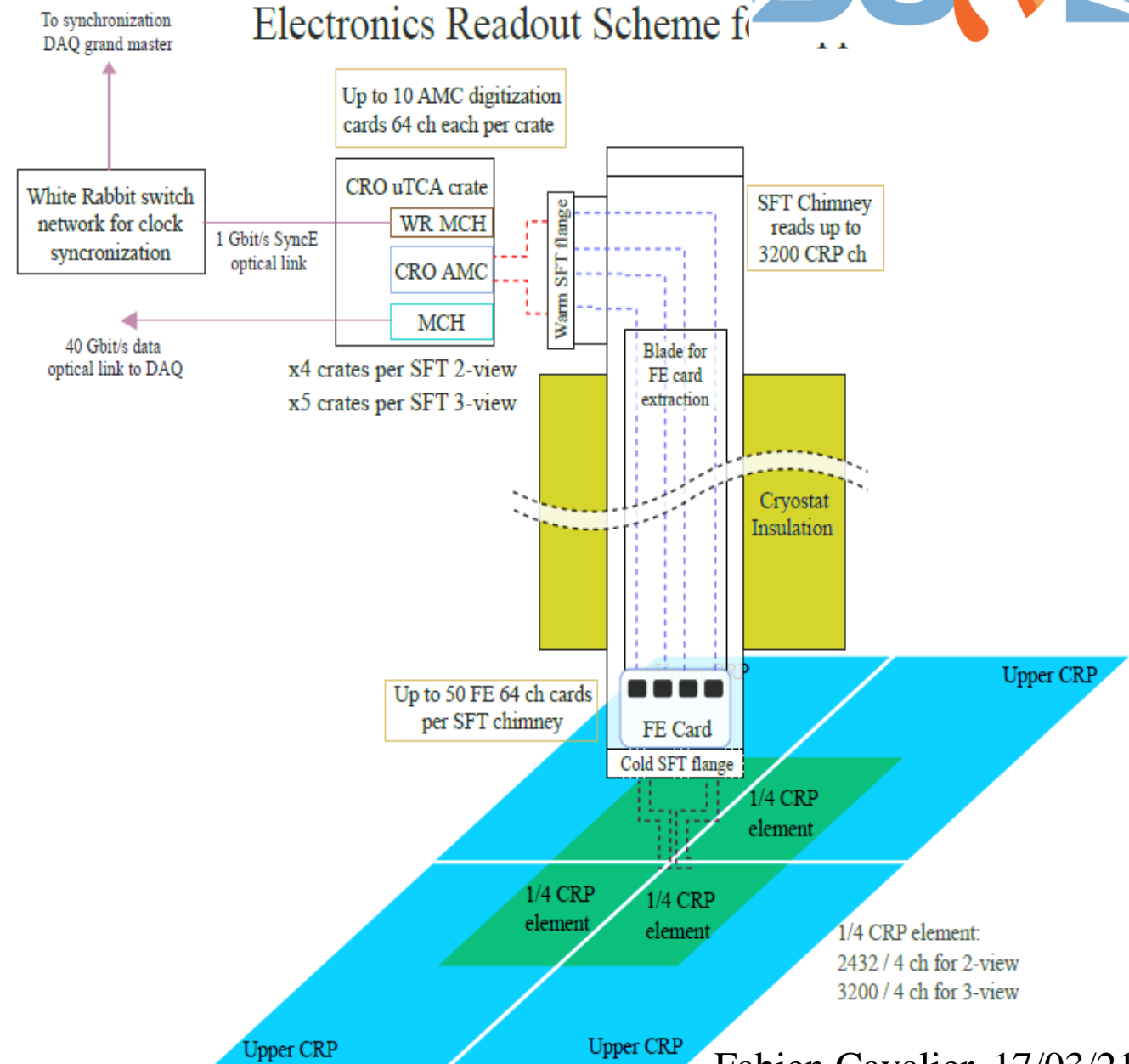
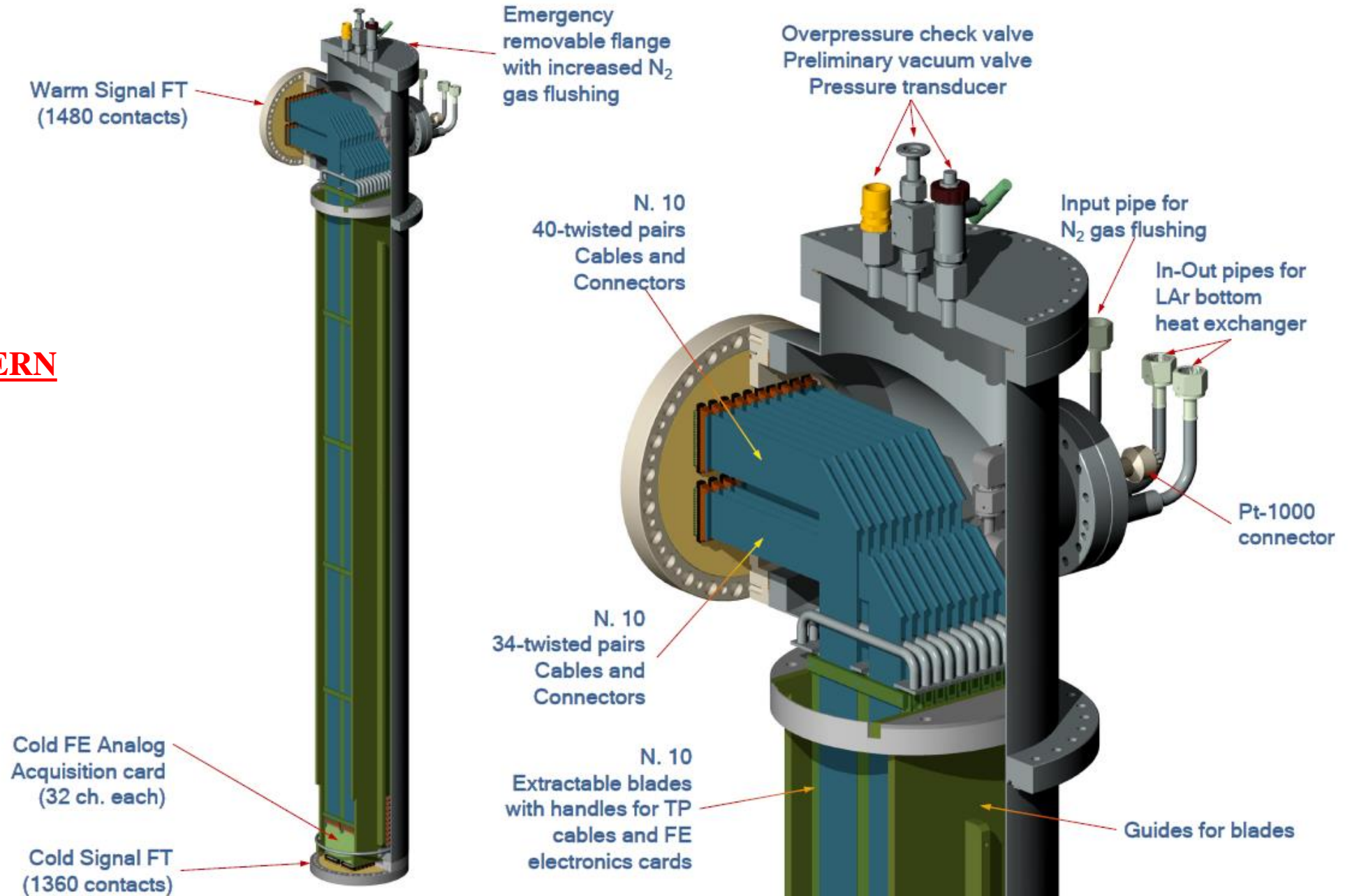


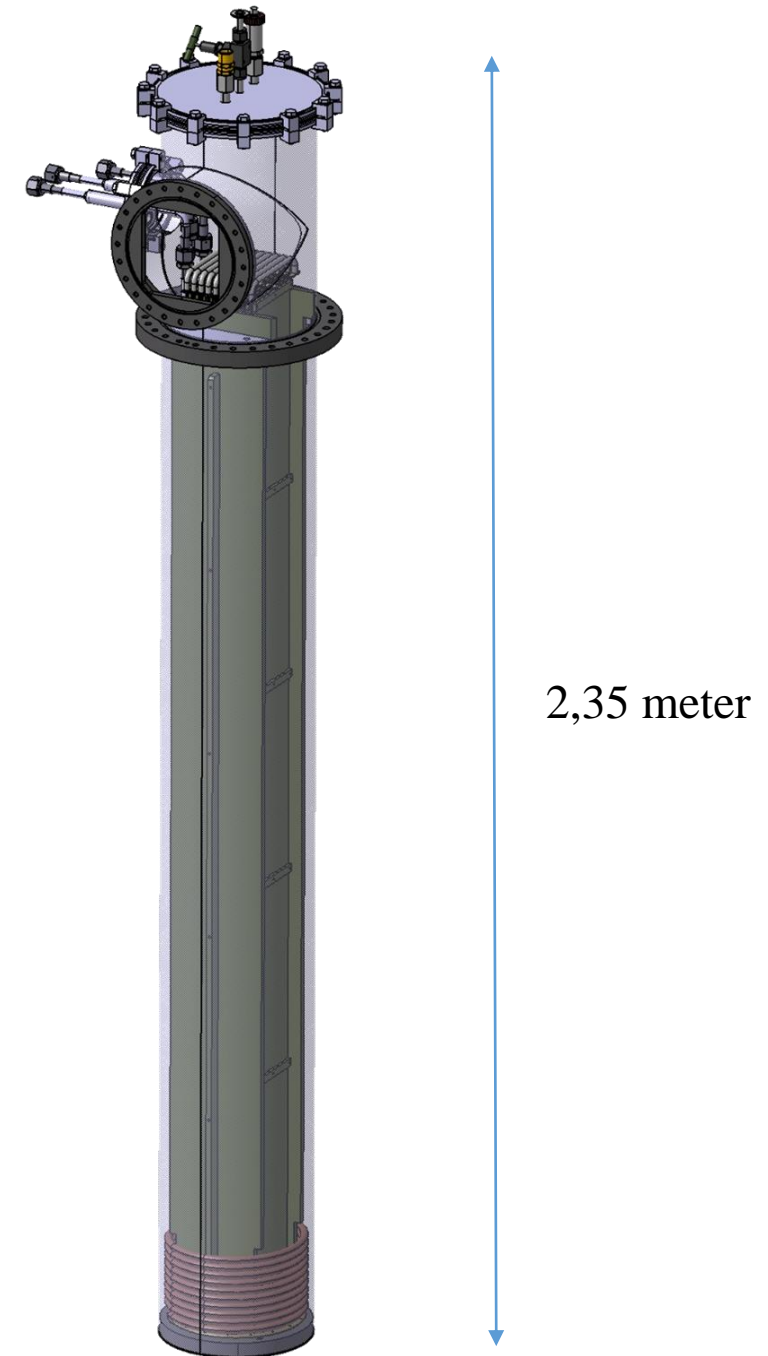
- Allows an **access** to **Front-End electronics** at any time
- Insures the **transition** between **cold** and **warm** parts
- Houses a thermal exchanger to **limit** the **heat injection** in the cryostat and to insure an **optimal running** of FE boards
- Is an isolated and independent volume filled with nitrogen at atmospheric pressure
- Houses **50 FE boards** (3200 channels)
- **105 chimneys** to be produced



Initial Design by CERN



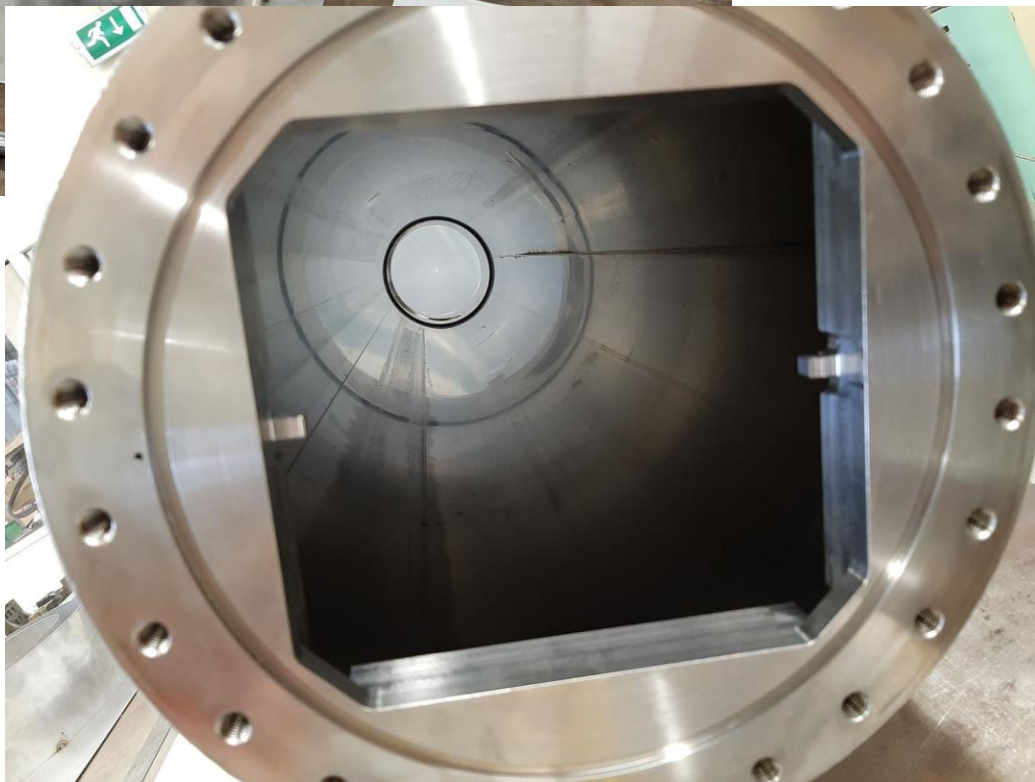
- For DP, need for 240 chimneys
=> **reduction of cost production mandatory**
 - Work lead by Rodolphe Marie at IJCLab in connection with Dario and Franco Sergiampietri
- ⇒ Move to CF flanges to LF ones
- ⇒ Modification of guiding system => **reduction of the numbers of components and weldings**
- ⇒ Design with **simplified machining**
- ⇒ Cost of **prototype ~12 k€**: probably ½ of this amount for a mass production





Chimney at workshop

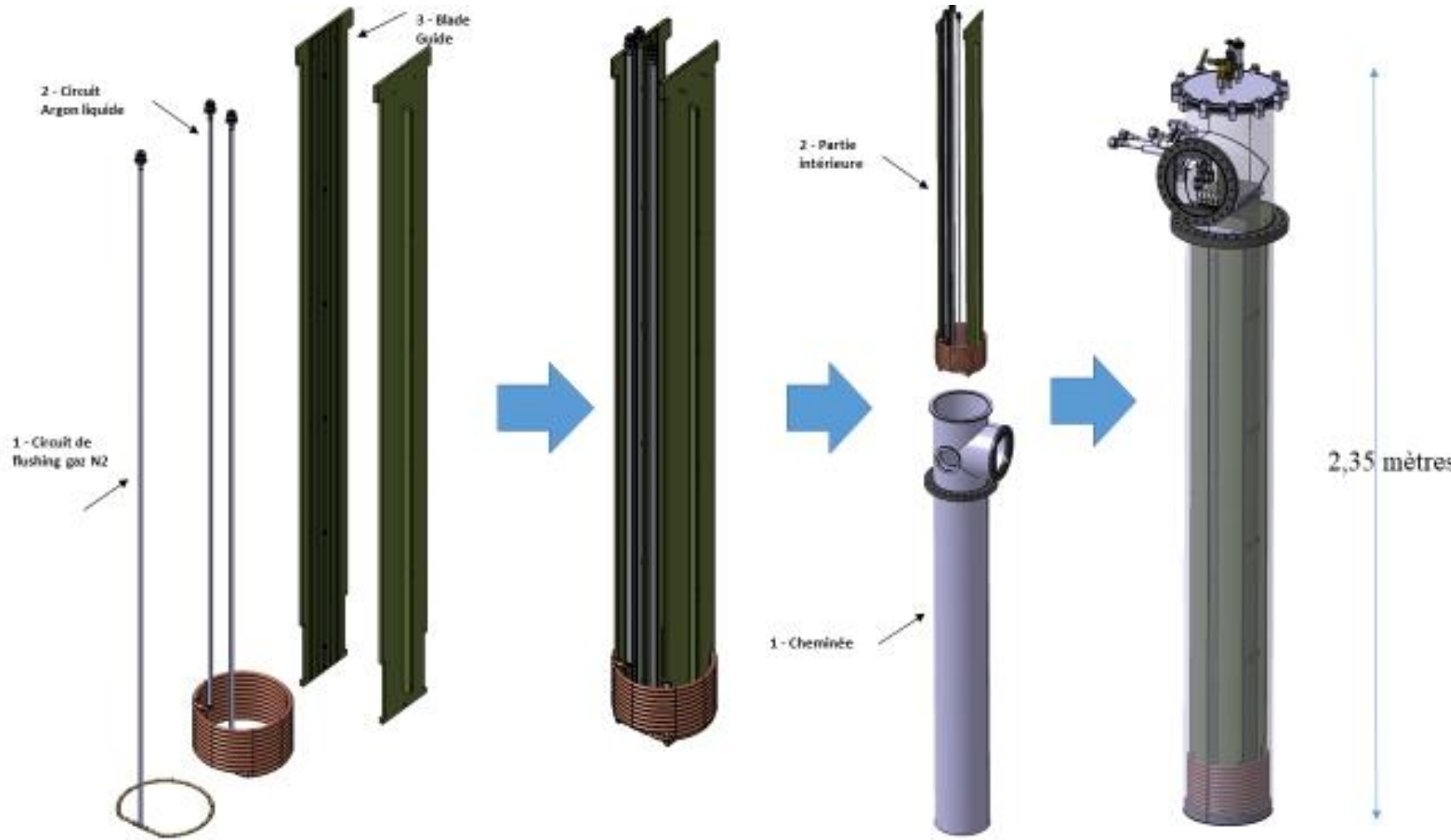
Cold Flange Side



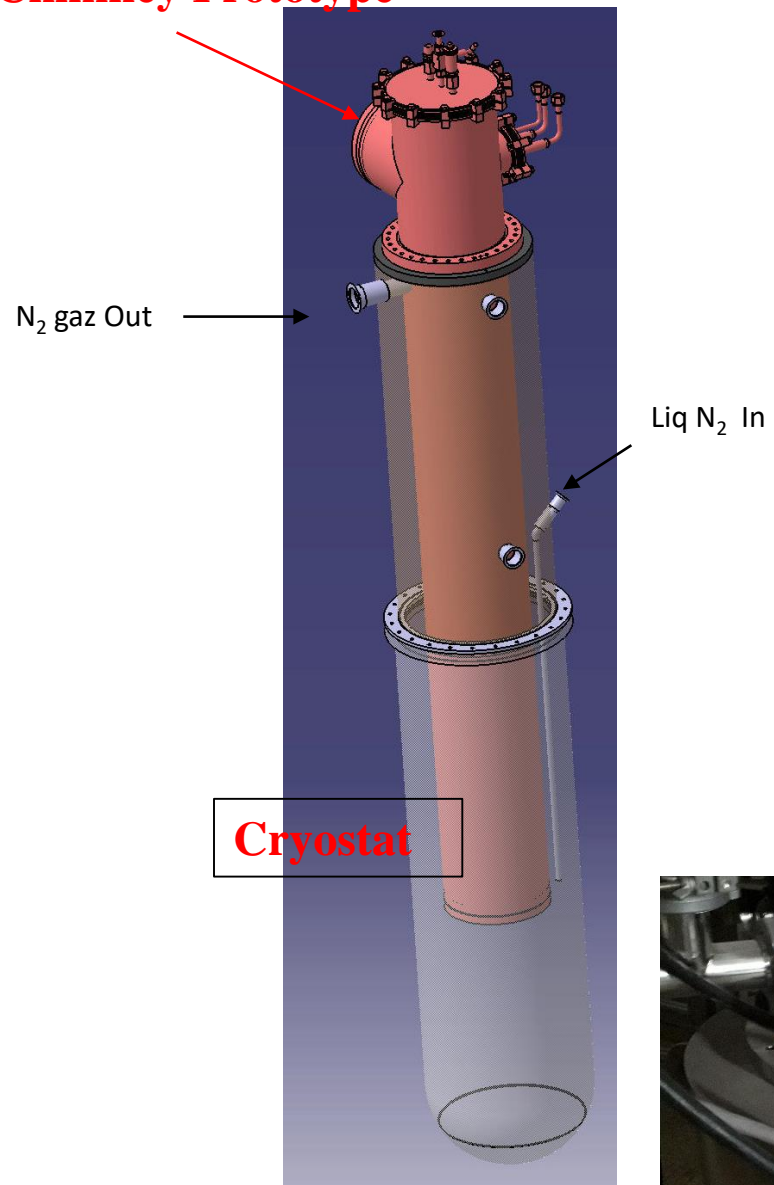
Warm Flange Side

Chimney Prototype

- Partially produced in the industry
- Finalized at IJCLab workshop
- Tests in **March 2021** in a **cryostat** with Liquid Nitrogen using **Accelerator Pole facilities and support**



Chimney Prototype



Cryostat

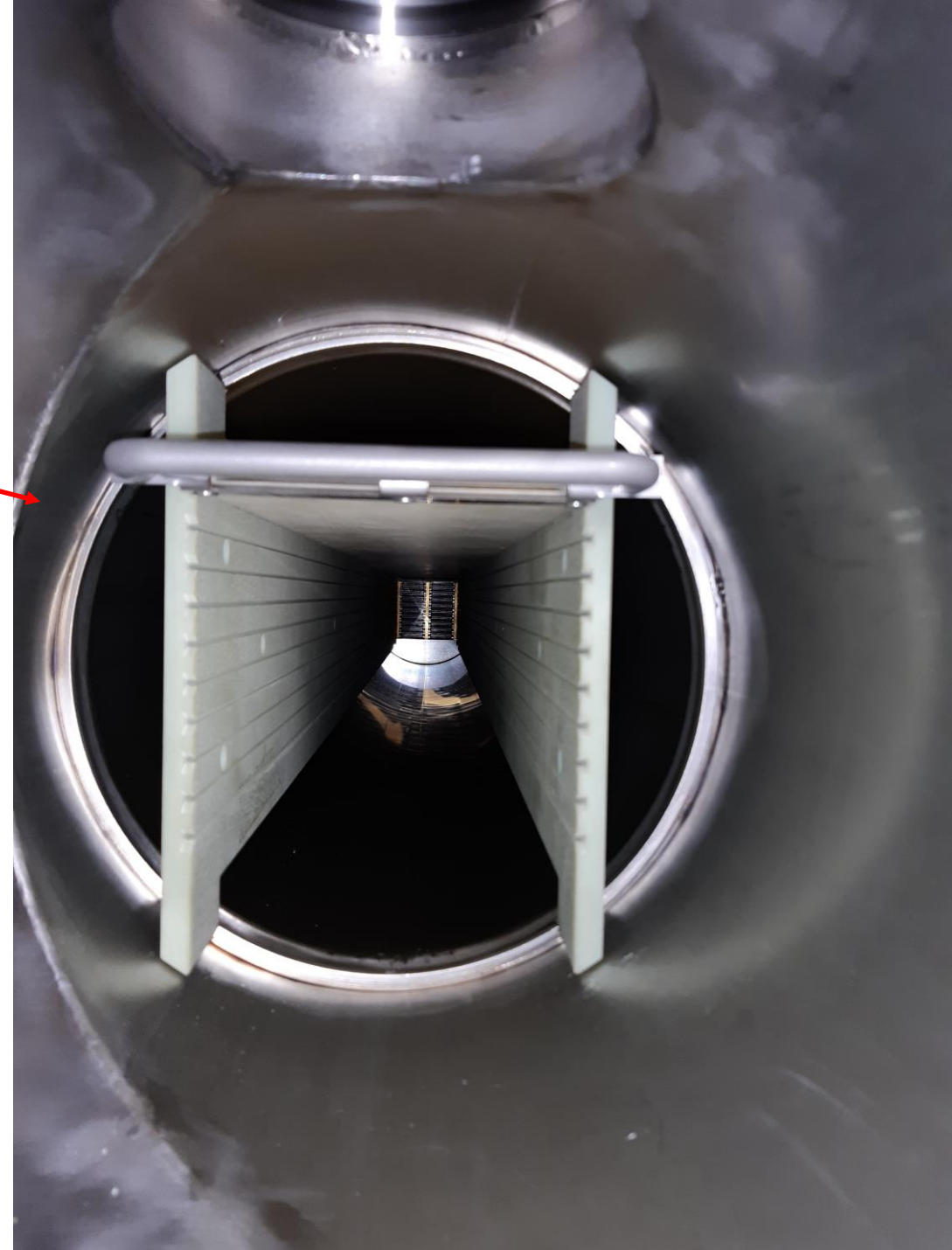
Cryostat



Cryostat Extension

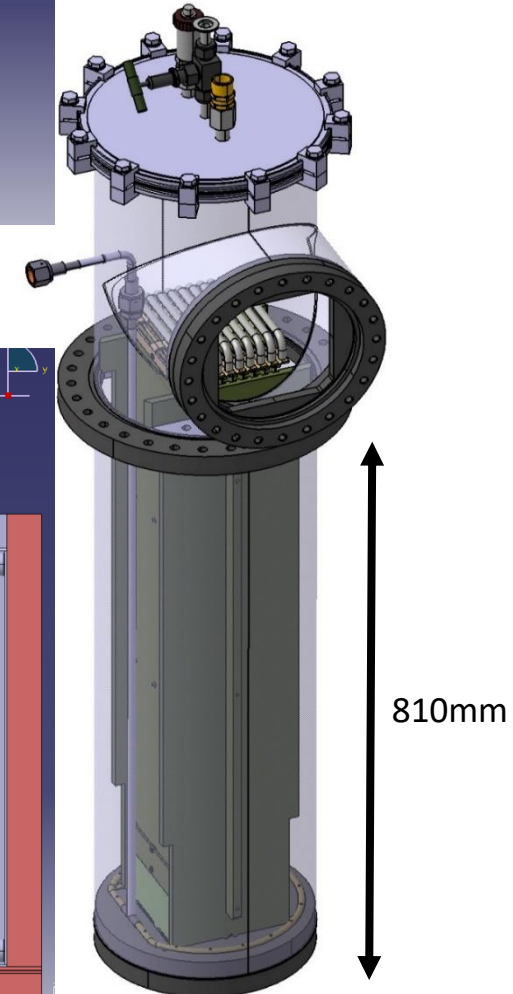
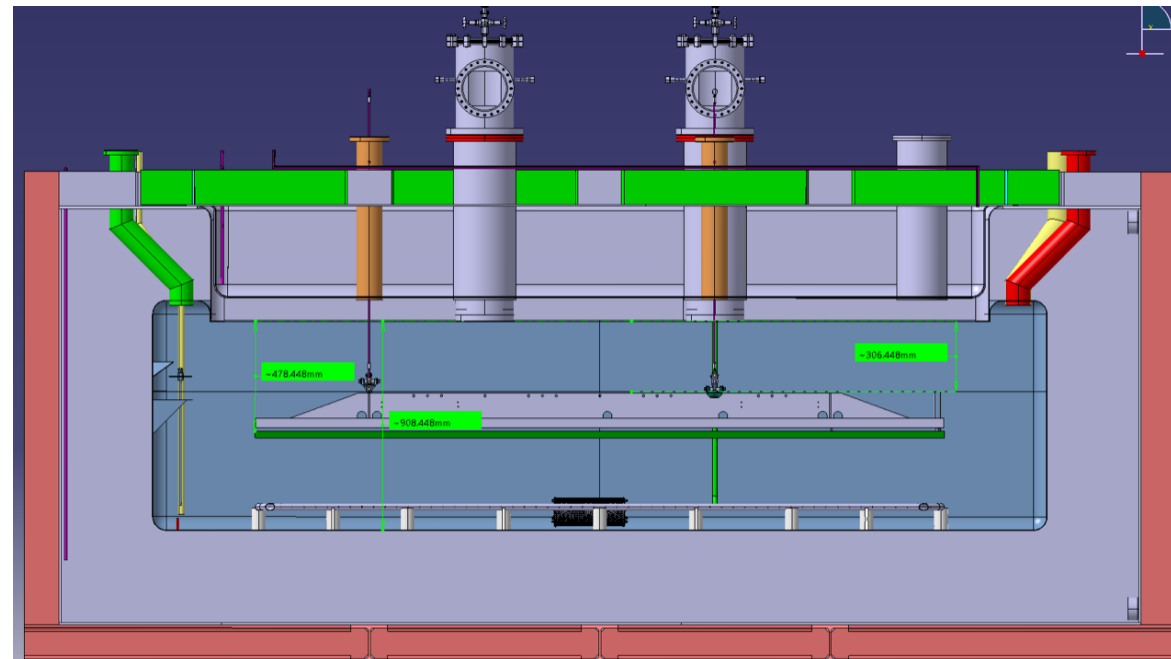
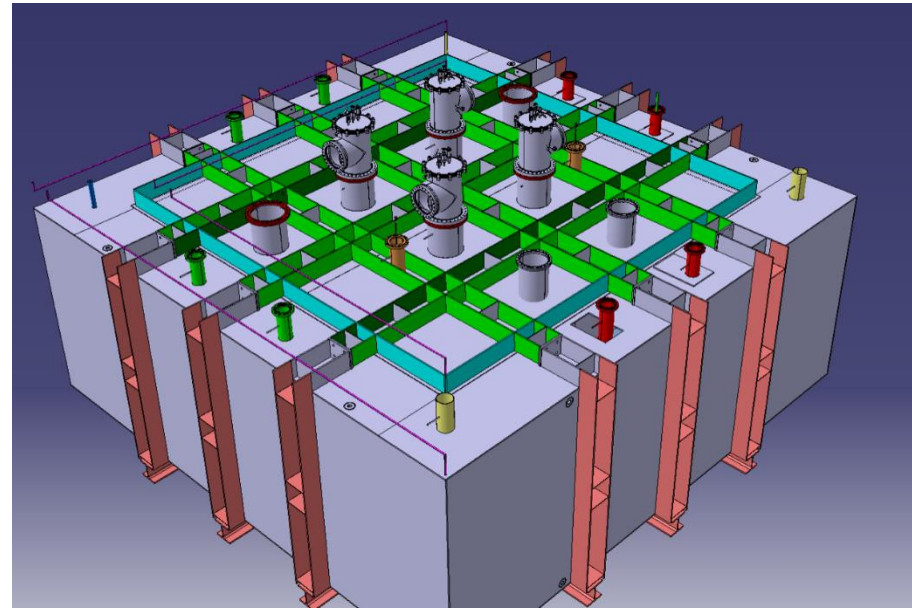
Tests Status

- **Sealing not correct** => one welding (done in the industry) to be improved => **Fixed last week** (to be validated)
- Introduction of **blades** at warm temperature **OK**
- **Sealing test in progress**
- **Full mounting** before the **end of this week**
- Move the prototype to **Cryodrome on Monday**
- **Installation** in cryostat on **Tuesday** and **start of tests**
 - Blade introduction at cold temperature
 - Temperature profiles (tube, blades) with/without a simulated FE board heat dissipation



Coldbox chimney

- Similar design, **just length adaptation**
- Suppression of heat exchanger
- **5 chimneys** to be produced (needed for 3 views test)
- **Design validated**
- **Production ready to be launched**
- Maximal **delay** (mechanics): **8 weeks**
- Estimated Cost: **9 k€ per chimney**

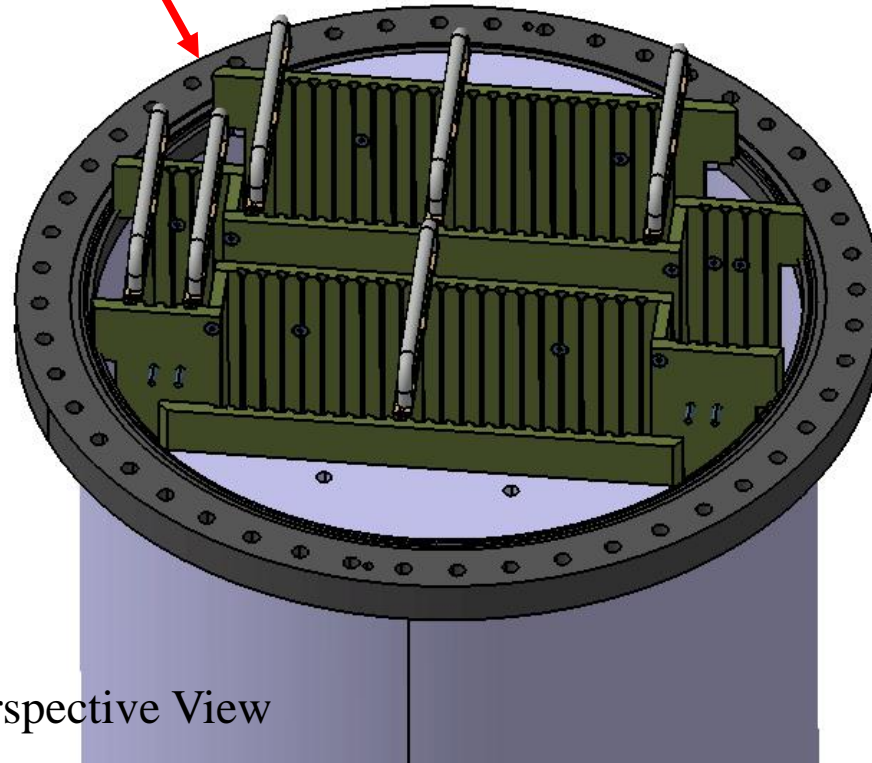


Detailed cost (for 5 chimneys):

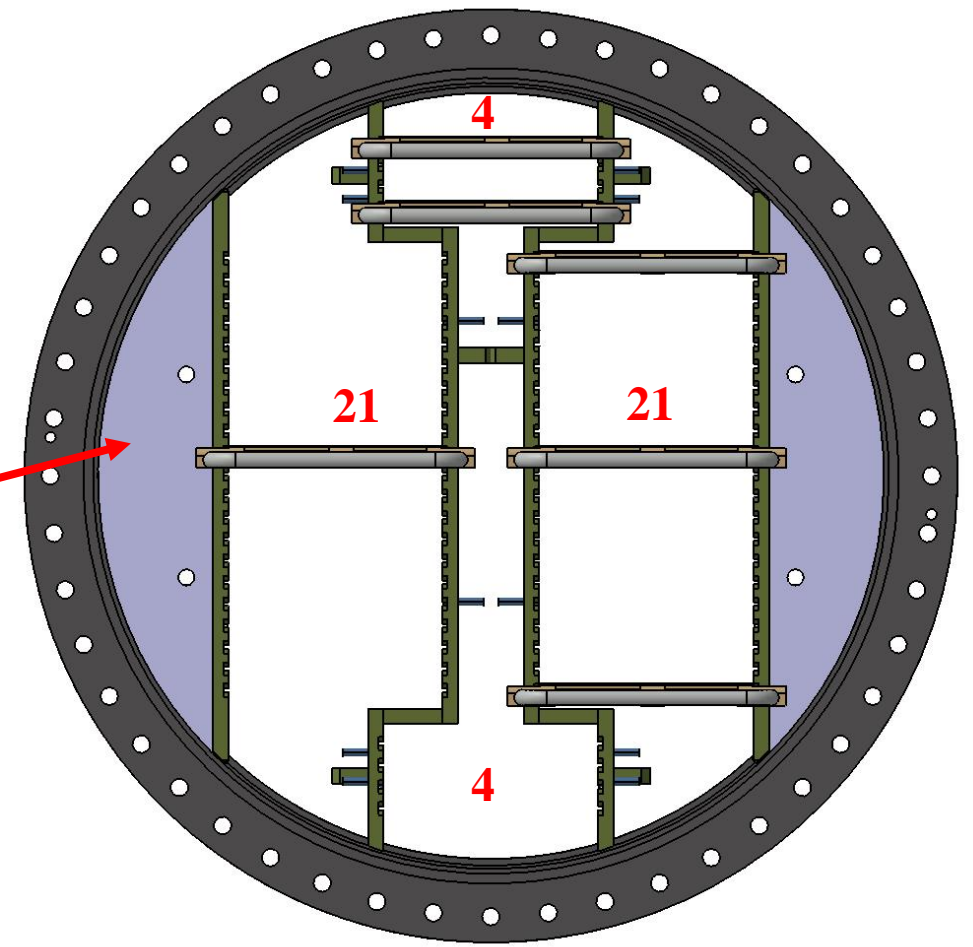
- **Mechanics:**
 - Best offer: 33 975 €
 - Max : 37 115 €
- **FR4 blade and guides:**
 - Best offer: 6 900 €
 - Max : 9 542 €
- **Gaskets:** 956,75 €
- **Small parts:** ~1000 €

Vertical Drift Chimneys

- Penetration diameter **from 250 to 480 mm**
- Able to house up to **50 FE boards** instead of 10
- **105 chimneys** to be produced
- Positioning of 50 connectors on Cold flange is possible with associated guiding system
- PCB design to be done



Perspective View

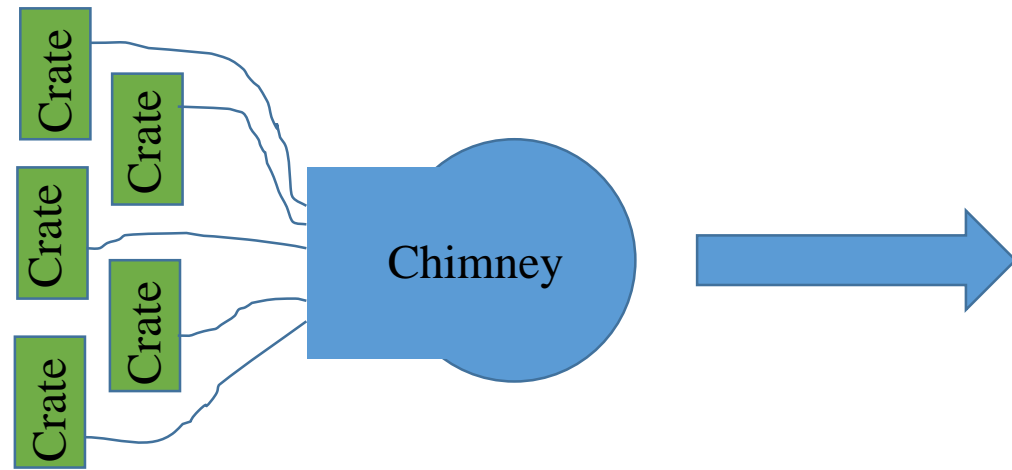


Top view

Warm Flange

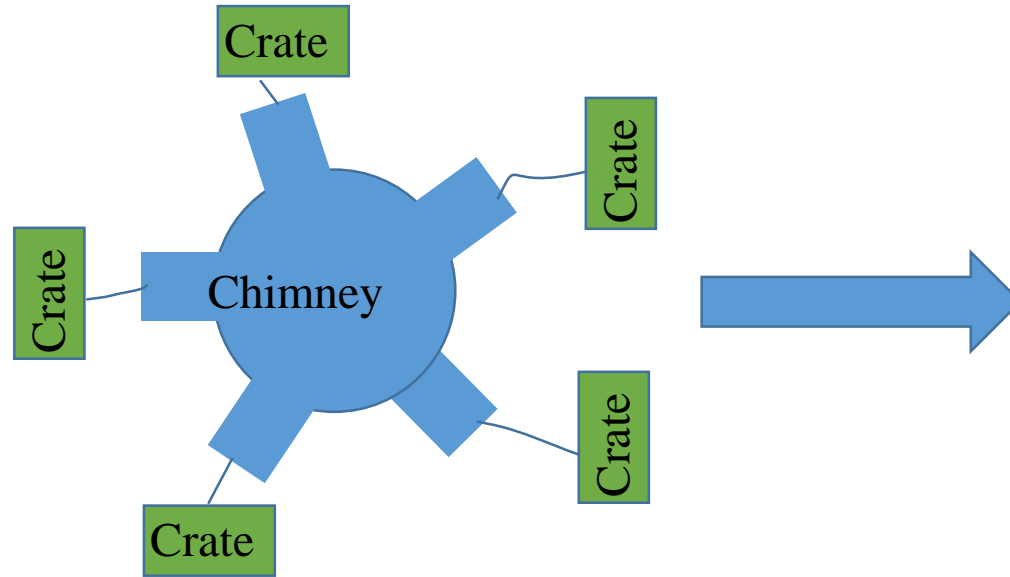
Several options to be investigated:

- 1 large flange (as today)



- Design of Large PCB to be done
- Only one welding
- 5 crates on the same side => can we superpose them if needed ?

- 5 small flanges (one per crate with the present tube size)



- Keep current PCB
- More weldings, flanges and gaskets

- Intermediate solution with 2 or 3 flanges ?

- Mechanics “wants” to **reduce the number** of weldings, flanges and gaskets for **cost optimization**
- Impact on PCB seems less dramatic

Crate positioning in DP prototype

