# Meeting on Status and Planning for the 400 MHz LHC RF system (ACS) 13<sup>th</sup> September 2002

#### Present:

Luca Arnaudon, Philippe Baudrenghien, Andy Butterworth, Thomas Bohl, Olivier Brunner, Edmond Ciapala, Roberto Losito, Trevor Linnecar, Eric Montesinos, Joachim Tückmantel. Absent due to vacation: Volker Rodel

**1) Installation** The LEP dipoles forming the quay in UX45 are now in place and the necessary concrete filling poured. There have been minor delays but the concrete floor will be laid beginning of week 39.

#### 2) Status of the various ACS systems

#### **Power Couplers (Eric)**

With a compressed planning, based on more rapid production of ceramics, it will be possible to have the first four series couplers for August 2003 - if all goes well. An important milestone, installation of couplers and conditioning of a completed SC module, would then be reached before the 2003 winter stop in SM18. The ceramics will be supplied by Verelec, who will also do the brazing. The schedule is critically dependant on a successful test (cut) of a prototype copper seal ceramic in the coming week.

In SA2, tests on the conditioning cavity, with one coupler having kovar sealing rings and the other copper, have now reached 250 kW. Previously observed vacuum activity at 200 kW on the kovar equipped coupler was not seen (This may have been due to a power glitch affecting vacuum equipment)

### SC cavity module completion (Roberto)

The modified second beam tube has been mounted on one cavity. This will be baked out using the standard procedure. The module will be cooled down to check that the tube stays at 300 K. This test will be completed by the end of week 38. If successful all tubes will be fitted by the end of the year.

Thermal cycling of the modules. A slow drift in central frequency with time (up to 30 kHz) is eliminated by thermal cycling of the modules.

In SM18 helium pressure spikes, resulting from power cuts or fluctuations, together with problems with valves, have resulted in helium overpressures in some cavities, 2 bar being reached. Fortunately no changes in central frequencies occurred. The protection of the cavities with suitable valves has been discussed with the cryo experts. *This needs to be followed up urgently with them*.

## RF power (Olivier)

Further news on the first load is expected soon. The second klystron, with redesigned gun, is expected in October. In Hall 112 setting up is in progress of a system for compensation of waveguide bends. A solution is needed for arc detection in waveguides near the cavities, where there are high radiation levels – principally X-rays from the cavities themselves. The problem is more difficult for cavities at the extremities (inside the tunnel) where waveguides have tight bends and arcs near the cavity will not be easily detectible downstream. Easily replaced detectors or fibres could be used. Radiation shielded components or fibres might be another solution (military standard?)

#### Low level RF system. (Philippe)

Analysis of the system is ongoing. Requirements and design will be discussed in separate regular Beam Control meetings.

For the SM18 chain tests the high level of power supply ripple components (6% total) may complicate test of the feedback loops. The possibility of changing the SM18 supply to a

standard LEP supply has already been investigated. The estimated cost however was 100 kSFr. The ripple levels for the LEP supplies should be checked in comparison *(see presentation by H. Frischholz & O. Brunner on klystron characteristics to HRF Group meeting 25<sup>th</sup> Feb 2002)* and the possibility of improving the existing supply (re)considered *This should be re-discussed with PO resp. R. Genand* 

Other Systems: See planning status below

### 3) Planning status for the various systems.

Good progress has been made using Microsoft Project. It allows a graphical representation of the planning and project breakdown in the needed EVM structure. It can also provide necessary calculation of resources and manpower for the work units. This should make transfer into the EVM straightforward, but not (for the moment) possible by direct means. The individual planning for the various systems should use the standard units set out in P. Bonal's example sheet as far as possible.

### SM 18 Modules and chain planning

A start to a more detailed planning than that presented last meeting will be made for both items. Important issues are:

- Availability of the SM18 clean room and its maintenance (40 kSFr/year).
- Availability of personnel experienced in clean room work and assembly of the cavities for future work *to be agreed with Enrico*.
- Availability and cost of Helium. (transfer line upgrade ?)

### *Power Couplers* (Eric)

A new detailed planning has been made. The level of detail needed to make this is greater than that needed for EVM. (A simple solution for automatic summing of work resources from the lowest level to the EVM level has yet to be found!)

# **RF Power** (Olivier)

The planning and resource estimations are ongoing. In order to plan spending for large items Trevor requested that a list (database) of large contracts and purchases exceeding a certain amount be established.

# Low Level RF System (Philippe)

A basic planning has been prepared, for presentation next meeting.

# Controls Electronics (Luca)

A detailed planning and resource list is well under way. As for the power coupler planning, a level of detail one level lower than that needed for EVM is needed to make sensible estimates. Handling at this level of detail for a large number of items does not appear to be an excessive workload and even brings advantages for the overall management.

### Software, Diagnostics and Post-Mortem

Basic planning for this was presented. The new AB-CO controls group is presently organising its resources. The equipment groups have been asked to define the items needed, with dates. Software planning and requirements for the RF systems will be presented to the AB-CO Technical Committee on 19<sup>th</sup> September.

## 4) AoB

The planning for the ADT and ACN should also be discussed in the present meetings.

An official photographer should be nominated to keep a photographic record of progress on the various systems and of the installation in LHC.