

MPGD production 2016 at CERN

MPT workshop

MPGD main projects done during 2016 at CERN MPT workshop

<u>High Energy Physics</u>			<u>Completion</u>
•SBS tracker	detector 600mm x 500mm	150 det	95%
•SBS Tracker	detector 500mm x 400mm	50 det	100%
•ALICE TPC	GEM 1.6m x 400mm	700 GEM	25%
•CMS GE1/1	GEM 1.2m x 450mm	450 GEM	32%
•BESIII	detector 600mm x 400mm	30 det	20%
•SOLID	GEM 1.1m x 400mm	8 det	100%
•CLAS 12	Micromegas 500mm x 500mm	30 det	90%
•CBM	GEM 1m x 450mm	100 GEMs	100%
•BM@N Dubna	GEM detectors 1.8m x 0.6m	8 detectors	25%
•Gbar	Micromegas 400mm x 400mm	20 detectors	10%

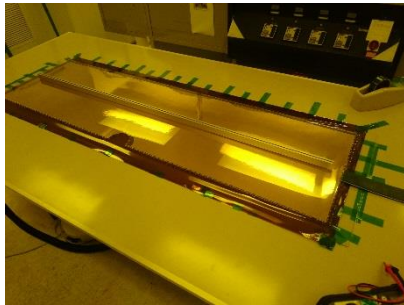
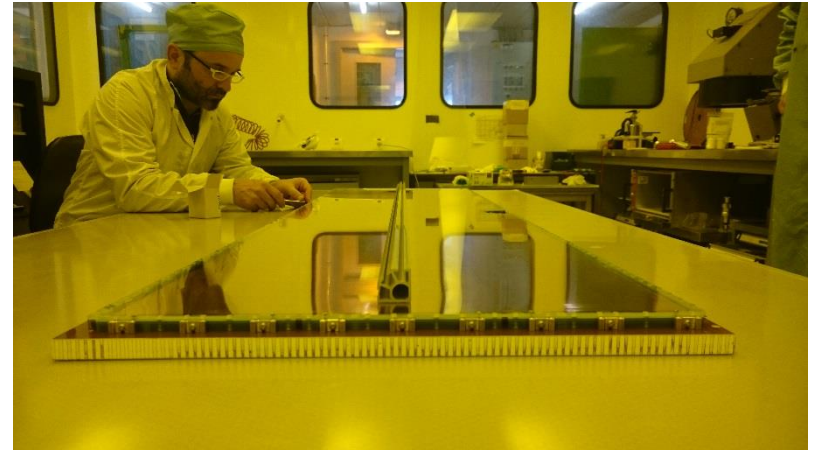
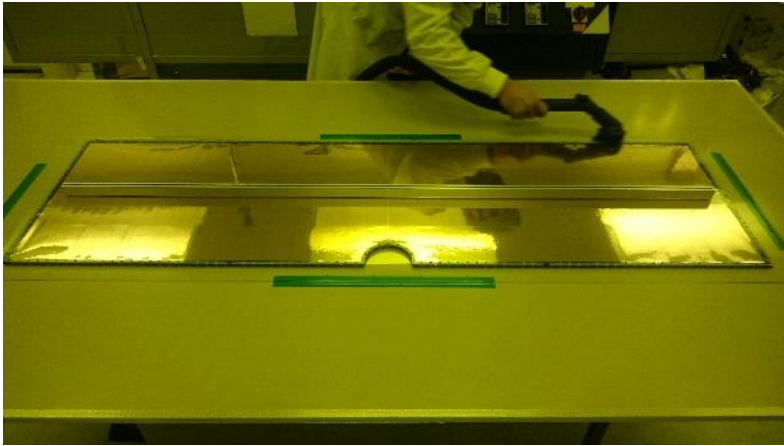
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<u>Nuclear physics/ Geoscience/Neutrino</u>			<u>Completion</u>
•Mcube	Micromegas detectors	12 detectors	80%
•Astro Gamma	Micromegas TPC	3 detectors	60%
•Zitix	Micromegas TPC	3 detectors	100%
•Texat-P	Micromegas TPC	3 detectors	100%
•Panda X	Micro-BULK	9 detectors	100%
•TrexDM	Micro-BULK	3 detectors	50%
•LSBB	Resistive Micromegas	2 detectors	100%

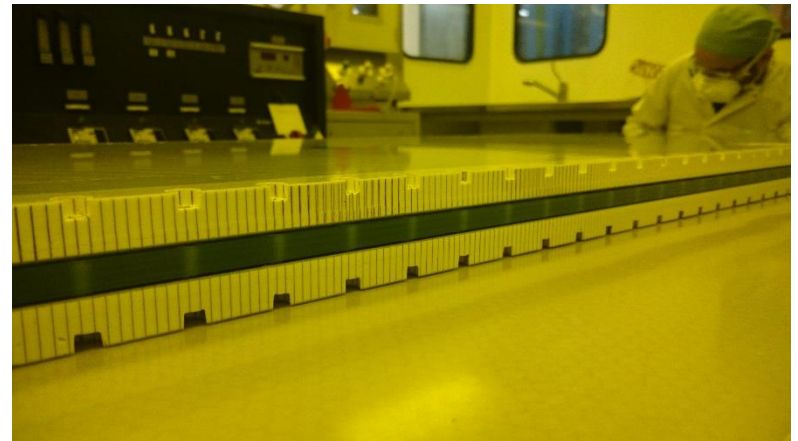
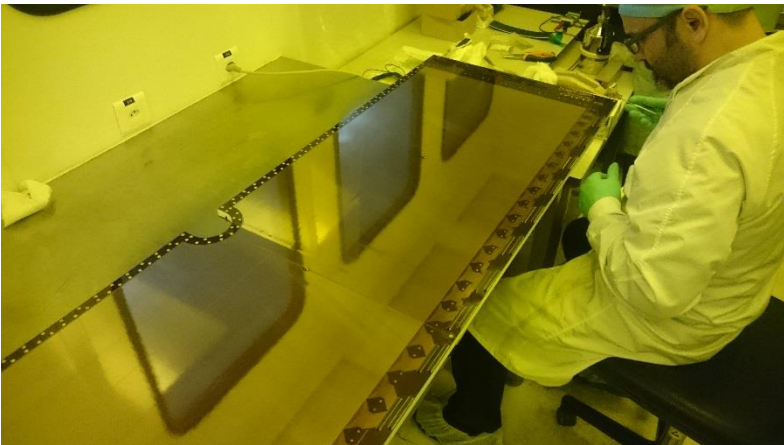
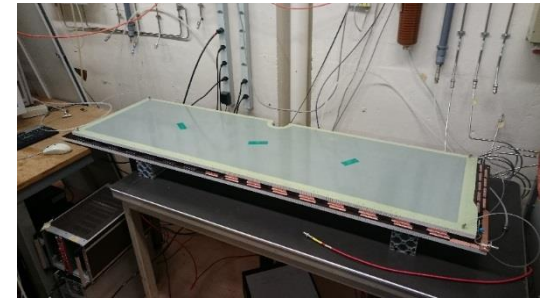
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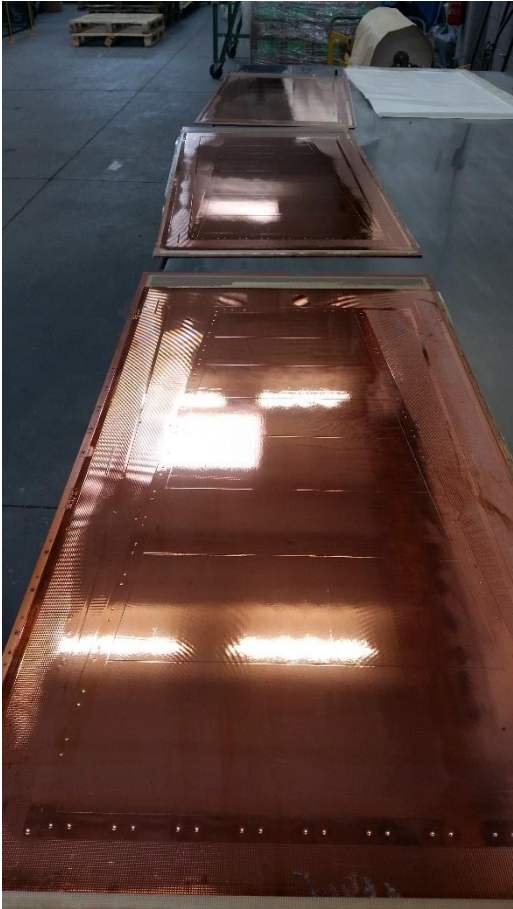
•R&D project

- Resistive Micromegas Muon large pitch low cost
- ATLAS resistive Micromegas embedded resistors for high granularity high rate
- CMS FTM multiple resistive well detectors for sub ns time resolution
- CMS R-well Muon detectors
- Embedded front end electronics in read-out boards
- Embedded resistor uRwell for high rate application

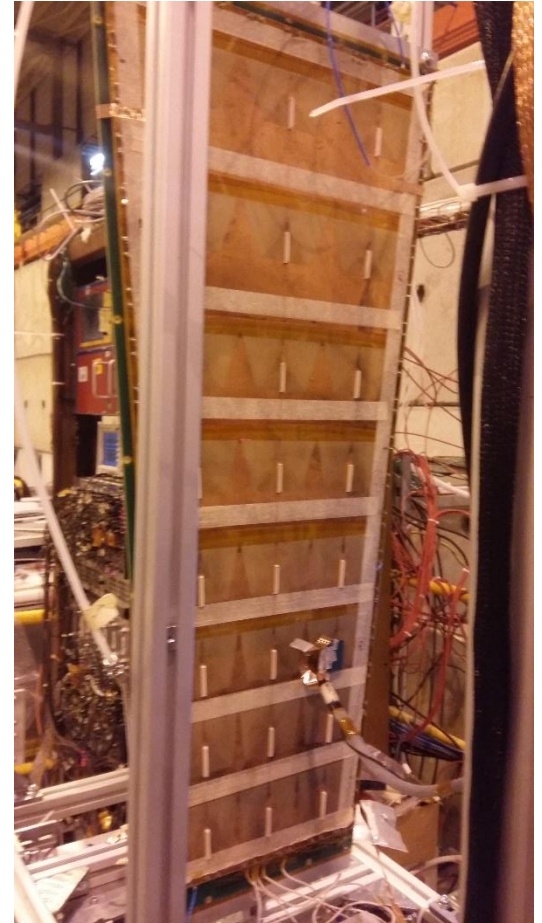


largest GEM detector
BM@N project 1.7m x 0.55 active area





largest u-Rwell detector
GE1/1 active area



Industry situation

- TECHTRA:
 - GEM 10 cm x 10cm → regular delivery since 2 years
 - In 2016 we have subcontracted GEM to TECHTRA for a total amount slightly above 200 000 CHF
 - GEM 30cm x 30cm double mask → Ok since 1 year
 - GEM 500mm x 600mm single mask → OK since a few months.
 - GEM 1.5m x 500mm already ordered
 - Participation to CMS GE1/1 being organized

- Mecaronics (Korea)
 - GEM 10cm x10cm → OK
 - Equipment ready for large size soon (1.2m x 0.5m).
- Micro-Pack (India)
 - GEM 10cm x 10cm → Ok
 - Next steps to be defined
- Tech-Etch
 - No information available

2 Main CERN's projects situation



CMS GE1/1
450 foils = 450 GEMS



ALICE TPC
350 Foils = 700 GEMs

CMS production : 450 foils

CMS productions should have started last quarter 2015

CMS production have effectively started April 2016 due to:

- Layout definition
- Base material problem

The nominal expected rate was 240 foils/year (2 tech)

The practical rate now is 200 foils/year due to

- holidays impact
- unpredicted illnesses

Yield: 9 foils/Batch increases to 13 foils/batch



ALICE production : 350 foils

ALICE productions should have started mid 2015

Effective productions started June 2016 due to:

- Layout modification

The nominal expected rate was 216 foils/year (2 tech)

The practical rate now is 140 foils/year due to

- holidays impact
- unpredicted illnesses
- introduction of GEM cut and resistor soldering (main impact)

Yield: 8 foils/batch increased to 12 foils/batch



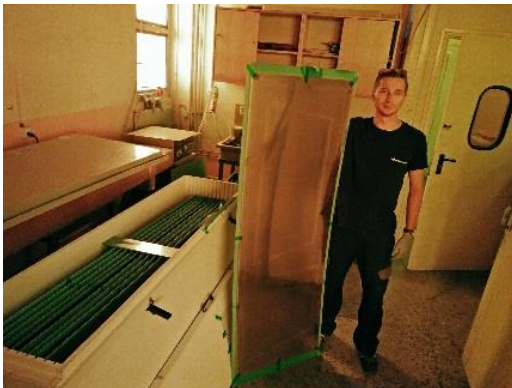
2017 : Increase man power to

6 technicians (2 CMS , 4 ALICE) + TECHTRA + 1 CERN staff part time



CMS GE1/1

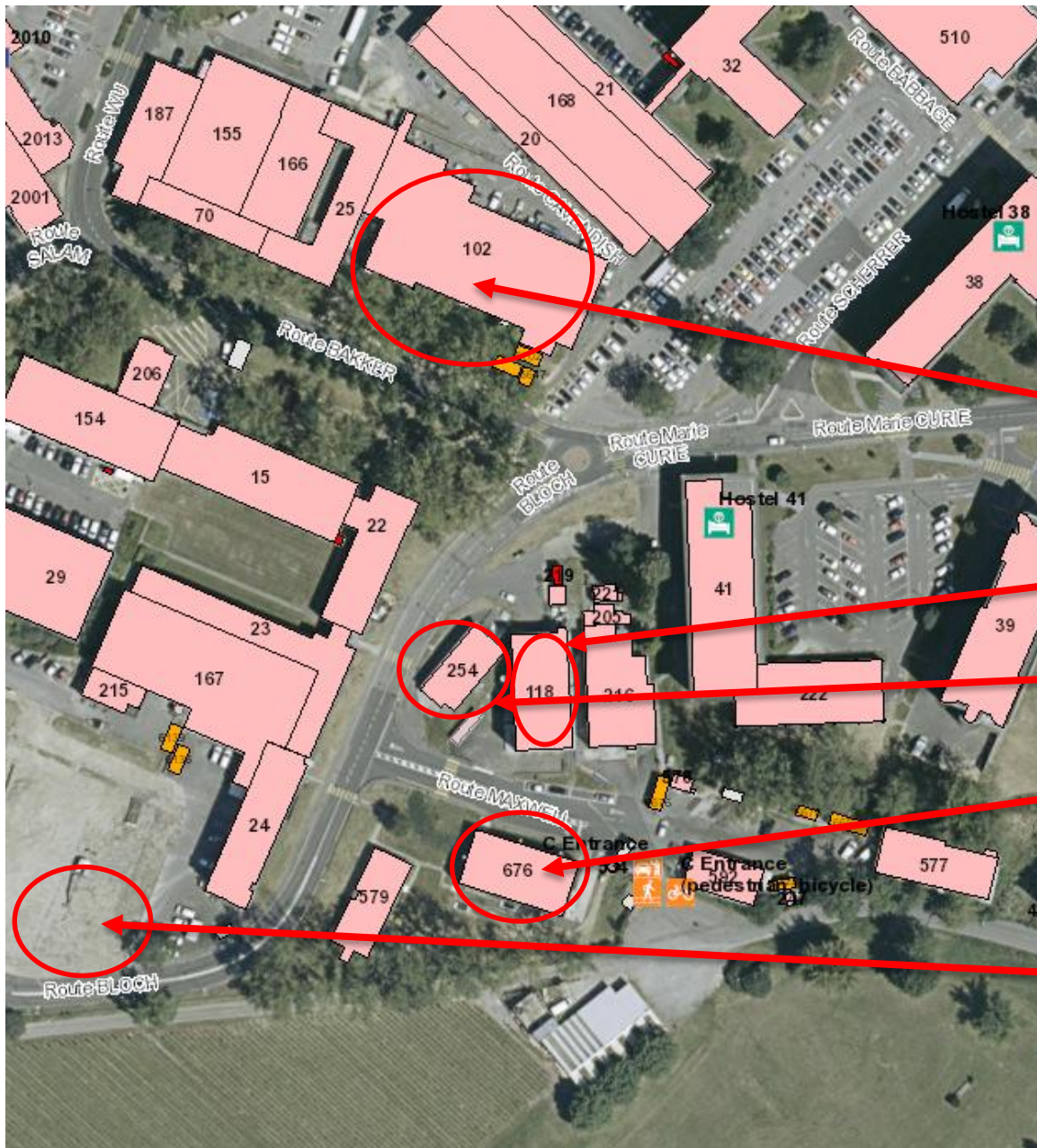
Year	2016	2017	2018	
CERN/FSU (2p)	140	200	0	total 340
TECHTRA		110	0	total 110



ALICE TPC

Year	2016	2017	2018	
CERN/FSU (4p)	90	240	0	total 330
CERN staff		20	0	total 20

B107



Main activity
Including clean room

Large UV exposure

GEM processes

Water treatment plant

B107



CERN Building 107
Basis of Design

- Last information : B 107 ready end 2017
- Installation of new machines beginning 2018 , no modification of the activity in 102: (2/3 months)
 - Etcher
 - Developer
 - Stripper
 - Jet pumice
 - Plating line
 - Desmearing line
 - Brown oxide line
 - Large dryer
 - NI/AU line
 - AU plating Bath
 - CU plating bath
 - Hoods etc
- Transfer plating activity (no stop)
- Transfer GEM missing equipment (1week)
 - 1 Laminator/Alcohol stripper/Electro-etching line/large exposure lamp
- Transfer the Photolithography equipment one by one (3 days stop per machine)
 - Laminators
 - LDI
 - UV lamps
 - ovens
- Transfer the CNC machines and test machines one by one (3 days stop per machine)
 - Driller
 - Router
 - AOI
 - Electrical tester
- Transfer Pressing equipment (3 days per equipment)
 - Large press
 - Std press
- Transfer photoplotter + developer (3 days stop)
- Transfer clean room equipment (1 week stop)
- Activity transferred mid 2018.
- Repair and transfer remaining equipment from 102

Thank you