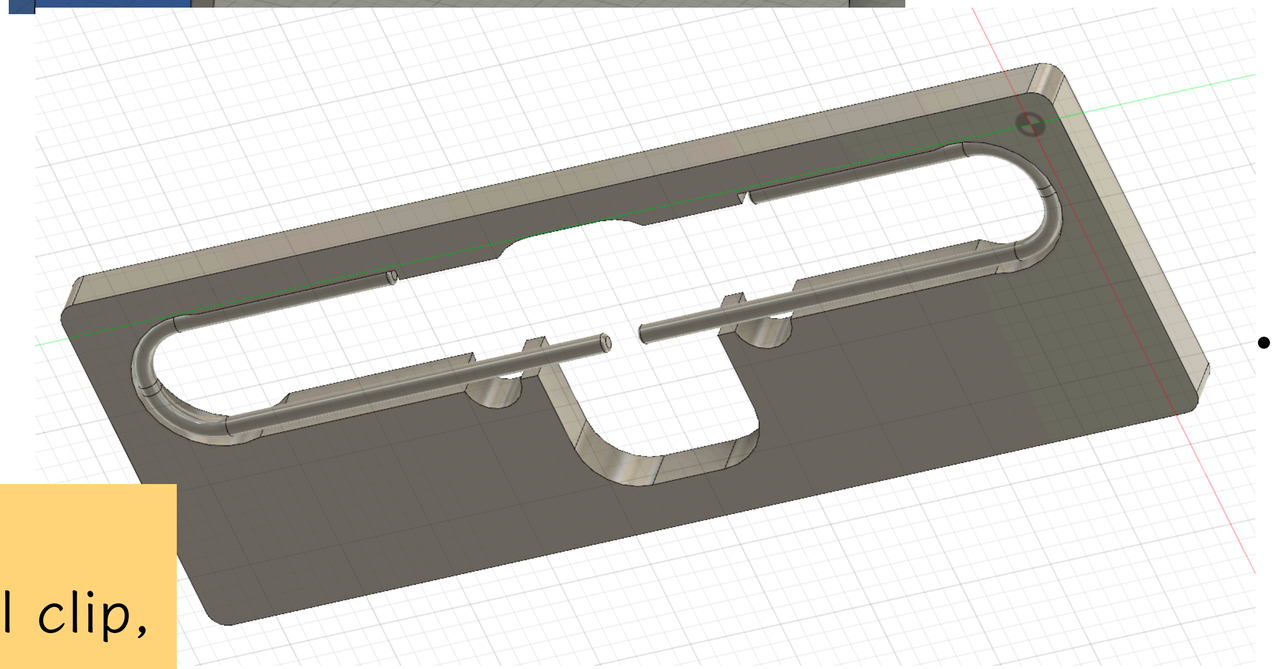
Clip / unclip prong (Obsolete)



Clipping mechanism

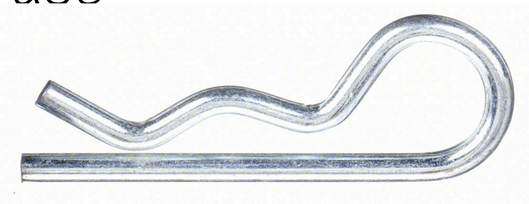
Old
(vertical clip)





New
(horizontal clip,
mockup plate)

- The UK group was interested in developing a Crab tool for the vPDUs
- The main difference is the R-clip they use



- I have reached out to Jocelyn, as there is perhaps room for simplification/ optimization

Plan

1. Develop all-manual prototype(s)
2. Learn what we want improved before finalizing the design
3. Practice on mockup mechanical PDUs
4. Make several for DS-20k installation

I have introduced the tool briefly to John Brandt on Monday

- I will send him the STP files to import into the vault
- Crab design needs to closely follow that of the Optical Planes
- So far, Ako has done most of the design work

Open questions

- Once PDUs are on the Optical Planes, do we want to cover them again with acrylic?
  - If so, how do we do it? In what orientation?

- The clipping mechanism is now horizontal (see next slide)
  - Clips currently being received of two sizes from the UK. Will be sent to Ako for testing
  - Did the UK group develop an unclipped for R-clips?

Questions / comments / next steps / ideas?

- Design / engineering: Cary?
- Mockup mechanical dummy installation (latter part of May)
- Google sheet: prepare and share
  - Length of pillars (holder vs. optical plane
  - Shape of pillars (cylindrical or hexagonal?)
  - Threaded holes for pillars are not planned for the optical planes —> check the crab will still work
- PMMA/black plastic cover: could be row slabs (avoid single-PDU sheets with screws) —> swap with single sheet before transportation
- Present status of the pillars?
- Care with clearance from SiPM —> delicate operation
- Optical Plane design + crab