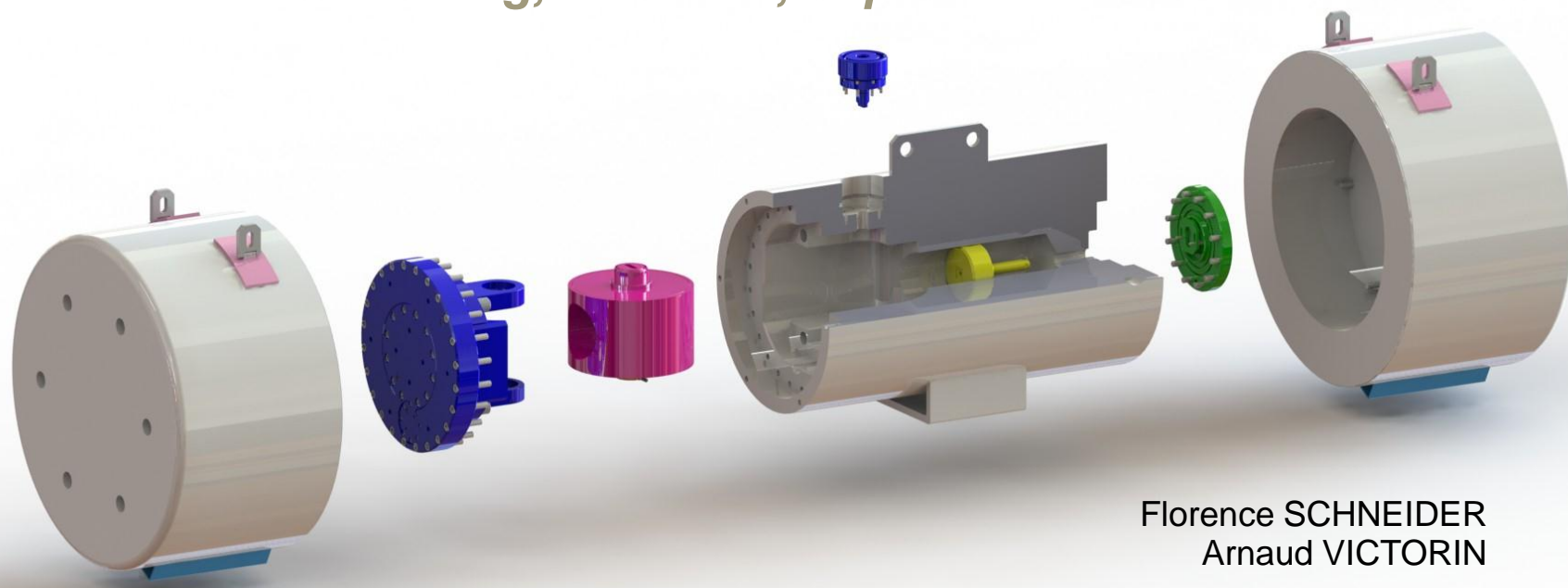


# ***Flying Pig Project Presentation***



*HOTLAB meeting, Marcoule, September 26th 2012*



Florence SCHNEIDER  
Arnaud VICTORIN



# Agenda

## **1. Introduction**

**1. Presentation of TNI**

**2. Initiators and Main Steps of the Project**

## **2. Main technical aspects**

**1. Objectives**

**2. Design**

**3. Content Definition**

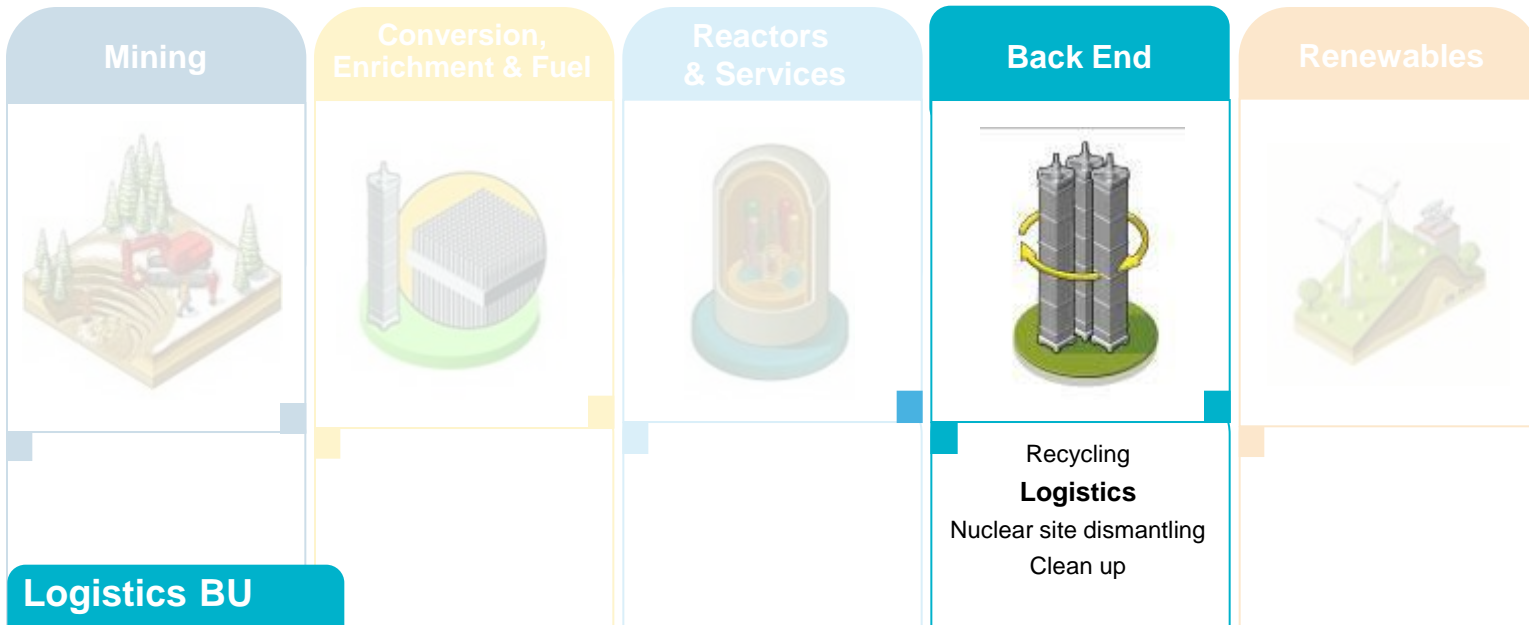
**4. Operability**

## **3. Modalities and Future Milestones**



# Presentation of TN International

## ► Our Position within AREVA



### Logistics BU

A global offer which includes:

- ◆ Design and manufacturing of casks for the transportation and storage of radioactive materials
- ◆ Provide logistics services and shipments under the best safety and security conditions



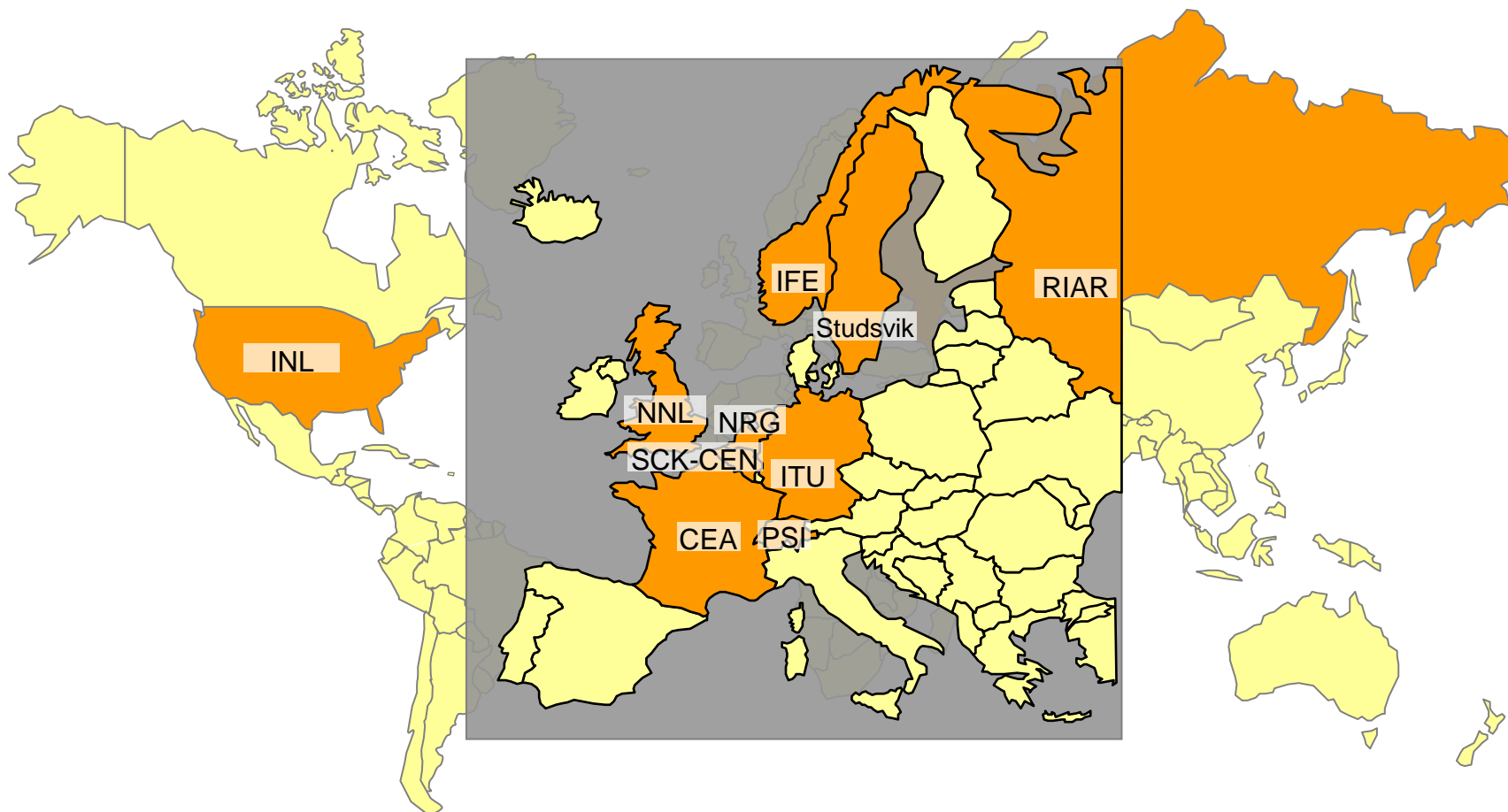
**50 years of know-how  
to our customers' advantage**

**Turnover = 370 Meur**

**Staff = 1270**



# Initiation of the Project – Participating Hotlabs



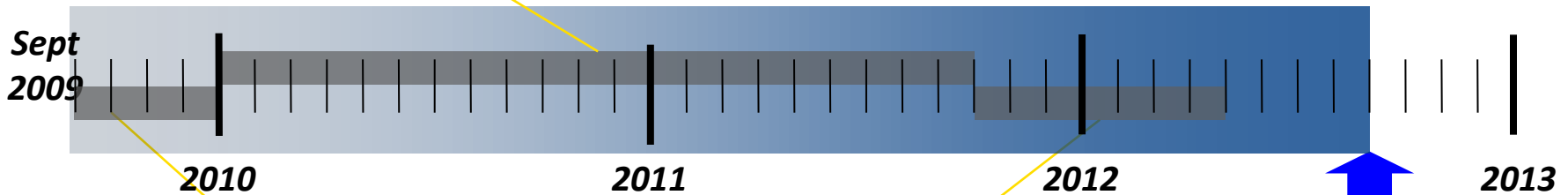


# Milestones Timeline

## ► Main Steps of the Flying Pig Project

Benchmark of existing casks and study for shielding calculations

- Determine the mass of transportable irradiated material
- Reach a compromise for shielding analysis (between main dimensions and transportable material masses)



Creation of a specific Hotlab Working Group for cost effective solution to transport small quantities of irradiated material

TNI is selected for the collaboration with Hotlab (after answering to the call for Proposal )

Hotlab Conference 2012

26 Sept 2012

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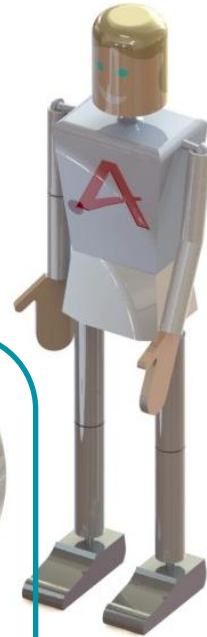
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# Agenda

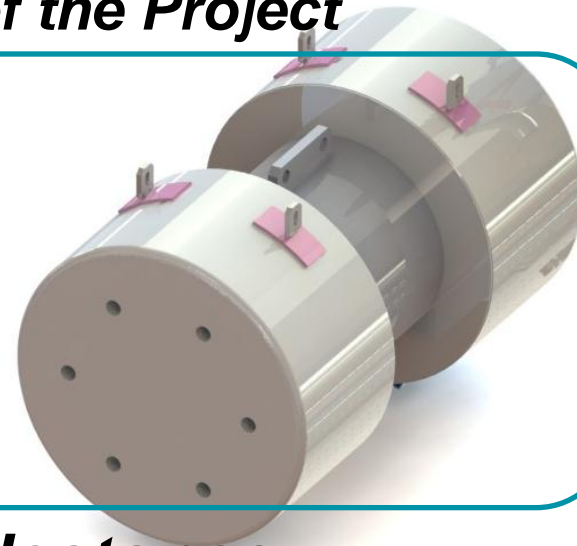


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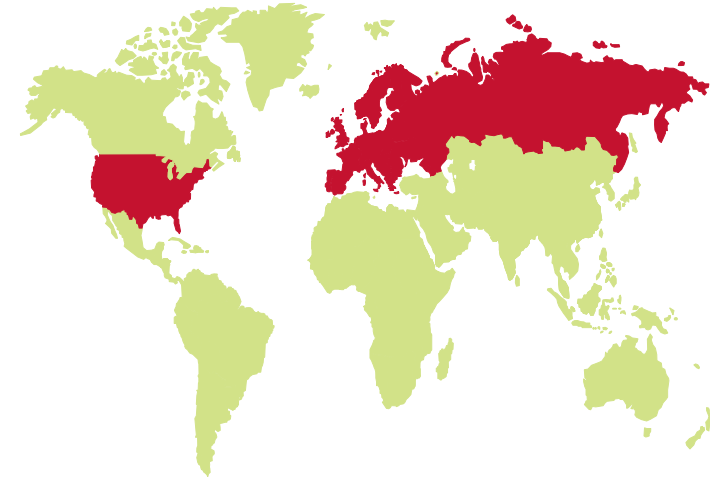


## 3. Modalities and Future Milestones



# Main Technical Aspects

A specific solution for international transportation of small quantities of irradiated research material



## ► Principal characteristics of the cask

- ◆ **Content** Various **irradiated** materials
- ◆ **Transportation mode** All (including **air** transport)
- ◆ **Region of activity** ADR signatory countries and USA (DOT)
- ◆ **Fissile quantity** Below the 15 g fissile content limit
- ◆ **Operability** Horizontal or vertical dry (un)loading
- ◆ **License** French certificate with DOT validation



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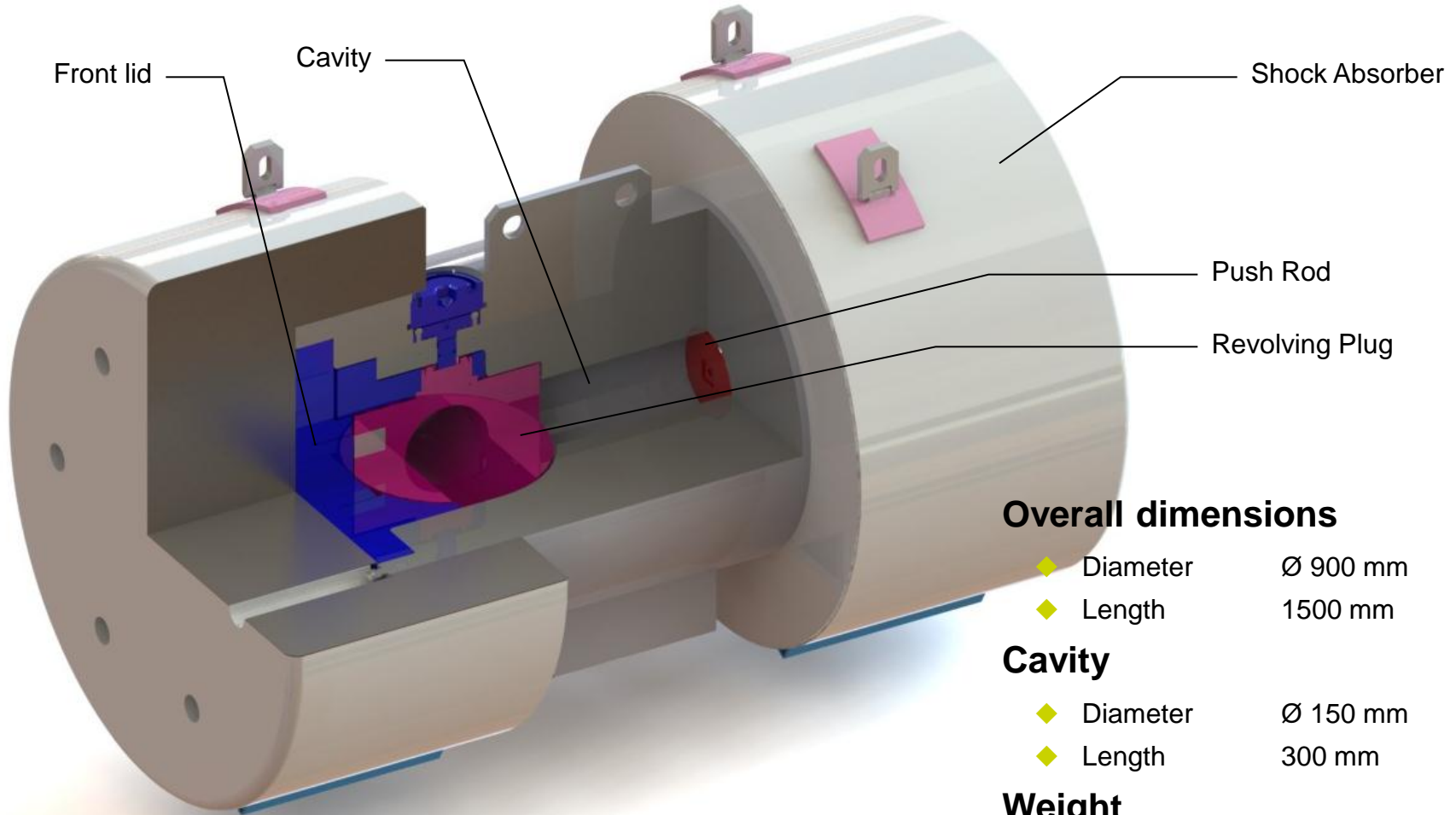
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# Main Technical Aspects



## Overall dimensions

- ◆ Diameter       $\varnothing$  900 mm
- ◆ Length        1500 mm

## Cavity

- ◆ Diameter       $\varnothing$  150 mm
- ◆ Length        300 mm

## Weight

- ◆  $\approx$ 2,5 T (for 220 mm of steel shielding)





# Main Technical Aspects

## ► Maximizing transportable content

- ◆ Safety studies will be based on
  - Impact of each isotopes on safety fields
    - Containment
    - Dose rate
    - Criticality...

| Isotope           | Maximal Activity (Bq) | Thermal limit (g) |
|-------------------|-----------------------|-------------------|
| $^3\text{H}$      | $3,5 \cdot 10^{16}$   | 150               |
| $^{10}\text{Be}$  | $8 \cdot 10^{10}$     | 560               |
|                   |                       |                   |
|                   |                       |                   |
|                   |                       |                   |
| $^{246}\text{Cm}$ | $1,1 \cdot 10^{12}$   | 5000              |
| $^{247}\text{Cm}$ | $3,5 \cdot 10^{10}$   | 7800              |
| $^{248}\text{Cm}$ | $1,5 \cdot 10^{10}$   | 6500              |

example of criteria for the table of isotopes

## ► Table of isotopes

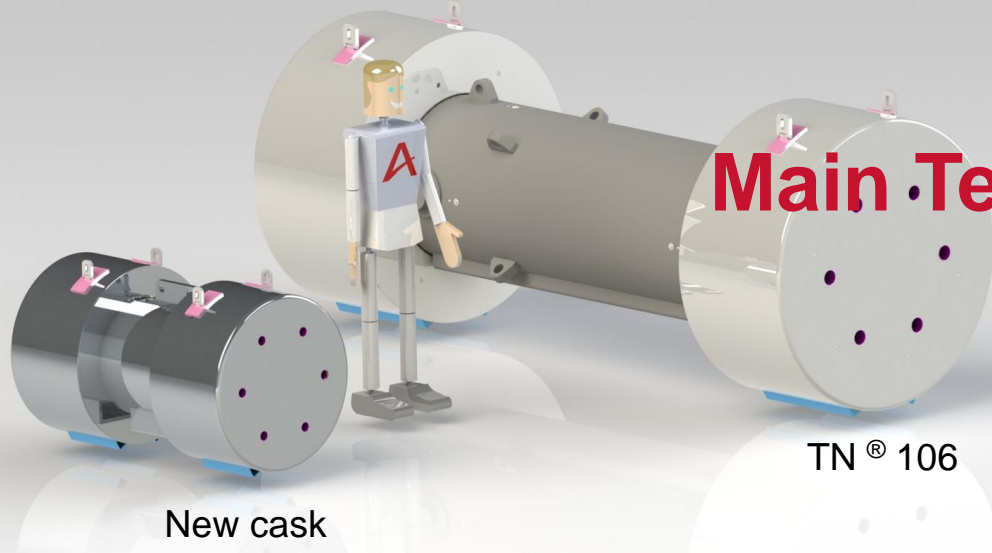
- ◆ **Main objective** : Open content definition

«Only elements critical to the safety will be present in the approval certificate »

« Content definition as simple as possible in order to accept various types of material »

## ► We take the most out of the cask's possibilities

# Main Technical Aspects

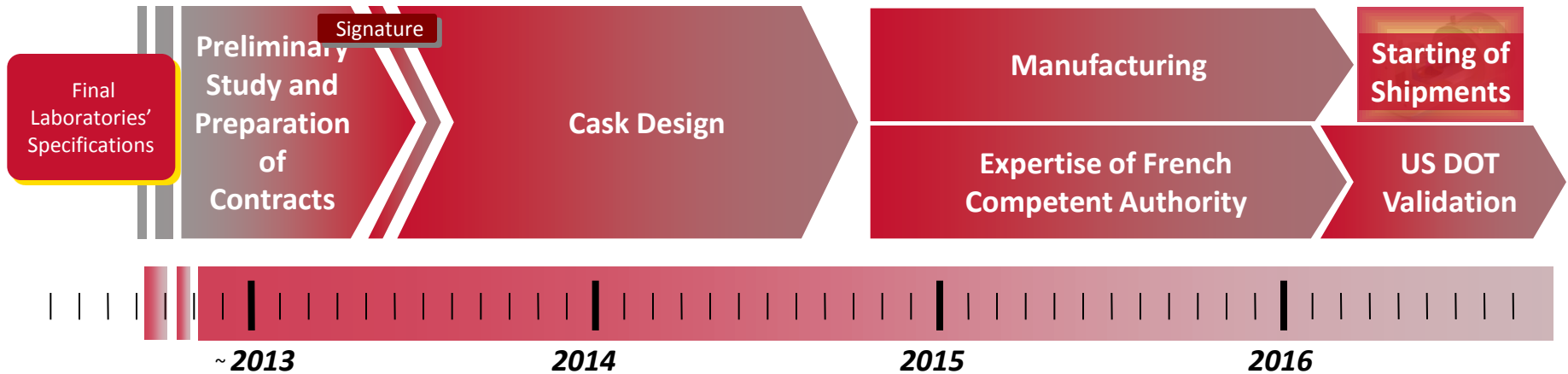


## ► Benefit of an existing cask design

- ◆ Flying Pig will be based on **TN<sup>®</sup>106 design**
  - French Competent Authority (FCA) : Certificate of TN<sup>®</sup>106 is issued by FCA
  - United States Competent Authority : TN<sup>®</sup>106 have DOT validation in US
- ◆ TN<sup>®</sup>106 is known from **Hot labs users**
  - The best way to guarantee a good operability
  - TN<sup>®</sup>106 casks have already completed more than 200 shipments since 2001



# Future Milestones





# Conclusion

## ► Major Advantages of the Flying Pig Project

- ✓ Shared effort and cooperation between hot laboratories to find the best solution
- ✓ Flexible and inexpensive transport cask for small quantities of irradiated materials
- ✓ Light weight and transportable by air
- ✓ Open content definition – flexible choice of content and easy to use
- ✓ Horizontal and vertical loading/unloading with revolving plug – operability guaranteed with use of proven concept
- ✓ Certificate from French Competent Authority and US DOT validation planned



**Thank you for your attention**

**We are available to answer your questions**

**Waiting for the final step  
Let the pig(s) fly !**

