

DE LA RECHERCHE À L'INDUSTRIE



**GETINGE**  
***La Calhène***

[www.cea.fr](http://www.cea.fr)

# INNOVATIVE SYSTEM OF VISUALIZATION IN HOT CELL

« my eyes on my hand »

a cooperation program between CEA and Getinge La Calhène

Christophe BRENNEIS ; Mickaël GENNISON ; François GOBIN – CEA Marcoule  
Bernard CHAVROT ; Samuel KERVOERN ; Christophe SELLIEZ – Getinge La Calhène

28 SEPTEMBER 2015





# DEVELOPMENT AT CEA (MARCOULE)

**FRANÇOIS GOBIN**

Work in hot cell :

- Restrictive
- Difficult
- Longer

Front area

Rear area

Light

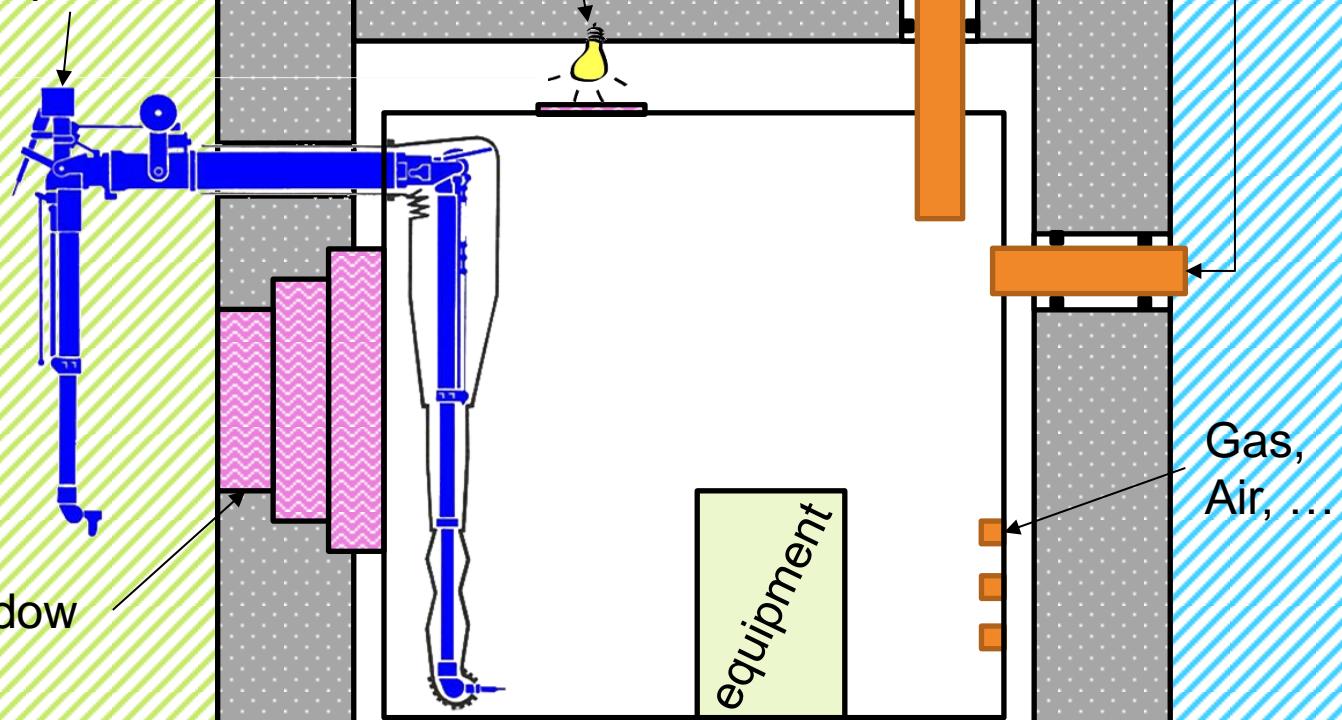
Electricity

Manipulators

Window

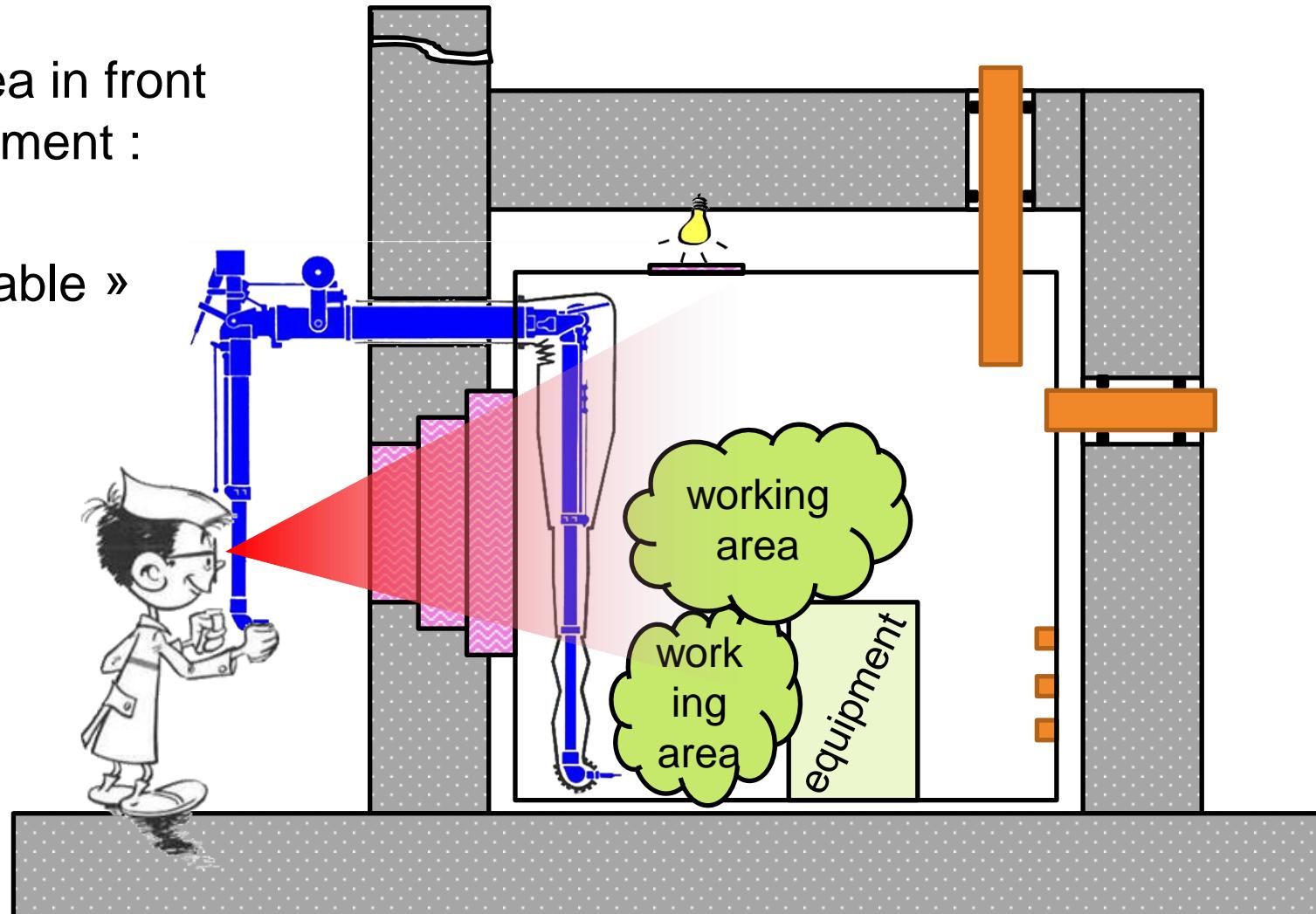
equipment

Gas,  
Air, ...



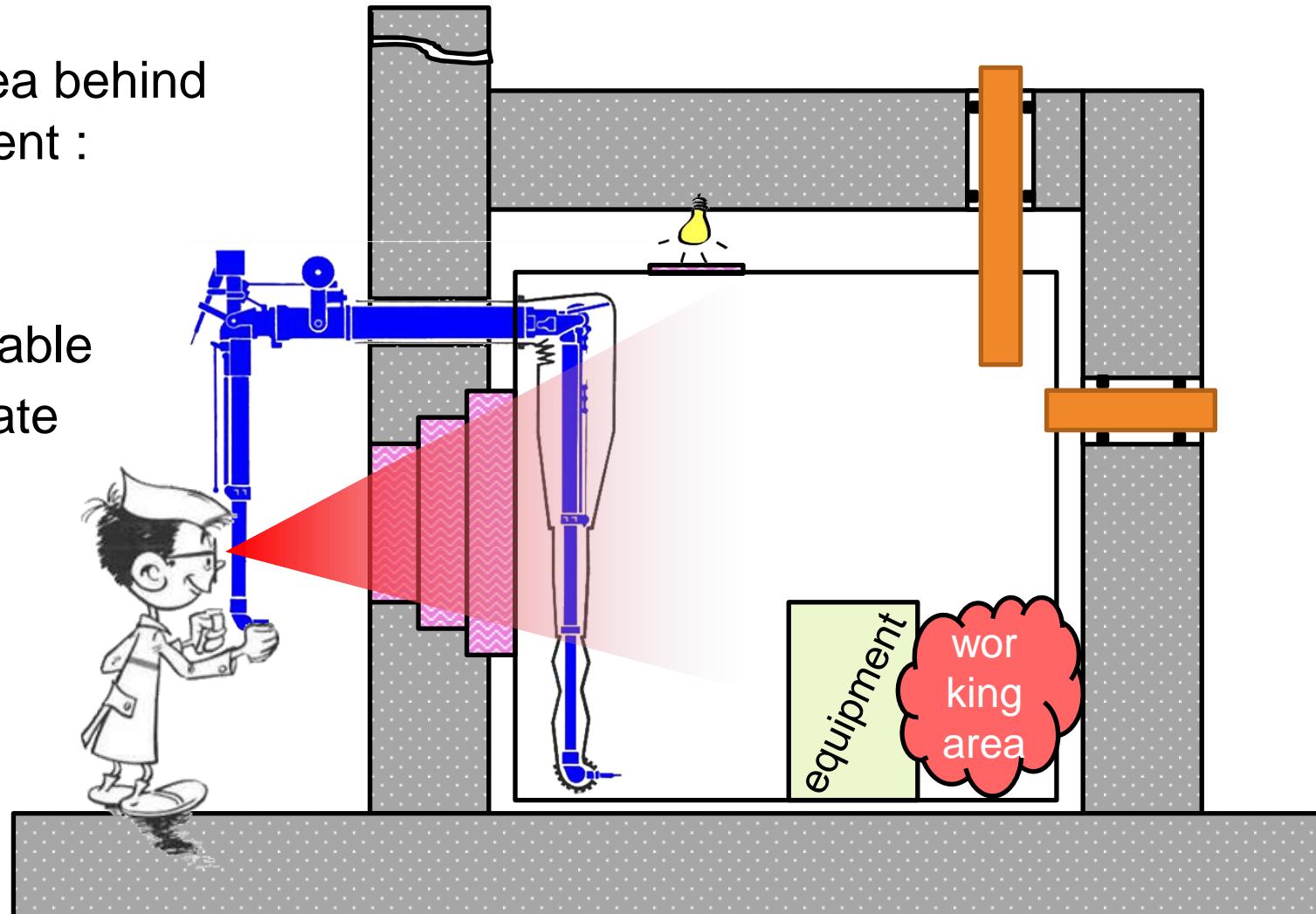
Working area in front  
of the equipment :

- « Easy »
- « Comfortable »



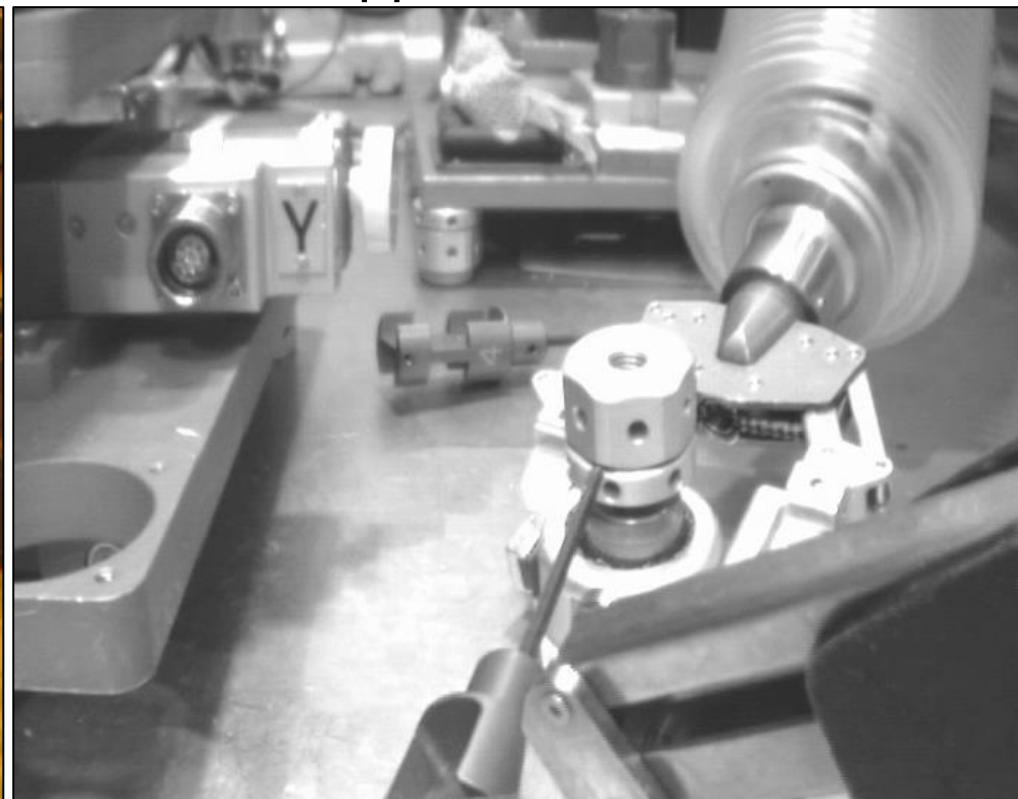
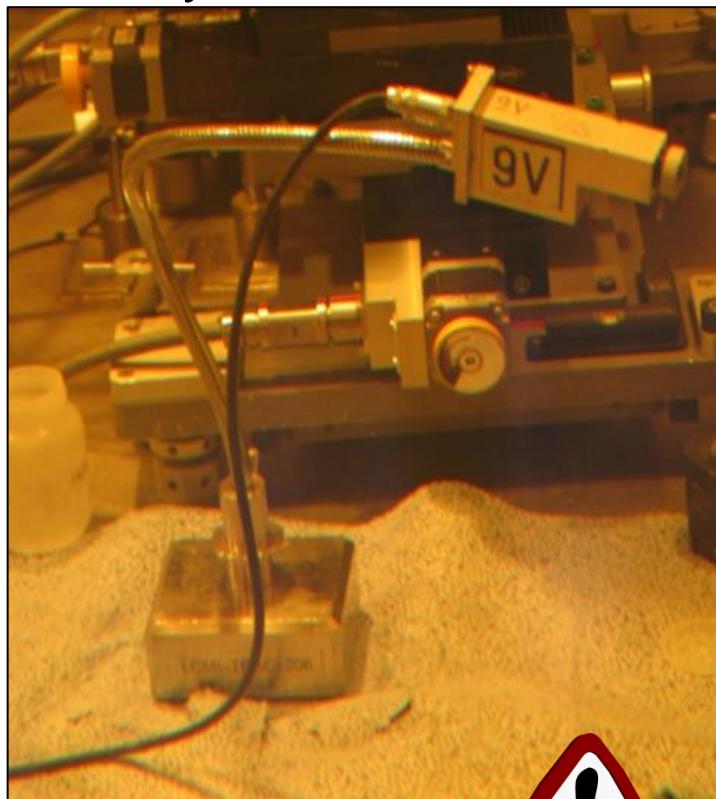
Working area behind  
the equipment :

- Harder
- Totally  
uncomfortable
- Not accurate



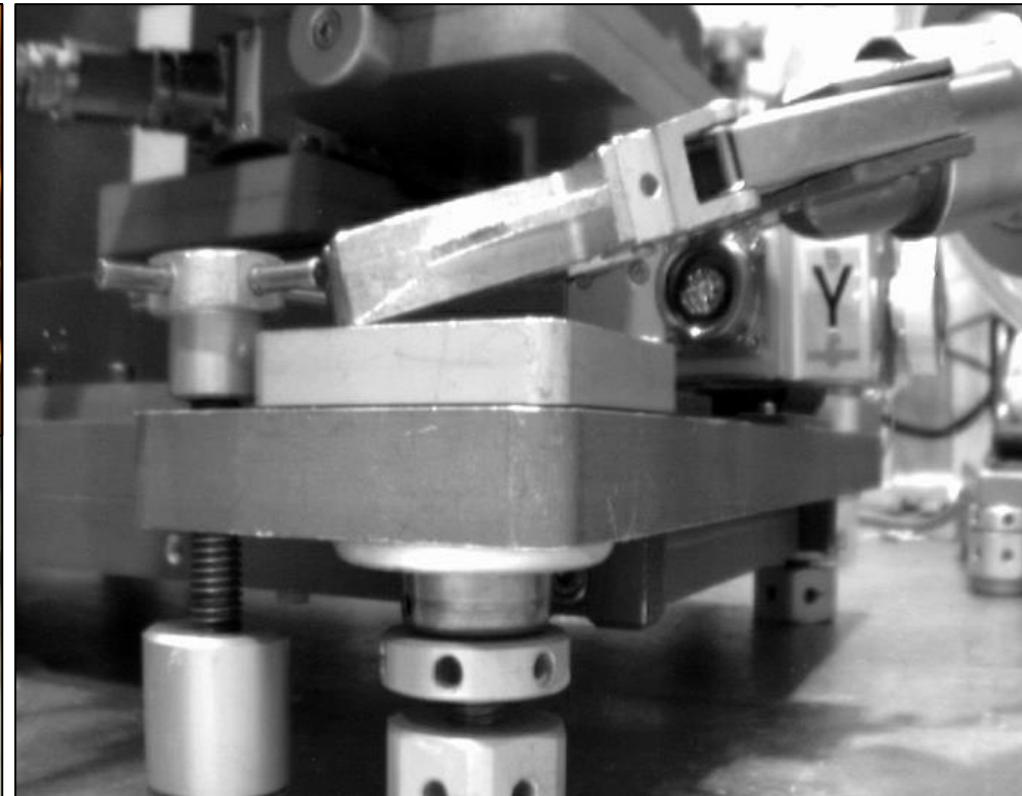
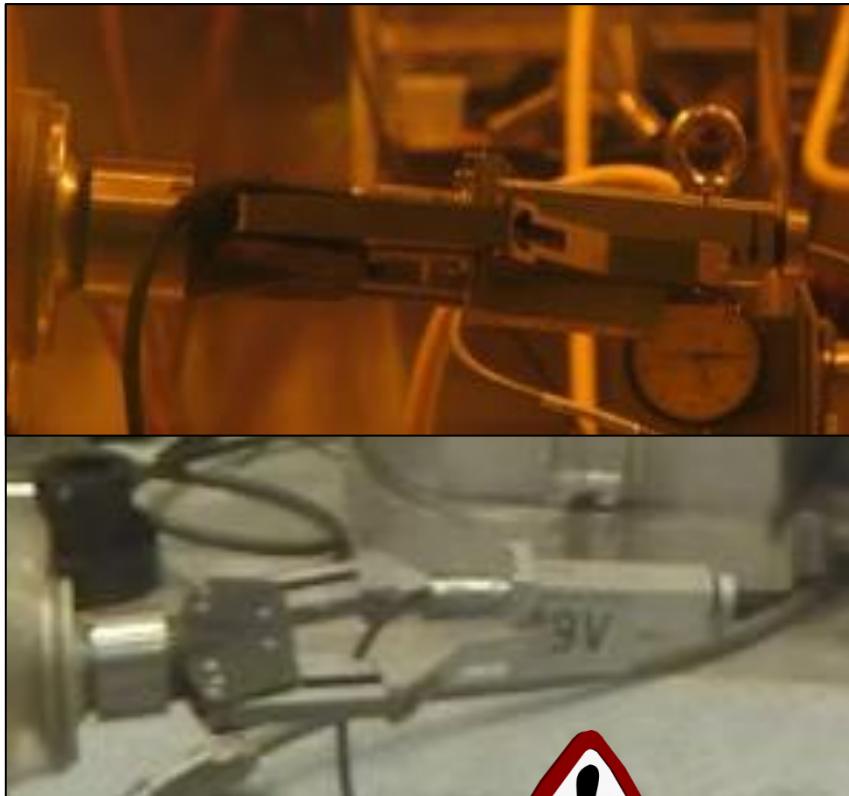
Mirror / Periscope / Inspection cameras / ...

Nuclearization of a « low cost consumable » camera at CEA Saclay and Marcoule → camera on a support



Visually limited area

Nuclearization of a « low cost consumable » camera at CEA Saclay and Marcoule → camera held by a gripper

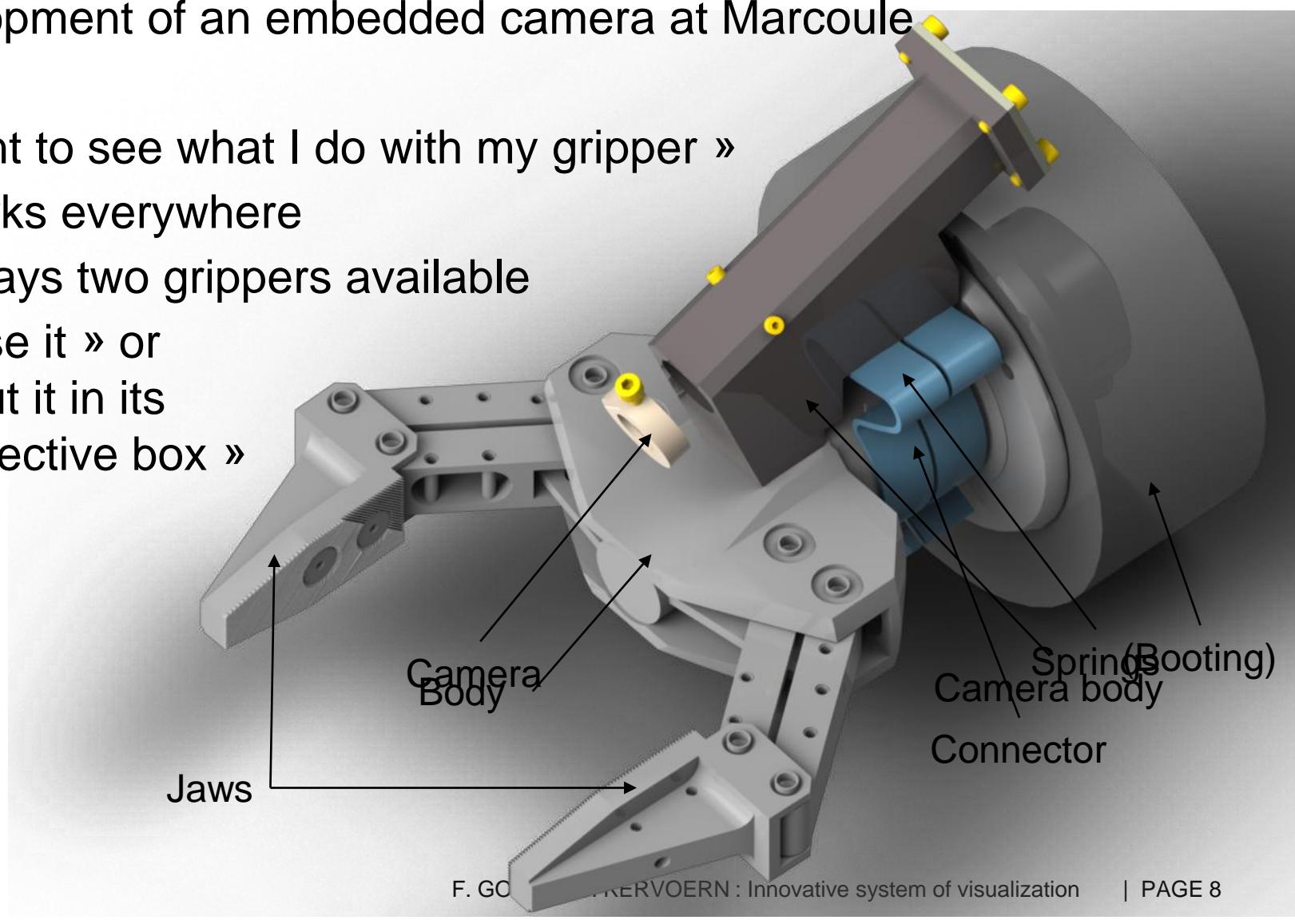


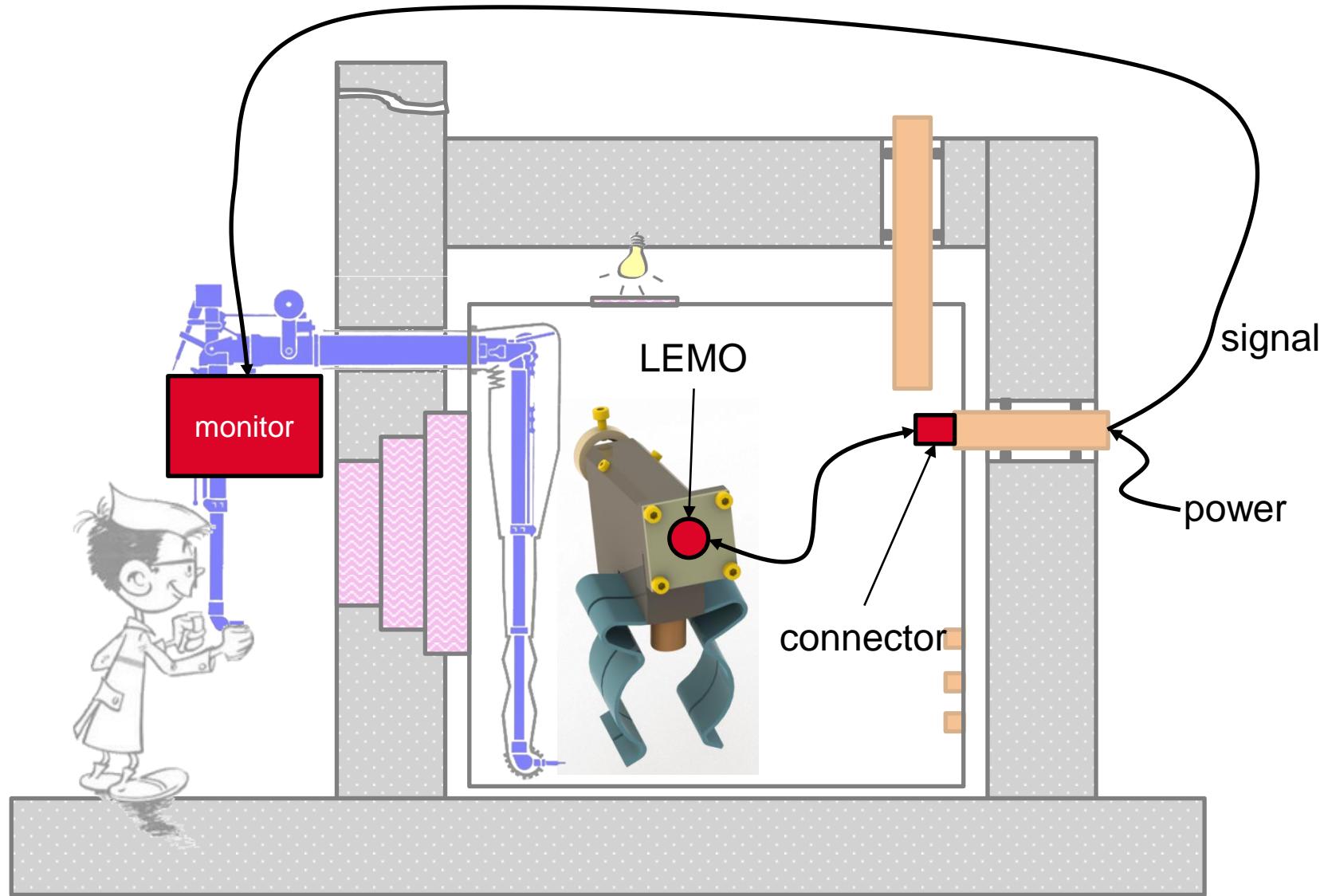
One dedicated manipulator

## Development of an embedded camera at Marcoule

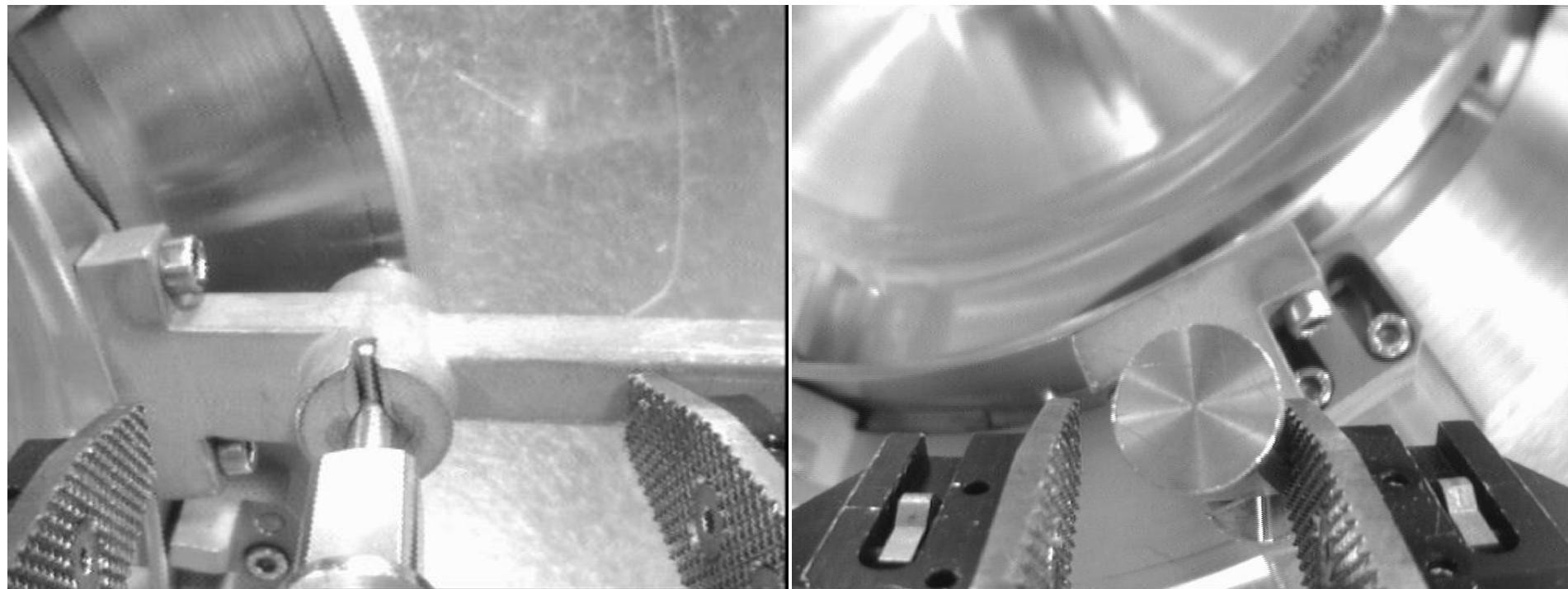
« I want to see what I do with my gripper »

- Works everywhere
- Always two grippers available
- « use it » or  
« put it in its protective box »





Machining & Tests on an inactive platform with the 1<sup>st</sup> prototype

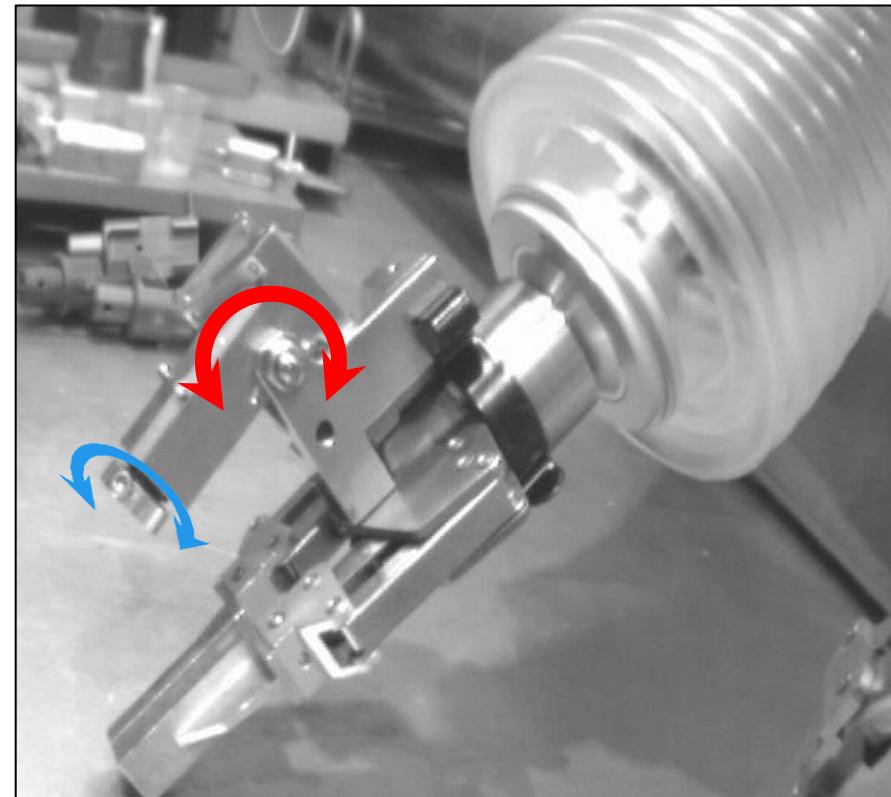


2<sup>nd</sup> prototype tested in hot cells

- Tuning      
- Tilt            

To optimize:

- Reduce size & weight
- Smoother shape





VIDEO

« Since the system has been installed on my manipulator, I leave the camera functioning, and no matter what operation I do, I systematically have a look on the monitor. I use it permanently... »

**Michel D. ATALANTE**

↳ Camera on hot cell for 15 months under  $\beta / \gamma$  flux

« »

**Lionel B. ATALANTE**

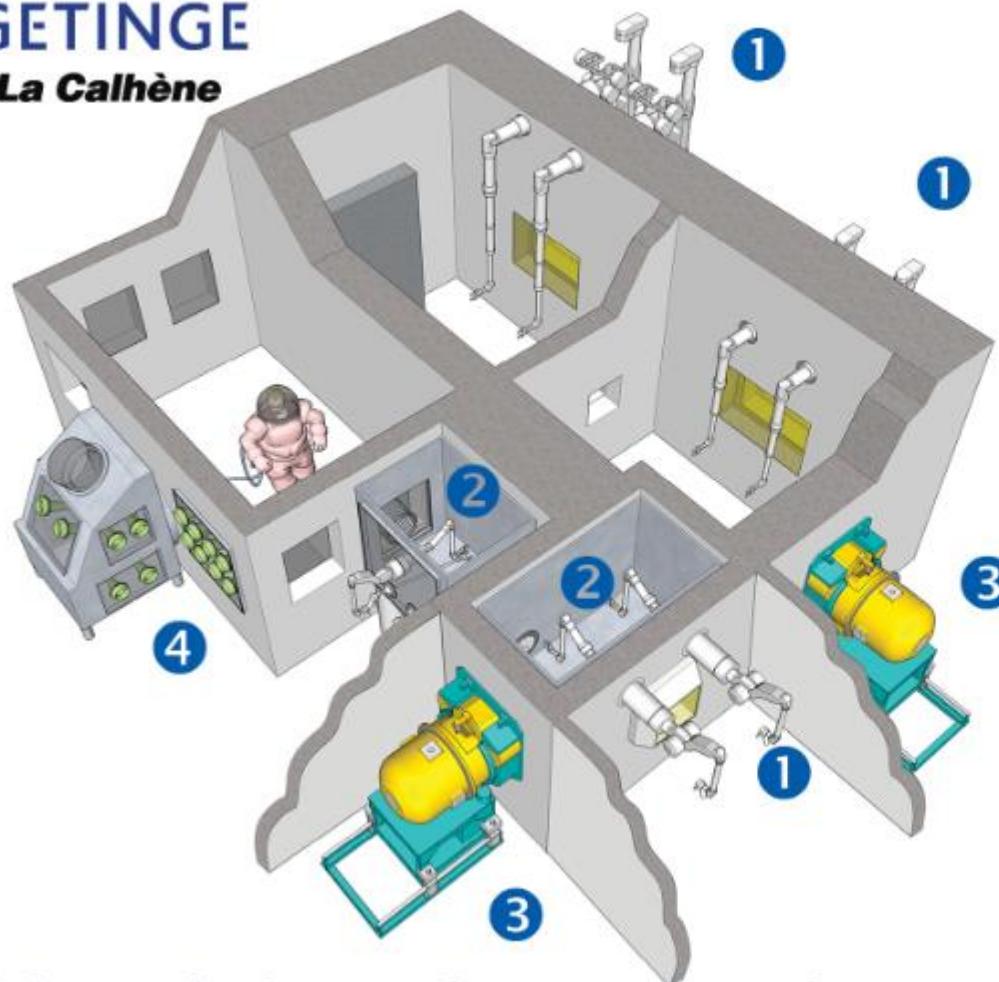
↳ Camera on hot cell for 10 months under high neutron flux





# INDUSTRIALIZATION AT GETINGE LA CALHENE (VENDÔME)

SAMUEL KERVOERN – SALES ENGINEER

**GETINGE**  
*La Calhène*

**SOLUTIONS DEDICATED TO NUCLEAR ENERGY**

- 1 MANIPULATORS**  
for remote handling ensure that staff operate in safe, ergonomic conditions.
- 2 TRANSFER systems**  
connection and secure transfer built with the famous patented DPTE ® design.
- 3 TRANSPORT solutions**  
shielded casks and protected docking for safe transportation of radioactive materials.
- 4 HANDLING systems**  
glove systems use ejectable rings for fast, safe glove changes without breaking containment.

**MT200 TAO**

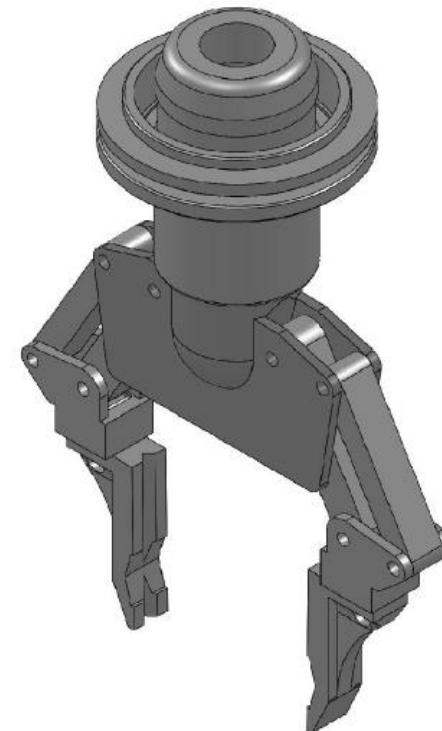
**GETINGE**  
GETINGE GROUP

This camera fits on all La Calhène M/S Manipulators equipped with PMC 97 and PEM 78 tongs.

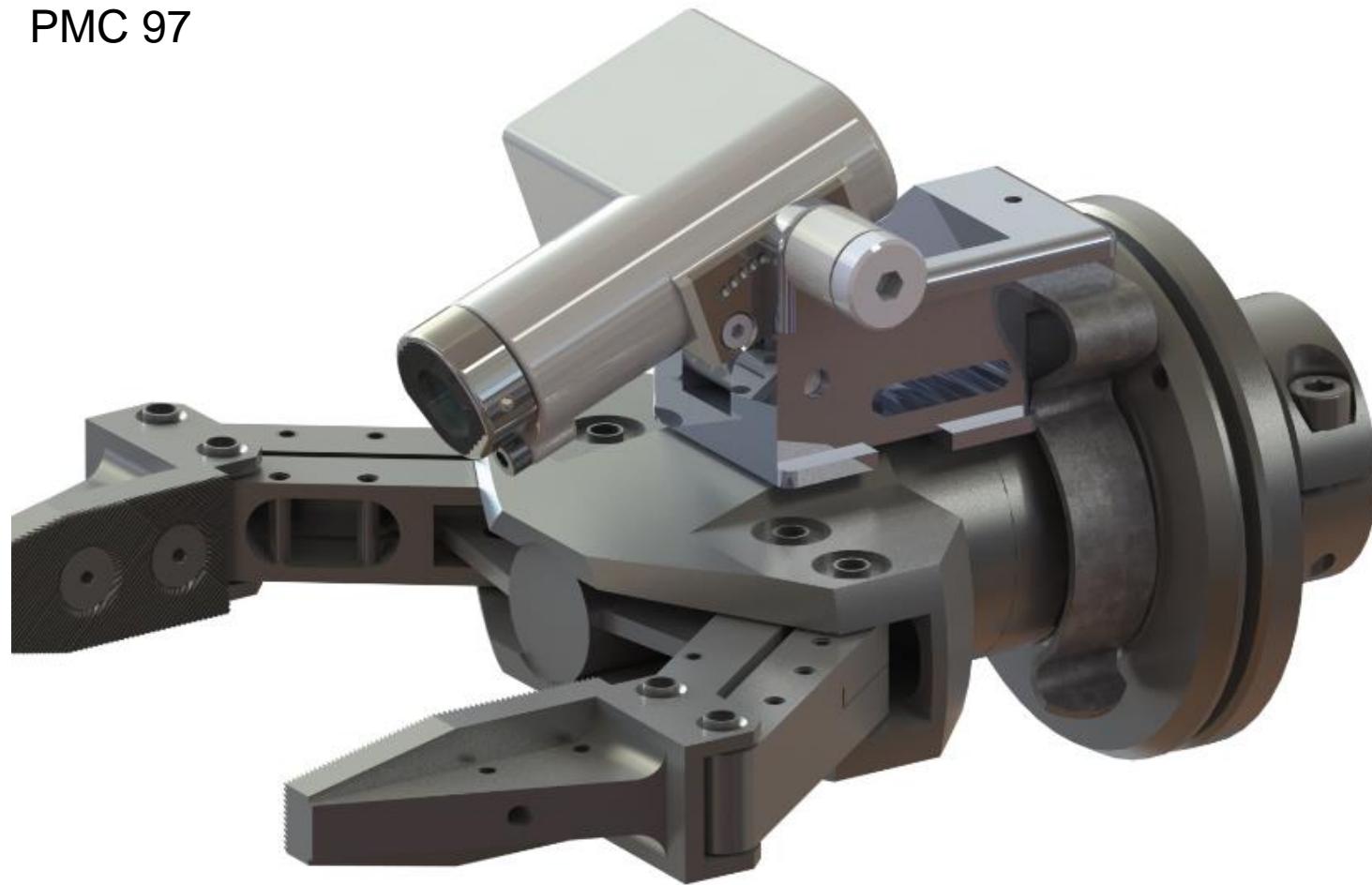
PMC 97



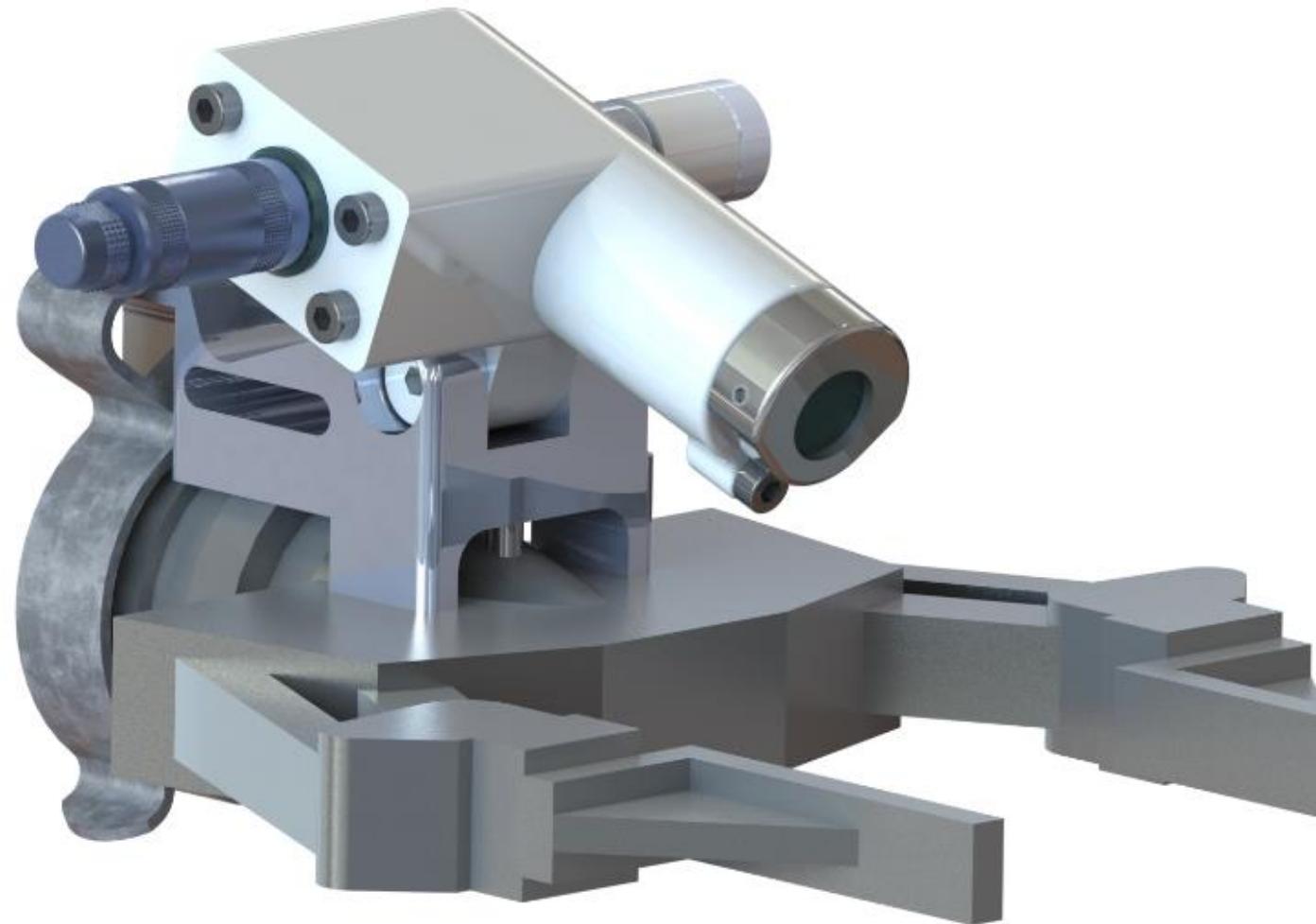
PEM 78



PMC 97

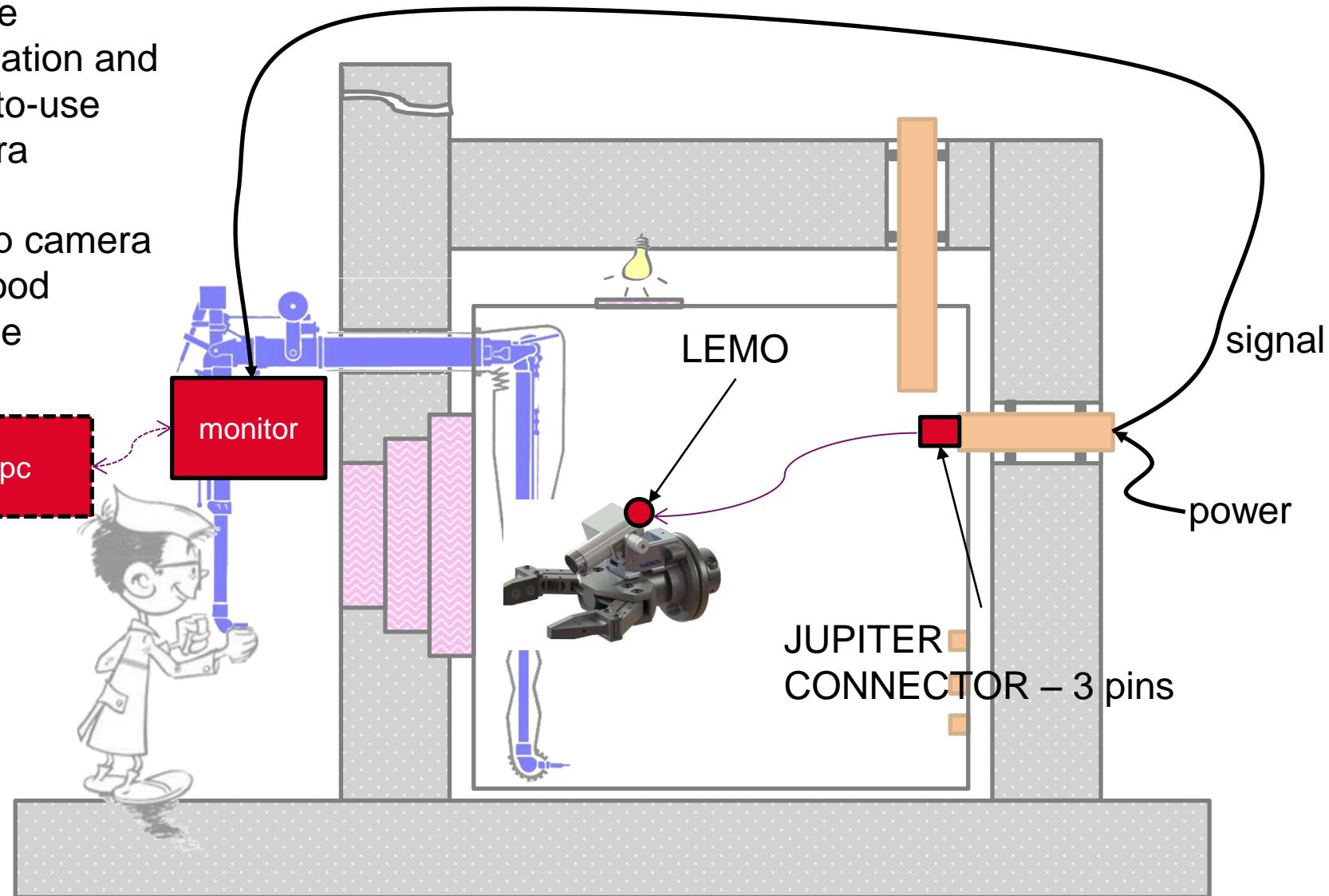


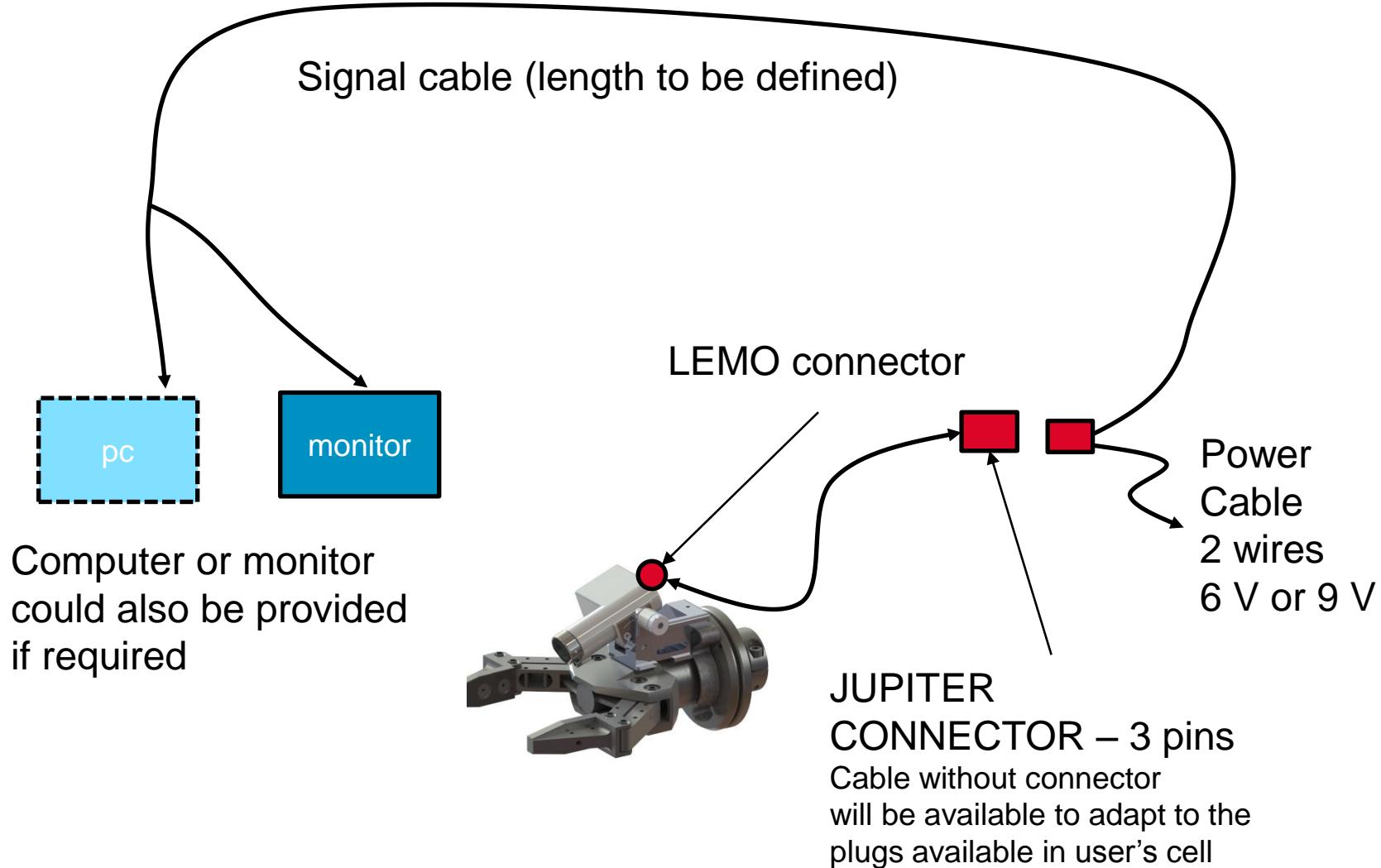
PEM 78



Simple  
Installation and  
easy-to-use  
camera

Cheap camera  
but good  
lifetime





# GETINGE *La Calhène* ROADMAP



Project CAMERA Week	2015												2016																								
	September				October				November				December				January			February			March			April											
	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Detailed design																																					
Prototype Manufacturing																																					
Industrialization and validation																																					
Sales																																					

Go to market  
↓

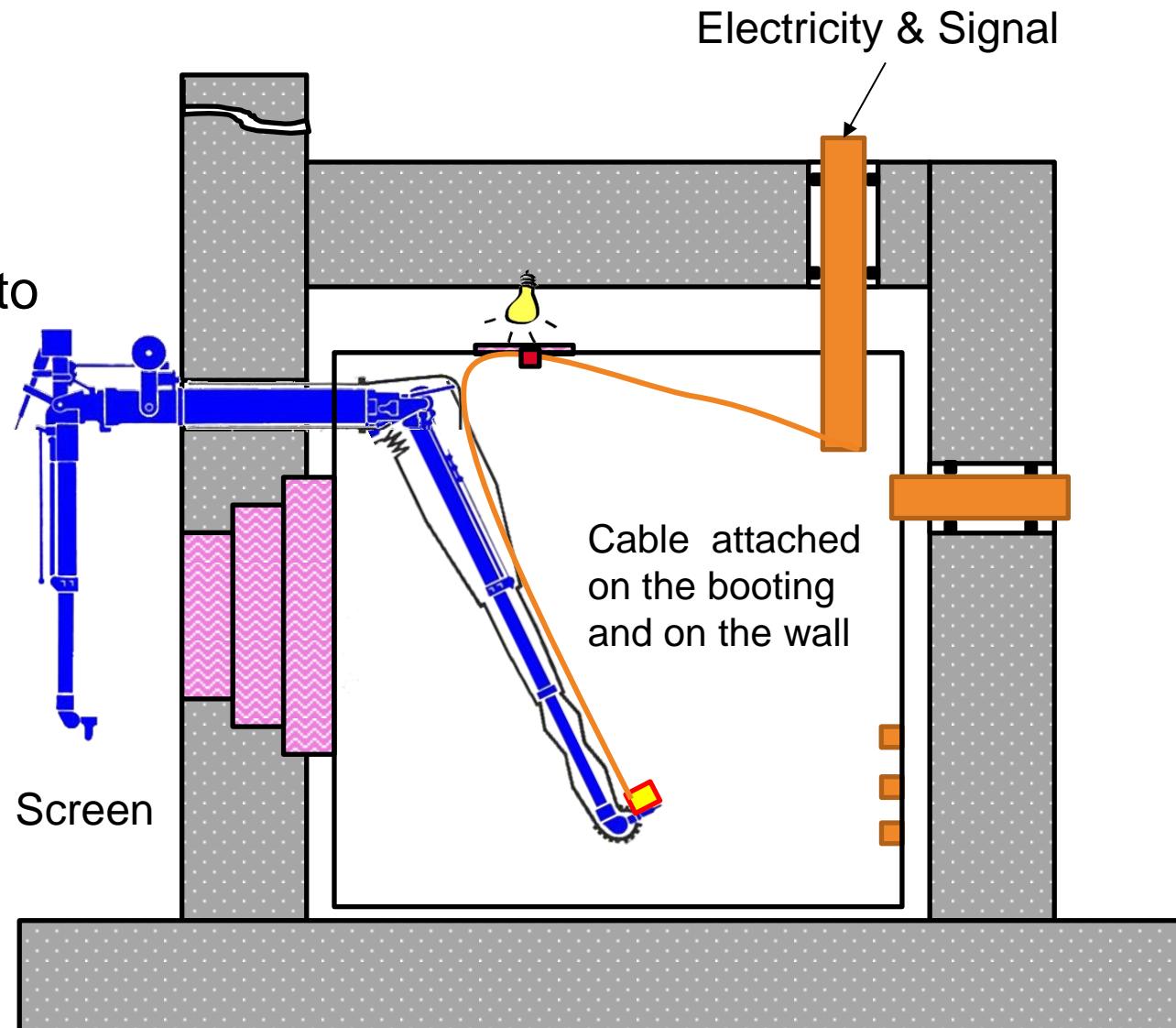
Installing this camera will bring many benefits to the user :



- ✓ Better view inside the hot cell - especially if the window is old
- ✓ Impossible operations can be made possible
- ✓ No hidden areas in the hot cell
- ✓ Enables the collection of « materials » (Safety, cleaning, dose reduction)
- ✓ Reduces operation time
- ✓ Improves the working conditions of operators
- ✓ Capacity to register operations for further check and investigation

Possibility to open  
this technology and to  
install on the tong :

- Light
- Little tool





VIDEO



## QUESTIONS ?

## THANK YOU FOR YOUR ATTENTION

For all contacts :

CEA Marcoule

François GOBIN  
+33 (0)4 66 79 18 92  
[francois.gobin@cea.fr](mailto:francois.gobin@cea.fr)

Getinge La Cahlène

Samuel KERVOERN (Sales Engineer)  
+33 (0)6 85 91 82 43  
[samuel.kervoern@getinge.com](mailto:samuel.kervoern@getinge.com)