

” BULK - MicroMegas ”

AT



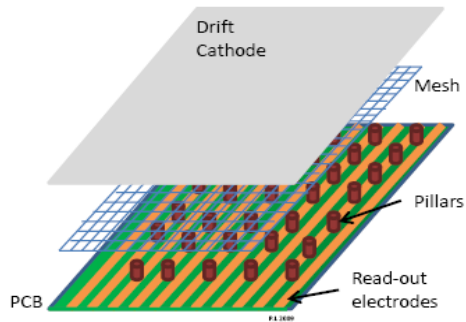
Presentation :
Yann DUGOU & Michel BILLANT

**Freiburg, 5th RD51 Meeting
May 2010**

Introduction

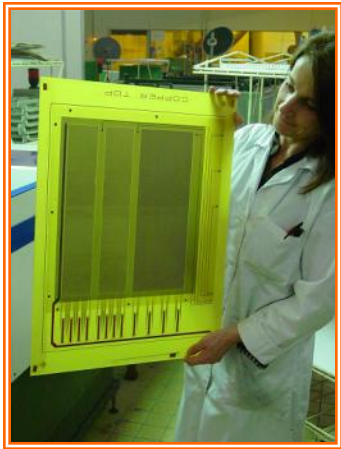
MICROMEGAS DETECTORS

- 2009 : Crete, 3rd RD51 meeting, capabilities evaluation
- 2010 : Freiburg, 5th RD51 meeting, prototypes manufactured at CIREA :
 - 1220 x 610 mm
 - 610 x 455 mm
- Industrial Process...
 - Large volume
 - Low price



Prototypes

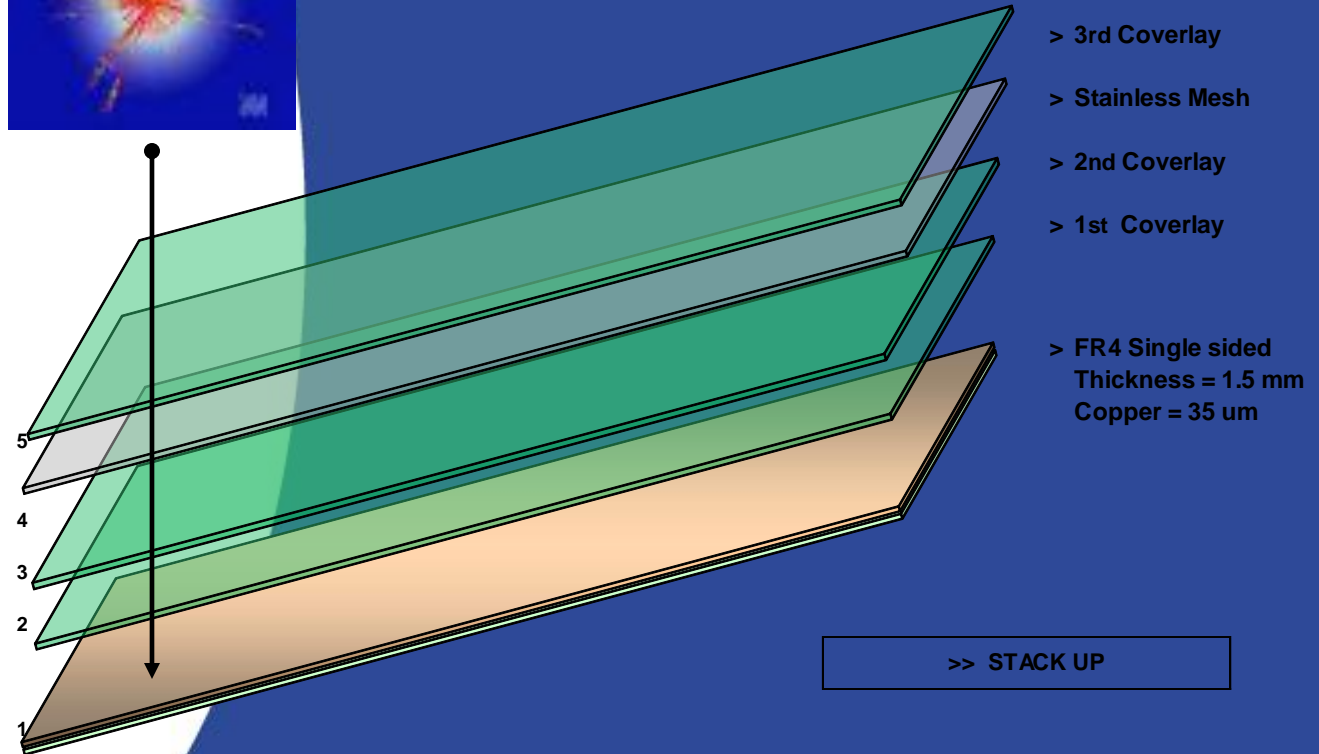
- Prototypes



**Size 1220 x 610 mm
&
Size 610 x 455 mm**



PCB MicroMegas

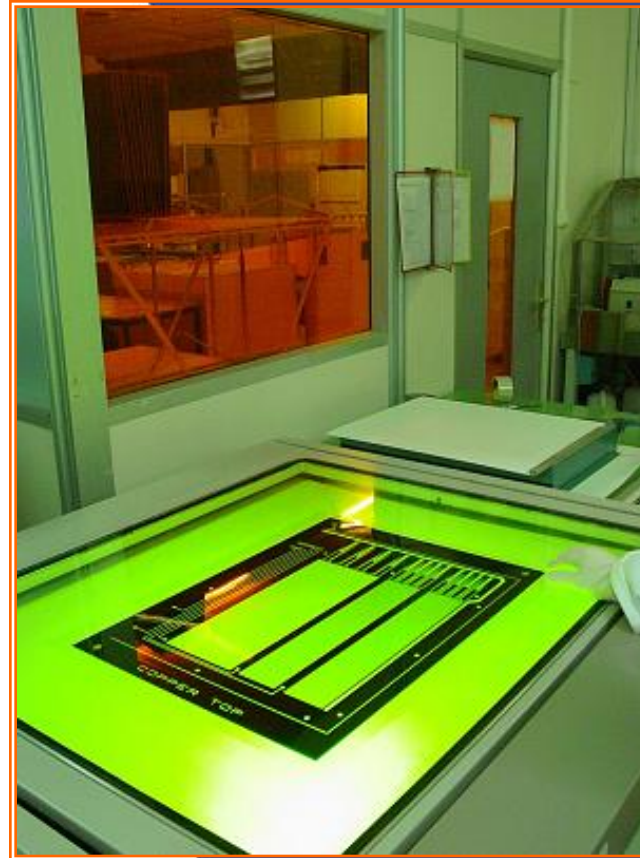


Workflow Process

- From CAM to film,
Artwork inspection

Workflow Process:

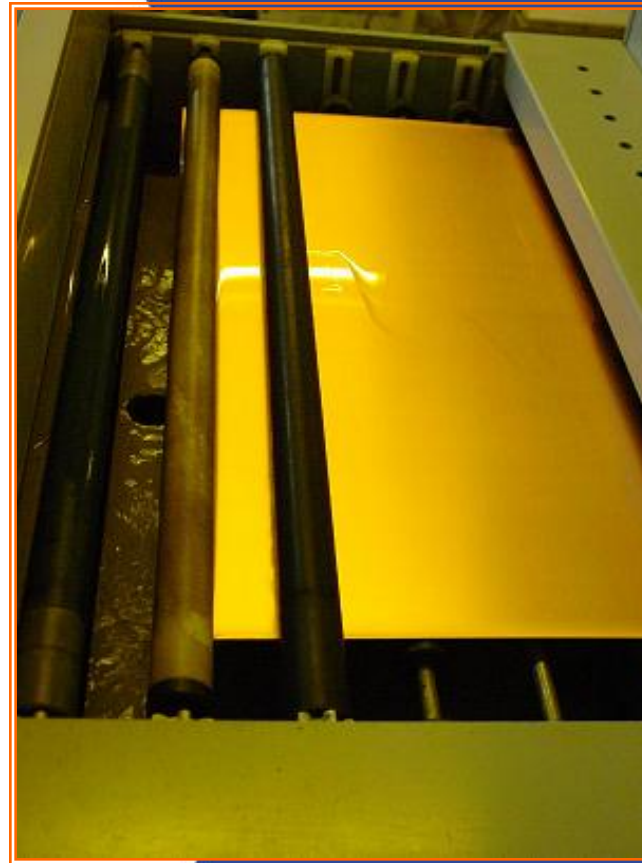
- **CAM**
- Micro Etch
- Dry Film Lamination
- Exposure
- Development
- Etching
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
- Exposure
- Mesh Lamination
- 3rd Coverlay Lamination
- Final exposure
- Development
- Oven curing
- Routing
- Final inspection



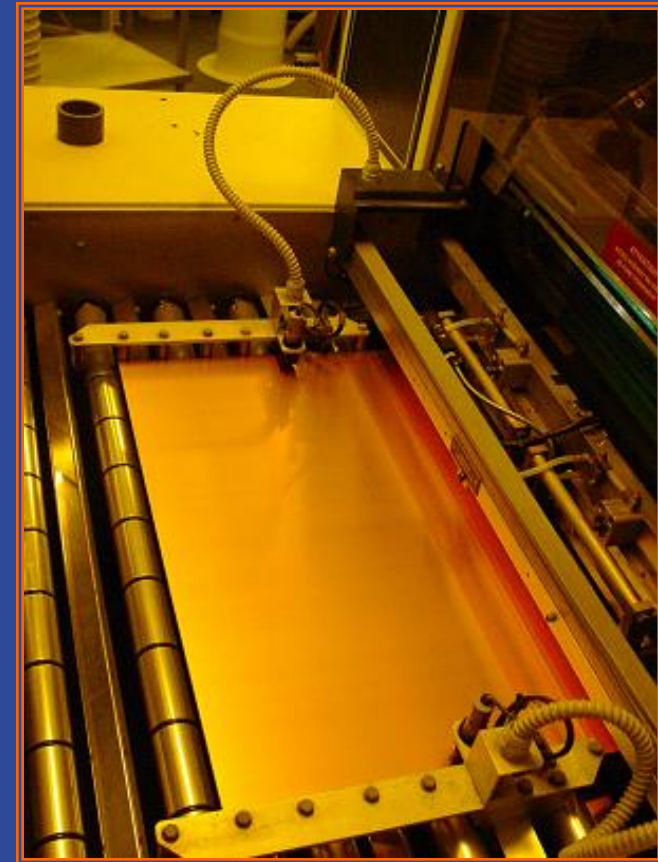
- **MicroEtch :**
Improved adhesion

Workflow Process:

- CAM
- **Micro Etch**
- Dry Film Lamination
- Exposure
- Development
- Etching
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
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Before dry film Lamination



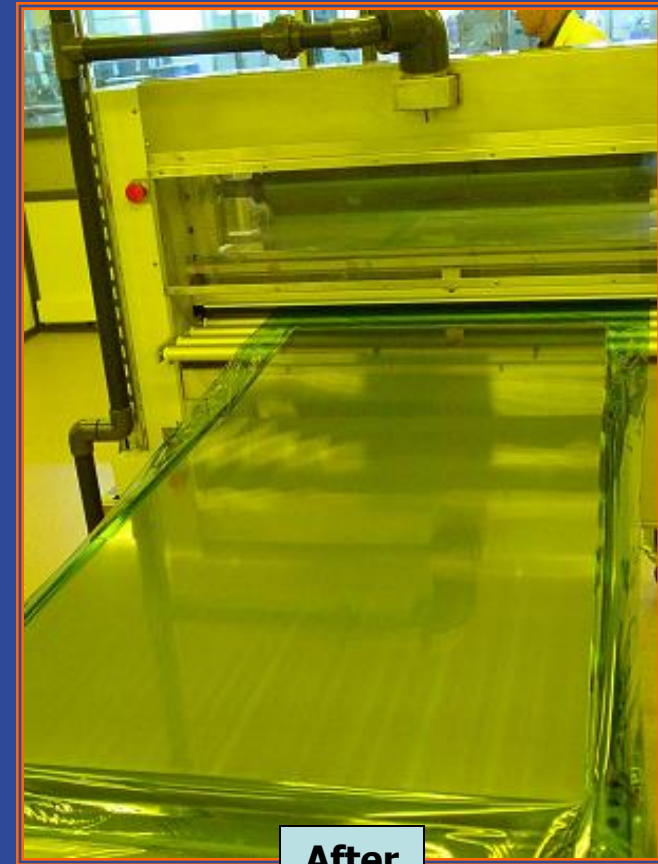
• Dry Film lamination

Workflow Process:

- CAM
- Micro Etch
- **Dry Film Lamination**
- Exposure
- Development
- Etching
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
- Exposure
- Mesh Lamination
- 3rd Coverlay Lamination
- Final exposure
- Development
- Oven curing
- Routing
- Final inspection



Before

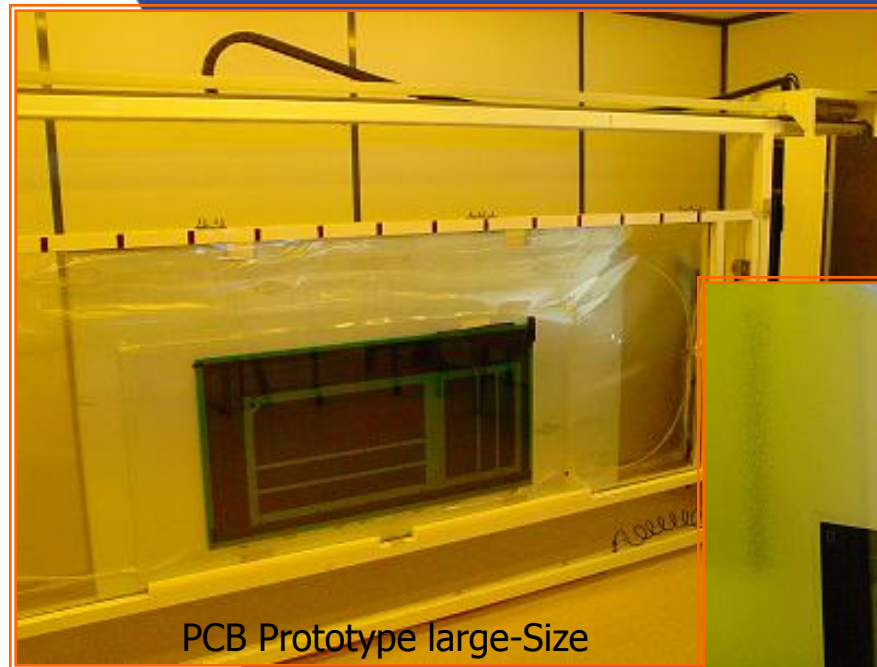


After

• Image Exposure

Workflow Process:

- CAM
- Micro Etch
- Dry Film Lamination
- **Exposure**
- Development
- Etching
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
- Exposure
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L/S =
100 μ m

**Under Vacuum,
Exposure in process**



• Dry Film development

Workflow Process:

- CAM
- Micro Etch
- Dry Film Lamination
- Exposure
- **Development**
- Etching
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
- Exposure
- Mesh Lamination
- 3rd Coverlay Lamination
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- Final inspection



Before



After

• Etching

Workflow Process:

- CAM
- Micro Etch
- Dry Film Lamination
- Exposure
- Development
- **Etching**
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
- Exposure
- Mesh Lamination
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- Final exposure
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- Oven curing
- Routing
- Final inspection

PCB Prototype large-Size Size 1220 x 610 mm



Before



After

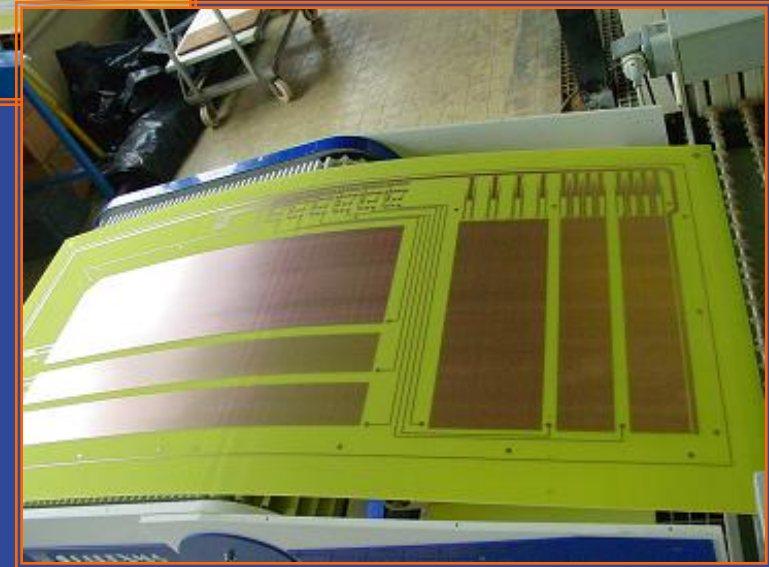
• Dry Film Stripping

Workflow Process:

- CAM
- Micro Etch
- Dry Film Lamination
- Exposure
- Development
- Etching
- **Dry Film Stripping**
- Inspection
- 1st & 2nd Coverlay Lamination
- Exposure
- Mesh Lamination
- 3rd Coverlay Lamination
- Final exposure
- Development
- Oven curing
- Routing
- Final inspection



Before

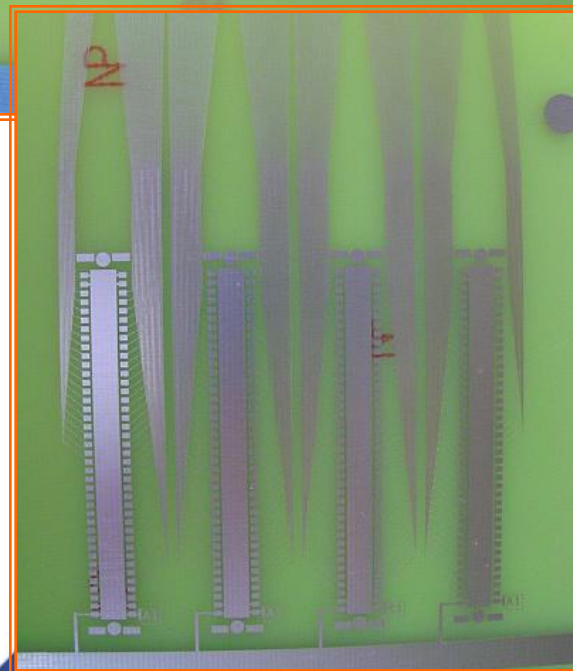


After

• Visual Inspection

Workflow Process:

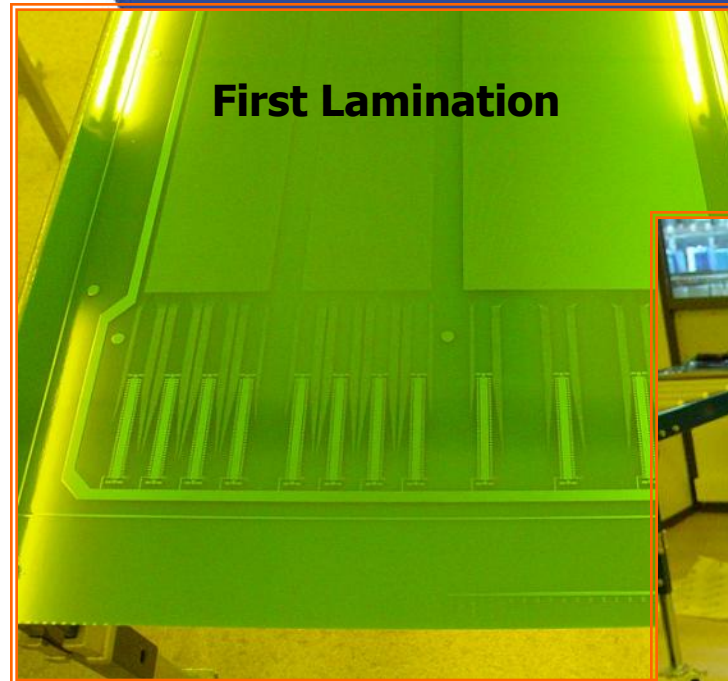
- CAM
- Micro Etch
- Dry Film Lamination
- Exposure
- Development
- Etching
- Dry Film Stripping
- **Inspection**
- 1st & 2nd Coverlay Lamination
- Exposure
- Mesh Lamination
- 3rd Coverlay Lamination
- Final exposure
- Development
- Oven curing
- Routing
- Final inspection



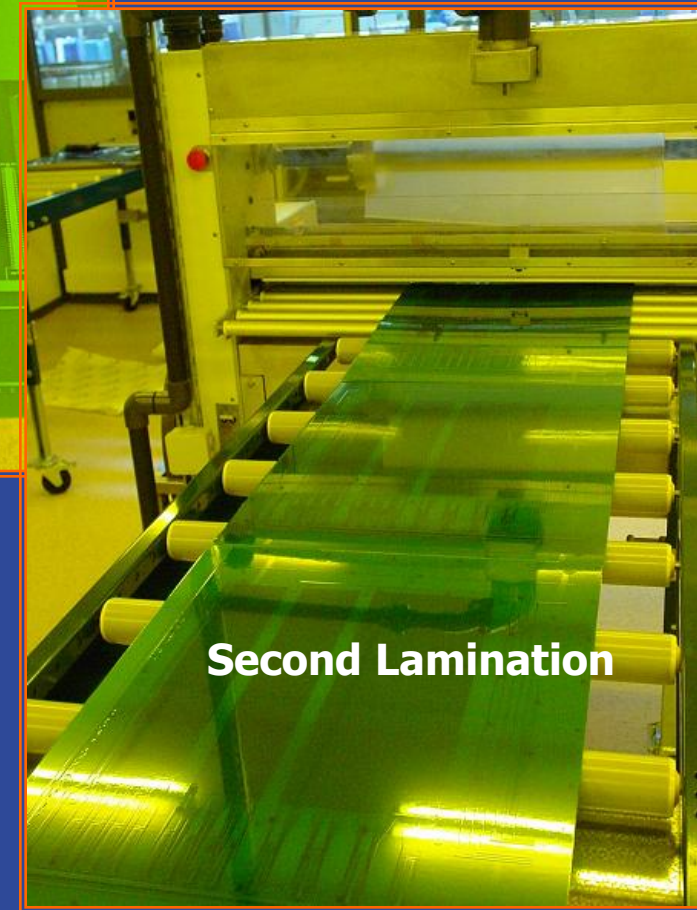
• Coverlay lamination

Workflow Process:

- CAM
- Micro Etch
- Dry Film Lamination
- Exposure
- Development
- Etching
- Dry Film Stripping
- Inspection
- **1st & 2nd Coverlay Lamination**
- Exposure
- Mesh Lamination
- 3rd Coverlay Lamination
- Final exposure
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- Final inspection



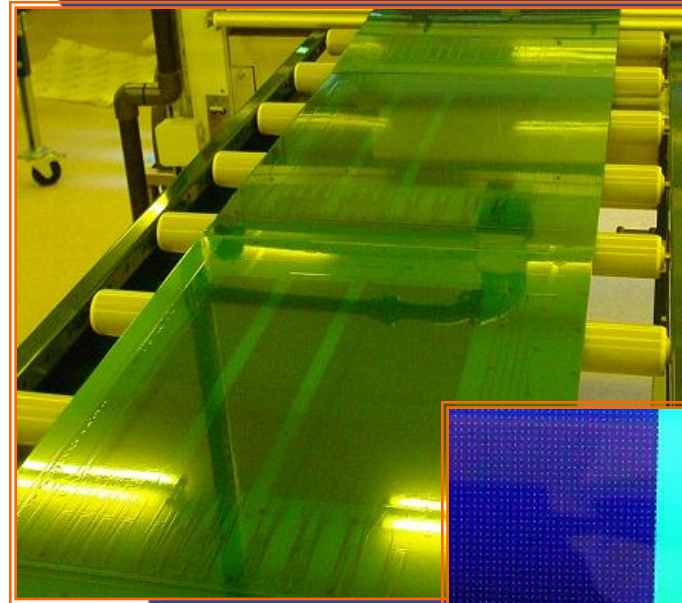
**PCB Prototype
Detector
Size 610 x 455 mm**



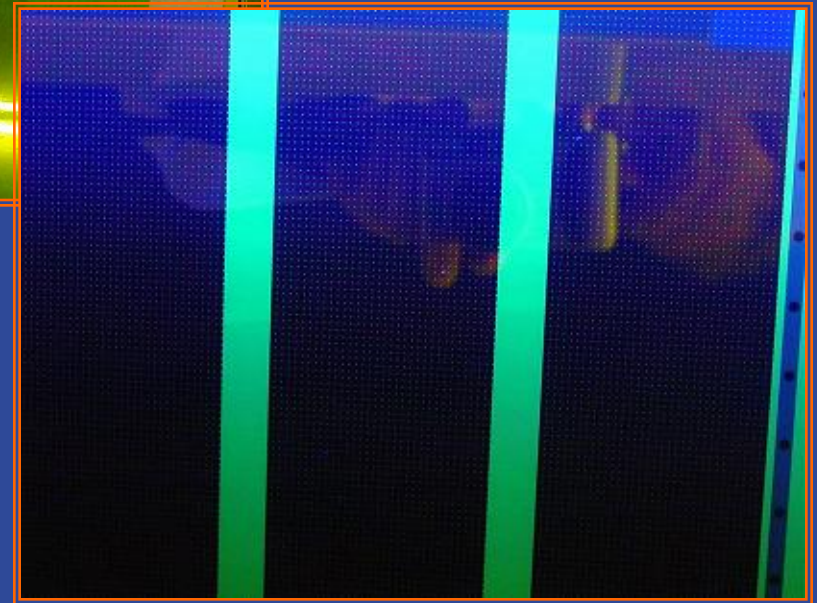
• 1st Coverlay Exposure

Workflow Process:

- CAM
- Micro Etch
- Dry Film Lamination
- Exposure
- Development
- Etching
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
- **Exposure**
- Mesh Lamination
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Pillars Exposure

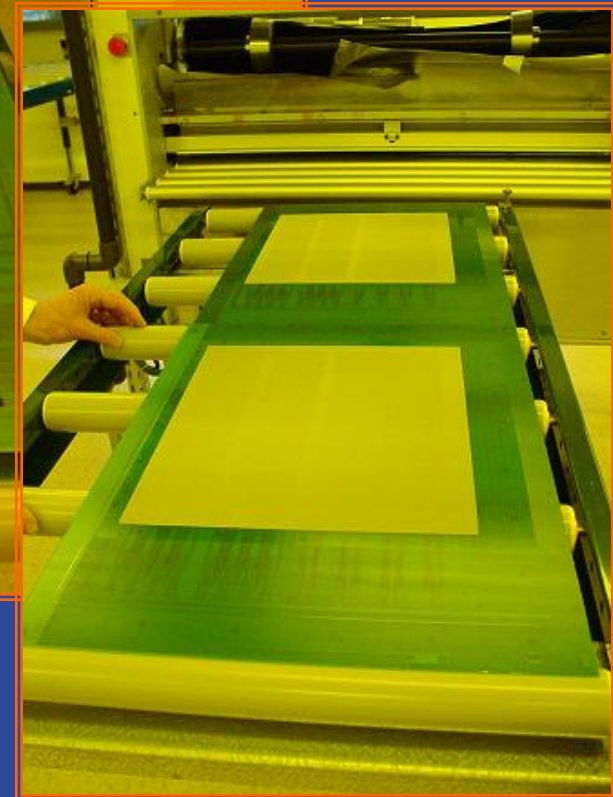


Coverlay
Thickness = 2 x 64 um

• Mesh lamination

Workflow Process:

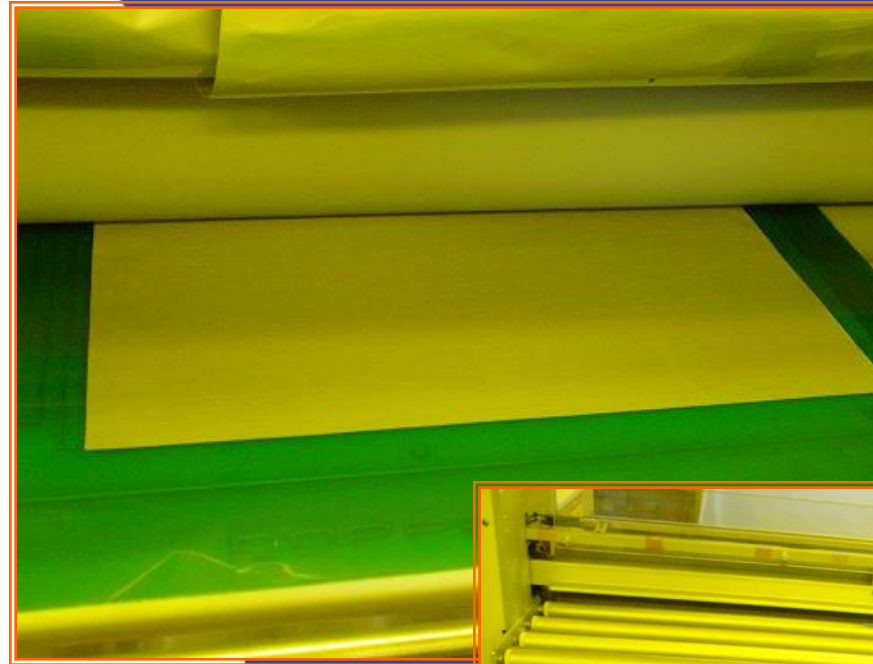
- CAM
- Micro Etch
- Dry Film Lamination
- Exposure
- Development
- Etching
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
- Exposure
- **Mesh Lamination**
- 3rd Coverlay Lamination
- Final exposure
- Development
- Oven curing
- Routing
- Final inspection



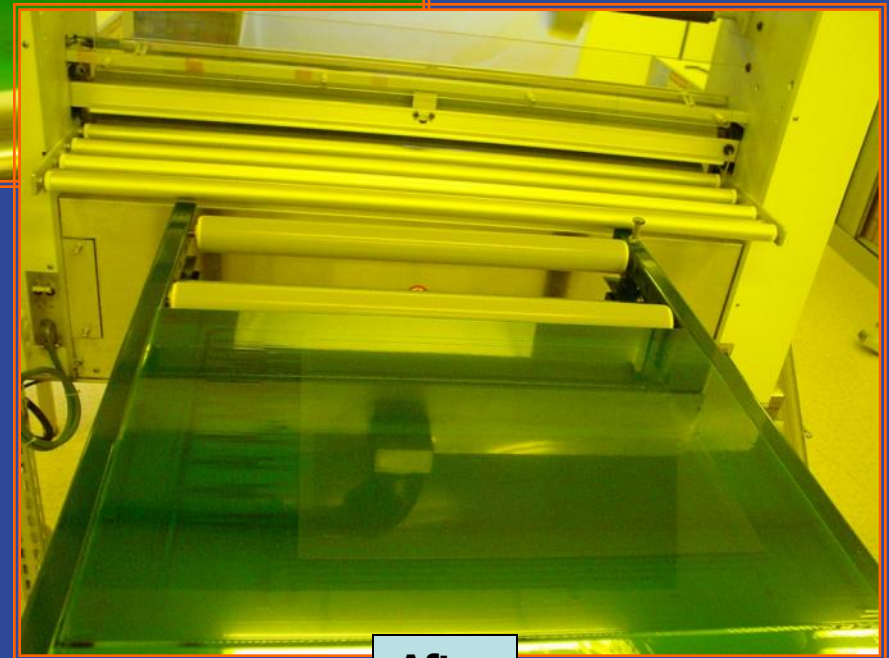
• Last Coverlay lamination

Workflow Process:

- CAM
- Micro Etch
- Dry Film Lamination
- Exposure
- Development
- Etching
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
- Exposure
- Mesh Lamination
- **3rd Coverlay Lamination**
- Final exposure
- Development
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- Routing
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Before

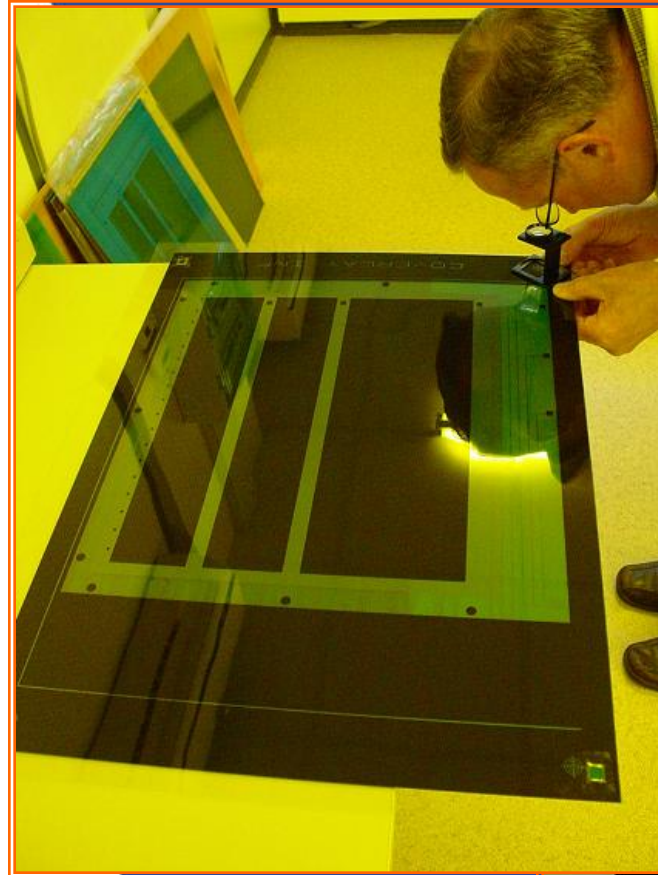


After

• Coverlay Exposure

Workflow Process:

- CAM
- Micro Etch
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- **Final exposure**
- Development
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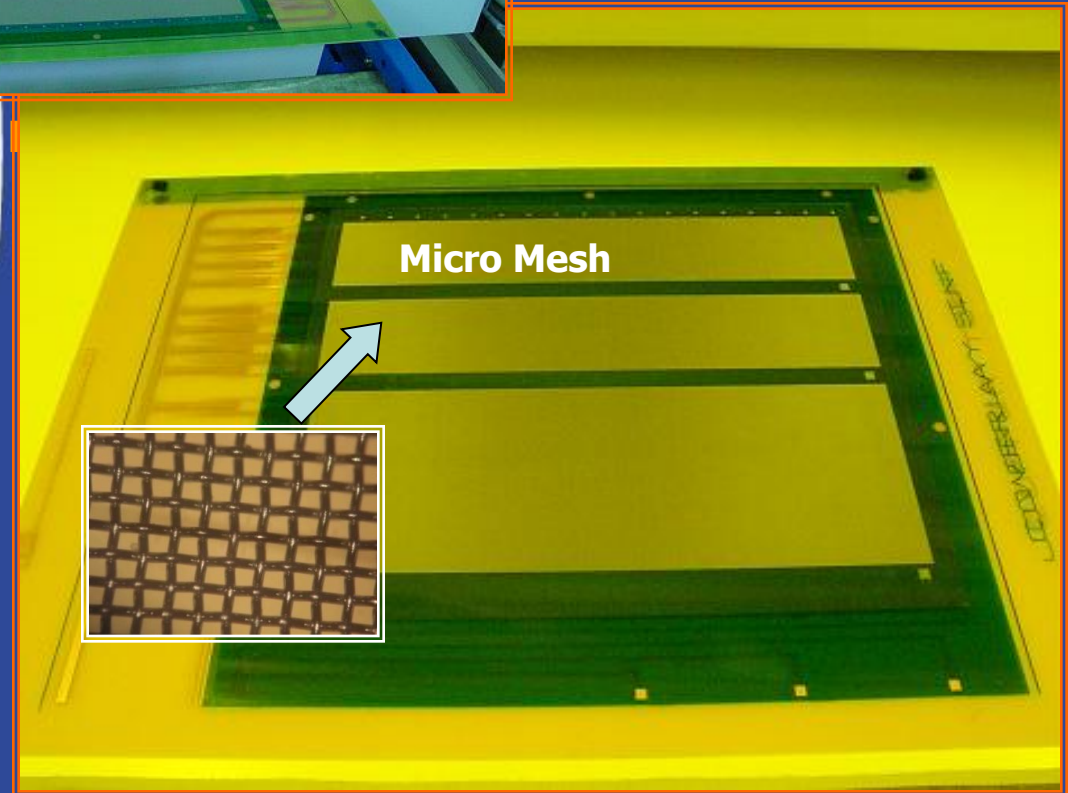
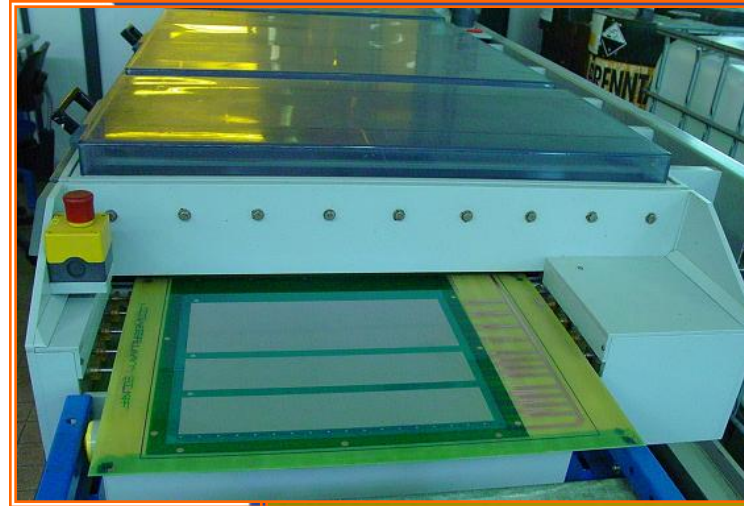
Film registration



Exposure in process

Workflow Process:

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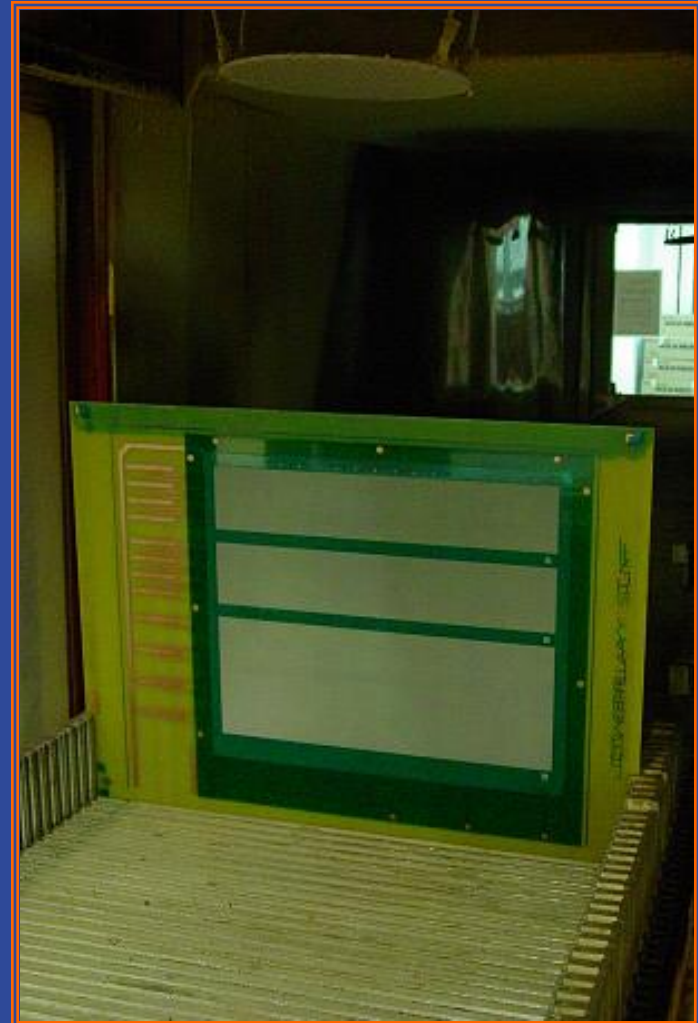


• Coverlay Curing

Workflow Process:

- CAM
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- **Oven curing**
- Routing
- Final inspection

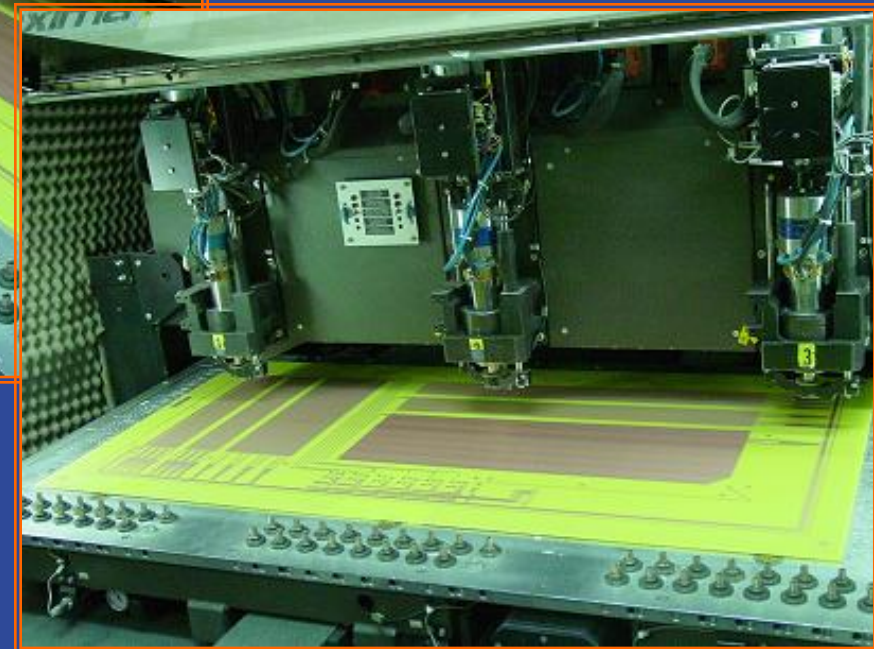
Tunnel Curing



• Routing

Workflow Process:

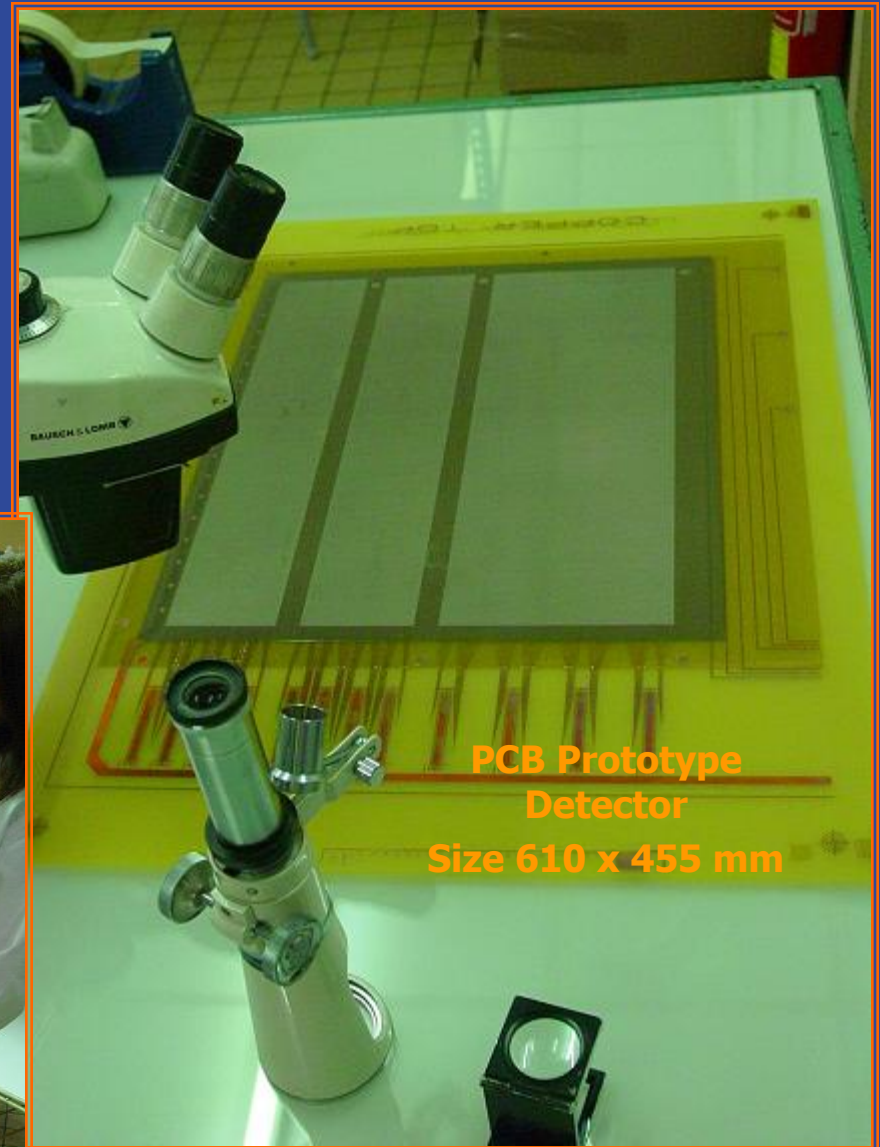
- CAM
- Micro Etch
- Dry Film Lamination
- Exposure
- Development
- Etching
- Dry Film Stripping
- Inspection
- 1st & 2nd Coverlay Lamination
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• Final Inspection

Workflow Process:

- CAM
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- **Final inspection**



STATUS

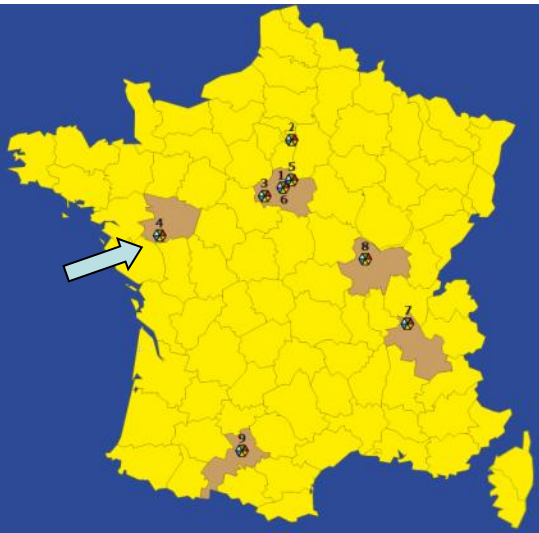
MICROMEGAS
DETECTORS

- Prototypes targets achieved
- Mesh type used : SD 50-30 without strenght
- Cirea ready for prototypes orders
- Exposure area available : 2000 x 600 mm



Volumes & Prices estimation

- Volume capacity :
 - 200 units per month, 1 shift
- Projected Prices for mass production:
 - Actual size (1200 x 600 mm) : around 1'000 € per unit, low volume.
 - Price estimation for a 1 x 2 m : around 1'000 € sqm in volume.



Thanks for your attention!



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