

Various news Calibration system

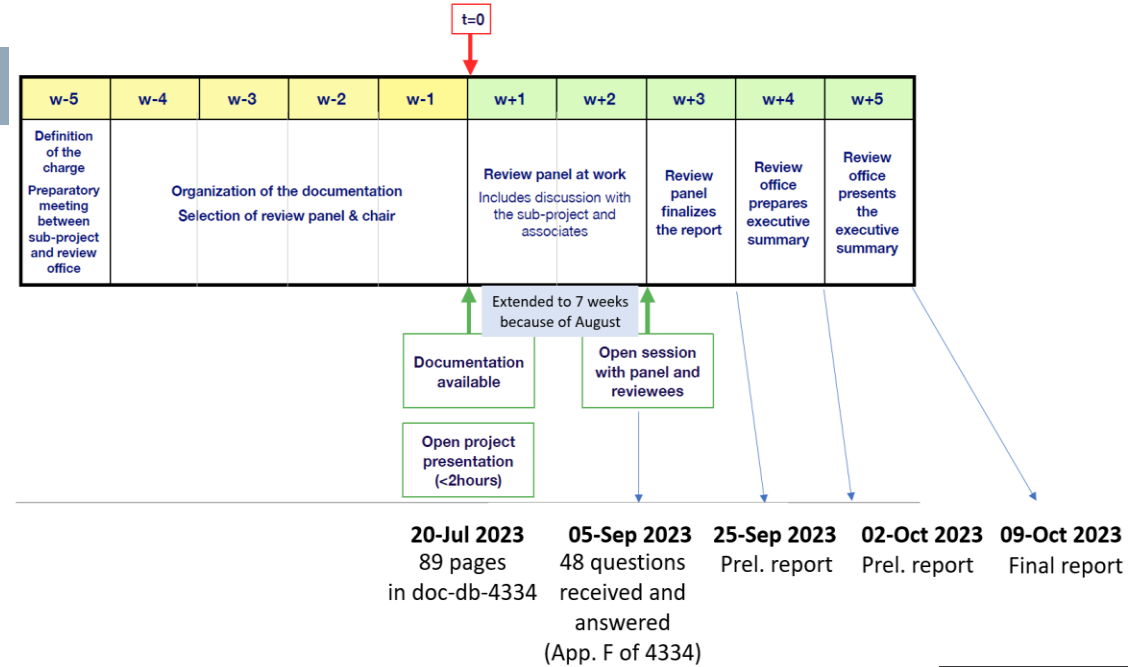
Pierre Barrillon

DS CPPM meeting – 5th December 2024

PRR process

FDR process

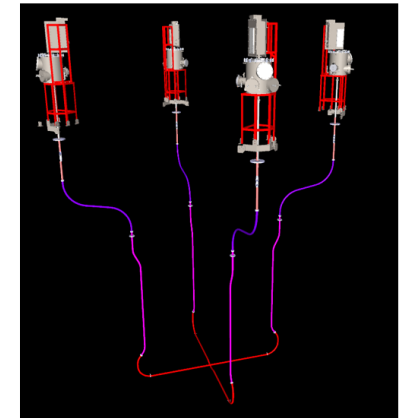
- **Reminder:** The FDR took place during summer 2023. Passed successfully in October 2023 with 8 pre-PRR + 3 pre-operation recommendations.
- Worked on the recommendations until April-May 2024 and initiated the PRR process in July with a discussion with the review committee.
- The **review panel** was constituted: Sandro De Cecco, Chris Jillings, Yorck Ramachers, Simone Stracka.
- A new version of the calibration note was provided mid-September.
- It was followed by an [introductory presentation](#) the 25th of September, opened to the collaboration.



Outline

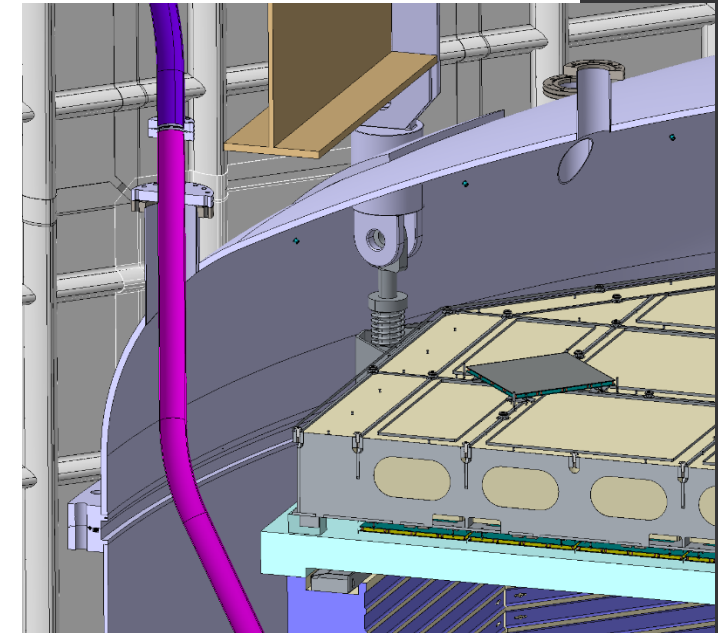
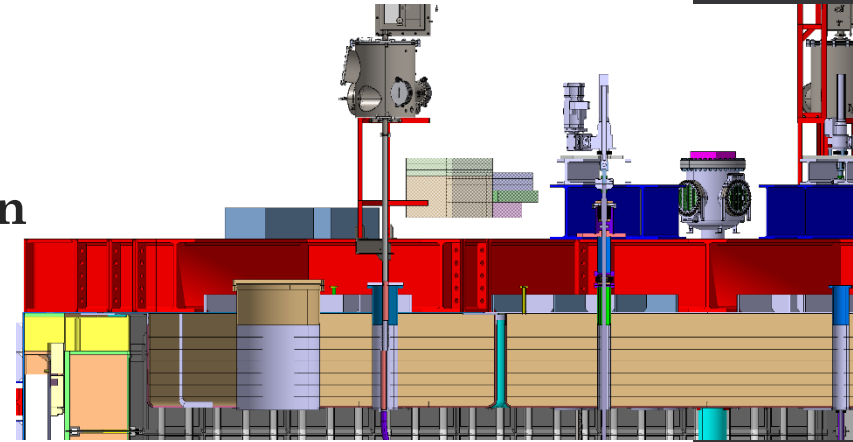
- Reminders of the External Source Calibration System
- Mock-up tests summary
- FDR process
- PRR requirements
 - Answers to the FDR recommendations
 - QA/QC
 - Final drawings
 - Interfaces
 - Procurement plan
 - Screening
 - Shipment
 - Equipment/storage
 - Manpower
 - Schedule

[Link to the last version of the note.](#)



PRR process

- Mid October the review panel sent a set of questions (38) divided in 4 themes:
 - Mechanical logic and behavior under stress
 - Internal and external personnel, schedule and organization of activities, Gantt charts, possible interferences during installation
 - Operations
 - Provided documentation and requests for additional documentation
- Answers (with additional drawings provided by Marco C.) were provided by the group the 28th of October
- They were then presented (+ discussion) to the review panel members the 4th of November during a Q&A session.
- All documents are gathered on docdb: [here](#).
- Draft of the report discussed within calibration group, with the review panel and with the review office (last week).
- Final version should be produced soon.



PRR process

- Main recommendations concern the integration strategy, the radiopurity assay, manpower aspects and refinement of the note.

Report of the Production Readiness Review of the
Calibration Guide Tube System of the DS-20k apparatus

Sandro De Cecco, Chris Jillings, Yorck Ramachers, Simone Stracka (chair)

November 15, 2024

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PRR process

- Main recommendations concern the integration strategy, the radiopurity assay, manpower aspects and refinement of the note.
- 1. The **radioassay** process must start as soon as possible as it remains a large schedule risk. A member of the calibration hardware team should **attend materials group calls**. **Screening requirements should be clarified** with the relevant institutions and the materials group.
- 2. The availability of **manpower** (from external companies and / or from the host laboratory) for all fabrication, integration and metrology steps and any other relevant service should be verified and secured.
- 3. The **addition of elements** to account for any misalignment during **integration** (e.g., rotatable flanges to avoid clocking mismatches in flanges) should be considered
- 4. The **integration and insertion sequences and procedures** (including the use of tools, support structures, lifting gear, and scaffolding) should be clarified, and verified with the installation team(s), to identify potential interferences and dependencies with other installation operations that might cause delays.
- 5. The **risk associated to leaks** (between nitrogen and argon volumes, or between the two argon volumes), detected during/after integration or during operations, should be evaluated and added to the risk register
- 6. **Interaction with the host laboratory** safety officials and the companies regarding procurement, shipping, cleaning, handling, and storage of the radioactive sources should start as soon as possible

PRR process

- Main recommendations concern the integration strategy, the radiopurity assay, manpower aspects and refinement of the note.

	A	B	C	D	E	F	G	H
1	Date of Rec.	Rec. #	Recommendation	Person responsible for response	Proposed Date for Response	Accepted/ Rejected/ Modified	Date of Status	Status
2	2024-11-26	1	The radioassay process must start as soon as possible as it remains a large schedule risk. A member of the calibration hardware team should attend materials group calls. Screening requirements should be clarified with the relevant institutions and the materials group.	Pierre	January 2025		2/12/2024	email sent to Vicente Pesudo
3	2024-11-26	2	The availability of manpower (from external companies and / or from the host laboratory) for all fabrication, integration and metrology steps and any other relevant service should be verified and secured.	Pierre	February 2025			
4	2024-11-26	3	The addition of elements to account for any misalignment during integration (e.g., rotatable flanges to avoid clocking mismatches in flanges) should be considered.	Pierre + Peter + Marco	February 2025			
5	2024-11-26	4	The integration and insertion sequences and procedures (including the use of tools, support structures, lifting gear, and scaffolding) should be clarified, and verified with the installation team(s), to identify potential interferences and dependencies with other installation operations that might cause delays.	Pierre + Peter + Marco	February 2025			
6	2024-11-26	5	The risk associated to leaks (between nitrogen and argon volumes, or between the two argon volumes), detected during/after integration or during operations, should be evaluated and added to the risk register.	Peter	January 2025			
7	2024-11-26	6	Interaction with the host laboratory safety officials and the companies regarding procurement, shipping, cleaning, handling, and storage of the radioactive sources should start as soon as possible	Pierre + Jelena	February 2025			

[Google doc](#)

PRR process

- Main recommendations concern the in manpower aspects and refinement of

Answer from Peter:

With regards to leaks : We can set up a procedure where we pressure and vacuum test each section of tube after manufacture and we can do Argon / He leak checking to look for pinholes. After installation we can repeat this. Leaks on the deck side can be tested separately.

The likelihood of a pipe rupturing is tiny . If there are any they will be at the joints. This could potentially leak N2 and Rn into the IV or the tube could fill up with LAr . That wouldn't necessarily make it unusable, just difficult to use.

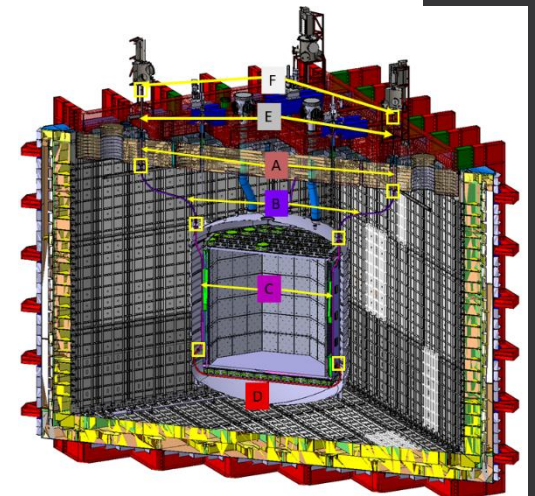
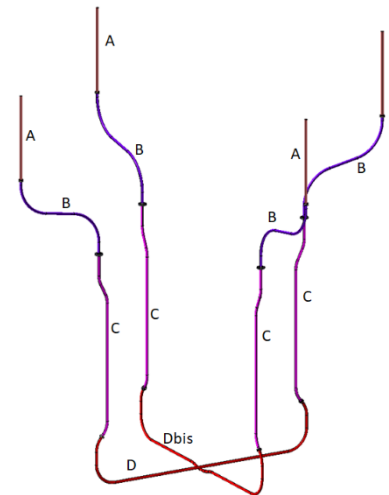
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PRR follow-up (radioassay)

- Contact made with **Vicente Pesudo**. We need to provide:
 - *Mass and location (approximate location within the experiment) of the object to be measured.*
 - *Mass and dimensions of the sample to be assayed.*
- *“With this information I will arrange the measurement in a location or another. One option that could be convenient from the logistics point of view is performing this measurement in **Modane**. However, we've made very few assays there and I would need to speak with Silvia and see if it's feasible.”*
- I will work on this in the coming days. Already got the information from Marco Carlini about the metric weight of our tube: 2 kg/m (so our 2 tubes are less than 100 kg in total).
- **Reminder**: elements to be assayed: tube sample (same batch from complete production), flanges for tubes assembly, gasket for these flanges, flanges and gaskets for the exit of the vessel.

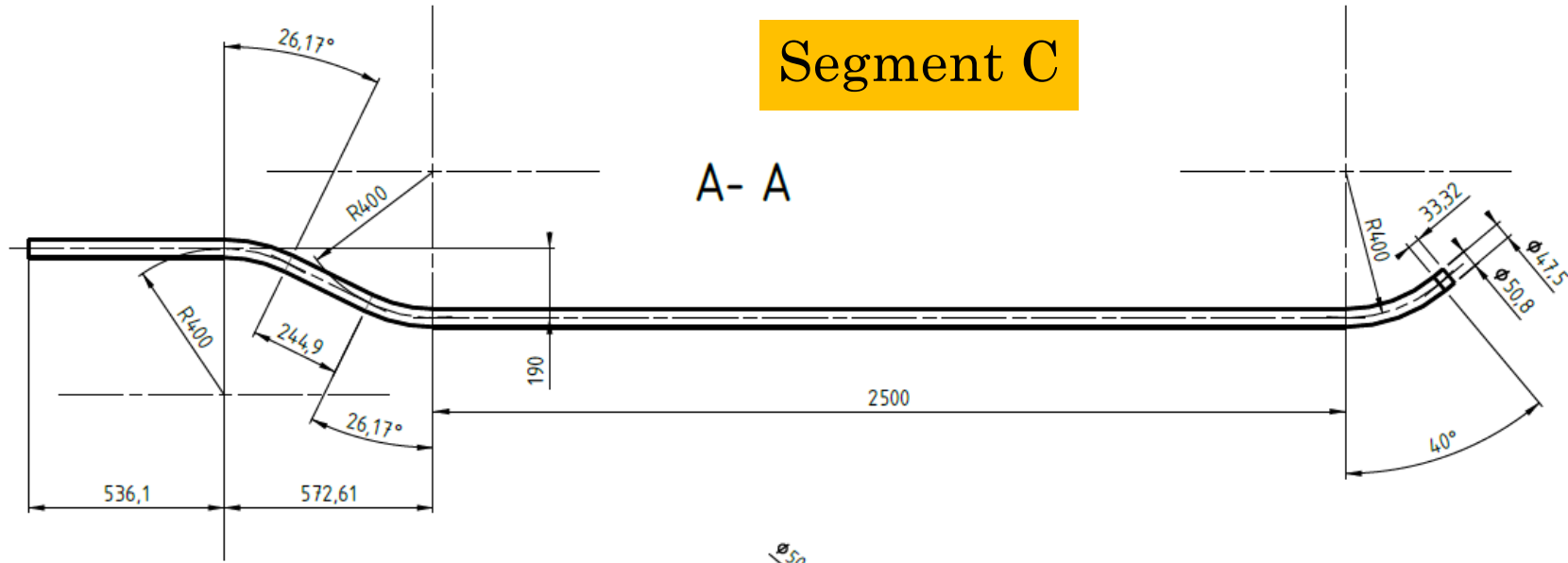
PRR follow-up (tubes procurement)

- Following the collaboration meeting, Marco Carlini contacted (*bisogno di acquistare circa 50 m di tubo seamless con $DE = 50.8\text{ mm}$, $sp = 1.6\text{ mm}$, non devono avere saldature all'interno, 304L o 316L*) several companies looking for the availability of stainless steel tube with specified requirements (outer diameter, thickness, no solders).
- Two positive answers (and one negative) so far:
 - **Europaacciai** ([link](#)): really close to L'Aquila and cheap price (26.5 €/m + 30 €/segment for shipment) but the maximal length of segments is 3 meters.
 - **Coferinox** ([link](#)): much further away (Milan) and a bit more expensive (47.5 €/m + ? For shipment) but the maximal length of segments is 5-6 meters.
- For segments C, D & Dbis we need 4-5 meters long tubes (see plans next slide).
- **2 options:**
 - Increase the number of segments (divide segments C, D and Dbis in 2) and add flanges.
 - **Buy long tubes**

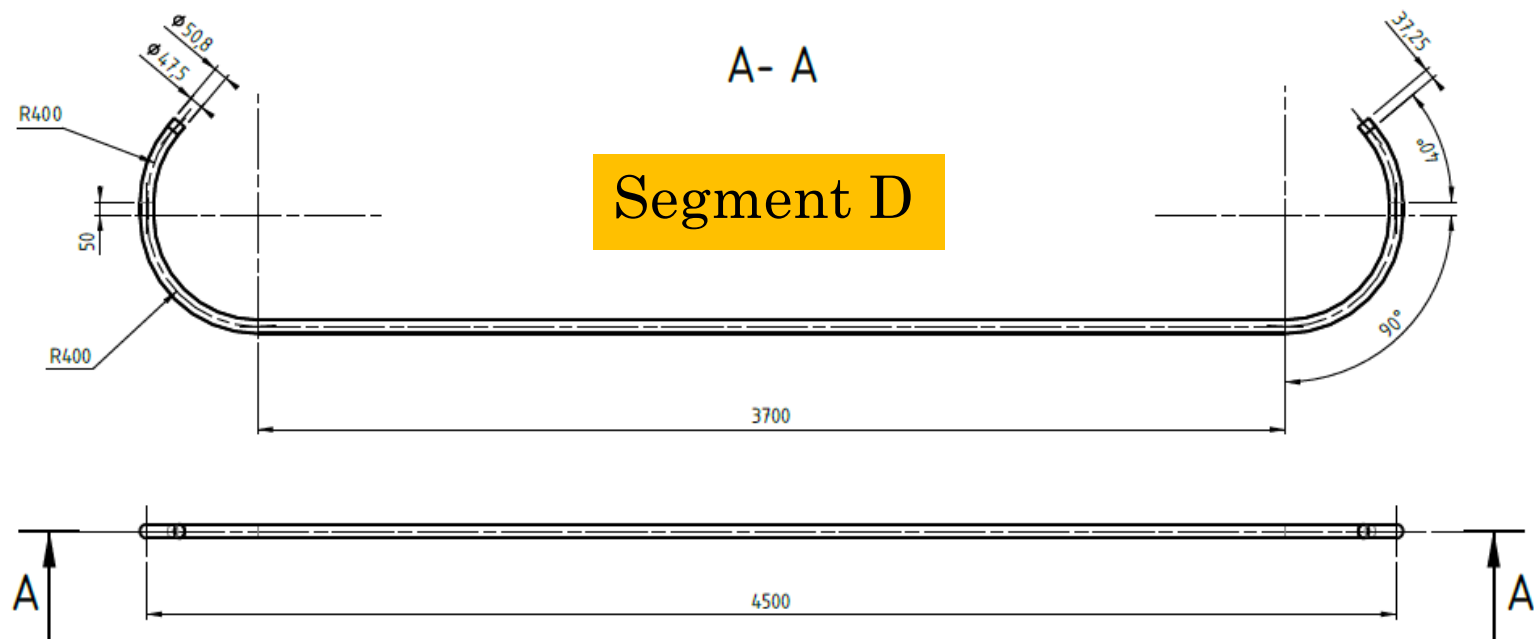


PRR follow-up (tubes procurement)

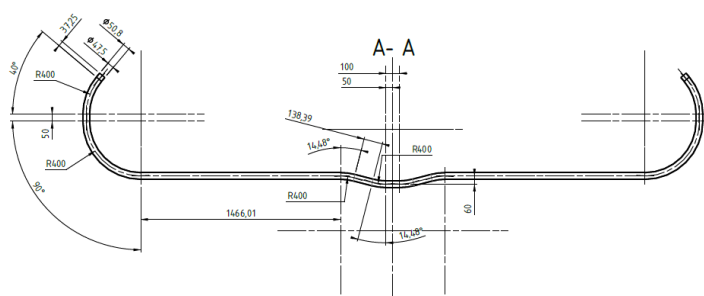
Segment C



Segment D



Segment Dbis



PRR follow-up (meet with host lab team)

- Asked Marco Carlini about a **visit at LNGS** to meet him and the technical team to discuss many aspects (recommendation #6 and more).

*For your visit to LNGS beginning of the next year, I think it's a very nice idea. I think the best moment would be **end of January / beginning of February** when we will have completed the installation of the AAr cryogenics, what do you think? Also, it would be good to coordinate with Andrea Zani to have also his presence, in addition to the LNGS people (he is here normally 2 weeks per month).*

- I agreed. I will contact Andrea and organize my visit early 2025.

Other stuff

- Mail from Bianca asking to fill/update a [google doc](#) about power needs.
- Updated it with validation from Fabrice, Pascal and Peter.

Sub-project	Items	Description	Number of units	Nº of phases	Voltage (each unit) [V]	Current (each unit) [A]	Unit Power [W]	Total Power [W]	Net	simultaneity factor [%]	power usage factor [%]
	Please use this column to list ALL the items that need electrical power. Use one line for each type/model of object.	Please use this column to describe the item in the previous column, we need to understand what kind of object it is and what's its working principle.	Number of identical units (if the objects are even slightly different please use a different line)		Nominal value				Preferred net you would like to be connected to (UPS/STD)	Percentage of units in use at the same time. (for example if you have 2 units but when one is in use the other is not you should write 50%, if you have 1 unit it will be always 100%)	Percentage of the total power needed by EACH unit when in use (duty cycle)
Calibration system	Motors systems	Each motor is powered by a single PSU (TTI EX355P-USB)	4	single	220-240		max 400	max 1600	UPS	2/4	1 month/year
	Control boxes	Each control box is powered by a PC PSU	2	single	220	low	500	1000	UPS	1/2	1 month/year
	Screen	Secondary screen for the laptop	1	single	220		30	30	STD	1/1	1 month/year
	Control computer	Laptop used to control and monitor calibration system	1	single	220		130	130	STD	1/1	1 month/year
	Laser system										

- Peter added (by email) information concerning the grounding that we need to keep in mind: *The low voltage side of the motors are grounded to the motor boxes which will eventually be grounded to the deck steel.*