uRWELL (BOT) Design Overview

MPGD-DSC - uRWELL Trackers meeting (12/21/2023)

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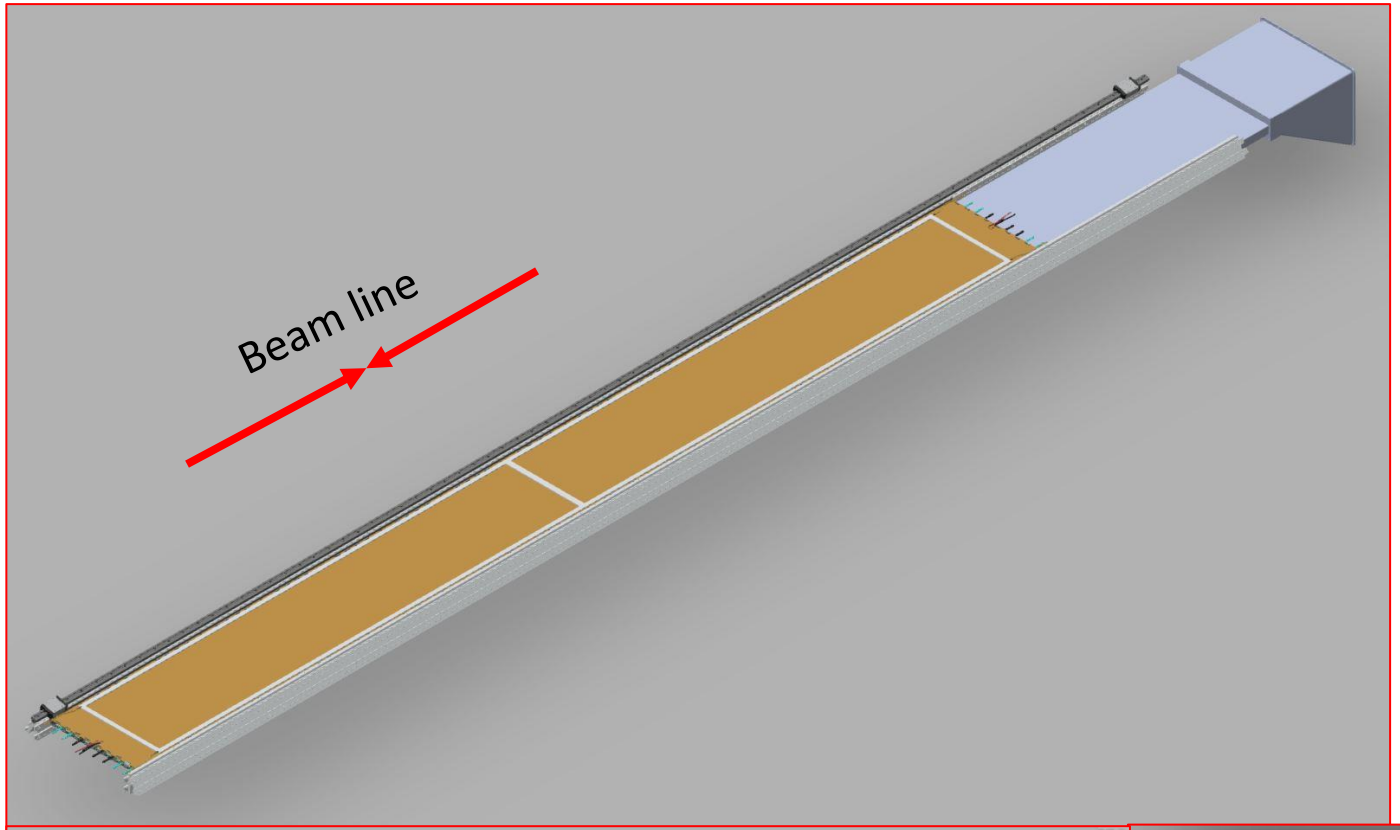
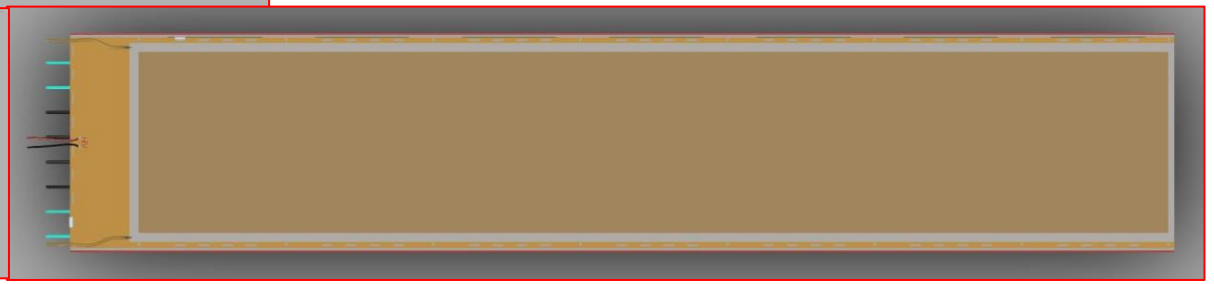
An overview with DIRC

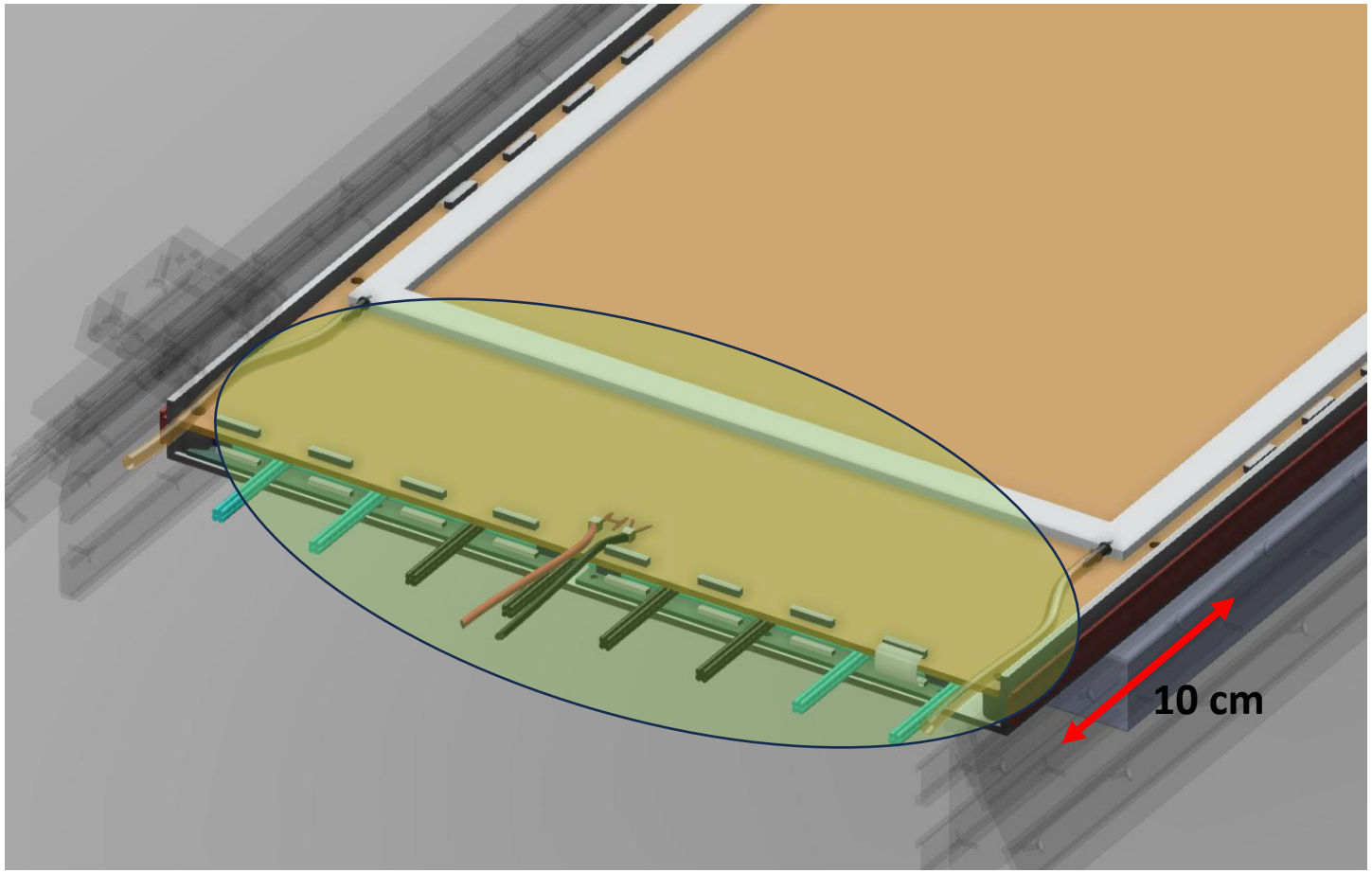


- Two uRWELLs butt against each other
- Give dimension (368 x 1736 x 25 mm^3)
- Detector FOV (310 x 1726 mm^2)
- 20 mm center dead area (chamber frame)

The goal is to maximize FOV & minimize materials for other detectors behind !!



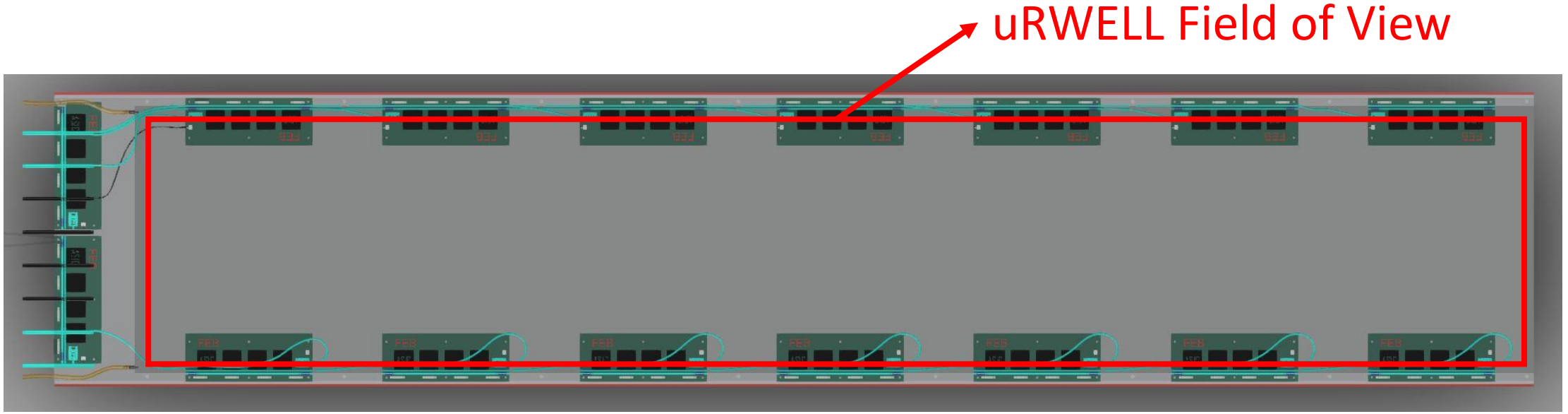
Service area



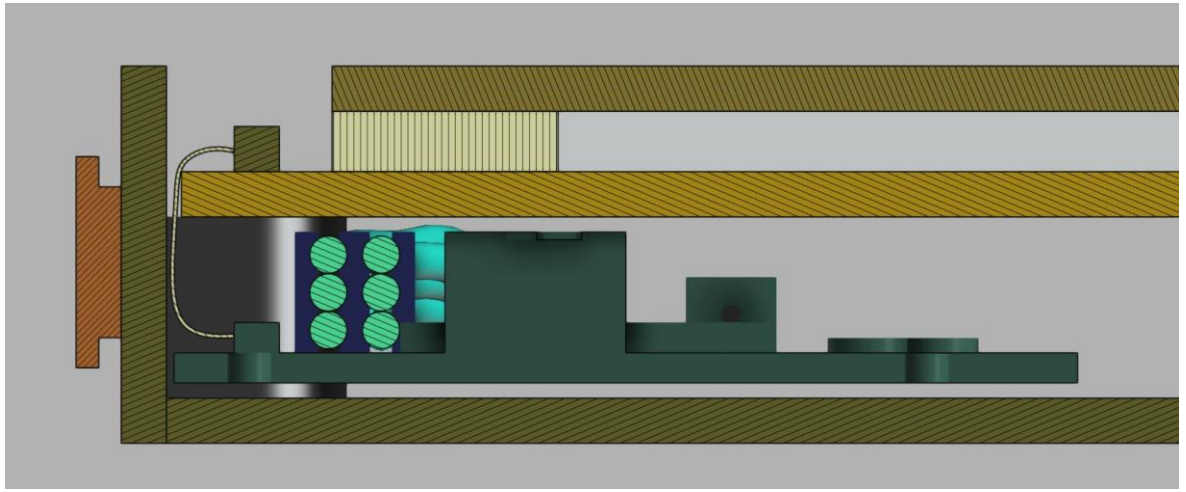
Minimum Connectors

- 16 Data cables (optical/copper) or 32
- 16 Power cables
- 1 HV
- 2 Gas lines (in & out)

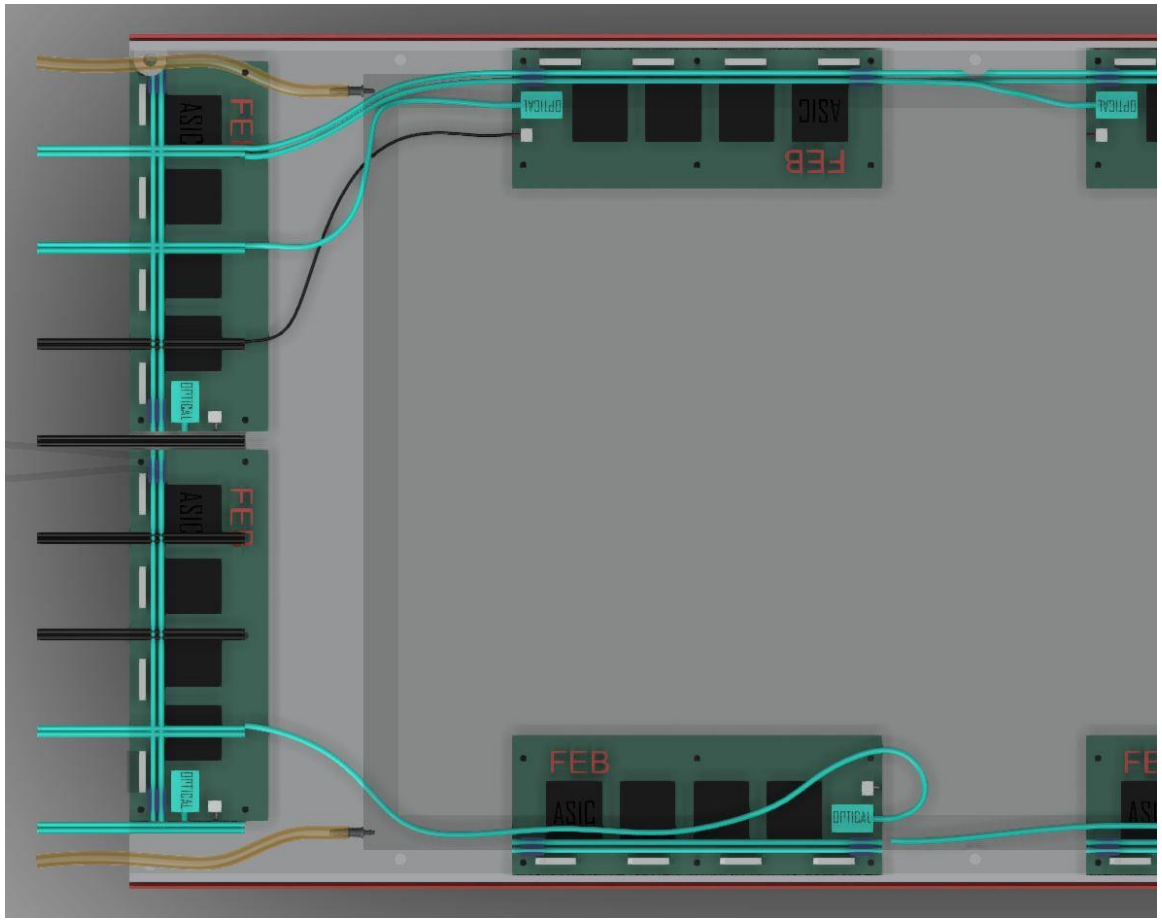
Top view without uRWELL



7 FEBs on each side + 2 FEBs on the service area
Each FEB has 4 ASCIS (total 256ch), 1 data cable, 1 power cable
Maximum length of FEB is ~160 mm (to be fit in the service area)



Cable routing

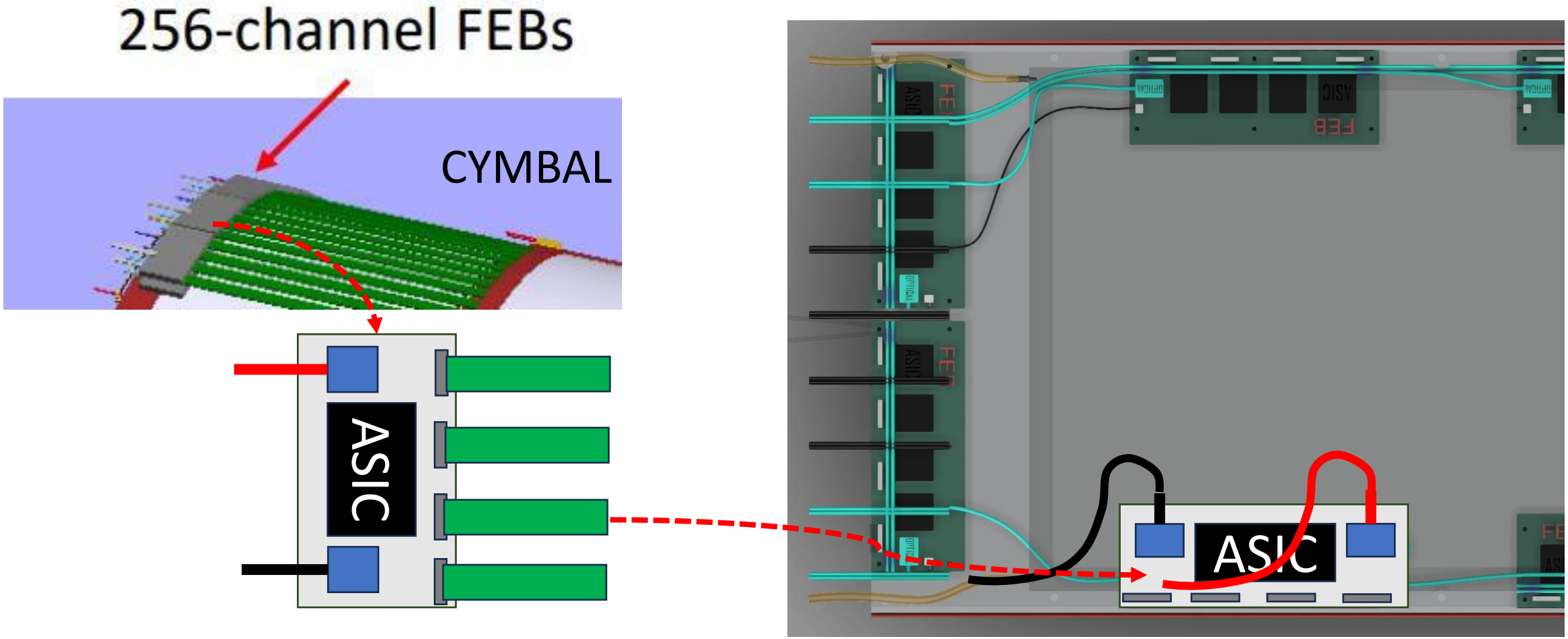


There are limited space for cable routing.

It is nearly impossible to route cables out of detector FOV

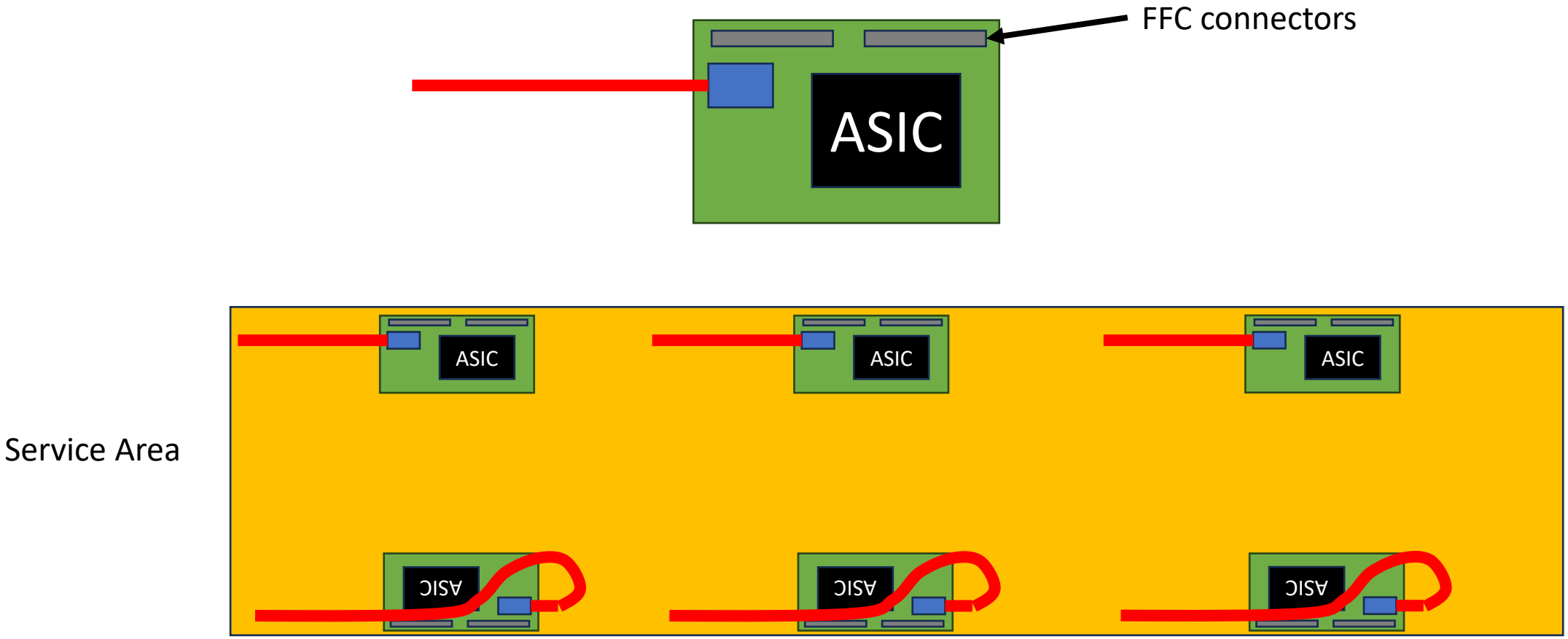
Details for the layout of FEB will be determined later.

Form factor comparison with other MPGD FEB

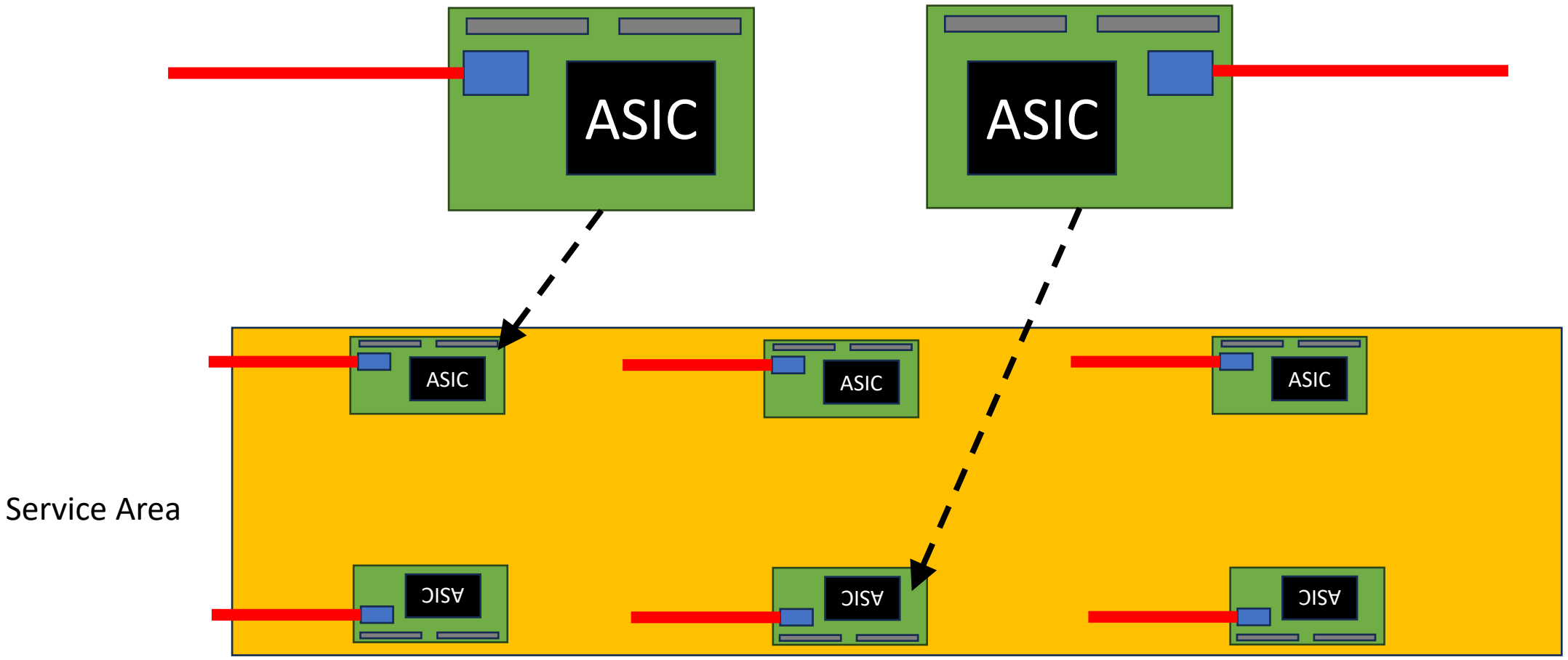


We need our own version of FEB !

Single type board



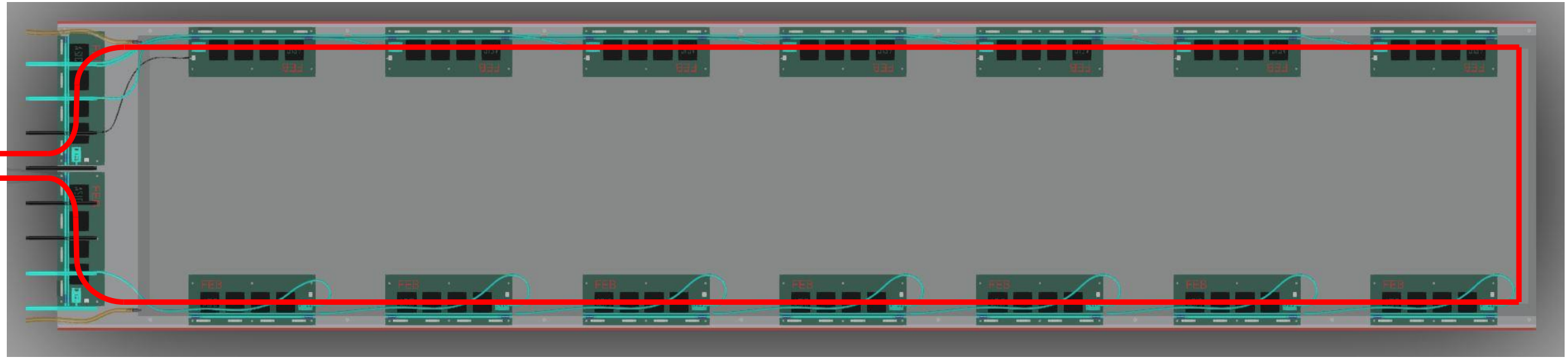
With mirroring Board



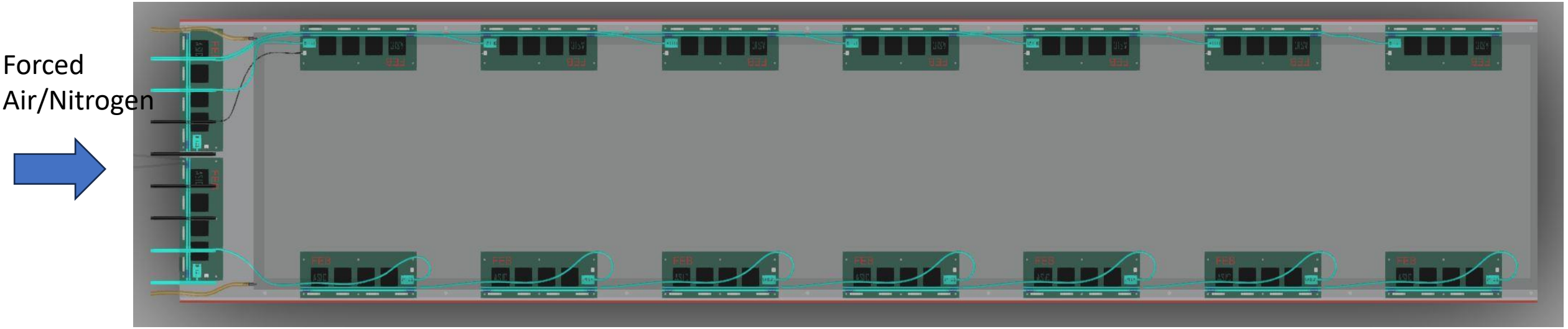
Easier to organize cables if we have mirrored version of FEB

Possible cooling line (if cooling is required)

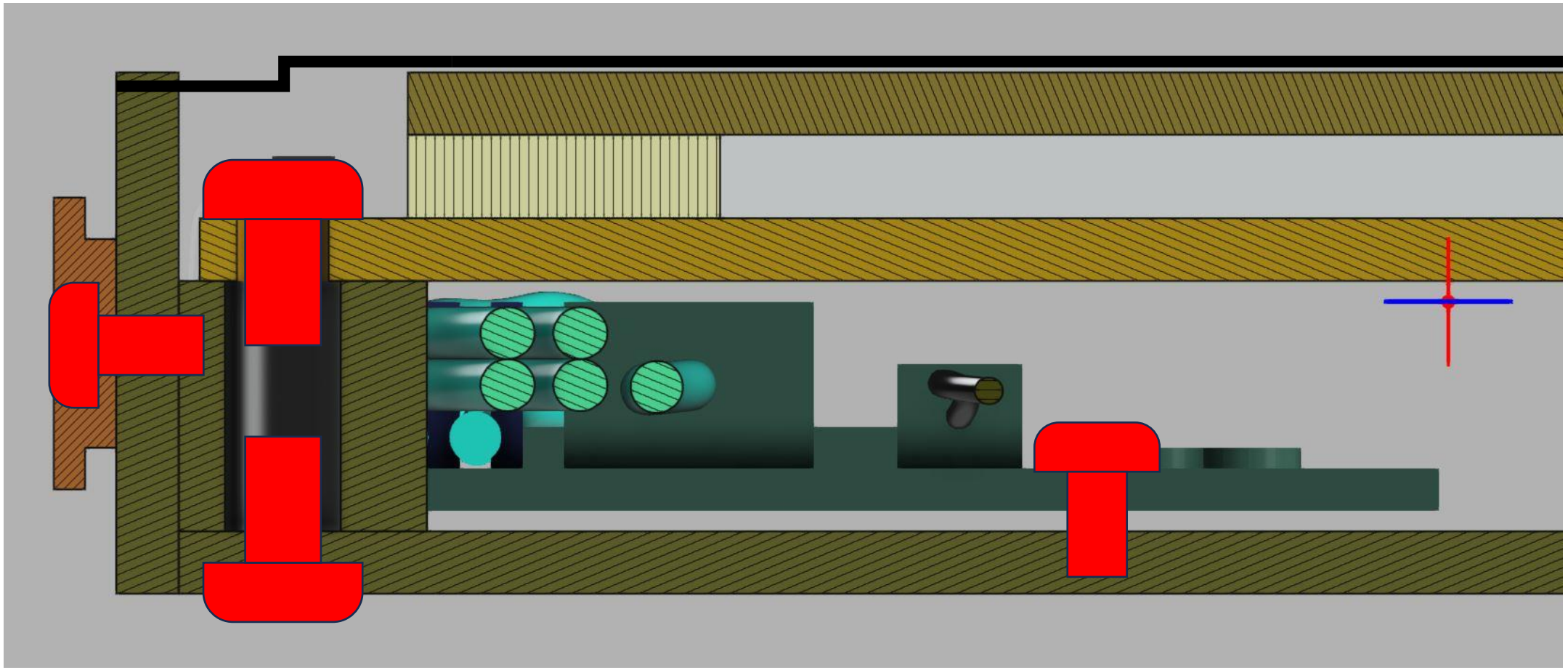
Cooling pipe



Forced Air/Nitrogen



Sectional view (structure)



Summary

- Initial design looks OK (or little tight) to make uRWELL detector within the specification.
- Details will be changed along with the FEB design
- Structural analysis will be performed later (requires materials specification)