

Actions in CLEAR foreseen for winter shutdown 2022

Week 6

(Wilfrid, Pierre & Alexander)

The scope of this memo is to list the actions that could be achieved in CLEAR during the winter shutdown 2022. These activities were mentioned during the meeting held on Monday 10th January and are still to be discussed to decide how to adapt and prioritize them taking into account the CERN requirement for teleworking.

1/ Installation of a new quad on the breadboard of the final test stand. **(ALMOST DONE)**

In accordance with the experiment request from Manchester University (Roger and Lucy), regarding strong focusing in a water phantom.

Progress:

- The cooling water system was connected to the quadrupole.
- The electric cables were connected to the quadrupole. Now waiting for Anthony to finalize the connections.
- One interlock table has also to be connected to the quadrupole.

2/ Possible removing of the CLIC ACS. **(DONE)**

A discussion has occurred about the interest of removing the CLIC ACS from the CLEAR line (easier transport at high charge), but this will of course prevent to resume studies on this structure in passive mode (kicks and WFM).

Progress:

- CLIC structure & Cavity BPMs removed.
- The pumping group has been removed.
- Pressure in this section: 2.9e-8 mbar.

3/ Installation of Cherenkov BPM in vacuum **(PLANNED)**

Availability of this new device is to be checked towards Stefano (**action CLEAR operation team**). It is foreseen to be installed downstream to the CLIC cavity BPMs.

Progress:

- There was a discussion with Stefano. The BPM will be rotated and their experimental setup will be installed when it's ready (late spring/summer).

4/ Installation of the Russian soft X-ray experiment **(POSTPONED)**

Since the large chamber (already in CLEAR) is to take place at the same position as the Cherenkov in vacuum device, its installation is not likely to occur during this shutdown. However confirmation is to be sought towards Stefano.

Progress:

- Nothing new.

5/ Diagnostic consolidation **(DONE?)**

It has been mentioned that Inductive BPM are presently providing inconsistent data. This is probably a software issue. Mika is to be contacted (**action CLEAR operation team**). We should also check them using the inner calibration function (**1 day**).

From a long time we are waiting for a complete FESA class for digital camera. Stefano said that this deployment could occur in February (action: to be checked). Our software should then be adapted accordingly (**3 days**, difficult in teleworking since on the technical network)

Progress:

- The ICT on the In-air test stand would be really close to the new quadrupole. Bergoz warned us by saying that it would be sensitive to transverse fields. Has to be tested.
- One still has to investigate what is the status of the FESA class for digital cameras.

6/ Optic fibre for beam loss monitor installation **(DONE)**

Belem and Sarah from the BLM group, after having observed promising results with the optic fibre presently installed on the CLEAR room ceiling, wish to install a new fibre closer to the beam chamber.

Progress:

- The optical fibre was installed with Sara as close as possible to the beam pipe. It goes through most magnets and elements (when possible).

7/ Production of a shaped applicator for beam flattening

Cameron has recently proposed a method to generate a flat beam by scattering a Gaussian beam with a shaped applicator.

Such an applicator could be produced in our workshop either with conventional lathe or with or 3D printer.

Progress:

- Still waiting for Cameron input.

8/ Photo-cathode renewal (**PLANNED**)

Considering that Eric will leave soon and that his official replacement is not likely to arrive before, a provisional solution is to be sought. Miguel and/or Edu are keen to learn how to evaporate a thin layer on a photocathode. This knowledge transfer should occur during this shutdown. A higher efficiency photocathode is also desirable for CLEAR operation.

Progress:

- Eric proposes will start re-evaporate the layer on the photocathode on Monday 21st.

9/ Laser activities (**DONE**)

Progress:

- Laserists are ready.

10/ Samples Handling Robot upgrades. (**ALMOST DONE**)

CHUV has a request for more samples in a batch capability. We believe that we can pass from 22 to about 30 by redesigning the storage support and adapting the code. **(1 day with laser cutting, 1 day for the code)**

Operation either with low charge (CONV) and at high charge (FLASH) will benefit of a movable filter in front of the camera fixed on the grabber. **(5 days for design, 3D printing, cabling a new servo-controller, software adaptation and test)**

Progress:

- The rotating filter for the camera was fully implemented in the Arduino and Matlab codes.
- The new PMMA plate for holder will be cut on Wednesday with the laser cutter at IdeaSquare.

11/ Samples Handling Robot replication.

The interest of replicating the present robot, for spare or for exhibition, has also been mentioned.

Once procured the various equipment: linear stages, construction rails, cable trails... **10 days - 3 people** will at least be necessary to fully reconstruct one (mechanics, cabling, electronic cabinet, software).

Procurement of the linear stages is not possible using the normal CERN DAI, instead we have to send the money first to the manufacturer (Fuyu)

Progress:

- Still on the to-do-list: purchase linear stages, motor drivers, power supplies and limit switches (total \$552).

12/ Vacuum consolidation activities **(ALMOST DONE)**

The crate controlling the turbo pump is still inside the CLEAR and suffers from the radiations, resulting in frequent shut-down of the pump.

The vacuum control panel (PVSS) is not actualised with the recent line modification.

(Action for CLEAR operation team: contact Alice and Jose and check their availability to achieve these consolidation during the shut-down).

Progress:

- Jose is still working on the vacuum Synoptic to update the names of pumps and gauges.

13/ Control room consolidation **(ALMOST DONE)**

Control room is to be made more friendly for us and for our users.

Progress:

- The 3 new chairs arrived.
- The new keyboard and mouse arrived.
- Still waiting for the hub.

14/ AOB

The cooling water now flows in the magnets.

There was a visit at Bergoz to discuss about the testing of a Wall Current Monitor inside CLEAR. The preliminary tests would happen in air sometimes in the next 3 months.

