

# Crab Cavities Technical Coordination XXIII



**Location:** 376/01-020  
**Date:** 27th March 2017  
**Time:** 10.30  
**Scope:** coordination and alignment of tasks involved in the preparation of SPS tests, follow up of master plan.  
**Attendees:** Alick Macpherson, Frank Gerigk, Rama Calaga, Giovanna Vandoni, Mateusz Sosin, Kurt Artoos, Ofelia Capatina, Mathieu Therasse, Aurelio Berjillos Barranco, Eric Montesinos, Silvia Verdú Andres, Karl Schirm

**Workflow:** EDMS 1703245

**Master schedule:** EDMS 1747466

**Logbook:** <http://elogbook.cern.ch/eLogbook/eLogbook.jsp?lgbk=387>

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## Cryomodule Review

Frank asks to have something to show on crab-cavities for the review's visits and the management visit 20th April in SM18. It is excluded to have the PoP USA cavity, because it will come only once available, namely during the cryostop in Jlab. For the management visit, we'll also have some items to show on other programs, although crabs are the project on which there is more attention today.

Acceptance Criteria document: task-leaders and interfacing WP leaders have given their comments, minor. The result will be presented at the review next week, as it was asked by the last review approx. 1 year ago. Rama will go through the list of recommendations during the review.

A visit is foreseen in SM18 for the review, although the cavity will be in the main workshop, not in SM18. The visit is on Tuesday during lunch time, organized by Ofelia, with sandwiches in the visitor area, for ~10 persons (7 reviewers plus some people). Monday lunch is in resto 2.

## Activities in SM18

Preparation of CM assembly out of clean room. Is space clear? Mathieu assures it will be ready for the 10th April, as requested by EN/MME for assembly of the portique

Portique: everything is ok at the supplier's premises, no delay expected. Whether it will be visible for the visit, not sure, but at least in assembly. During the management visit, Frank wants to make the point that we need to maintain several infrastructures for different projects.

**Vacuum:** Vincent Baglin confirms that the most expert technicians in clean room vacuum work are not with VSC but with 4030. It was agreed by Vincent that 4030 is validating the steps by leak checks, while VSC will only validate the beam and insulation vacuum of the cryomodule before cold testing.

## String assembly preparation and sequence (M.Therasse)

**Sequence.** Mathieu explains the string assembly sequence. Cleanliness check is done by wiping with non-woven tissue and check the residuals on the tissue. The helium tank is cleaned at EN/MME before welding.

If the outside of the helium tank needs degreasing, different options may require different preparation time, so better be prepared or choose one option.

Once cleaned, the dressed cavity goes on a dedicated trolley, using the SM18's crane. Then it goes into ISO5, where it is prepared for the ISO4. To support the cavity for mounting of the HOM couplers, we need an interface piece, discussed with EN/MME but not yet designed –ready within the next 2 weeks. The special lifter arriving on week 15 will ease this step. As discussed with Eric, it is easier to turn the cavity, than to mount the HOM having the cavity on the support (bad access from below).

Leak detection is done here once FPC and HOM installed. For the leak check, 1 flange needs to be removed and substituted by an adaption and metal valve. As a warm antenna will be put back on cavity 2 after the cold test, there will be no need to change the adaptation flange for cavity 2. There would be no nitrogen flushing here as the risk to introduce particles by the flushing operations is considered higher than the risk without. Leak check is done as well in ISO4.

**String trolley** will be blank assembled at reception, then parts cleaned and reassembled. Cavity will be transferred from the ISO4 to the ISO5 where the string is assembled.

**Vacuum valves** are arriving end of May, they need cleaning from dust while repeatedly opening and closing the valves. The same was already done for HIE-Isolde, so the procedure is known.

**Bellows** preparation: we will have 3 type of bellows therefore 3 different preparations. Reception date will be just in time, under the control of Malzaecker. At reception, bellows are checked, external parts cleaned, bellows inner surfaces blown with N2, then bellows are conditioned in plastic bags. All parts are receptioned, checked, rinsed and conditioned if possible in b.252.

**Clean room tools.** We are looking into using a special fork to install on the new lifter. The design of this new fork, to be done by Actiworks, must be compatible with the BCAMs. If this is not possible, we will use the standard lifter to be purchased this week from the Manutan catalogue. Clean room equipment is completed by standard clean room tables supporting 250kg. We need new lifters because the ones we have do not do the job.: either the charge is not ok, or the fork is too low. Buying another one today is dictated by urgency, but ideally we should have one in the ISO4 doing all the job.

**Clean room preparation.** Two patch panels will be installed in the main ISO5 with pumping ports, gas inlet and electrical feedthroughs. Pipes are ready for gas line interface and electrical interface: planned between mid and end April. Consumables are ready, 3 new ion guns are delivered but not yet installed.

**Pumping, venting, leak detection:** the equipment was discussed with A.Grimaud and approved. RGA is not yet ordered because quite expensive: maybe VSC can lend one. The use of an RGA would be an asset not only in leak detection but also in assessment of cavity cleanliness or contamination. In terms of vacuum related issues, problems appear when removing flanges and having the copper gasket stuck. Leak detection completes the procedure in ISO5.

HOMS and double tube were discussed with Eric. Rinsing will be in b.252, with a tube for 8 pickups, cleaned all together then stored under vacuum.

**Alignment** in clean room: the plan is to check the stability of the clean room floor, then use no dedicated tooling but only some adaptation piece. Only the real floor can be used as a support for alignment equipment, the artificial floor will need to be removed locally.

## Status:

### Cavity #1 (Ofelia)

First cavity: EN/MME is proceeding to experimental mode analysis. Originally planned to be done also with the supporting system, but we may drop this. Assembly of the helium vessel: pieces are in preparation, we are still consistent with the planning, although very tight, no contingency. We detailed 17 sequence steps for the helium tank welding, meaning 17 days of work. For sure it will be impossible to finish before the date Aurelio quoted. In this procedure, there will be no grease nor fluids which may contaminate the cavity. Some wax used to attach the accelerometers, but not on the interfaces and easy to clean away. People working on it are aware of the problematics of clean room and taking great care.

### Cavity #2 (SM18)

Progress on cavity 2: there may be a small external leak, on the cryostat's pumping line. The low field  $Q_0$  is  $9.3 \cdot 10^9$ , maximal field attained today was 4.5 MV. Cavity 2 shows the same consumption as cavity 1. Action point concerning the leak: perform a further leak check, understand the RGA spectrum with the help of experts (B.Jenninger).

## Planning:

Aurelio reports. Today we are late by 1 weekend on schedule for connection in the SPS. It may become better aligning the CM on the cold-box schedule, to be confirmed by the cryogenists. Rama asks that for next week's cryomodule review, we keep today's planning by Aurelio throughout the talks.

Planning number is always related to the preceding meeting, today it is #23. Planning is on INDICO and Sharepoint. Aurelio explains the main changes, which bring us to some 3 days of delay. Eric asks that the "s" is dropped on FPC and a capital "S" added for HOMs (S=suppressors).

## SPS report

SPS: the EYETS was concluded successful, besides for 2 activities which didn't match the goals. EN/EL pulled all the cables but was not able to put all connectors therefore test all cables. TE/CRG didn't finish the warm pipework. They were late since the beginning and weren't able to catch up with this delay. None of the 2 will get on the critical path, which remains with the Faraday cage, the cold-box and the transfer table.

## AOB

- Frank reports on the check of all space potentially available in BE/RF, with a  $>50\text{m}^2$  filter. An extension of b.252 onto the parking lot is under study.
- Reminder: Cryomodule Review is foreseen for the 3-5.4.2017  
<https://indico.cern.ch/event/590988/>

## Action list:

### General and Planning:

ID	Action	Responsible	Opened	Closed	Result, Comment
18	Introduce infrastructure (mainly cryogenic) availability inside the planning	Aurelio	26.9.2016	30.1.2017	See action 42. To be reopened once dates of cryo stop are well defined
47	Announce the new versions of the planning, when available	Aurelio	27.2.2017		
50	Adjust duration of tasks 206, 255, 256 and 324 of the master schedule according to inputs	Aurelio, Carlo	13.3.2017		Assembly of HOMS and pickup: 3 days for both cavities FPC mounting: 3 days for both cavities No HPR after dressing for both cavities
41	Definition of cryo tests feasible without cryomodule	Krzystof	30.1.2017	13.2.2017	
42	Timeframe for cryo shutdown to be agreed	Frank	30.1.2017	27.2.2017	15.8.2017 – 30.9.2017
49	Define detailed test sequence of Cryomodule in SM18	Alick (inputs needed)	27.2.2017		Inputs needed (RF, cryo, vacuum...)
51	Follow up DG visit to SM18 on 20.4.2017	Frank	13.3.2017		

### Documentation:

ID	Action	Responsible	Opened	Closed	Result, Comment
32	Approve and/or comment acceptance criteria	Task leaders	19.12.2016		Approval resumed after comments
44	MTF to be updated with actions on chemical processing, heat treatment and RF conditioning	Carlo	30.1.2017		Input needed by Alick and Leonel
46	Correct HOMS naming in workflow	Carlo	13.2.2017	27.2.2017	

### Design:

ID	Action	Responsible	Opened	Closed	Result, Comment
29	Follow-up design of Y chamber and supports by EN/MME for TE/VSC, by a dedicated SPS test-stand meeting (out of CCTC). Report on the outcome to the CCTC	Luca, Giovanna, Rama	21.11.2016	27.2.2017	Design done

**Cavity production and processing:**

ID	Action	Responsible	Opened	Closed	Result, Comment
10	Follow up vacuum activities. Document listing all activities to be approved by Vacuum task	Giovanna	1.8.2016		Giovanna has a first draft of the document. Someone from vacuum should join the CCTC every now and then
45	String assembly sequence (full definition)	M. Therasse (+ Alick, initially)	30.1.2017		

**Tools & Ancillaries:**

ID	Action	Responsible	Opened	Closed	Result, Comment
43	Tools for monitoring alignment in clean room	Mateusz	30.1.2017		Mateusz will organize a wrap-up meeting

**Space:**

ID	Action	Responsible	Opened	Closed	Result, Comment
14	Follow up reservation of assembly and storage areas in SM18	Karl, Rama	1.8.2016		Space request in SMA18, 200 m2. Visit service agreed in leaving us the sofas space in SM18. Space between bunkers in SM18 can be used, but it's not a working area and it cannot be accessed while tests in cryostats are running (radiation). Alick to provide test plan to Marco
37	Urgent need of storing space	Rama	9.1.2017		bldg. 162 will be available in a few weeks
38	Buffer space for transfer table	Kurt, Rama	9.1.2017		Final decision after EYETS
48	Make sure the space in front of the clean room is free when the Vacuum Vessel arrives	Karl (tbc)	27.2.2017		

*Minutes taken by Carlo and Giovanna (for SPS)*

*Next meeting: Monday 13th of March 2017*