

PRR news Calibration system

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Calibration meeting – 17th of September 2024

PRR preparation

- Meeting with review office the 12th of July.
- We (Pascal, Peter & Pierre) discussed with them about the “charges” asked to the reviewers. Last version is [here](#) (see next slides).
- Reviewers will be: Simone, Sandro (replacing Marco Rescigno), Yorck and Chris.
- PRR will take place the 25th at 2pm CEST. Presentation expected.
- Documents to provide:
 - Updated version of the calibration note. It includes the answers to the FDR recommendations and should include first level answers to the “charges”. Sections 5 (FDR process), 6 (PRR process), F (comments from FDR) and G (answers to FDR recommendations) are the relevant ones.
 - PRR document(s): first discussion with review committee was about the documents expected for the PRR. Most of them are covered by the note. Some were judged not relevant to our system.
- An update version of the calibration system note has been provided to the review office and the reviewers the 10th of September 2024, with explanations.

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- We (Pascal, Peter & Pierre) discussed with them about the “charges” asked to the reviewers. Last

Since it is a rather long document that has grown since the FDR, here are some points to guide yourself into it:

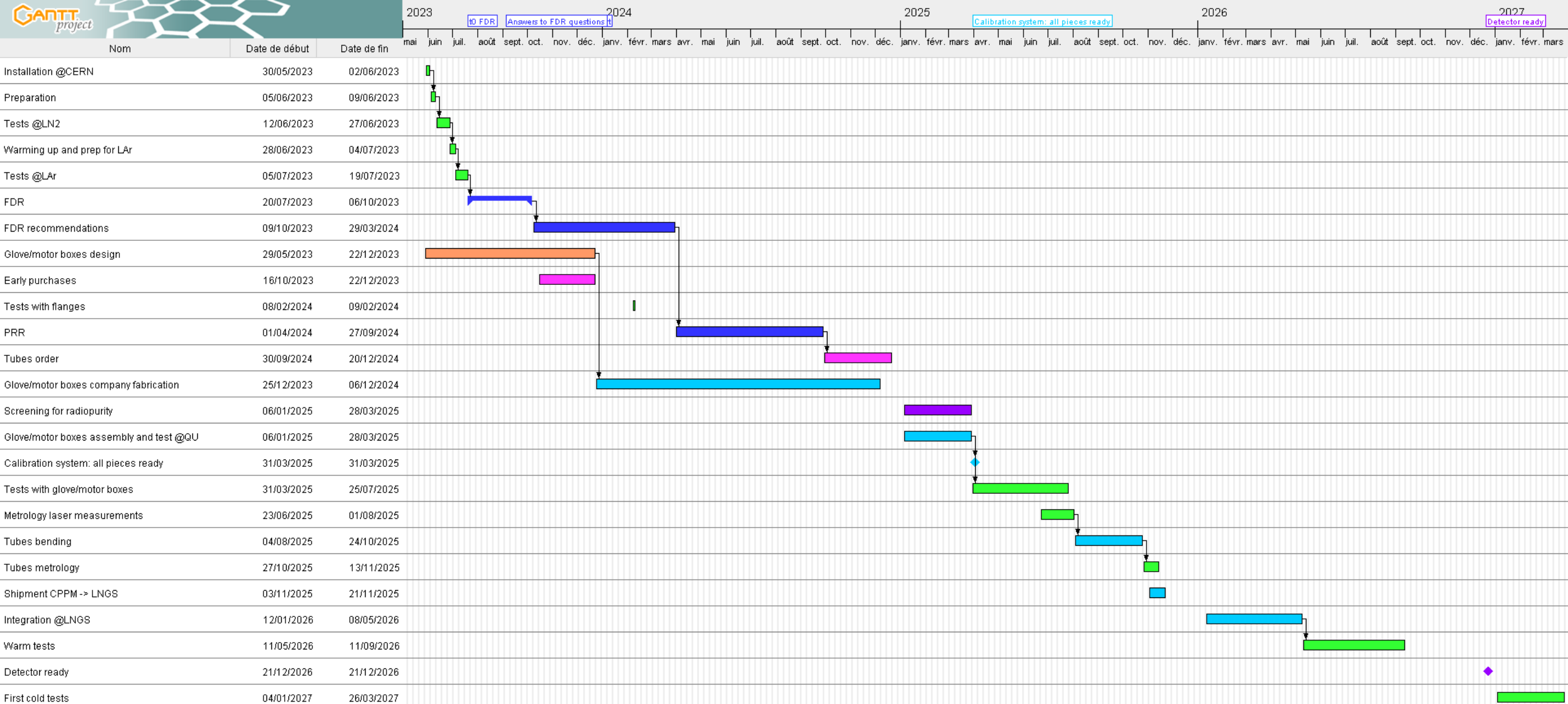
- R - sections 1 (introduction), 2 (motivations), 3 (simulation studies) and 4 (hardware implementation) are unchanged (or with few minor adjustments) with respect to the FDR.
- P - section 5 gives a reminder of the FDR process. It is completed by the Appendix F tracing the comments from the FDR Committee and our answers. Finally the appendix G covers the FDR recommendations (pre-PRR ones) with our answer to each one of them.
- D - section 6 covers the PRR process: initial requirements from review office and first order answers to the charges of the reviewers. In several cases, links to the relevant sections of the note are given.

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PRR “charges” and thoughts/notes

1. Have the recommendations from the FDR report been adequately addressed? Please identify areas of continuing concern. **ok we have addressed everything, we will present our answers**
2. Is the design complete with a full set of executive drawings or equivalent? Is the design known to be robust for the cooldown? **Calibration system (both inside and outside the cryostat) is included in the official CAD. Light (Navisworks) version up to date available (end of last week). Fabrication drawings exist for the tubes as well as the glove and motor boxes. Concerning the robustness to cooldown, design took it in consideration, flanges are known to be robust. Welding will need to be assessed, keeping in mind that the calibration system won't be the only element with welding..**
3. Are the preparatory/dry-fit procedures and tooling in place? **we have the integration plan.**
4. Is the required hardware, including hardware for the required QA/QC steps, at the appropriate stage of procurement wrt the schedule? **We believe it is. A lot items (including spares) have been purchased or built: motor systems, control-command systems, flanges, elements to equip the glove boxes, rope, computer, tools, etc. Glove and motor boxes are close to a fabrication. Tubes will be ordered after the PRR.**
5. Is there a reasonable schedule for preparation of operator manuals and user level documentation for the system? **We consider this as pre-operation material. Nonetheless manuals written for the mock-ups tests exist and will be an ideal starting point.**
6. Is there clear documented and fulfilled specification for radiopurity of the calibration system material and fabrication (welds)? **we explained that we were planning a screening of the components that will be inside the cryostat. Welds will also be assessed.**
7. Is the QA/QC plan adequate both at the system level and for the individual components? **many elements used on the mock-ups will be used on the final system and that they have undergone QA/QC with all the tests carried out.**
8. Is the schedule realistic and compatible with the overall experiment installation schedule? **We believe it is. An update of GANT has been done.**

PRR “charges” and thoughts/notes



8. Is the schedule realistic and compatible with the overall experiment installation schedule? **We believe it is. An update of GANTT has been done.**

PRR “charges” and thoughts/notes

9. Is there sufficient manpower for all phases, including for issues that may arise during the installation? **we said that we had mentioned the question of manpower in the doc for the PRR. It will be necessary to better clarify the needs for the presentation.**
10. Are specific responsibilities for transportation and delivery and installation clearly defined and assigned to people? **We don't expect it to be complicated. All elements (except tubes foreseen to be bought to an Italian company) will be centralized at CPPM before shipment to LNGS after tests with complete chain.**
11. Are the assembly and installation procedures and the required tooling
 - in the cryostat
 - for hardware outside of the cryostat defined and agreed with the installation team?**Basically, we have 2 installations (inside and outside the cryostat): the one on the tubes and the one on the cryostat. We remind that we have written the installation plan (section G.6) but that it is subject (mainly for the part inside the cryostat) to modification because it depends on the general installation.**
12. Are all interfaces considered and agreed with relevant teams?
 - Are the procedures for the acquisition, storage, use of radioactive sources agreed with the lab?
 - Is the data format/interface between calibration systems and DAQ defined?**Mechanical interfaces: ok, described in the integration plan. DAQ and offline is considered as a minimal interface. We will “just” need to provide information related to the sources (type, position, duration at the position, etc.). Concerning the neutron sources, the permission to bring them has not been asked yet to LNGS. However, these are no different in strength or energy (weaker actually) than source brought in for DS-50 so we do not anticipate roadblocks there.**
13. Is the effect of using pure PMMA as opposed to Gd-PMMA understood?
No simulation foreseen on short term. More statistics for neutrons expected (lower capture).

Purchases

- 5 (out of 8 needed) **access doors (glove boxes) received.**
- Remaining access doors (x3) has been ordered last week (~4k€).
- Glove boxes items about purchased by Jelena:
 - feedthroughs: <https://www.idealvac.com/en-us/vacuum-product/pp/p108205>, x4 → **4 received.**
 - ferrofluidic couplings: <https://www.idealvac.com/en-us/vacuum-product/pp/p1010432>, x4 → **4 received**
- Adapters (Lesker) for vessel (x4) and cryostat (x4) exits have been selected. Cost: 4.4 k€ (including gaskets, bolts, nuts...). **Received** (11th of July).
- **Tubes:** 2 companies contacted: [Kohler](#) and [Acciaiterni](#). Advice from Marco C. Would be simpler to order tube segments from an Italian company near LNGS. They have the type of tubes needed (50.8mm OD 1.65 mm thickness). Contacted by emails multiple time but no answers yet.

CAD update

