LHC RF Meeting
13th January 2006

Participants: Luca Arnaudon, Philippe Baudrenghien, Thomas Bohl, Olivier Brunner, Andy Butterworth, Edmond Ciapala, Trevor Linnecar, Pierre Maesen, John Molendijk, Eric Montesinos, Elena Shaposhnikova, Joachim Tückmantel, Daniel Valuch.

1. ACS Modules (Pierre)

- **Module 4:** The frequencies were measured. Cavity D has moved ~ 30 kHz upwards, is now only 50 Hz below Frf at minimum and will probably need to be fitted with springs. This was also the first cryo test of a module fitted with new safety domes.
- **Module 2:** Two vacuum problems – small leak on the stopper flange (due to slight indent on sealing surface!!) and a leaking sector valve (same side – cavity D. The latter was due to a small particle preventing proper closing. The leaks were both small, no significant increase in pressure was measured during operation. The particle will be analysed to find the type of material. It was discussed whether or not this leak could explain the problem during last power tests on this same cavity, with field level being one half that expected for the applied forward power. Normal experience however with any contamination of a cavity is that large He dissipation prevents application of the full field and corresponding power. However the module will be tested in the bunker as soon as helium is available after the cryo winter stop.
- **Module 5:** Will be fitted with couplers in two weeks
- **General planning:** This has been updated recently. The current version (13th Jan 2006) is as follows: After the module 2 re-test, modules 1 and 3 will be cold tested in the bunker, without power, following their tuning and cryo mods. Module 5 will follow for conditioning and power test. Two modules will therefore be available in April 2006 and the remaining two by end June.

Note: that the latest long term planning can be found via this link to the ACS RF web pages

- **Vacuum group support:** Other start-up activities are putting pressure on the group. Even minor changes in our schedule may result in delays due to non-availability of the specialist. We may be able to get support from M. Jimenez.
- **Bellows and cycling test:** The prototype bellows is now going through the cycling tests, under vacuum. If results are OK we will start the procedure to purchase the series.
- **Torsion Bars:** The number of cycles to which this part has been tested is 14000. We need to find out what this means for lifetime under our expected operating conditions.

2. ACS Couplers (Eric)

- **Couplers 126 and 126:** SA2 conditioning has re-started. The SA2 water system ran without interuption over the end of year break. Conditioning is in the early stages but proceeding normally.
- **Couplers 128 and 128:** will be assembled and leak tested next week and baked the following week. We would like to have these couplers finished in SA2 before the stop at the end of March/beginning of April.

3. ACS Power (Olivier)

- **SM18:** The klystron has been switched on
- **HV boxes for klystrons.** The supplier will give an answer next week on the re-design of the HV box to avoid the problems of proximity of the top part to HV.

4. ADT Equipment (Eric)

- **Kickers:** We are waiting on the vacuum group for bakeout of the first kicker in B113. It has been agreed with vacuum group, after the tests on the copper bar as used for the electrodes, that bakeout will be done to 200 °C. We now have all 20 kickers, electrodes and parts from Dubna and everything appears in order. The Dubna team will come to do the assembly. The planning needs to be agreed with the vacuum group.
- **Amplifiers:** The final design has been agreed between ourselves and Dubna. No. 5 is being completed in Dubna, for the end of February. Eric will visit and series production will start soon after. A new resistor design will be delivered for test at the end of January.
- **Installation of anode supplies:** Installation in SR4 will start in March. The transport support cross piece has been approved by SC for use in this installation process.

5. APW Equipment (Eric/Thomas)

- **PU 01 Bakeout:** We are waiting on the vacuum group for bakeout of the APW 01.

6. LLRF (Philippe/Daniel)

- **Planning for VME modules and crates:** The final technical and manpower resource planning for module production is being agreed between CA and FB sections. CS section can provide additional help for assembly, test and software configuration of the VME crates. At the moment the power supply current ratings have to be verified, but other work can be started in the meantime.
- **RF system components (Daniel)**: HV dividers for ADT (60 pieces) have been made and tested. The signal distribution crates for the Faraday cages have been made. The klystron pre-driver module prototype is ready for test.
- **Klystron transients:** These have been measured during the feedback system tests in SM18. (See Philippe's presentation on the tests done). Values in excess of 1 MW peak were observed. In this case the transients were of short duration and did not cause arcing. The power couplers have been conditioned to an equivalent 1.2 MW power. We might expect however that that we may have substantially higher reflected power transients during operation, for example for the longitudinal damper for which a worst case 180 ° rapid phase change in the forward power could be introduced. LEP experience when the beam was lost is also a worry. The questions of the maximum amplitude and duration of these transients and their effects were discussed. The estimated values probably need to be rechecked and also simulated with Joachim's program. For the moment this is not a reason to abandon work on the longitudinal damper! (Note also the Joachim is preparing a proposal for a transient reduction system). Positioning of arc detectors should also be looked at.
- **LLRF presentations:** It was agreed to have presentations on two subjects in coming meetings:

1) The results of the Matlab simulations on the feedback system, by technical student J.K Holma (3rd February)

2) On the SM18 test of the tuner system, by Philippe and John (10th February)

7. Controls Equipment (Luca)

- **Equipment:** The bulk of the controls equipment, PLC systems, I/O units and other crates for ACS has been produced and tested. ADT equipment is ongoing. Installation in UX 45 cannot be done till all cabling is completed.
- **System Testing:** A complete set of control and I/O interface equipment is being installed in the Lab to allow overall system test and software development for ACS. For ADT the B867 test stand can be used as the equipment installed is close the final versions.

8. UX45/RUX45 Installation (Olivier)

- **UX45 CE work & platform:** The work on walls and platforms has been completed. Some costs may be considerably higher than expected (e.g. waveguide holes twice expected!)
- **QRL work:** is going on, the parts for sector 3-4 are in the tunnel, ready to be assembled. Until this has been completed there can not be any access to the area between the walls.
- **Cable trays:** Between the walls the original cable trays had to be removed and will be put in place later. The positioning will be different but this will not affect our cable lengths much. We would like to avoid an additional platform between the walls. Elsewhere cabling is progressing well. Progress is being followed by J-C Perrier on this as well as the Faraday cage work..
- **Access doors:** The positioning of the doors to restrict access to the upper part of the UX45 cavern has been decided.
- **Waveguide mounting:** The order for the waveguide installation work has been approved.
- **ADT water cooling:** 'Piquage' has been decided. The work will be done in a few weeks, inder a new contract with the company.
- **Floor painting:** We agree that painting of all floor areas, UX45 and RUX 45 is essential to avoid dust problems later on when equipment is installed. The best time to do this work will be after cabling and just before major equipment installation.
- **Earthing in UX45:** We still need to establish the earthing connections between the UX45 equipment and the tunnel earthing system - with J. Pedersen. (TS-EL)
- **Faraday cage work:** The false floors are being put in place inside the Faraday cages. The false flooring for the rest of UX45 will come later.
- **UPS Supplies:** These are now in place, in the PZ45 end of UX45 and are being connected
- **Ventilation units:** The installation will start soon, the 6 rack ventilation units will be installed at the beginning of February, followed by the systems for the HV bunkers and the Faraday cages.

Next Meeting: Friday 20th January at 08:45 in the JBA Room 864-2-B14.

E. Ciapala, 16th January 2006.