LHC RF Meeting 27th October 2006

Participants: Luca Arnaudon, Edmond Ciapala, Wolfgang Höfle, John Molendijk, Eric Montesinos, Daniel Valuch, Frode Weierud.

1. UX45/RUX45 installation (Luca)

Cabling around ACS modules: All HOM cables on one module have been connected. For the remaining three modules all the cables have been cut and put in place, only the connectors now need to be fitted by TS-EL. One HOM cable however is too short. We will purchase splicing tool for 3/8 inch cable and try to extend this cable. Fixing the blue antenna cables is still under study.

Cryo Instrumentation: A. Suraci is preparing installation of the capillary lines for He pressure measurement for the cryo control system.

Coupler mechanics and control: A complete assembly was put on one ACS cavity just after installation, to verify that there would be no installation difficulties. This has now been checked for correct operation of the drive, including limit switch connections and position readout. Control can be done both by the cavity controller and by the PLC control system, the latter very useful for commissioning and test.

Klystron and circulator installation in UX45: Only two klystrons and circulators remain to be transported. Four klystrons and circulators (i.e. one row) have been aligned, the waveguides connected, HV cables connected and the controls racks installed and cabled. Removing klystrons near the wall may require displacing one other klystron and two circulators. Support wheels are being changed on each klystron before installation, to allow better manoeuvrability.

ADT grounding: Grounding from the tanks to the supports then to the main ground is being put in place.

Racks grounding: In progress for ADT, APW racks on the other side of the quay will be done at the same time.

4 ADT vacuum and interlocks: There is one vacuum pump per module (two kickers). One contact pair will be taken from the control unit of each of these pumps (situated in the RAs) to the ADT control racks, to either cut the RF or the HT in the event of overpressure. The cables have been requested (Luca).

ADT Heater supply box: Two distribution boxes, one each side, will be put in place to distribute 400 Vac to the tetrode amplifiers for the heaters.

HV Bunkers: Installation of equipment in the third bunker installation is nearly finished.

4 ACS Rack area: Practically all equipment is now installed in the racks and cabled, only a few interconnecting cables have still to be done. The false floor will be done at the end, probably by FSU. We have a stock of floor panels in SR4 and a suitable support frame will have to be made on the floor.

SR4 Enclosure: The order has gone out and it will be put in place by the supplier at the beginning of December.

ACS HOM Domes protection: Plates cut to the same profile as the domes will be fitted to both ends of the Beam 1 modules. A transport vehicle from either side would therefore touch these before the HOM domes. An alarm could be installed to provide additional warning.

2. ACS couplers and cavities: (Eric, Ed)

Coupler assembly: MCs 132 and 133 have been assembled baked and leak tested. Fitting to the SA2 test cavity revealed a vacuum problem with a double tube on the test cavity. This could be solved by re-tightening but the tubes will have to be changed for the next couplers. (Spares situation to be checked). The test cavity has been installed in SA2 and conditioning will start this week-end.

Couplers MC131 and 134 are being prepared. The tentative planning is to have the first pair conditioned by the end of this year and the second pair by the end of February 2007.

Single cavity module and coupler: The coupler mechanism has been fitted and mounting the cavity tuning mechanism is in progress. All remains on schedule for installation in the bunker the week after next (Week 45).

3. ADT (Eric, Wolfgang)

Dubna amplifiers: The Dubna team leader is here. We expect to start receiving amplifiers in mid-November. The two remaining kickers will also be completed when the full team arrives in December.

4. LLRF (John)

4 Conditioning DDS: John showed <u>I & Q signals</u> and the <u>I vs Q plot</u> for the carrier with the double (slow and fast) FM modulations, correctly generated by the module and measured using the tuner front end and control modules. The plot shows the 'slow' sweep with superimposed smaller circles from the fast modulation. For meaningful power measurement squaring of both I and Q samples is needed. A module to do this will be added in the tuner control FPGA. Taking the square root of the sum will be done by the VME processor.

A problem with long term drift in the output amplitude (<u>See last meeting 20th Oct</u>) may now be understood. Two DDS outputs are used to make frequency modulated 100 MHz I and Q signals, subsequently mixed with 500 MHz. If ramping of the two components is not absolutely synchronised cumulative phase errors may cause I and Q eventually to shift apart (into the wrong quadrants) and the de-modulating mixer to produce 600 MHz, which is filtered out. Synchronising the ramp start signals with the internal clock of the DDS should cure this and will be tried soon.

Series Production of LLRF modules: Our component inventory nearly completed. This will be given to TS-DEM who will then organise procurement of remaining material. We should probably try to keep track of our own stock situation as components are used.

Setpoint module: Final checks were done on the layout. Some routing improvements for RF signals will be done then production of a prototype will be launched by the design office.

Crates: The ATOS representative will visit next week (one week delay) to discuss crate mechanics delivery dates.

5. AoB

Hardware Commissioning – RF and Cryo: We are preparing the specs for He stability requested at the meeting held last week with the hardware commissioning team and Luigi Serio (AT-CR)

Oxygen Bio-Cells: Now that work is going on continuously in Point 4 there is a shortage of these. We should buy another four (Luca) to increase the pool or make another. A list of personal holders can be made for borrowing if the pool is empty. Note that J-Y Benoit in 904 1-004 has some that can be borrowed for short periods , e.g. for visitors.

Electricity in January 2007: There will be a two week period in January during which EDF maintenance will limit the site to 60 MW. Requests for running have to be given to F. Bordry and M. Batz (TS), giving the priority. We have confirmed with L. Serio that cryo in SM18 has been requested. We will therefore add the 500 kW for RF power in a separate request. Eric confirms that RF powering SA2 and B867 will not be done during this period. We need to decide if we would need power in UX45 during this period and make the corresponding request. (Olivier/Luca)

Next Meeting: Friday **3rd November** at 08:45 in the JBA room.