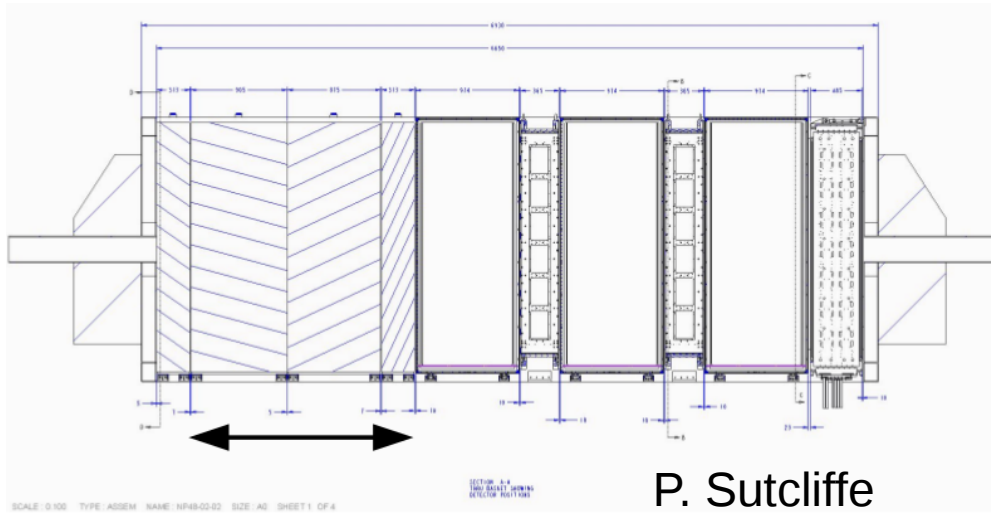


WP1 mechanical design and integration – CERN meeting summary

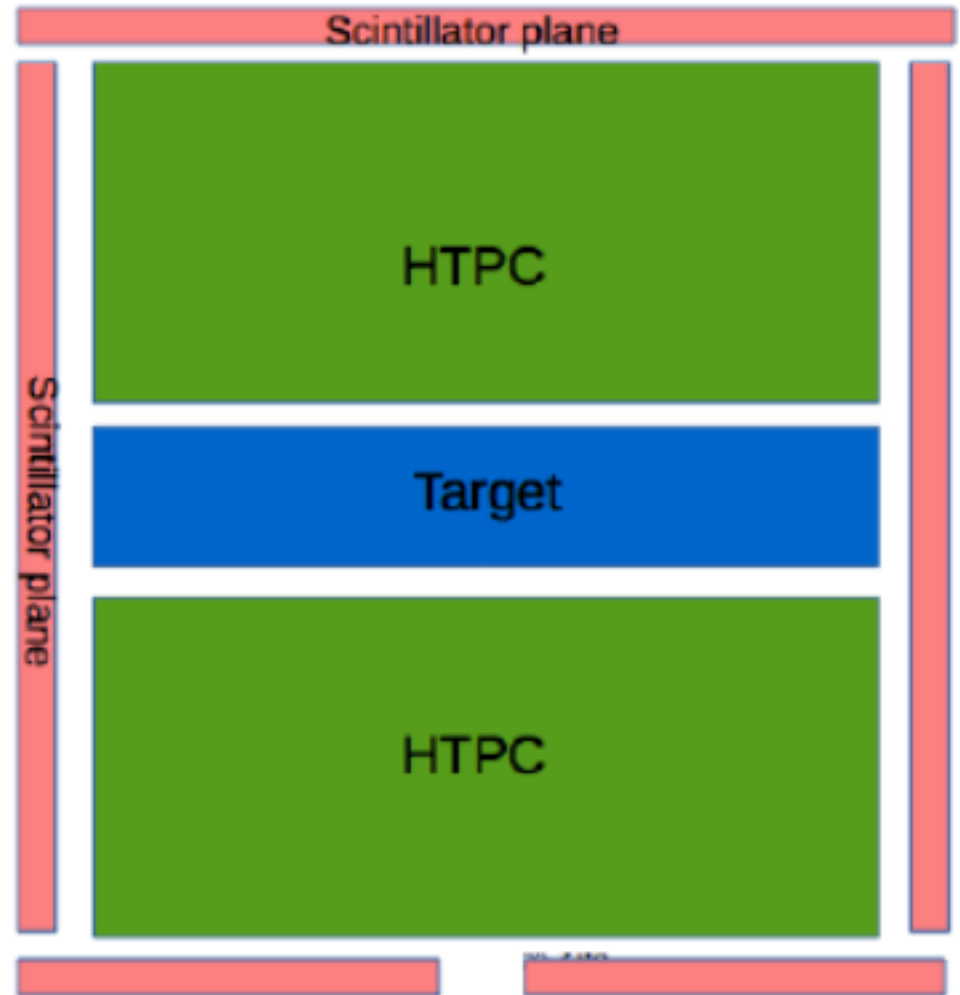
Marcela Batkiewicz
Davide Sgalaberna
Thorsten Lux

Tokai, 8 October 2017

Detector configuration



- Available size:
 - x – 2103 mm
 - y – 2239 mm
 - z – 2093 mm



WP1 tasks

- Target box
 - University of Geneva
- TPC end plates and mechanical structure to support MicroMegas
 - IFJ PAN (Kraków)
- Mechanical structure to support TOF subdetectors
 - ???
- Modification of the basket to include new subdetectors
 - ???
- Overall integration
 - ???

Target box

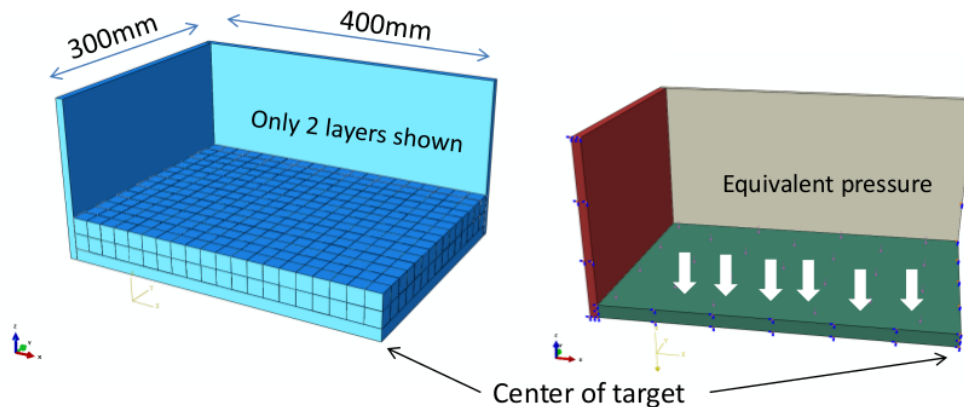
- Expected thickness of the box is between 1.5cm and 3cm (calculation from FEA)
- Summary of the target box design, displacement calculation and discussion will be shown during target overview session.

Super FGD

Target Design_ FEA simplifications

Key numbers and assumptions (to start with...)

- Overall target size: **2m x 1.8m x 0.6m** high
- Assumptions for CAD and FEA: scintillator cube is **15mm**
- Optimization is mandatory / target height (tight clearances on Z)... less tricky on X / Y
- Try to simplify the FEA as much as possible (cubes vs equivalent pressure)
- Double symmetries are considered to limit the model size (same results!)
- Cubes are linked by friction (3 friction factors are considered: 0/0.5/1..)



02/10/2017

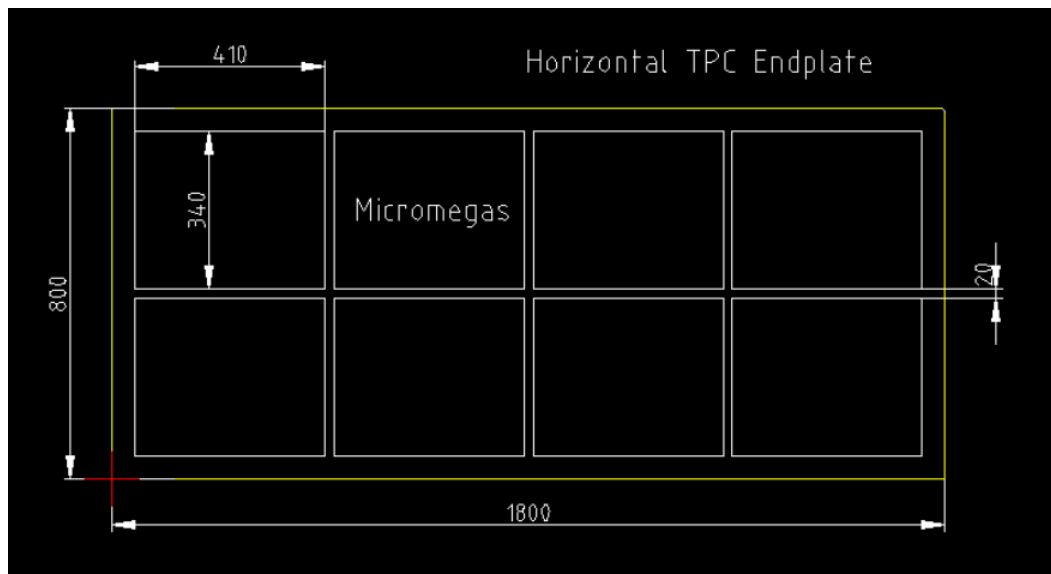
Franck Cadoux, University of Geneva

2

from F.Cadoux presentation

TPC end plates

- Use of glass fibre (G10 type)
- Proposition to prepare panel in IFJ by gluing smaller elements (less material needed)
- Design will be adjusted to requirements from field cage and MicroMegas groups



from M.Zito presentation

End plate requirements

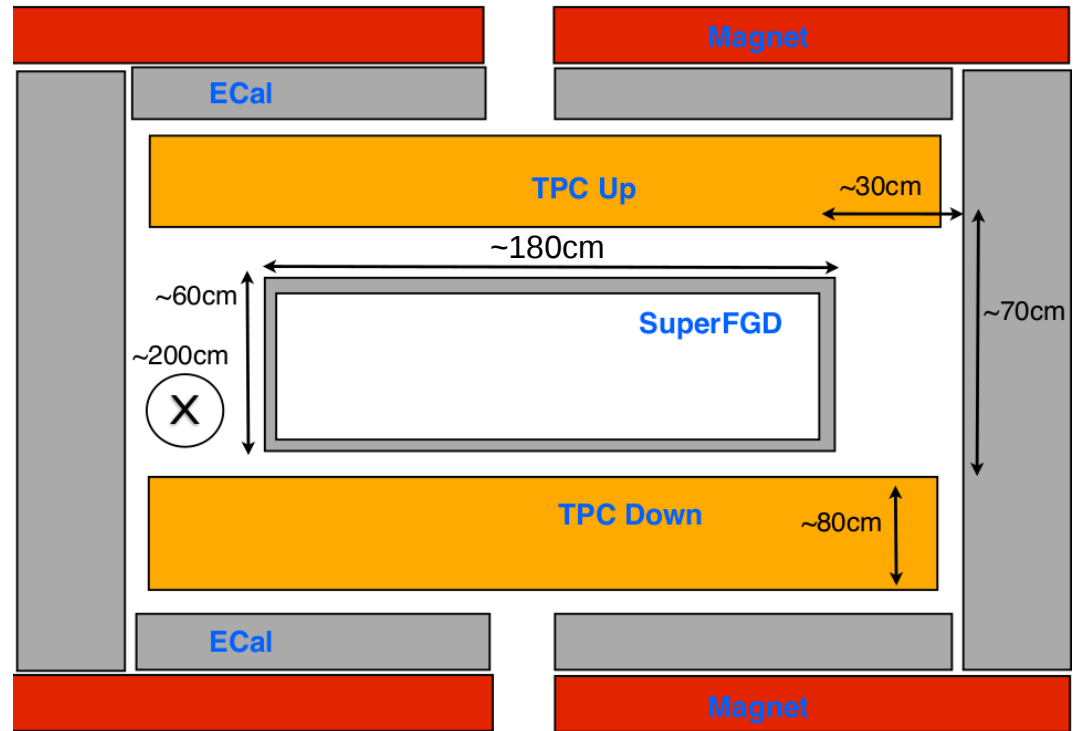
The TPC end plate provides the following:

- Mechanical support for the Micromegas, front end electronics, cables, cooling
- Gas containment (the inner gas should be very pure, ppm level of oxygen and water). All material should be compatible with this for what concerns outgassing
- Matching the drift electrical field with a planar equipotential surface. This requires the planarity to be at the 0.2 mm level. (The E field should be very uniform, at the level 10^{-4})

from M.Zito presentation

Target readout

- Readout electronics need:
 - space
 - colling
 - cable entries
- The more compact electronics the better
- Decision how to organize it depend on used electronics

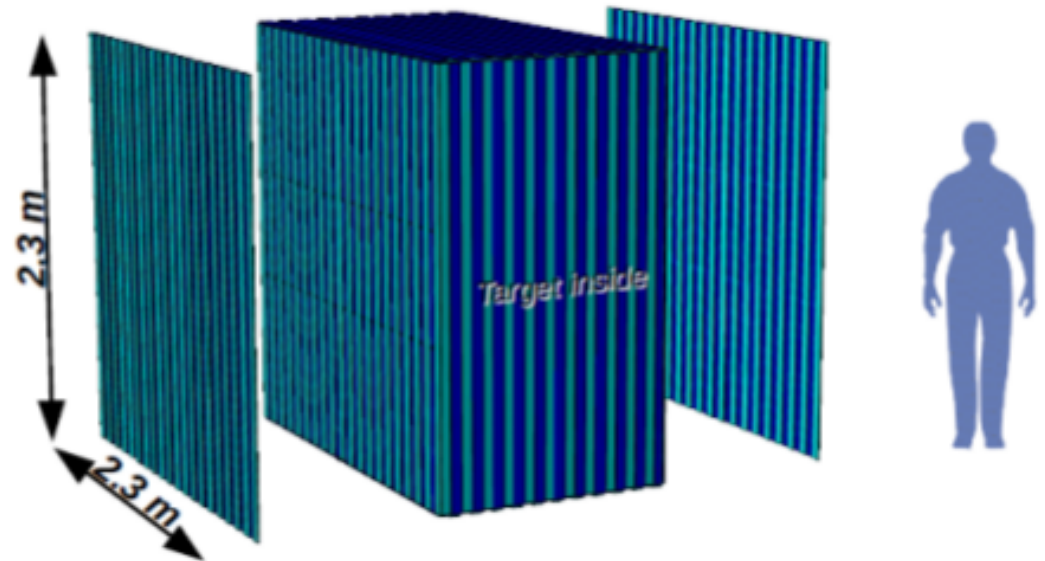


from D.Sgalaberna presentation

TOF

- TOF plans foresee to cover practically all sides of TPC with panels
- Where to fix them? (Inside or outside the basket or attach it to BrECaI?)
- How to ensure that easy access to TPC electronics is guaranteed?
- If fixed further outside, more channels will be needed

- For the present version of the design
 - Transversal size 2.3 m x 2.3 m
 - bar size **230 cm x 6 cm x 1 cm**
 - In total 288 bars
 - 288 bars x 2 = 576 channels
 - 576 ch x 8 = 4608 SiPMs
- Number of items is **reduced by 42%**



from T.Lux presentation

Integration

- Realized that we it seems that we discuss each sub-detector separately
- But choices for one subdetector might affect performance of other subdetector
- Access to one subdetector must not be blocked by other subdetector or design must be satellite like
- Everything has to be fixed in the basket

from T.Lux presentation

Summary

- Still there are tasks which are not assigned to any institution
- Especially engineer responsible for overall integration is needed
 - CERN can partially pay him/her
- For better communication, new mailing list was created by Davide
 - <https://e-groups.cern.ch/e-groups/Egroup.do?egroupName=EOI15-WG1-Mechanics>
- Thorsten Lux is a new additional contact person of WP1
- Proposal to CERN
 - Instead of separate section about mechanics, each new subdetector will have its own paragraph about mechanics