LHC RF Meeting
21st October 2005

Present: Luca Arnaudon, Thomas Bohl, Olivier Brunner, Philippe Baudrenghien, Andy Butterworth, Edmond Ciapala, Trevor Linnecar, Pierre Maesen, Joachim Tückmantel, Volker Rödel, Daniel Valuch, Frode Weierud.

1. ADT (Trevor + info from Wolfgang)

- **News from Dubna:** 15 kicker tanks, two power amplifiers (to be retro-fitted at CERN) and about half of the electrodes are in a truck on their way to CERN (due to arrive in about a weeks' time).
- **JINR Collaboration:** A presentation of the LHC Damper project was given at the recent CERN/JINR cooperation meeting (presentation prepared by V. Zhabitskiy and Wolfgang). Dubna Television is visiting in B867.
- **Water-cooled resistors:** Four water-cooled resistors have been sent by supplier Pulzer but the problems continue. One resistor has been repaired (now works up to 14 kV), two leak above 8 kV and one at 5 kV. Nevertheless, we will mount them and start testing at 5 kV. With one tetrode we could go safely up to 8 kV. Tests should be done for an extended period (e.g. two weeks) after which an analysis on these resistors could be done. The supplier now thinks that due to the size of the devices and the unavoidable stress during moulding long-term damage is caused to the ceramics. As the repaired resistor (cut open and repaired in the center plane) holds the 14 kV, the strategy is now to make two half pieces separately molded. Pulzer is working out a proposal.

2. ACS Couplers (post meeting, from Eric)

- **Coupler conditioning test stand:** Conditioning of couplers 124 and 125 remains difficult but progressing in pulsed mode. There are fewer arcs than at the start of conditioning. New arc detectors will be fitted in the SA2 test stand

3. ACS Modules and SM18 (Pierre)

- **Module 5:** has been cold for nearly two weeks. The lower frequencies of the disc spring compensated cavities (B and C) have been measured during cool-down. See PLOT. **The excellent result** is that these two cavities have been successfully brought down in frequency and can be tuned normally throughout their new ranges. In fact we have over-compensated, but this will be adjusted back when the module is taken out of the bunker. The correct adjustment can now be predicted for other cavities. There was no problem for the stepping motors of the compensated cavities, even with 20 m additional drive cable. The necessary material for another 10 cavities has been ordered. (Olivier). It may take up to 3 months to get the full number required but we have a small stock of 300 springs.
- **Module 2:** The apparently reduced antenna signal which was observed on cavity D before the module was removed from the bunker is a serious concern. No obvious problem was seen on the antenna connector when the module was opened. Additionally the responses on both antennas to a signal applied on the waveguide transition were similar. The behaviour is not consistent with any previously experienced cavity deterioration. We should check the main coupler and compare warm conditions with another cavity to get some more information. We will clearly have to test this module with power again. We may have some extra running time in SM18 if the cryo shut down is delayed due to changes in the magnet test schedule (LTC information), giving an ideal chance to do more tests. The leaking sector valve will need to be changed in the clean room.
- **Modules 1 and 3:** These are now open for fitting of modified safety domes.

4. ACS Power (Olivier)

- **Klystrons** The last klystron is presently under test in H112. One klystron still needs adjustment of the tuning mechanism on one of its cavities.
- **Drive chain:** A measurement of the response of pre-driver, driver and klystron, and saturation levels will be done next week in H112.

5. **APW (Thomas)** RF tests are being started on the prototype while waiting for vacuum group availability.

6. Low Level RF (Philippe)

- **Faraday cages:** Construction both Faraday cages is almost completed. The lower patch panels are in place, doors have been fitted and electricity is now being installed. The connecting duct between the cages is also in place. The insides now have to be finished off.
- **TTC upgrade:** The document "TTC System Upgrade - Project Definition", Doc No .628545 is in EDMS and is under approval at .https://edms.cern.ch/comment/628545/2 The division of responsibilities between AB-RF and the experiments is clearly defined in the document. A deadline of Spring 2006 is requested for the first prototype system….
- **Fibre optic equipment:** For the 10 initial links the transmitter/receiver modules will cost 80 kCHF. The modules proposed and extensively tested are the only ones both having the needed bandwidth for all applications and which can be easily integrated into our hardware. We need to obtain them rapidly to be ready for the sector test. (See also TTC upgrade above)
- **Resources, planning etc.** The remaining ACS cavity controller modules, then the synchro modules and the beam control electronics represent a considerable amount of work. The problem of other commitments during machine start-ups was raised by Philippe. Planning is being studied by Wolfgang. **LHC priorities** are likely to be the cavity controllers (modulator, setpoint and conditioning modules) and the synchro modules where larger quantities are needed and hardware commissioning and sector test deadlines are approaching fast.
- **Patch Panels:** Daniel's RF patch panels are the first pieces of RF equipment to be installed in the UX45 racks.
- **HOM loads:** The special custom attenuators, made in 5 stages and better capable of withstanding HOM signals generated by the beam, have been ordered.
- **Series production:** The ordering of components for the tuner card has been started by TS-DEM. While checking of the orders before they are sent out is tedious it is indispensable to avoid problems later on. The overall arrangement will save us effort in the long term. Trevor has been invited to visit their workshops by E. Van der Bij. **Anyone interested is welcome to join him on this visit.**

7. Controls and Software

- **Software (Andy)** Drivers which also include a certain amount of functionality have been developed and FESA is being implemented for the tuner controller. So far we have no more news on IEPLC and FESA integration from AB-CO.
- **ADT control hardware (Luca)** about 90 % of the material for ADT is in production. There are some issues to be resolved concerning ADT interlocks: use of fast interlocks, location of the Power Interlock Module and interlocking of Ug1 supplies. This will be followed up with Wolfgang and Eric.

8. UX45 installation

- **Cabling:** The first 7/8 flexwell cables have been pulled from the surface for the APW. Cables of ~700 m have successfully been pulled for ADT, from SR4 to pick-ups in magnet cryostats, in single uncut lengths as we requested. Unfortunately one cable was run over by a heavy tractor and has been flattened to half its diameter at one point. (Interestingly this does not show up as a serious defect on the analyser). However the cable can not be used. We just have enough spare cable to pull a replacement. Removal of the damaged cable will be difficult.
- **Faraday cages:** See LLRF above.

- **Floor in transport area:** Since very heavy equipment will pass through (up to 40 T) thick metal plates (22 mm) will be placed on the floor. This will not cause problems for pulling RF cables later.
- **HV Bunkers:** Roofs are finished, the inside construction will be finished next week.
- **Platform:** The reinforcing is still in progress, safety rails are now installed around the waveguide passages and some additional elements will be installed to facilitate the installation of waveguides.
- **ADT Water:** The arrangement and 'piquages' have been defined with J. Inigo-Golfin (ST-CV). A pressure reduction system, similar to that for the klystrons and loads, will be installed. F. Moro will continue to be responsible for the installation.
- **QRL Installation:** The installation of the elbows in UX45 will be delayed. This affects our cabling work and testing.
- **Electrical Installation:** This is delayed and there is no sign of activity for the moment.
- **Installation database:** Entry of data for ACS cavities will be started with S. Chemli next week. The database can be found at http://lhclayout.web.cern.ch/lhclayout/.
- **Warm recovery connections for ACS modules:** The cable tray restricting access for inserting/removing the flexible pipe and tube for the warm recovery outlets have been displaced. The clearance should just be enough, but should be re-verified.

9. AoB

- **Stores delivery delays:** Luca and Daniel pointed out problems with the delivery of crate and connector components which are severely blocking progress in preparing electronics equipment. They have not been able to contact the responsible person. Trevor agreed to follow this up.

Next Meeting: Friday 28th October at 08:45 in the JBA Room 864-2-B14.

E. Ciapala, 22nd October 2005.