



Updated DESY testbeam preparations

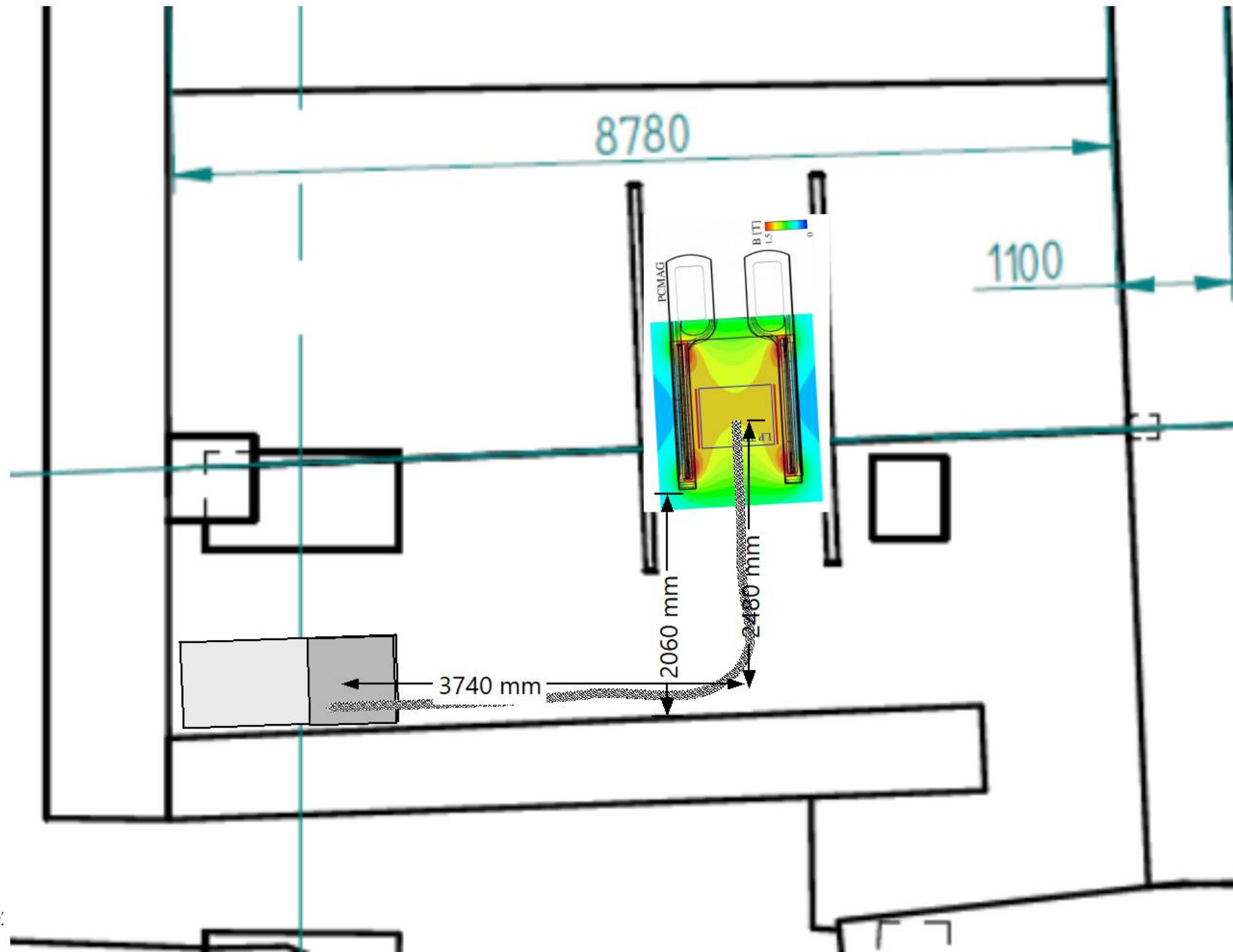
Fred Hartjes

NIKHEF

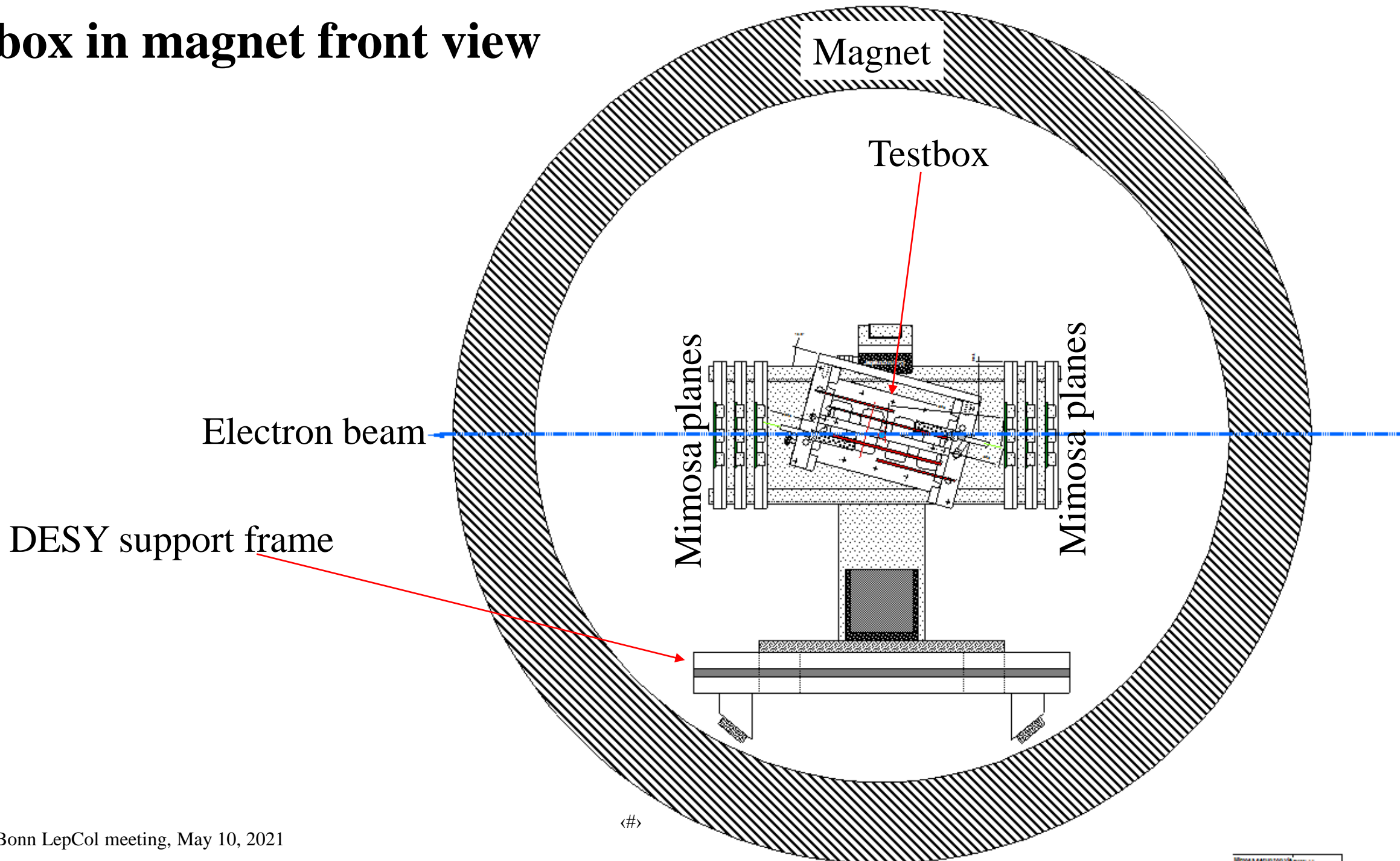
Nikhef/Bonn LepCol meeting
May 10, 2021

Floor plan

■ T24/1



Testbox in magnet front view

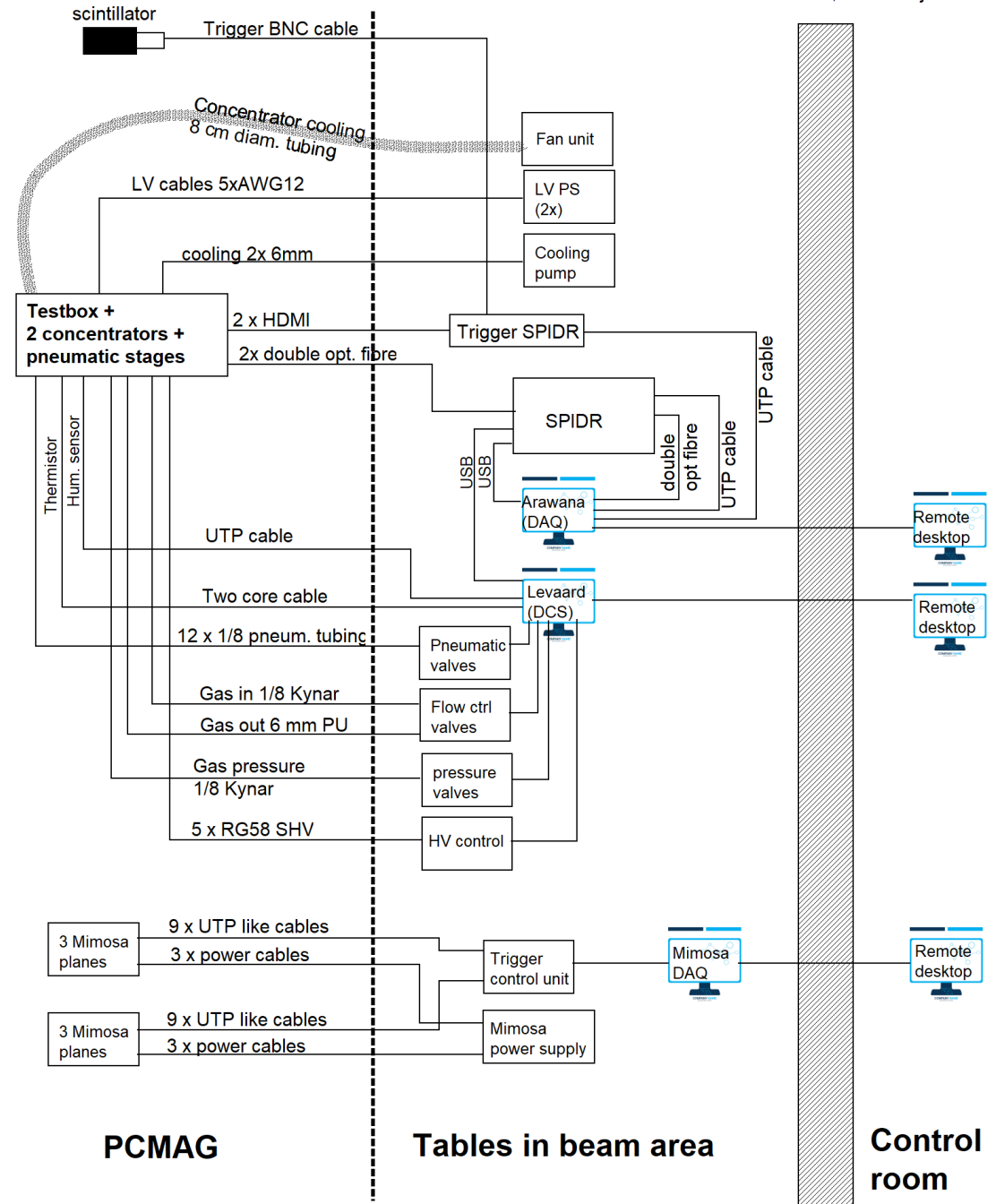


Block diagram of set-up

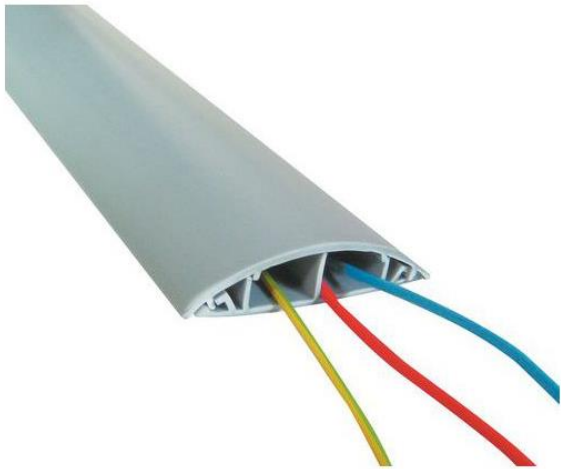
- Provisional, may have some errors/omissions
- **Much more complicated** than in Bonn in 2018
- **Abundance** of cables and tubing (57 in total)
 - All have to be neatly directed from PCMAG towards the control table
 - In cable trays on the floor
 - 8 cm fan tube high up by the cable tray on the wall
 - At least 8 m cable/tube length needed
- **Two** office tables (about 80 x 180 cm) needed
 - Control hardware
 - 3 PCs
- Probably 3 remote desktop PCs needed in the control room
- I couldn't find much information about set-up and cabling of the 6 Mimosa planes

Set-up of Lepcol eight quad testbox at T24/1

10-5-2021, Fred Hartjes



- **57 cables/tubes in total**
 - In 3 – 5 cable trays on the floor
- While bundling we have to provide some freedom for movement of PCMAG and pneumatic stages



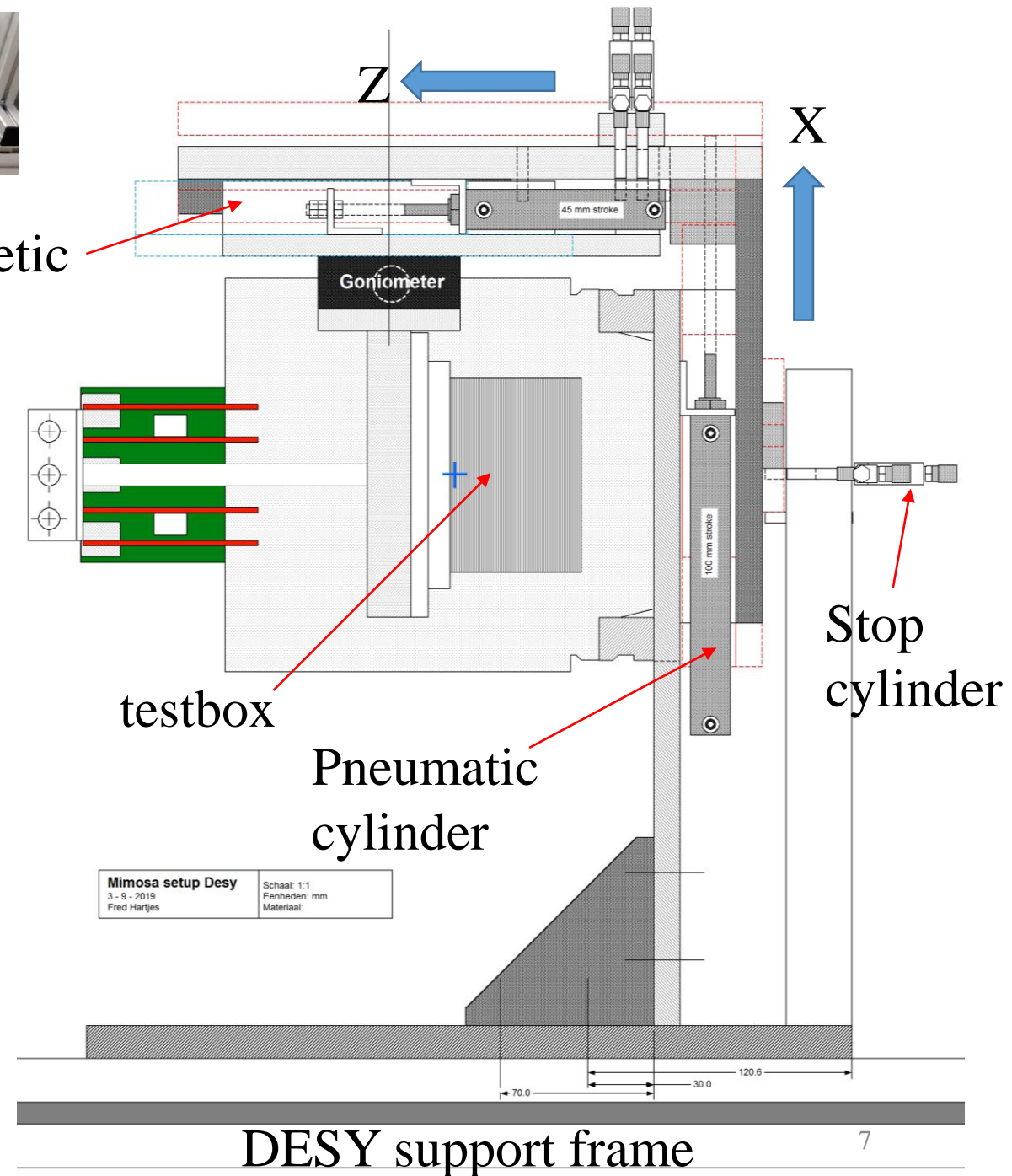
Spare

Our setup



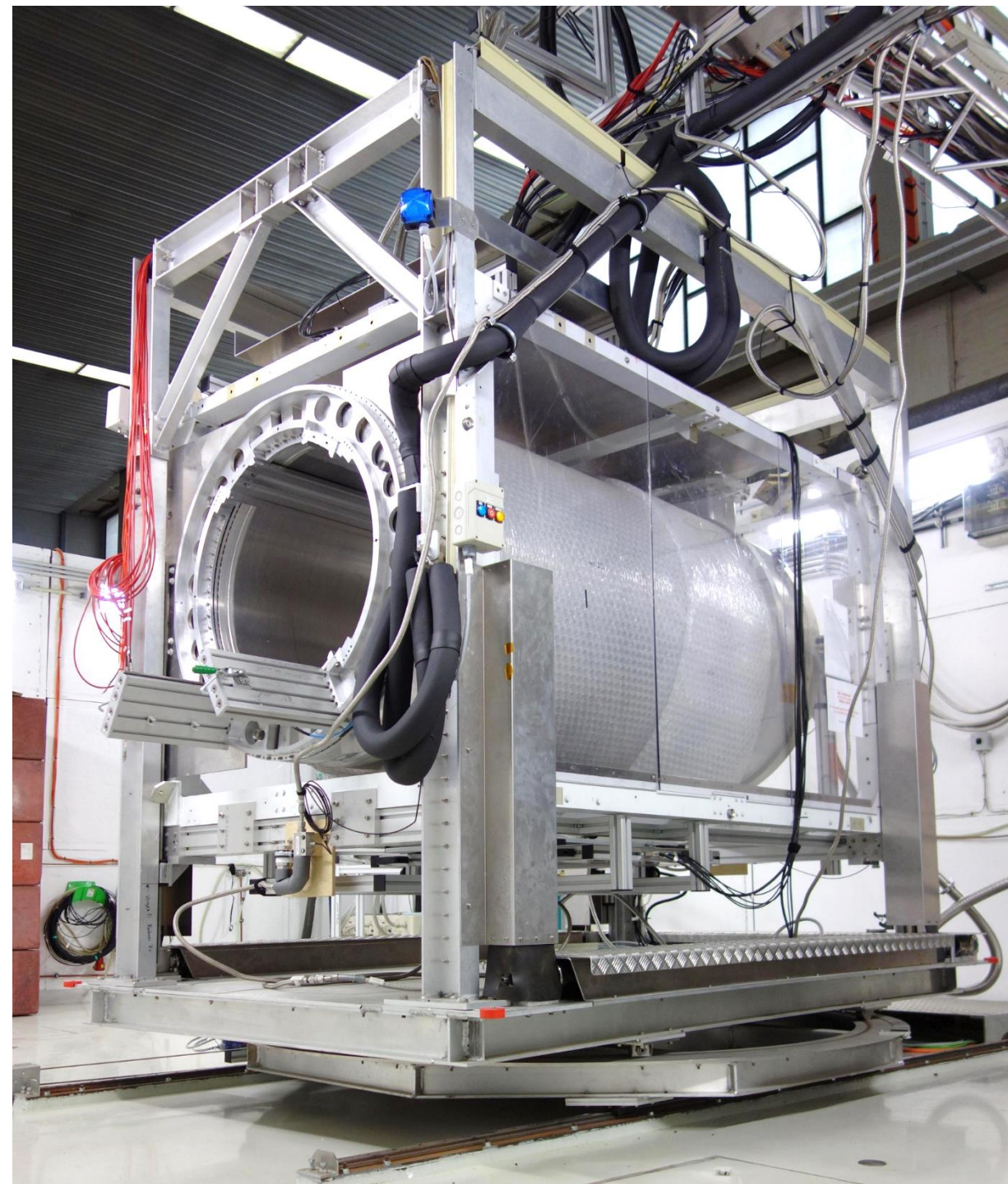
- Testbox setup mounted on the ILC-TPC mounting frame
- Testbox is movable in X and Z wrt telescope frames
- Using non-magnetic stages and pneumatic cylinders
- In vertical direction (X coordinate) 3 ranges of 20 mm of magnet scan
 - $X = 0 - 20; 20 - 40; 40 - 60$ mm
- Horizontal (Z coordinate) 4 ranges of 10 mm of magnet scan
 - $Z = 0 - 10; 10 - 20; 20 - 30; 30 - 40$ mm
 - Reproducibility estimated at $30 \mu\text{m}$
- Pneumatic operation will be done remotely under LabVIEW control
 - X/Z positions will be logged

Non-magnetic stage



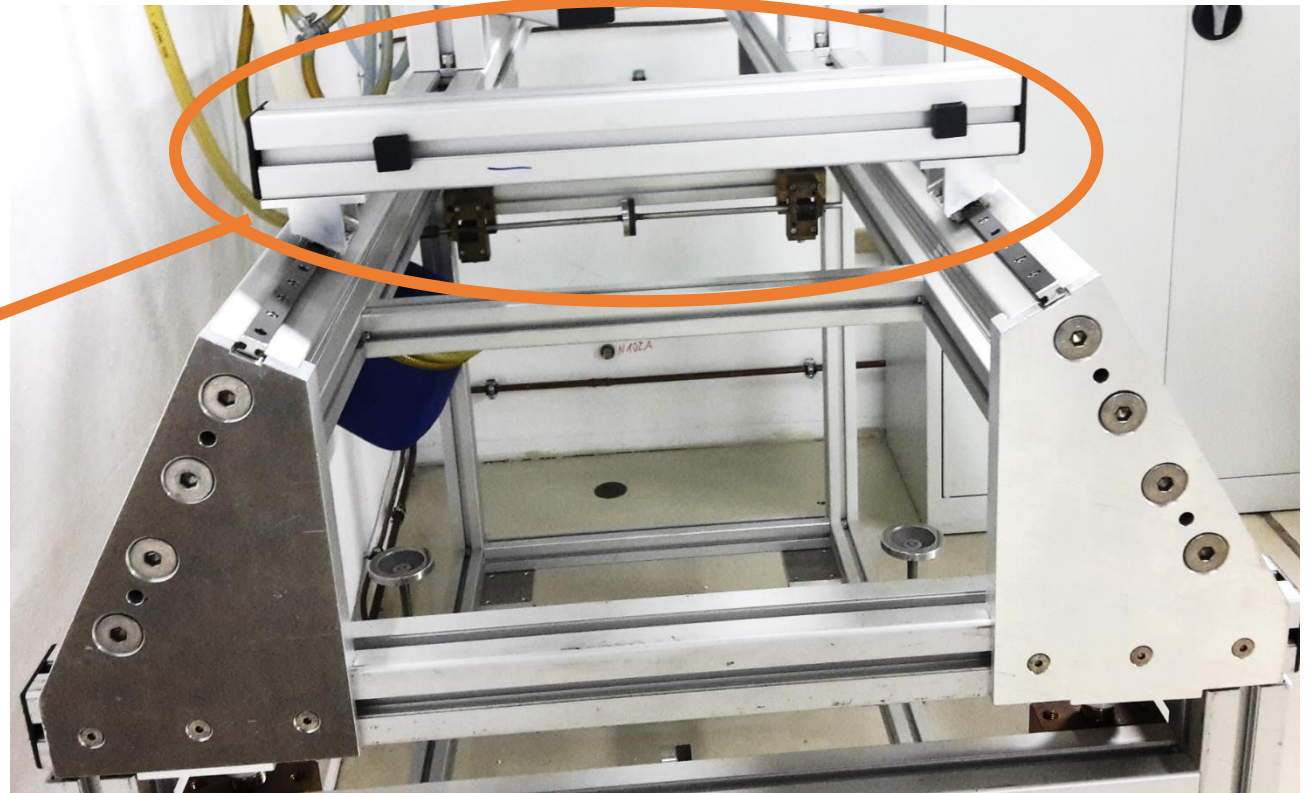
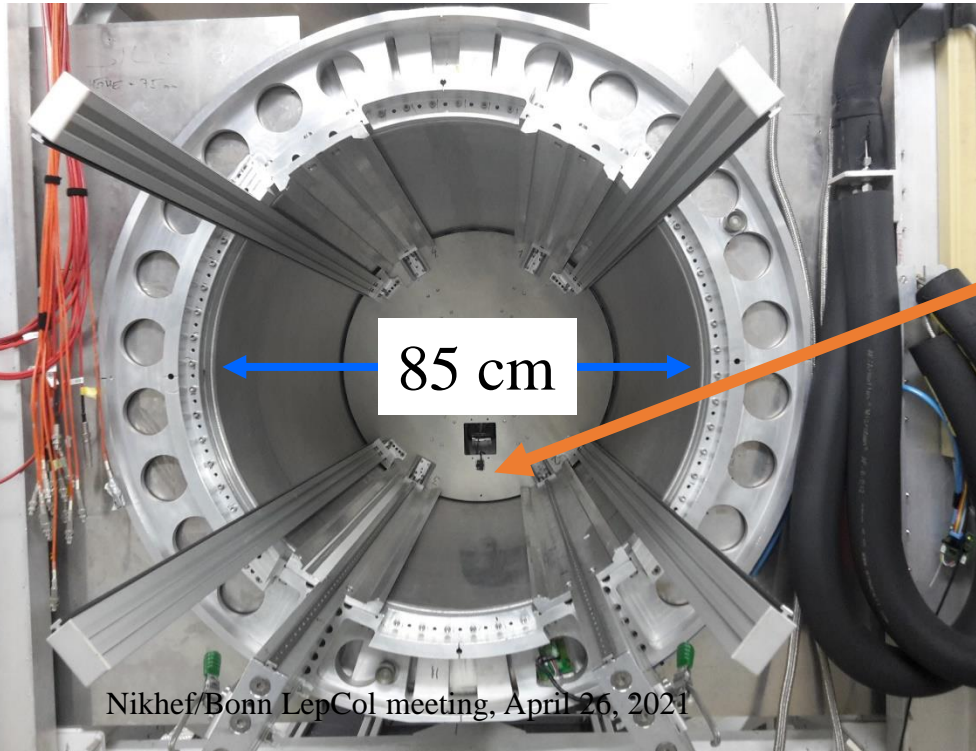
Solenoid magnet in TB24/1

- Remotely movable vertically and sideward (X and Z)
 - Also rotation in horizontal plane
 - => beam not parallel to detection plane
 - Tracks with different drift positions
- Super conducting
 - => no running power needed
- 1T magnetic field horizontally
- Radiation length magnet wall: 20%
- Inner diameter: 85 cm



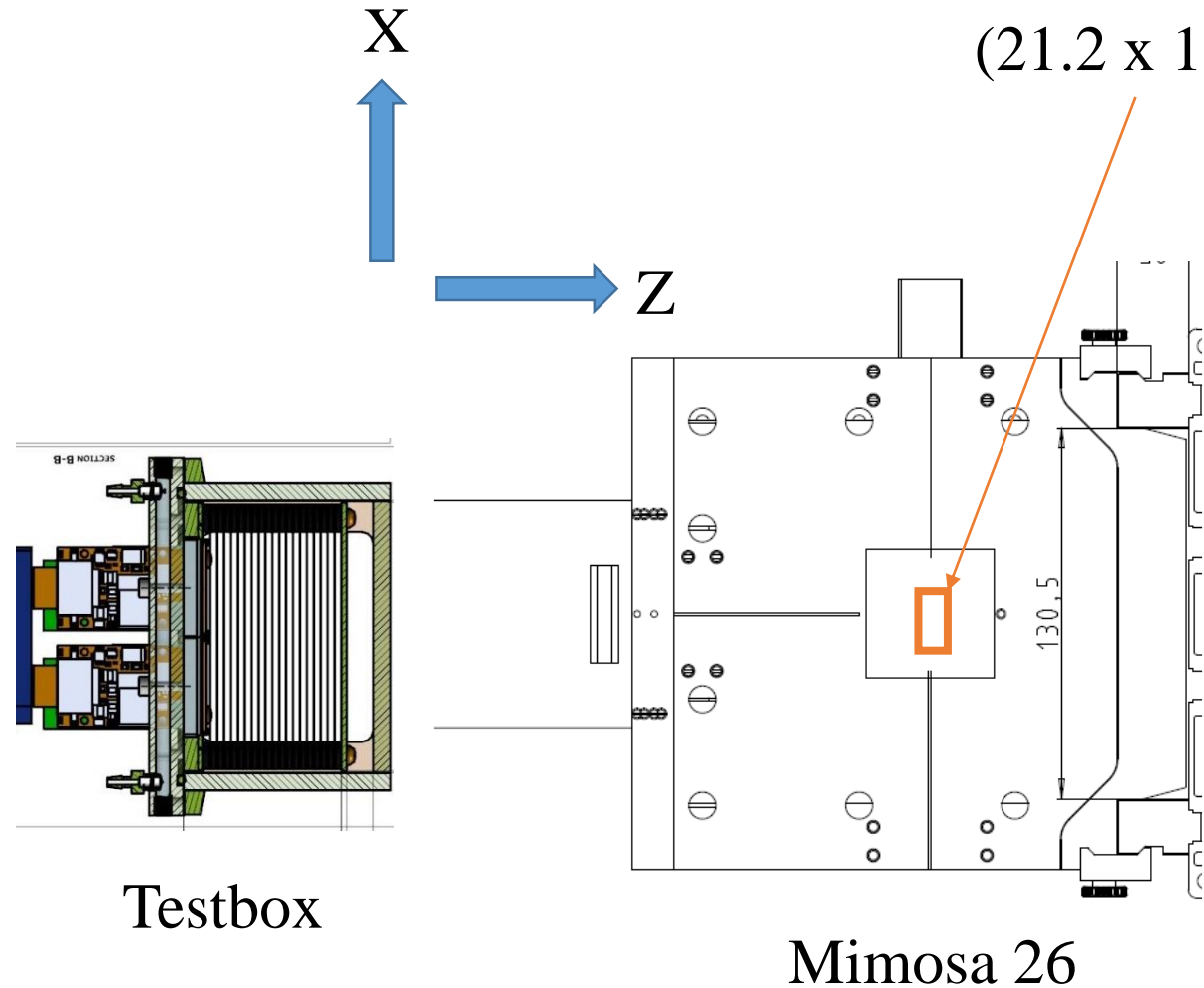
Mounting the testbox in the magnet

- Our setup will be mounted on a frame on rails
- Detector has to be installed at ~ 60 cm from the magnet entrance

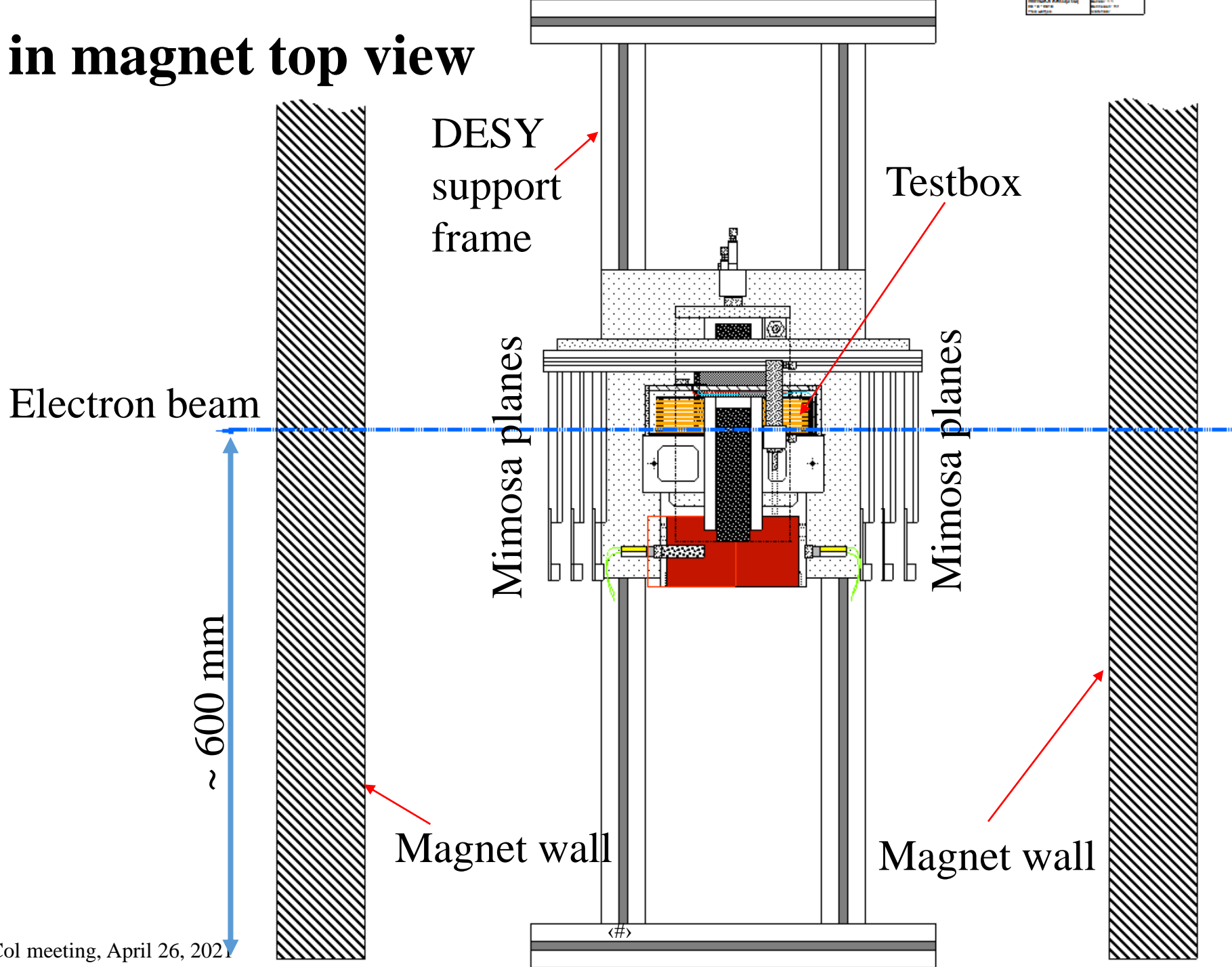


How many different magnet positions do we need?

- Mimosa26 telescope
 - Pixel size 18.4 x 18.4 μm
 - 1152 columns
 - 576 rows
 - \Rightarrow acceptance 21.2 x 10.6 mm (X x Z)
- So for a 3 mm wide beam we need to cover the full acceptance of the telescope
 - 7 magnet positions in X
 - 4 magnet positions in Y
- For a 6 mm wide beam we need only
 - 3 - 4 magnet positions in X
 - 2 magnet positions in Y



Testbox in magnet top view



Beam rate vs momentum

- If collimator is 2 x 2 mm
- => Beam rate is about
 - 160 Hz (2 GeV/c)
 - 80 Hz (4 GeV/c)
 - 25 Hz (5 GeV/c)
- We may like a bigger collimator like 5 x 5 mm
 - => 6 x higher rate
 - => less steps of magnet needed to scan the Mimososa acceptance

