Minutes ITS engineering meeting 19 April 2001

Point from last meeting
The use of extension cables (for the front side of the ITS, TPC in parking position) for the testing the ITS during installation has been accepted.
Provided the maximum length of the cables to the shoeboxes remains limited (25 meter)

Main topics

Air-cooling
The requirements for the SDD are not yet clear. For the SPD the requirements are related to the stability requirements of the SDD.
The power to be taken out by air-cooling for the different detectors is:

SPD	50 Watt
SDD	260 Watt
SSD	0 Watt, airflow to prevent hot spots

The main importance of this discussion is the requirements in terms of space required for the air supply ducts and the necessity of another air supply structure (cone). Another air supply structure has serious design implications due to limited available space.

Cooling
Main problem for the cooling is the cooling fluid in particular the corrosion effect caused by the cooling fluid.
For the cooling one should assume that one could design a leak less system. To this end a strong emphasize should be put on the qualification of the materials for the cooling system.

Cooling SDD
As several of the current problems are governed by decisions on cooling by the SDD the SDD will come with a full report on cooling requirements (air and fluid flow) before the end of August, a preliminary report on the requirements for cooling for the SDD should be available in the begin of July. Before the next ALICE week the demands for cooling will be reviewed. With respect to these demands the following was mentioned, of main importance is a limited temperature increase within a limited time span. Mentioned was 0.8 ^{o}C for a time span of 15 minutes to one hour.

Cooling system outside ITS
The position, through which the piping of the cooling system has to be routed, has been changed. This implies that the piping no longer needs to be in place before summer next year.
For the further work for the cooling system outside the ITS, the cooling group at CERN will be asked for assistance.
To allow design work on the cooling system outside the ITS to start a requirements document has to been written. Main points for this document is fluid flows, control requirements and requirements from leak detection. Jarl Buskop will come with a preliminary document fore the next ALICE week.

Corrosion and plastic degradation
A document on corrosion and plastic degradation will be written for the next ALICE week by Jarl Buskop. Based on this document a strategy for necessary tests will be defined.

Installation
The deformation of the rails will be reviewed. The review is necessary, as the design of the TPC has changed.

FMD
For FMD Si 1 a proposal will be drawn for the support or connection to the ITS of the detector. This drawing will be made by the FMD group. The drawing should give a global indication of the required space. To this end the FMD group will be supplied with the current version of the beam pipe support cone. The drawing will be supplied by Lars Leistamm.
Assuming that for Si 4 the signal to noise ratio cannot be improved, it is proposed to move Si 3 close to the PMD. The following order of detectors is proposed, Si3, T0, V0, PMD. Advantage of this proposal is that common support structure could be used for these detectors, which would simplify the installation of the detectors and a support inside the cable support for the front-side can be avoided.
The problems with FMD Si 4 though require a management board decision.
Form the engineering side there is a strong wish to assume this modified layout of detectors as base line.

Services and connectors
The mock up on the services is showing progress, it becomes clear that we do not have sufficient space for patch panels on the muon plug, based on the current requirements. Therefore all groups are asked to review their requirements in terms of services. The patch panel layout on the muon plug has now changed to staggered, to create more place for connectors.
A connector from hypertac was shown, Pier Luigi Barberis strongly prefers the use of this connector.
There is no proposal for optical fibers connectors yet.

Cable support front side
The services support cylinder for the front side will be given its maximum possible diameter, to minimize the influence services support on the PMD.
The front-side support cylinder will not be given a conical shape.
Important to realize is that the maximum diameter is limited by the rails.

Rack requirements
All groups are asked to review their requirements for rack space for the next ALICE week. (19” racks).

Dynamic vacuum level
There is no clear result from the simulations yet, this is of importance if higher vacuum levels are needed. Because higher vacuum levels would imply that the vacuum pump should be moved closer to the interaction point. This would have a strong impact on the design of the front-side services support and this would complicate the installation scenario.

Details from the discussions

Air-cooling
The maximum accepted air speed in the SPD is 1 m/s, within the pixel support cone there is a flow speed reduction from 1 to 5, implying a maximum air speed of 5 m/s in the air supply ducts. From we can calculate the temperature increase of the air is for removing 50 Watt by air-cooling, the temperature increase of the air is 1 ^{0}C.

Cooling circuit outside the ITS
Most of this work is standard work, which could easily be outsourced.
Main points that have to be defined to allow this work to be outsourced are:
Control requirements
Leak detection
Issues related to corrosion caused by the cooling fluid.
Cleaning unit for ensuring the cleanliness of the cooling fluid.