

Schedule SuperFGD beam tests hardware

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03 April 2018

Schedule

- Assuming SuperFGD proto is fully assembled and delivered to CERN end-May:
- **2 weeks to cable** - 4th June to 15th June:
Hardware required by end-May at CERN: all MPPCs, mini-PCBs, micro-coaxial cables and HV-ON PCBs.
Manpower required: 3 people full time (**lets start planning**)
Some of this work could be done before 4th June, e.g. gluing mini-PCBs to connectors.
- **1 week to test and commission** with all FEBs - 18th June to 22nd June
Additional hardware required by 18th June: 4 Minicrate, 4 backplane, 18 FEB, 1 DAQ PC.
Manpower required: min. 4 people full time (**probably shifts required 8 hrs x2/day**)
- **Transport** from bldg. 595 to bldg 157 (East Area T9):
 - Packing: 26th June
 - Transport: 27th June

Discussion today

- **Injection moulding cubes:**
 - For now assume none in SuperFGD proto for June.
 - Some possibility to include a few, too early to decide.
- **Cutting/assembly/gluing of fibers/connectors:**
 - 1000 fiber/connector assemblies ready.
 - 2000 to be produced in total by end next week (wk15).
- **MPPCs:**
 - MPPCs (x1200 S13360-1325CS) still on track for end April delivery to UniTokyo.
 - Mapping of MPPCs to proto channels to be done: 1st draft in 2 weeks, likely to be based on expected light yield (simulations input required).
- **Simulations:**
 - Ongoing work in simulations working group.
 - Too early yet to discuss digitisation parameters.
 - Approach likely to be based on direct parameter extraction from calibration runs on a channel-by-channel basis given the different MPPC types that will be used. Calibration: 1) gain ADC/p.e. from fingerplots, plus 2) light yield from MIP runs in beam.
- **Mechanics: common platform SuperFGD/electronics:**
 - Who does it, to be confirmed by next week (wk15).
- **Manpower for June preparations:**
 - Should be enough (2-3 people from CERN and UniGe + 2(+2) INR + ??)

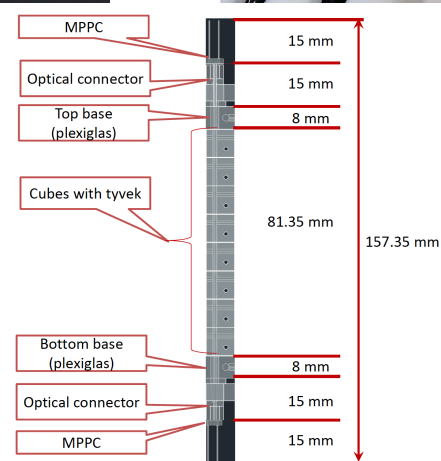
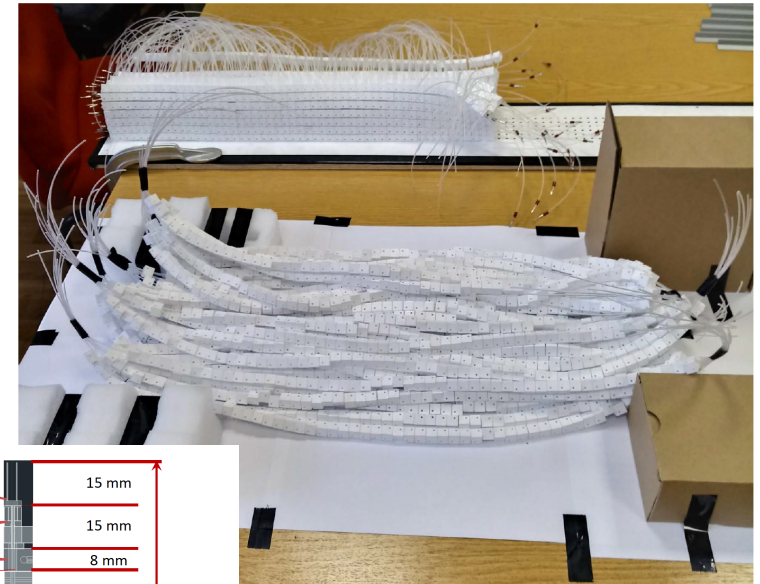
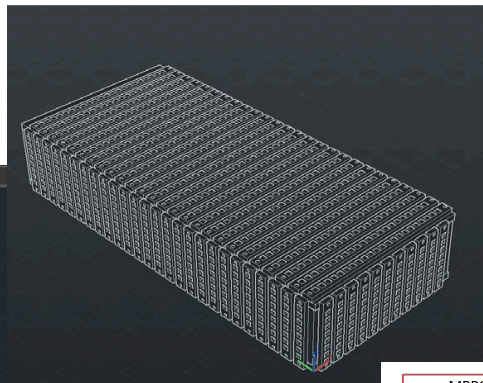
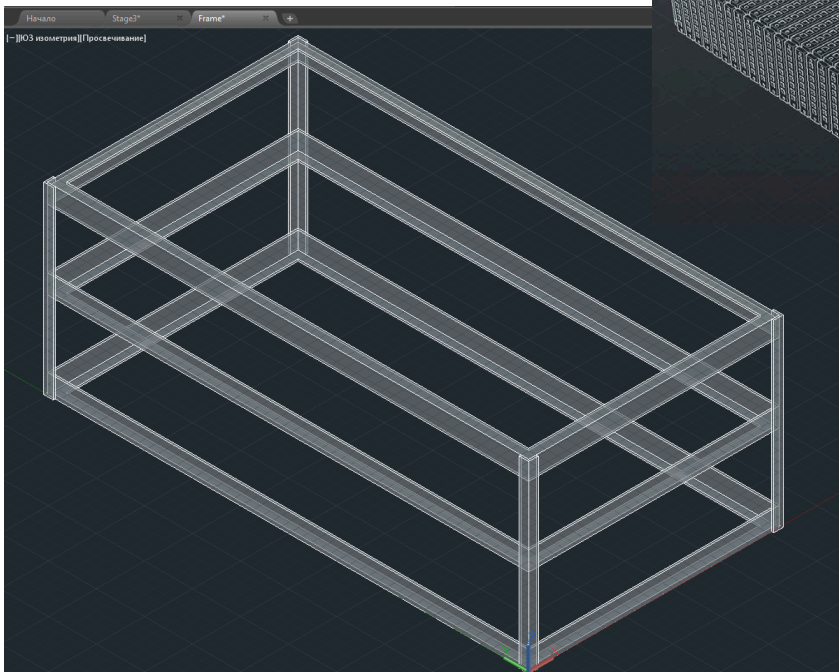
Back-up

SuperFGD mechanics

Reported by A. Khotyantsev 27/03/2018

Detector: 24 (w) x 48 (L) x 8 (H) cm³ -> array of 9216 cubes, each 1 cm³
1152 + 192 + 384 = 1728 WLS readout fibers/connectors (~600 m Y11)
1728 MPPC's
1728 channels of electronics
18 boards
3 MiniCrates

Assembling 48 cubes strips in progress. These strips will be assembled into 8 layers.



Electronics

Front End Board: No re-design: 2000 CHF/unit

- All components ordered (+ 4 FEBs to produce, modification of contract required)
CITIROC order to be filed through EDH: 60 CITIROCs already reserved
- FPGA: expected delivery: 12 May (3 weeks later than expected!)
- No FEBs before end May, + 1 week for tests by Yannick
- Best case scenario: we have FEBs 1st week June (worst case mid-June)

Backplane: No re-design: 180 CHF/unit

- PCB received = 8
- PCB to be mounted with components = 7
- Components order by Georgi: TBC
- Expected complete: 1st week of May + 1 week for tests by Georgi

HV ON PCB: New PCB: 87 CHF/unit

- All ordered: 63
- To be received soon

Clock fanout board: No re-design

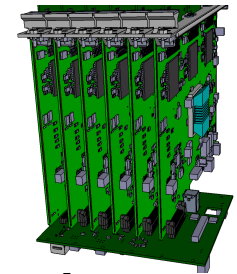
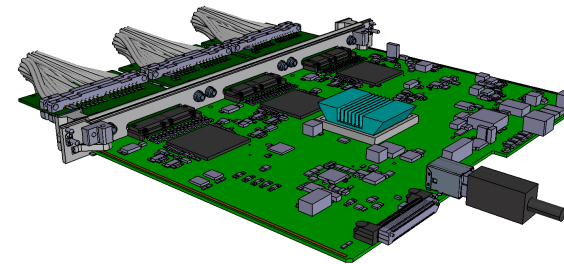
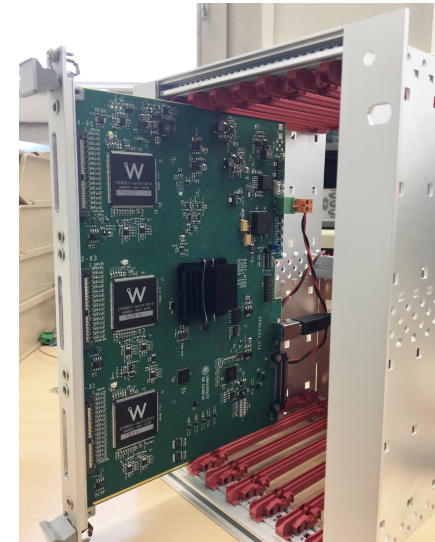
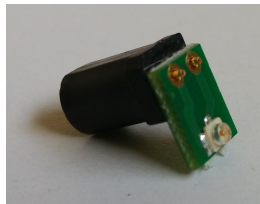
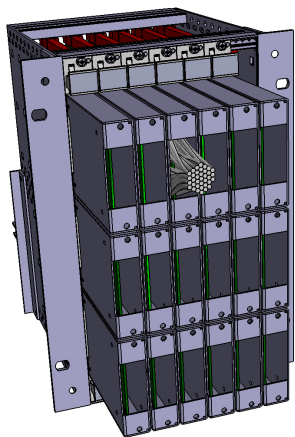
- Components received 28/03/2018 for 4 units

Mini-PCBs: No re-design (**URGENT**):

- Type selected: DPNC315_03C
- Orders to be made for 1800 units (Baby MIND spares buffer 900)

Micro-coaxial cables:

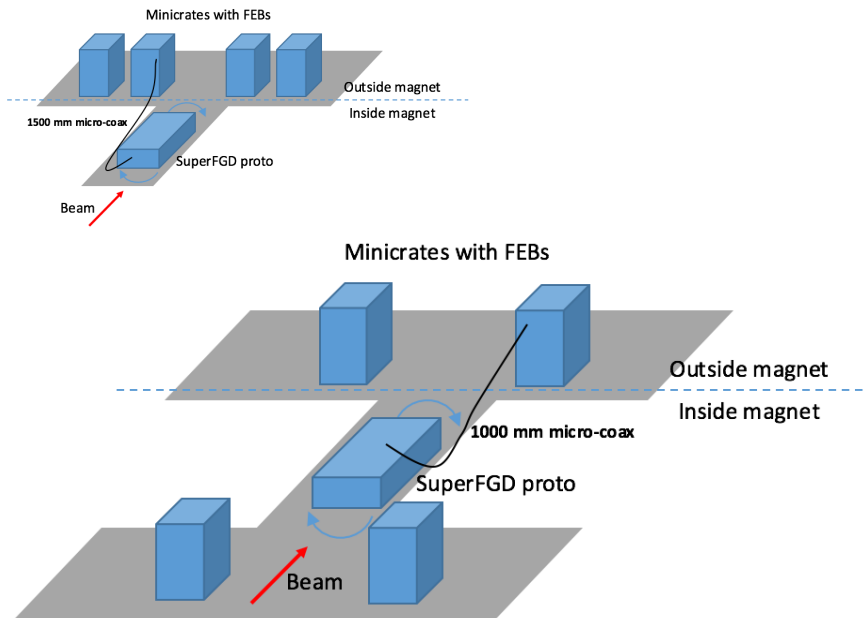
- Cable length 1m (was 1.5m to 2m)
- Orders to be made for 1800 units
- **Critical: non-standard, long lead times**



Minicrate hardware to be ordered



Positioning the minicrates



STEFANIA BORDONI (CERN)

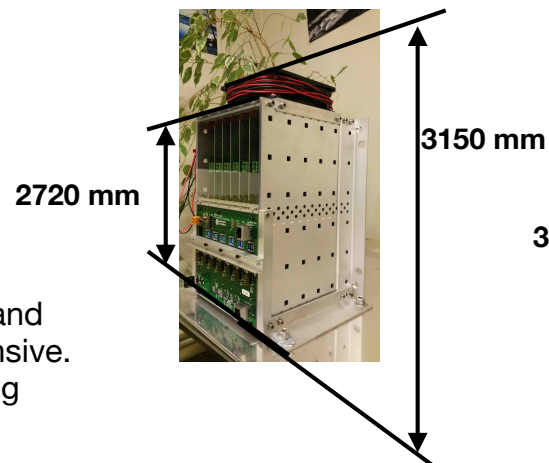
MEASUREMENTS

- $d = 15$ cm
- $d = 30$ cm

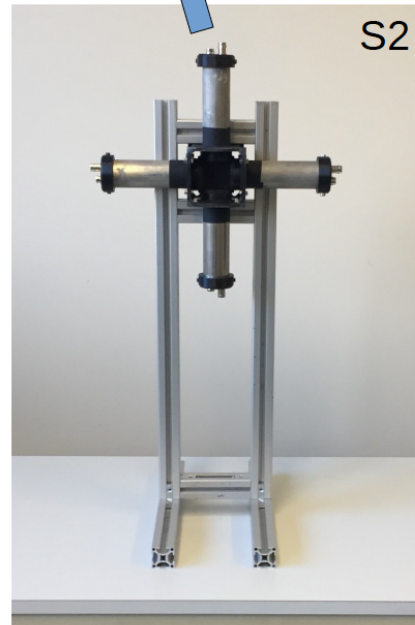
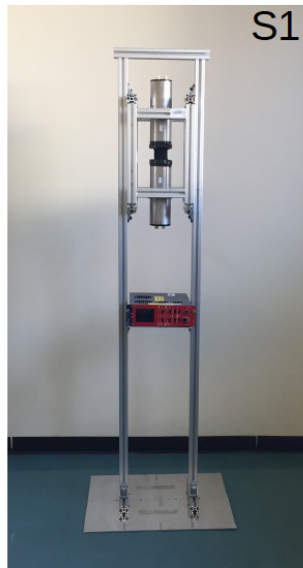
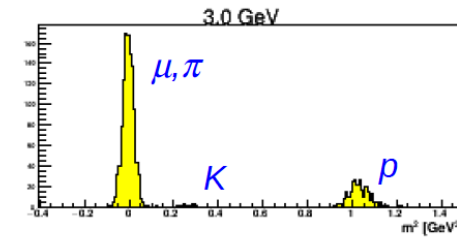
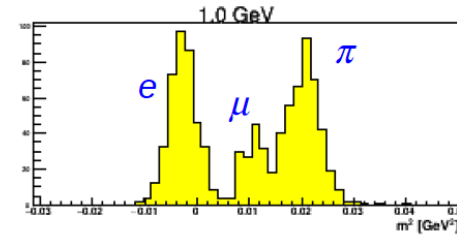
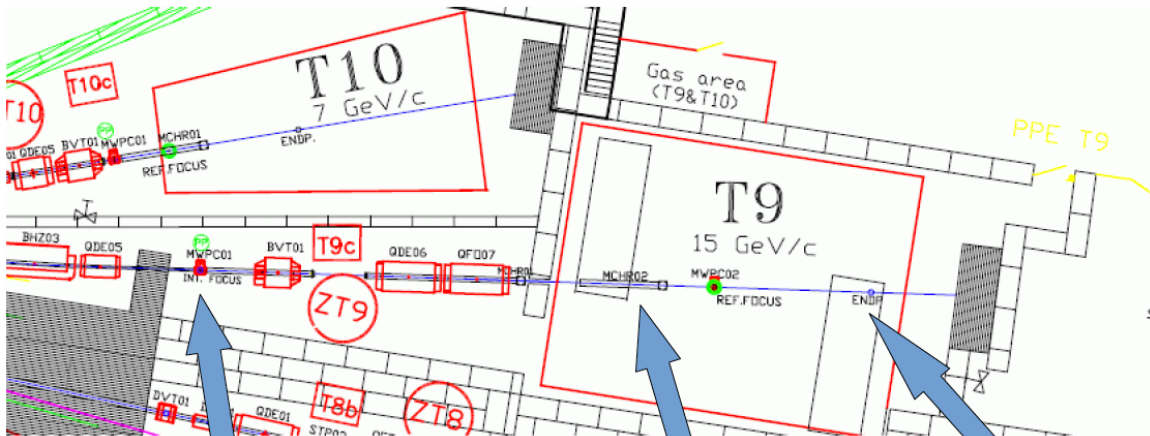


	A	B	C
$d = 15$ cm	0.09 T	0.09 T	0.09 T
$d = 30$ cm	0.02 T	0.04 T	0.02 T

- Baseline: position minicrates: 2 upstream, 2 downstream of SuperFGD
- B-field is a concern:
- Minimum cable length required between MPPC and FEB is 1 m, had considered 1.5 m, but too expensive. Partial test of one possible configuration with long cables in B-field.
- Open issue for discussion: shared mechanical platform (or not) between SuperFGD and mini crates.



ToF and trigger system for the SuperFGD test-beam in June 2017



2 bars:
 $50 \times 6 \times 1 \text{ cm}^3$
 $\delta t = 60 \text{ ps}$

To be set
 up- and
 downstream
 of SuprFGD