MAGiC progress report

October 2022 STAP meeting

This report highlights the progress and changes made on the MAGiC instrument since the last meeting in May 2022.

1. Status of tenders and procurement

LLB

The tendering process has started at CNRS since February 2020. Two paths can be used to procure equipment :

- Above 140 k€ : open tender
- Below 140 k€ : simplified procedure

Since last STAP meeting :

- Polarizer section of the guide system has been procured
- Heavy shutter has been procured
- Experimental cave has been procured
- Small components have been added to the instrument inventory at LLB

Major risk for installation is the vacuum housing for the neutron guide system. Lack of ressources at LLB is slowing down the developement of the detailed design. The in-Bunker and BWI parts are priority #1.

TG5 is expected in May-24 (from Mar-24).

The Hot Commissioning will be possible as soon as the BoT milestone is achieved.

JCNS

Procurement is done for most of the equipments (detectors, monitors) and everything is on track for a successful installation in 2024.
Detector B and Monitors are produced. Detector A internal IDR took place on October 19th with the first 6 degrees sector being evaluated.

PSI

An IDR is in progress to secure procurement of raw materials ahead of sub-TG3 (steel, silicon wafers and permanent magnets).

2. Meetings

DMSC

Quarterly meetings with DMSC (most recent one on 14th of October) with a focus on data reduction and analysis.

3. Progress on individual components

Solid State Bender

Order has been delayed but is now in the pipeline. Integration with the BBG and alignement is in progress.

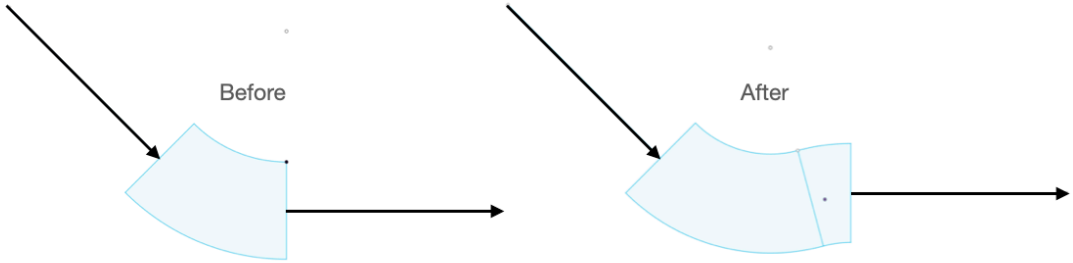


Figure 1: geometrical change of the SSB to maximize polarization at large wavelength.

Choppers

The LLB components (magnetic guide field) are at ESS and ready to be with the Front End choppers set.
Position of the fiducial elements of the neutron guide system within the Band Chopper has been validated.

Neutron Guide system

In-Bunker : sub-TG3 validated. Manufacturing in progress at SNAG. Delivery in February 2023.

BWI : sub-TG3 validated. Manufacturing schedule for December 2023 for a delivery in February 2023.

Out of Bunker : sub-TG3 validated. Manufacturing in progress at Mirrotron.

Polarizer : SNAG has been selected as a supplier. Kick-off meeting held in September. A first design has been sent and is awaiting validation at LLB.

Vacuum Housing

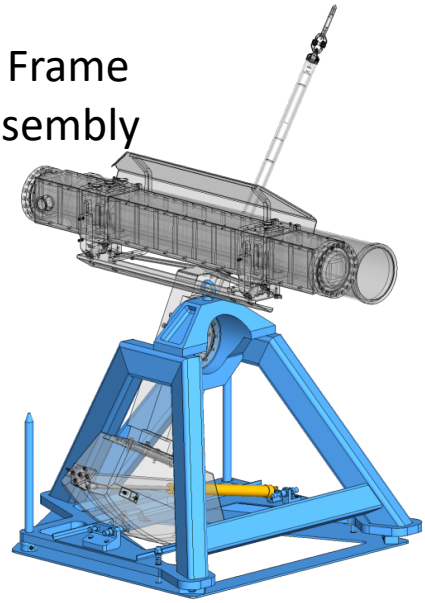
Lack of ressources at LLB is impacting the detail design of the Vacuum Housing. As such focus is on the in-Bunker parts to ensure proper installation during the bunker opening window. A budget quote for the IB elements has been received.
We are evaluating the possibility to subcontract entirely this equipment at an additional cost.

The out of bunker Guide Vacuum Housing will be designed based on the IB ones at a later stage.

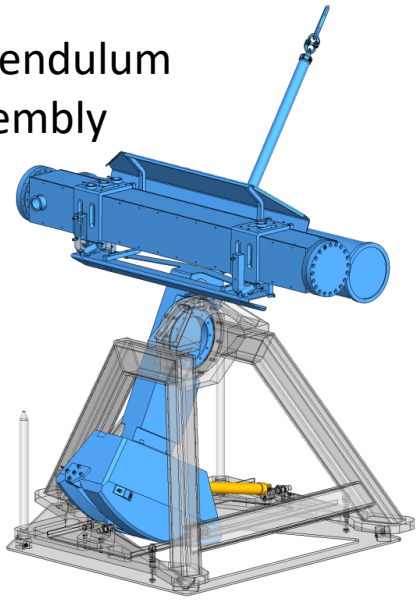
Heavy Shutter

Sub-TG3 has been validated. The HS is in production with most of the elements being at the paint/anodisation stage. Delivery is estimated in November 22.

1. Frame assembly



2. Pendulum assembly



The attenuating block is not part of the HS assembly. Its design is now frozen and it will be manufactured before end of Dec-22.

Detectors

Following Detector B achievement, the first 6° sector of Detector A has been manufactured for validation of the manufacturing process. An internal IDR was held at CDT on October 19th prior to the sub-TG3 in late November 22.

Detector B is ready for delivery when needed by the instrument team.
Detector A production is scheduled in the first half f 2024.

Analyzer

- An IDR is in preparation with ESS to validate the tendering of critical materials (magnets, steel and silicon wafers) which are subject to unpredictable price variations.
- A common subTG3 with the XYZ is in preparation (Jan/Feb 23).
- internal developments to go from prototype solid state stack to mass production
- Activation calculations have been carried out to ensure safe handling and maintenance of the Analyzer. A 10 years exposure 200 days per year is simulated. The main source of doserate comes from the iron. Aluminum is the major source of short term doserate.
- A static stress calculation showed that the preliminary design for the support table is sufficient.

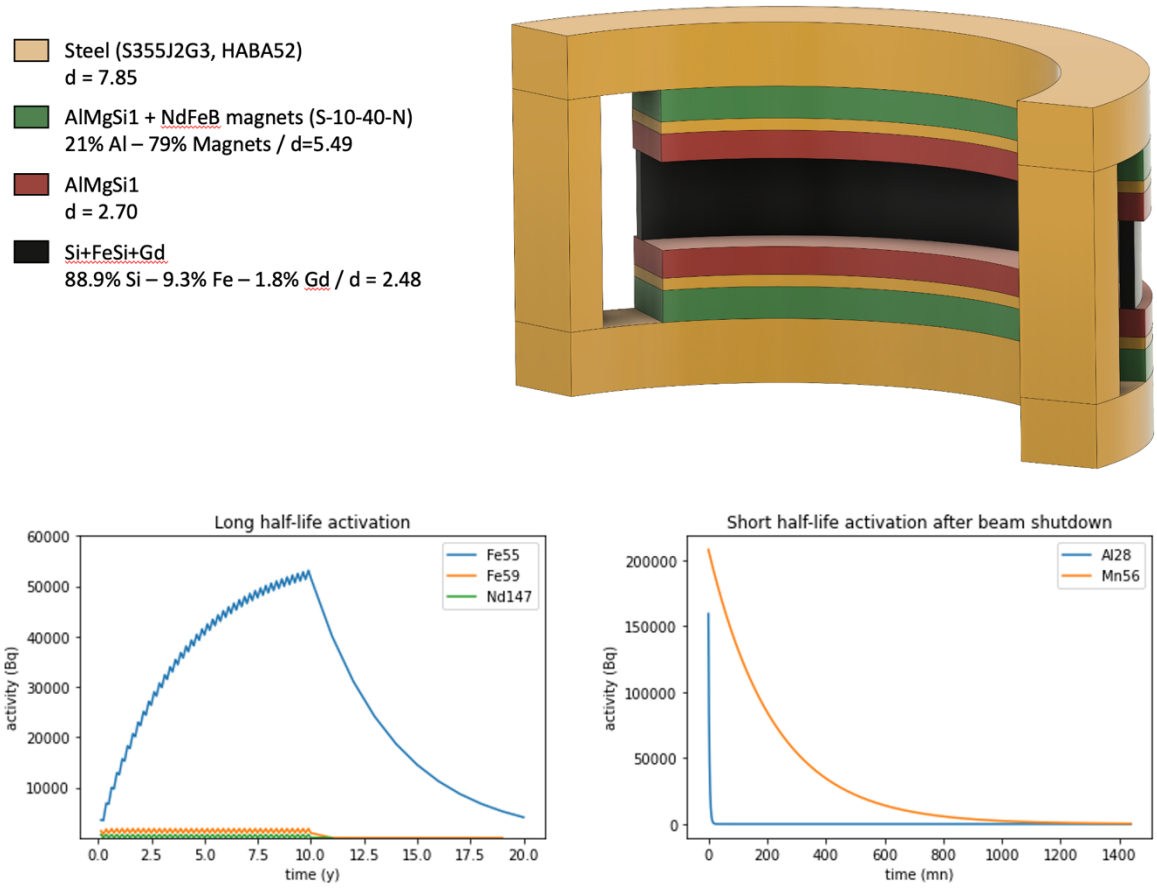


Figure 2: Activation calculation of the analyzer.

XYZ field / guide field at sample position

The sub-TG3 is scheduled for Jan/Feb 23.

Experimental Cave

Mshield has been selected as the experimental cave and control hutch supplier. The kick-off meeting took place on September 30th and a first technical meeting on the 14th of October. The schedule is now validated and work is in progress on the Preliminary Design (milestone for Dec-22).

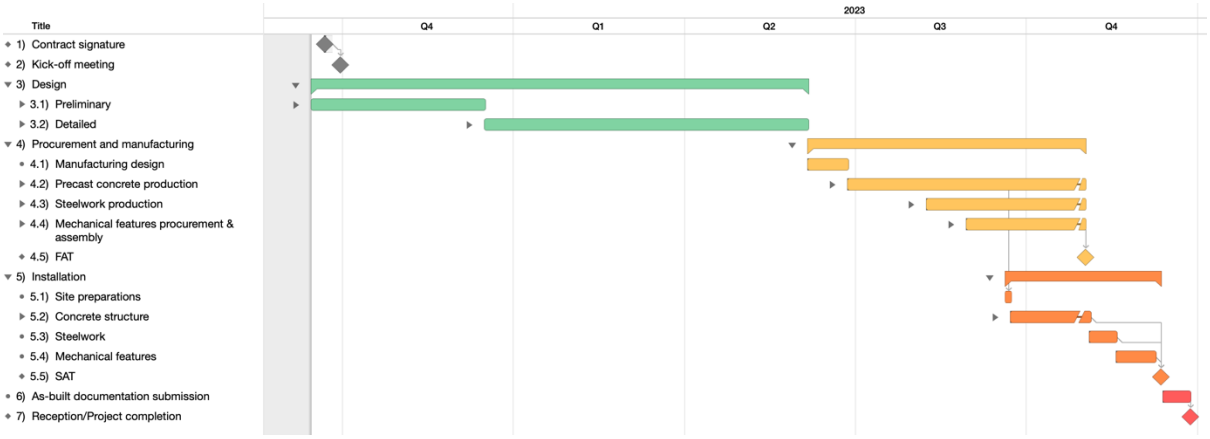


Figure 3: Experimental cave schedule

4. Updated timeline

The instrument timeline has been strongly impacted by :

- Delay in Bunker access to February 2023 and extended opening period
- Delay in guide elements delivery up to August 2023
- Delay in Experimental Cave procurement
- Update in the Analyzer delivery planning

TG5 without the Analyzer is now scheduled in October 2024. The delivery of the first analyzer sector (~33%) is now expected in January 2025 postponing the global TG5 to March 2025.
The instrument will still be ready for beam on target. A hot commissioning phase of one year will then be possible while ramping up the accelerator.
To achieve this, cold commissioning will be performed in parallel with installation to benefit from any downtime in handling activities.

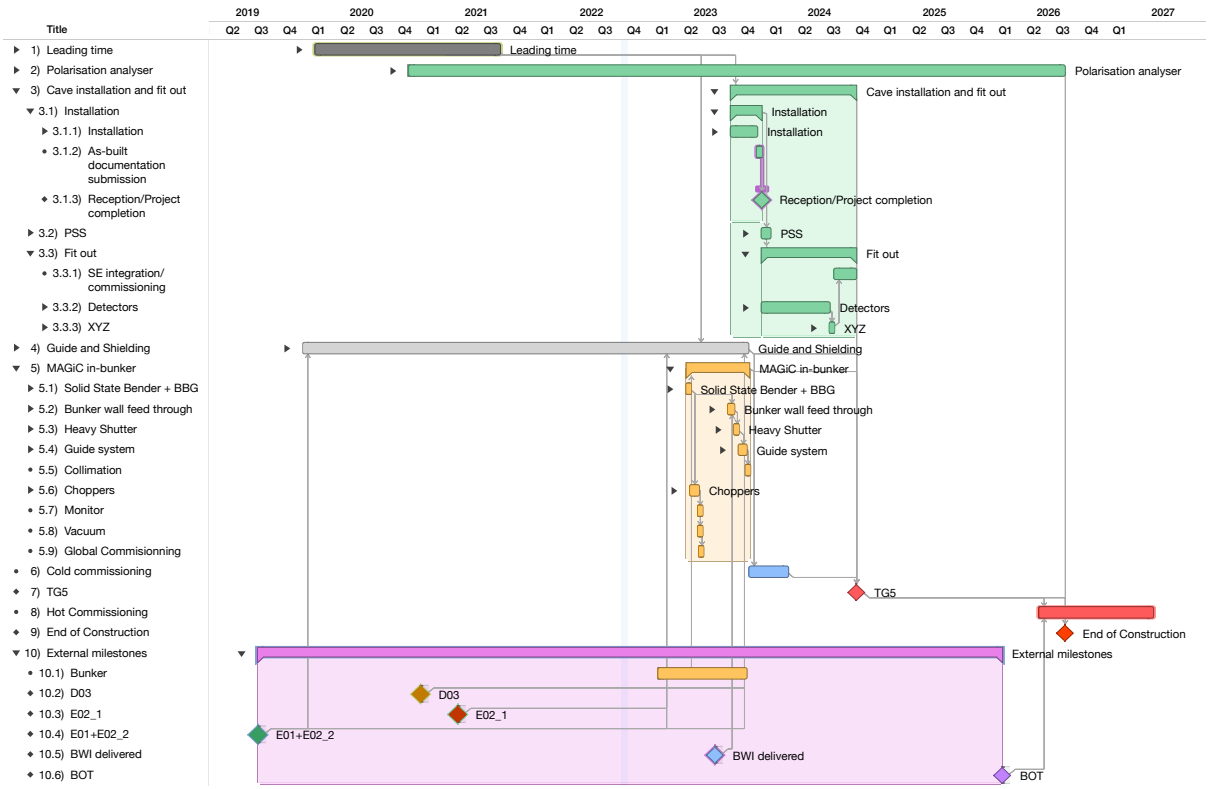


Figure 4: updated MAGiC's installation plan