INNOVATIVE SYSTEM OF VISUALIZATION IN HOT CELL

« my eyes on my hand »

a cooperation program between CEA and Getinge La Calhène

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DEVELOPMENT AT CEA (MARCOULE)

FRANÇOIS GOBIN
Work in hot cell:
- Restrictive
- Difficult
- Longer
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 »
HOW TO CONNECT IT?

- Monitor
- LEMO
- Connector
- Power
- Signal
Machining & Tests on an inactive platform with the 1st prototype
2\textsuperscript{nd} 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

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

«  »

Lionel B. ATALANTE

氪 Camera on hot cell for 10 months under high neutron flux
INDUSTRIALIZATION AT GETINGE LA CALHENE (VENDÔME)

SAMUEL KERVOERN – SALES ENGINEER
1. **Manipulators**
   - For remote handling ensuring 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.

**Solutions dedicated to nuclear energy**
This camera fits on all La Calhène M/S Manipulators equipped with PMC 97 and PEM 78 tongs.

PMC 97

PEM 78
PEM 78
HOW TO CONNECT IT?

Simple Installation and easy-to-use camera

Cheap camera but good lifetime

pc

monitor

LEMO

JUPITER CONNECTOR – 3 pins

signal

power

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HOW TO CONNECT IT?

Signal cable (length to be defined)

pc

monitor

LEMO connector

Power Cable
2 wires
6 V or 9 V

Computer or monitor could also be provided if required

JUPITER CONNECTOR – 3 pins
Cable without connector will be available to adapt to the plugs available in user’s cell

pc

monitor

LEMO connector

Power Cable
2 wires
6 V or 9 V

Computer or monitor could also be provided if required

JUPITER CONNECTOR – 3 pins
Cable without connector will be available to adapt to the plugs available in user’s cell

F. GOBIN & S. KERVOERN : Innovative system of visualization   |   PAGE 21
## ROADMAP

<table>
<thead>
<tr>
<th>Project CAMERA</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>September</td>
<td>October</td>
</tr>
<tr>
<td></td>
<td>Week 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</td>
</tr>
<tr>
<td>Detailed design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prototype Manufacturing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrialization and validation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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
QUESTIONS ?

THANK YOU FOR YOUR ATTENTION

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