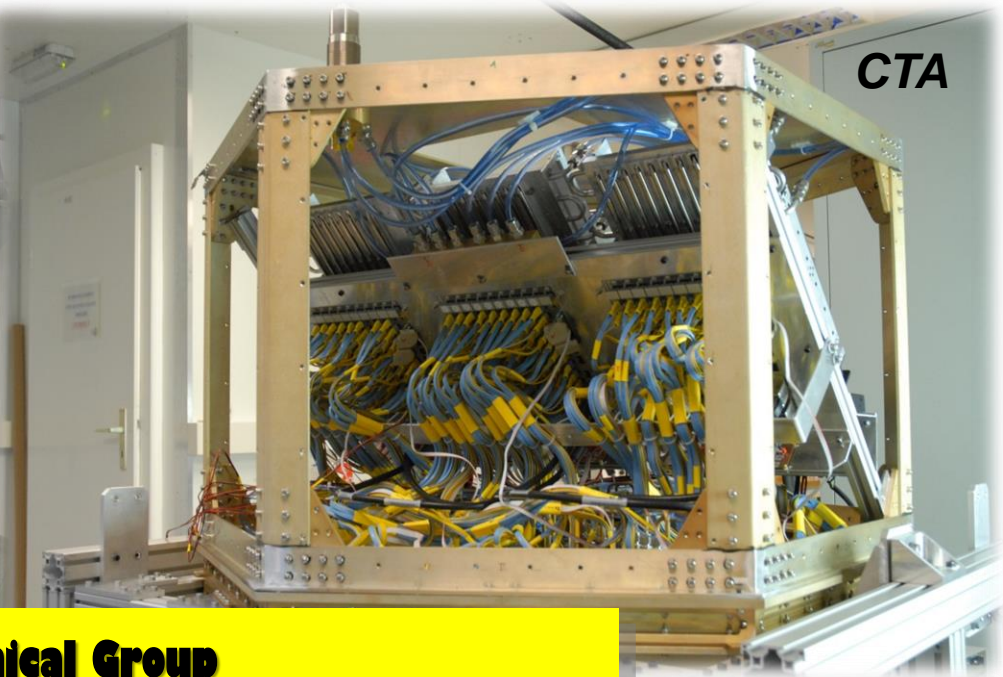


**Atlas\_SLIM**



**CTA**

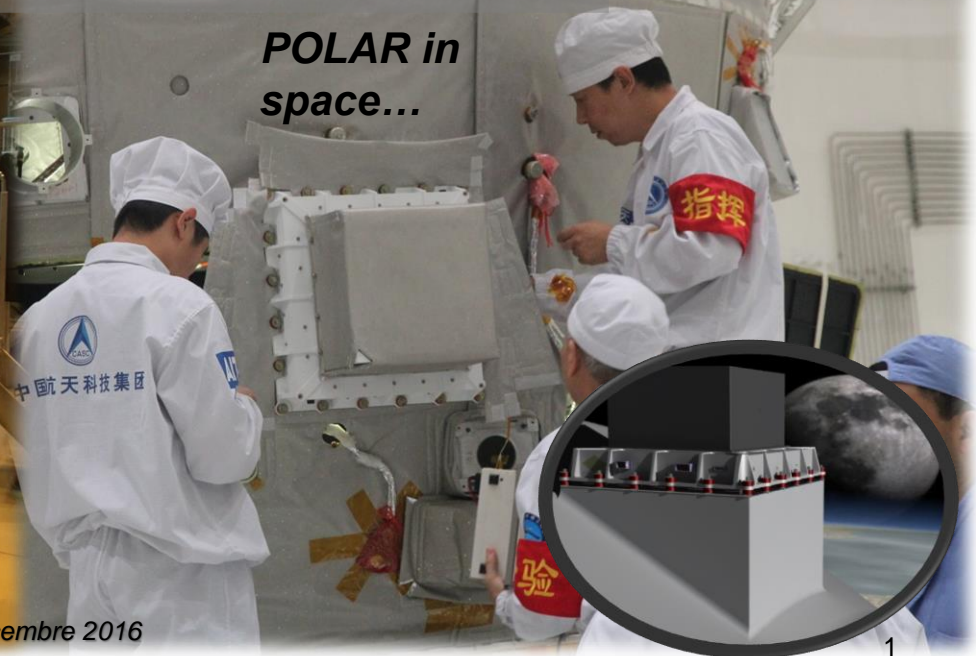


**Mechanical Group**  
***Highlights in 2016... and outlooks towards 2017***

**Neutrinos**



**POLAR in space...**



DPNC, le 20 Décembre 2016

**Workshop / Design & Engineering  
(4 people full time)**



**Maarten** is now retired  
**Maxime** left in March

**Coralie** (Workshop and clean room)

**Laurent** (Neutrinos, CTA) in overlap with Workshop activities

**Sébastien** (Engineer on ATLAS),

**Franck** (Head of Mechanical Group)

► **We should now “restart” the collaborations with students (internship with Engineering schools)**

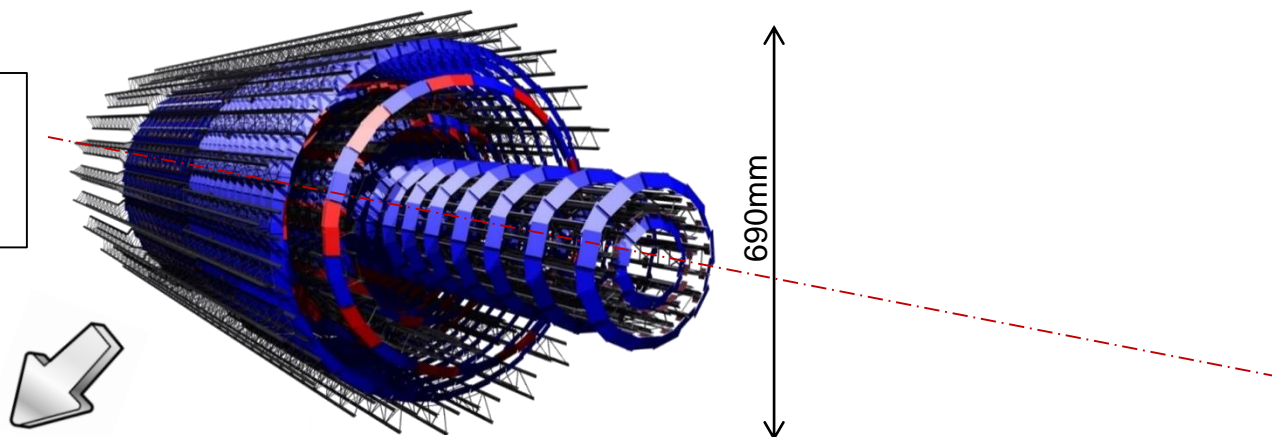
... without forgetting **Catherine, Liliane, Nathalie, Yann** and our “Central” workshops...

**\_\_\_\_\_Main achievements (projects)\_\_\_\_\_**

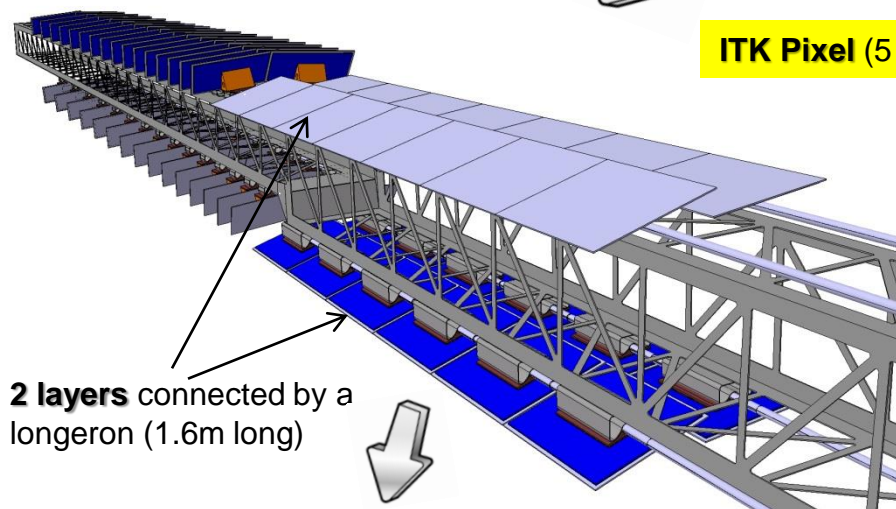
- **CTA** is completing the first camera assembly... about to launch the 2<sup>nd</sup> camera (pre production)
- **ATLAS\_SLIM** has provided the first prototypes (Test in Mechanics, and Thermo mechanics ...)
- **Baby MIND** (Neutrinos) has completed the first module (collaboration with CERN)... launching the full production (18 modules)
- **POLAR** has been successfully launched into space (our 3<sup>rd</sup> scientific satellite after *AMS-02* and *Dampe*...)
- **TT\_PET** is a new time of flight for MRI system (Medical field). R&D has started with UniBern)
- Activities related to **Mu3e, Dampe, HERD**... Tests beams at CERN



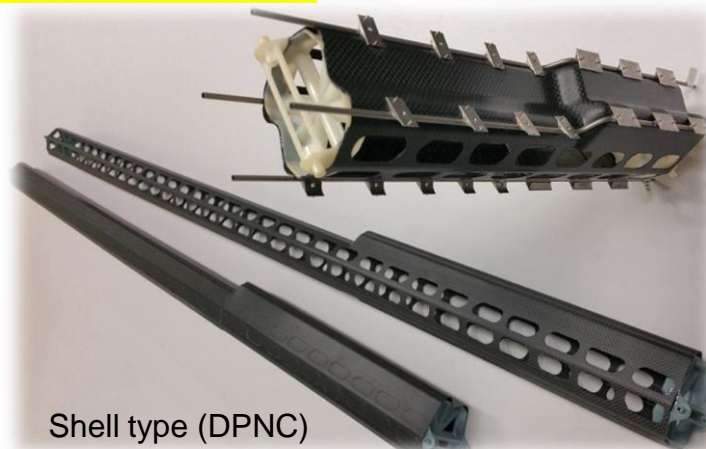
- **Coralie** is part time on Prototyping and Module assembly
- **Sebastien** full time (Main designer of the DPNC project)



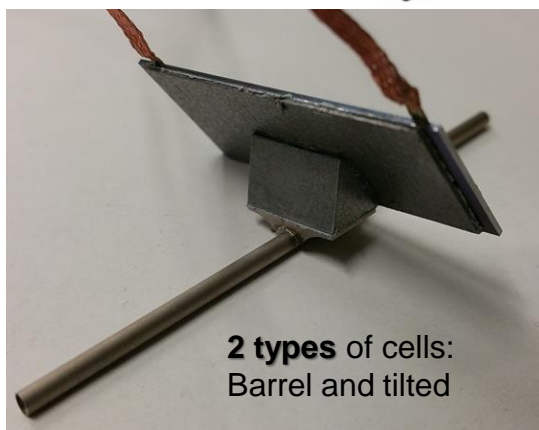
ITK Pixel (5 layers of PIXELS)



2 layers connected by a longeron (1.6m long)

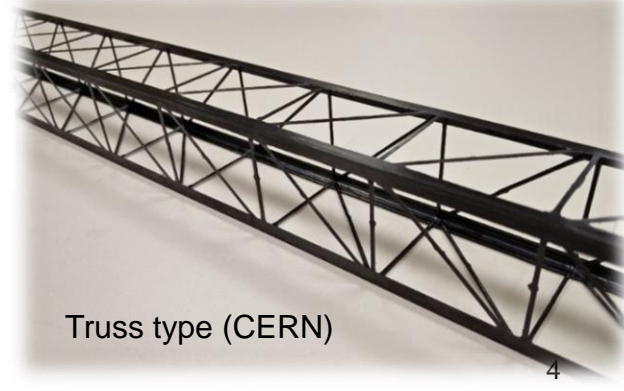


Shell type (DPNC)



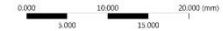
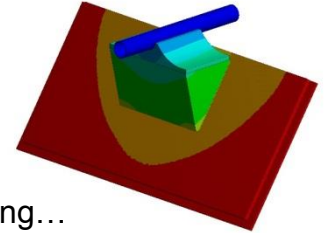
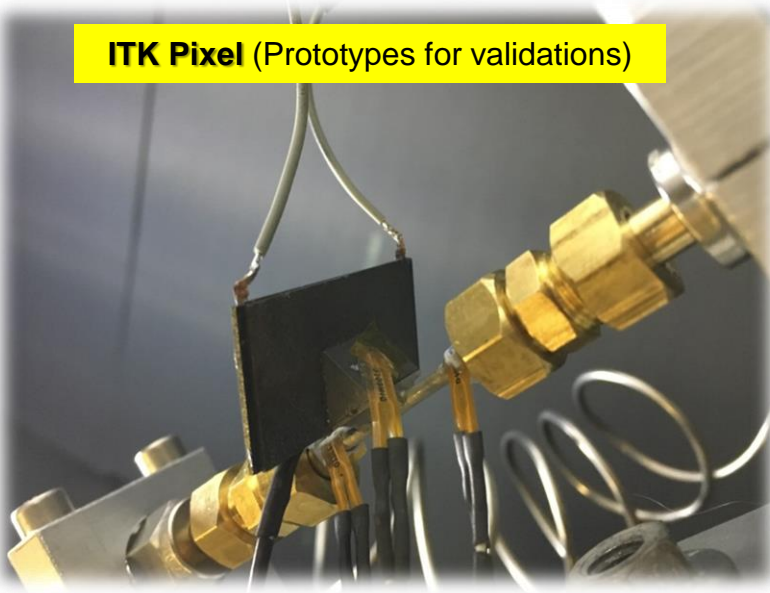
2 types of cells:  
Barrel and tilted

2 types of supports have been prototyped this year...



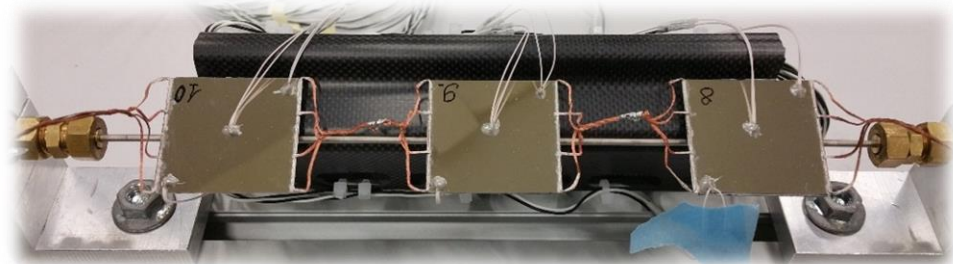
Truss type (CERN)

## ITK Pixel (Prototypes for validations)

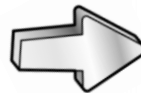


**Thermal Tests at CERN and FEA with CO2 cooling...**

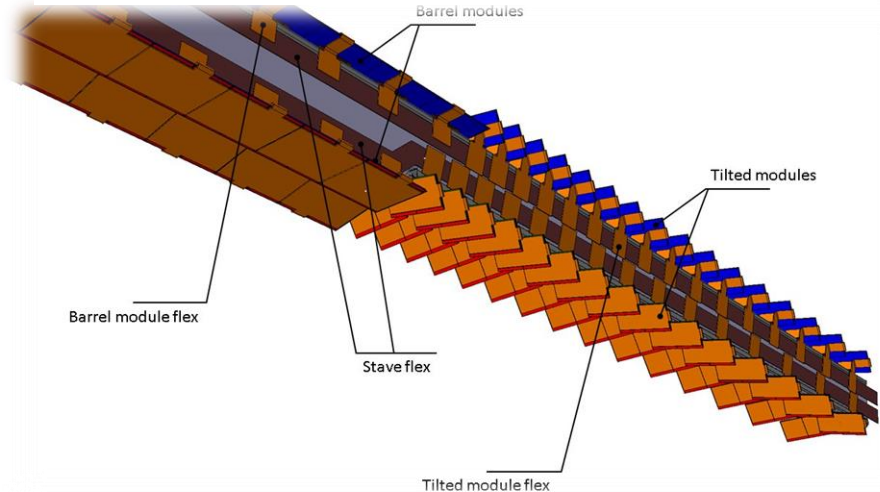
► Thermal parameters are validated!



**Prototype developments** on brazing  
and cooling line assembly with jigs  
(based on 1m long object)



**Common project with CERN and other labs ...**  
towards the ultimate optimizations (curly pipes ??)...

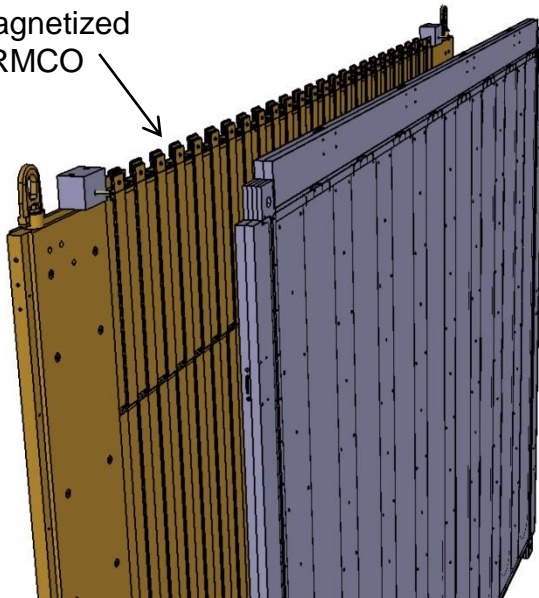


► **2017 is devoted to a 1.6m long prototype with real modules and cable bus... challenging!**



- **Laurent** full time (Main designer of the project, exchanges with CERN )
- **Franck** is part time on Crate Cabling + EMI shielding "boxes"

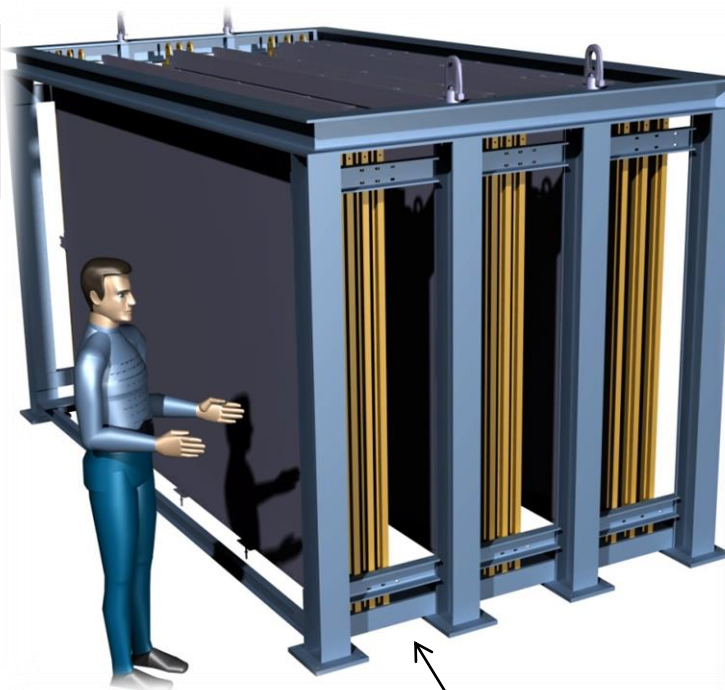
Magnetized  
ARMCO



Double X-Y  
scintillator

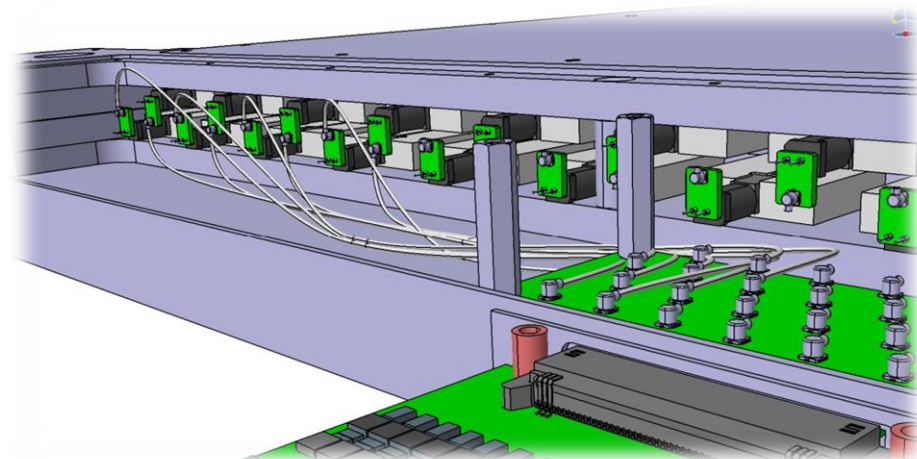
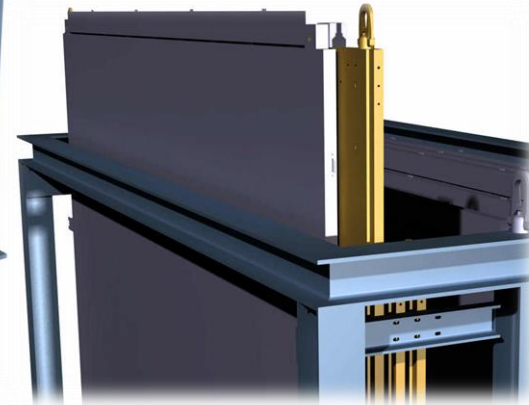
## The Module#1 in a few numbers...

- 222 SiPM and connectors
- 95 horizontal scintillating bars
- 16 vertical scintillating bars
- Aluminum frames and covers
- ... 926 screws!!
- **~200Kg** without cables and electronics

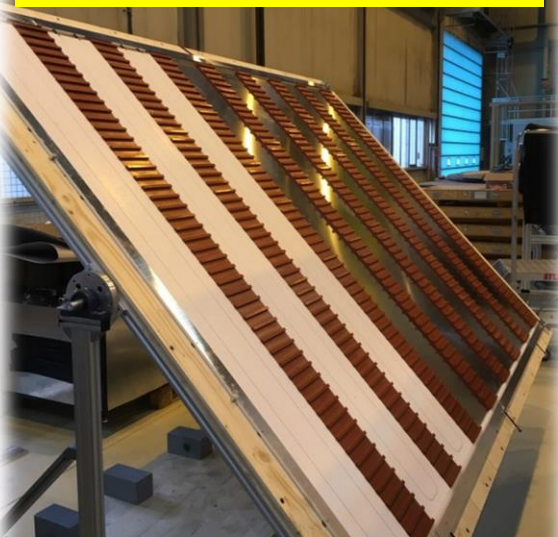


4 blocs (not identical) in  
total (about 22 tons each)...

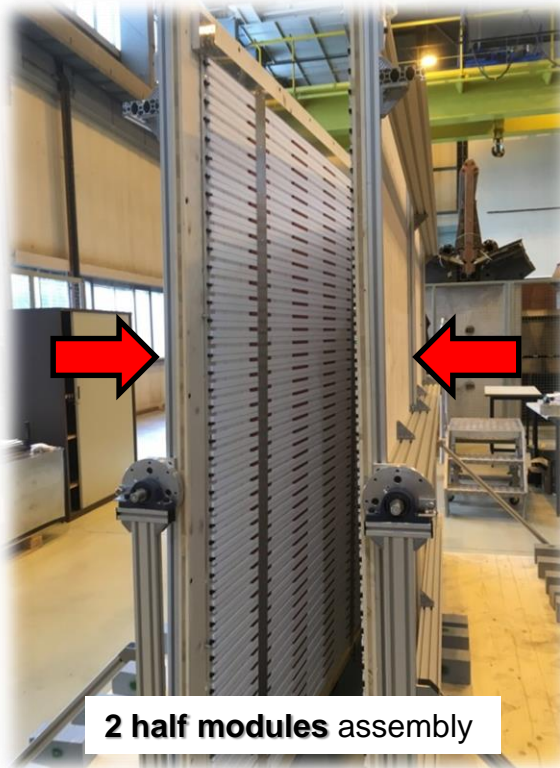
Module insertion  
(ARMCO by CERN  
+ Scintillator)



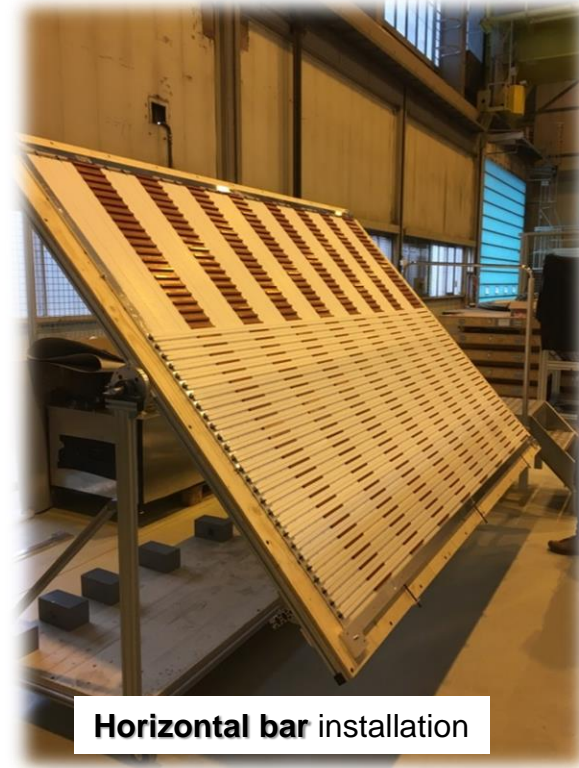
**Module#1** assembly at CERN for validation before full production  
(**18 modules** by Mid 2017)



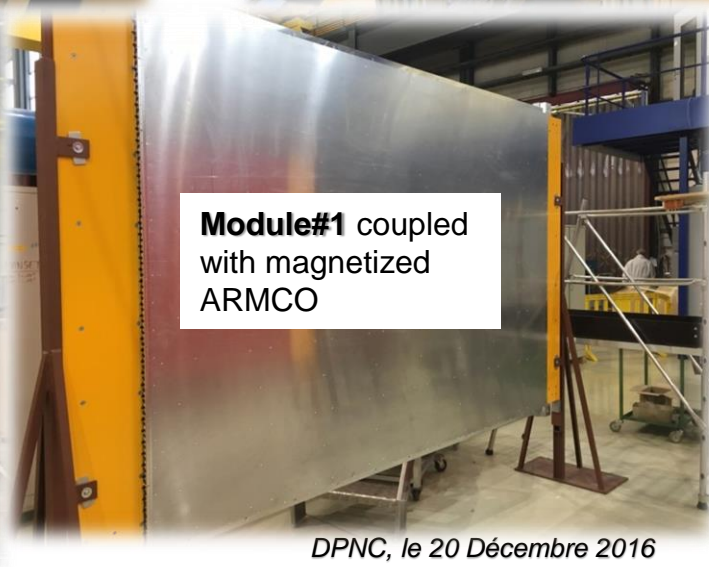
**Vertical bar** installation (in white)



**2 half modules** assembly



**Horizontal bar** installation



**Module#1** coupled with magnetized ARMCO

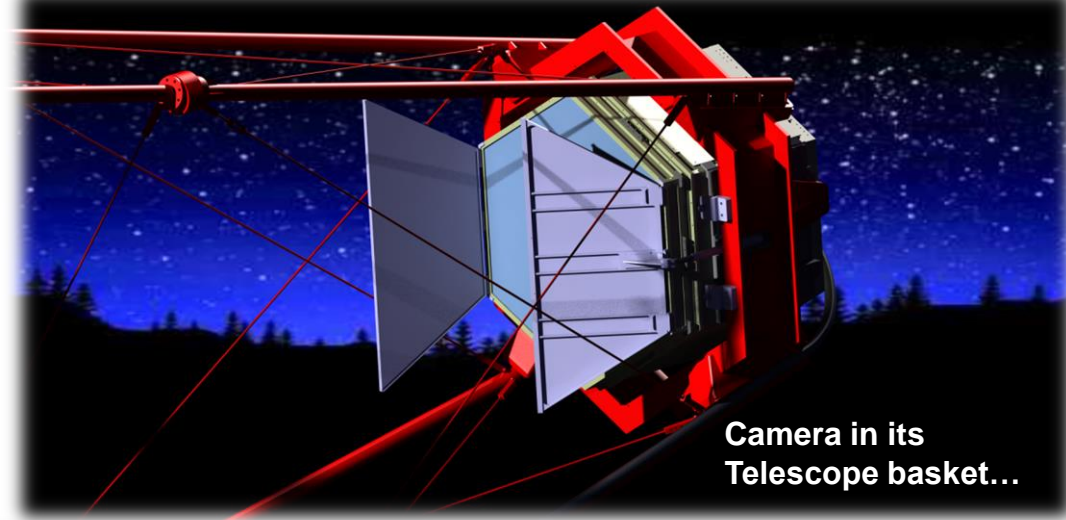


► **2017 will be focused** on Test beam at CERN + Delivery at J-Parc (Japan) of the full detector...

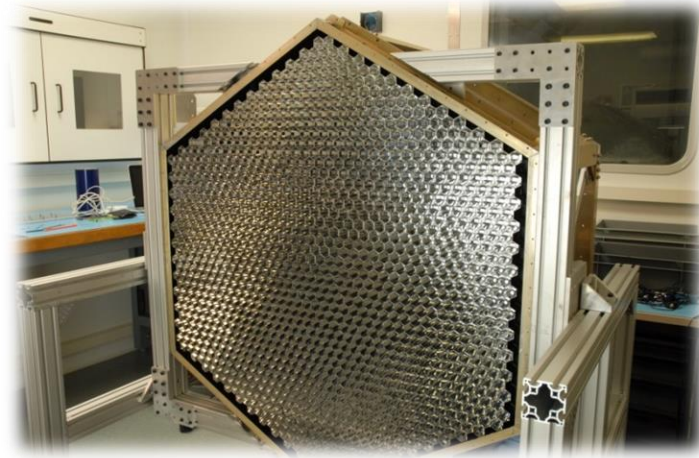
**Intensive works** at CERN for the next months!



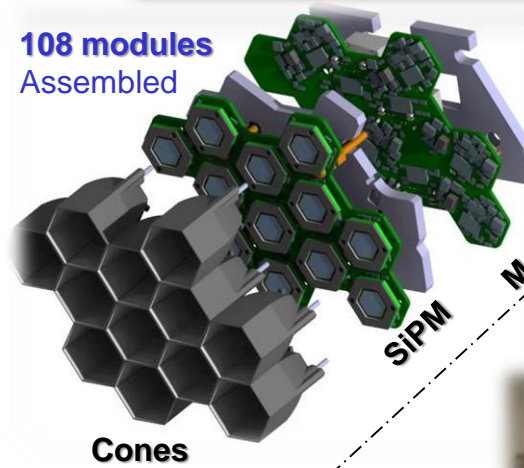
- **Coralie** was part time on Camera integration (module, cooling system...)
- **Franck** was nearly full time on Camera mechanics (+ cooling design and Tests)
- **Laurent** part time on design works (shutter, basket, holders...)



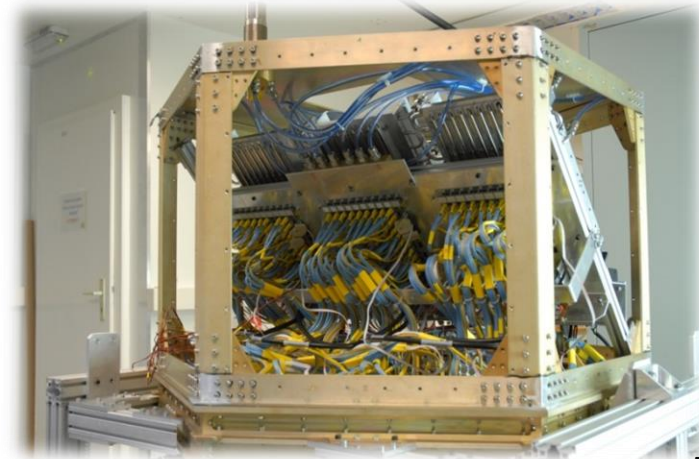
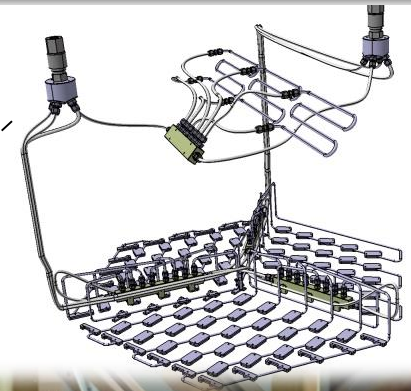
Camera in its  
Telescope basket...



108 modules  
Assembled

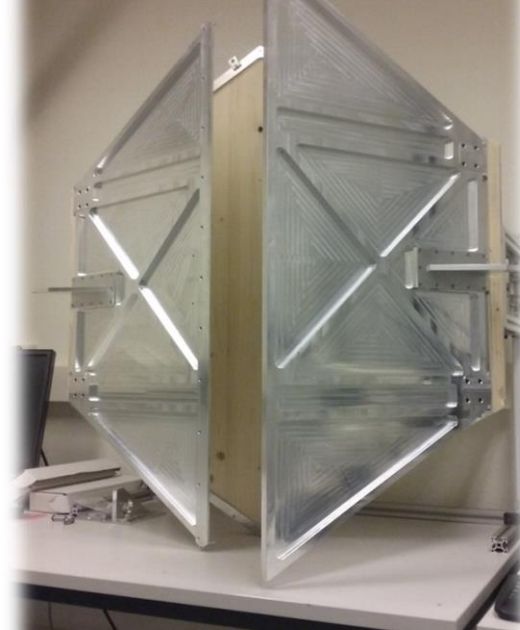


Cooling  
management  
(PDP + Crate)

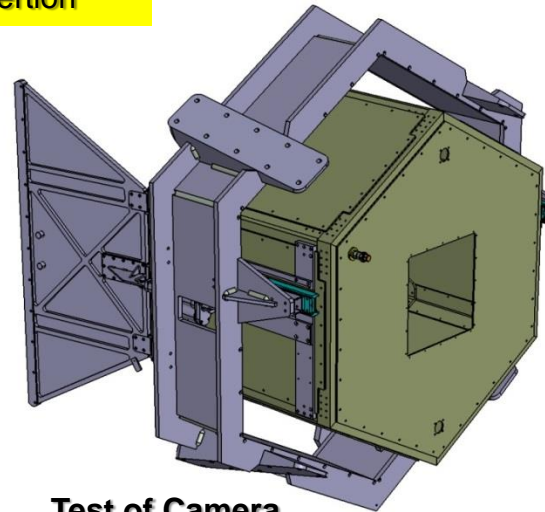




**Still to be tested...** Shutter system, Basket and holder mechanism, camera insertion



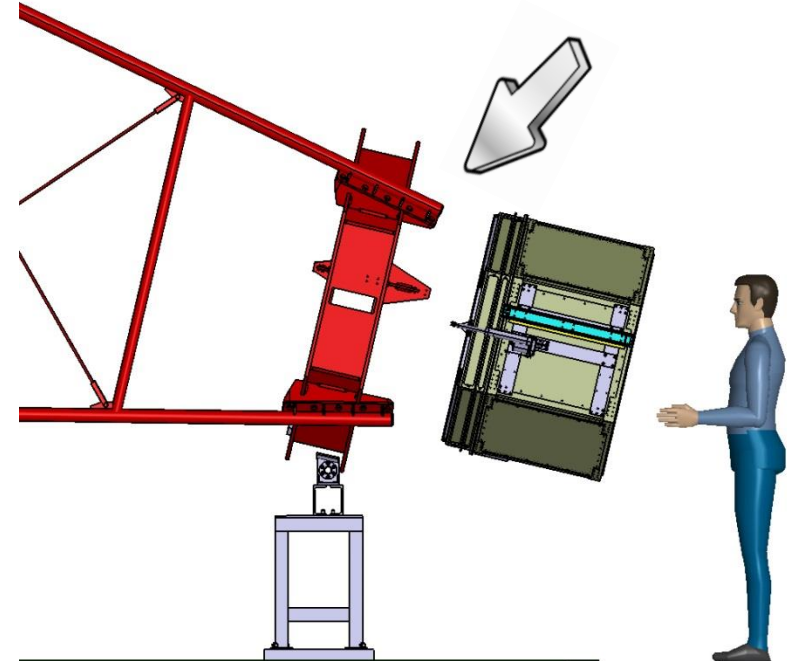
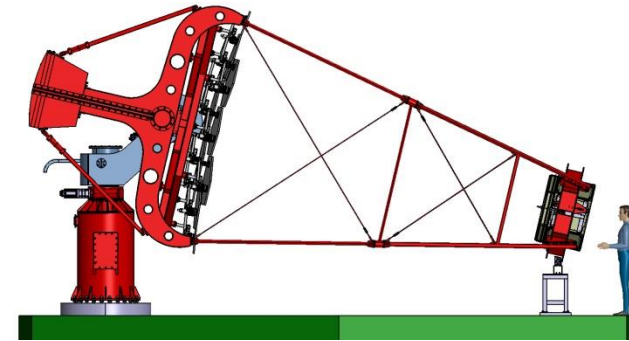
**Shutter** on its Test bench



**Test of Camera insertion** into the basket



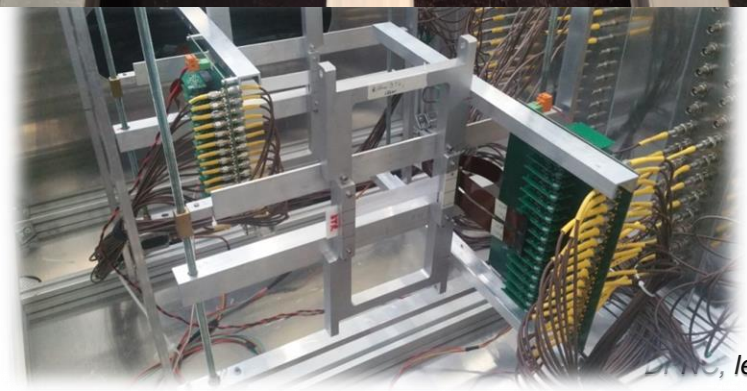
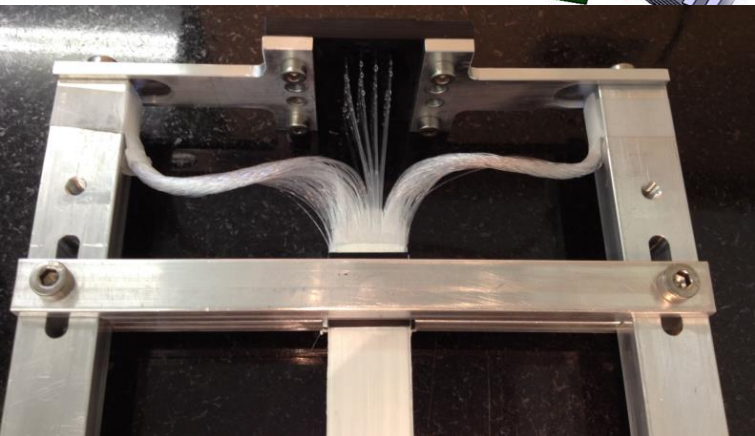
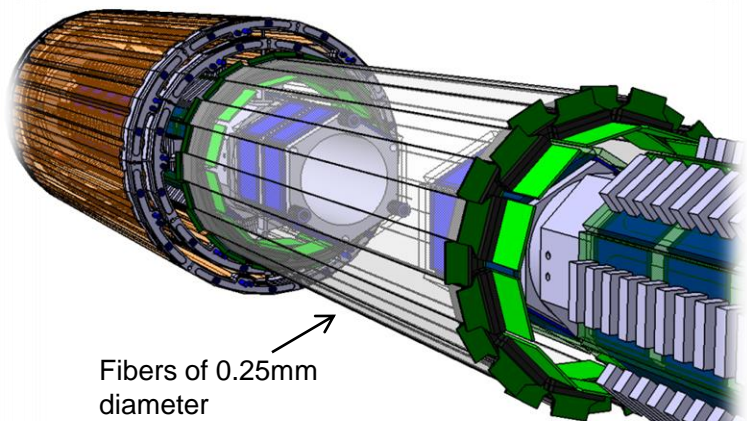
**Camera basket** at "les Maraichers" ...before welding



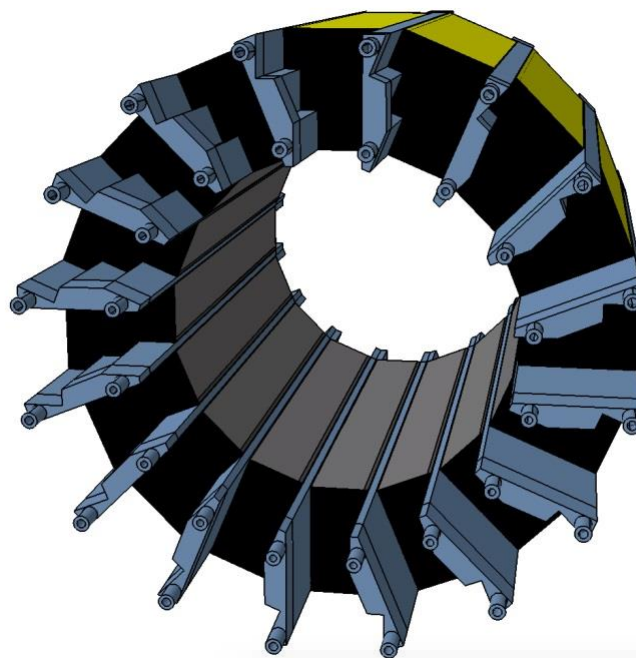
► **2017 will be focused** on manufacturing and Assembly of the **second camera** + Camera insertion into the telescope!

**Pre production phase** so... more optimization to ease future production and out sourcing (mechanics, cooling)

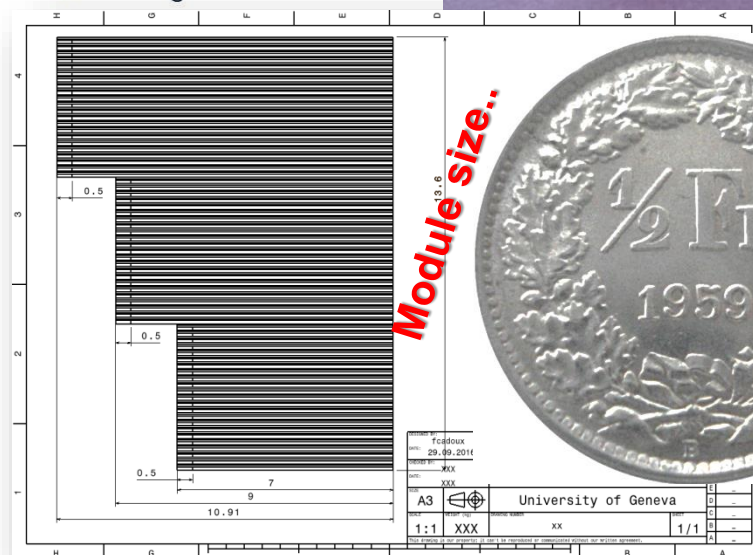
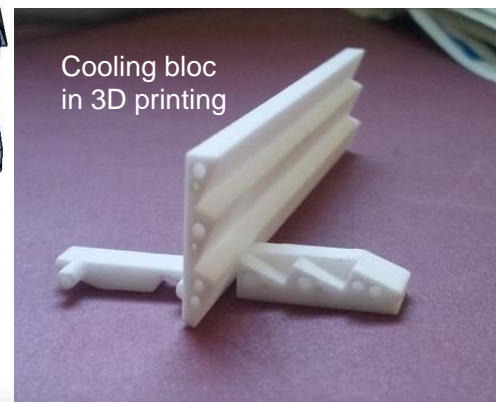
## Developments around SiPM activities + strip of fibers (scintillator) Lots of Beam Tests at CERN in 2016



## Developments for TT\_PET (more in 2017...) (MRI for medical research... HUG + UniBern)



16 modules in Lead + Silicon + flexes...  
(barrel type)



le 20 Décembre 2016



- Various projects in quite different fields (CTA, TT\_PET, ATLAS-SLIM, Neutrinos, Astro...)
- Open some challenges in new areas
- Develop new skills such as CMM (module loading activities)
- **2017** will be “crowded” with our defined commitments: ATLAS\_SLIM, BabyMIND and CTA
- BUT we will do our best to cope with incoming projects (TT\_PET, Mu3e, Astro??..)

Thanks again and Merry Christmas!