Minutes ITS engineering meeting 7 October 2002

Also include are the main points of the meeting during the Alice week in September

Main points meetings

The installation procedure should be better documented.
(There will be a review of the Alice installation in March 2003)

The implications of the installation requirements of the vacuum pipe where discussed. It was concluded that the design of the ITS should allow for de –installation on a yearly bases.

There was presentation of the CERN survey group

Accessibility of the parts to be connected at the RB26 side

The sag of the rails (supporting the TPC) during the movement of the TPC requires realignment of the TPC to avoid displacement of the beam pipe and to avoid stresses in the TPC. The discussion emphasized the importance of the alignment systems. Also to be verified is the adjustment range of the TPC.

The space for the connection of the service support cylinder to the electronics frame needs to reserved. For the RB26 side it will be study if the same support system of the RB24 side can be adopted.

The work on the routing of the services at the RB24 side is still ongoing. The current view is that there are 4 patch panels at the RB24 side and 3 at the RB26 side.

The services from the ITS to the patch panel on the muon plug and the patch panel are sufficiently defined for the SSD & SDD to be included in the mock up.

A dummy structure of SPD will be coming to CERN shortly, in combination with the work of the SPD this would allow for a study of the services routing at the RB26 side.

The drawings of the area in front of the cone of the ITS at the RB24 side need further details. For example the support of the services of the SPD at the RB24 side needs to be further defined and there are no provision being made be any of the sub- detectors to guide the airflow through and from the detectors.

There has been a discussion about the airflow through the detector. Proposals have to be made be each sub detector.

Results where presented for the SSD ladder cooling.

The need of a thermal shield between the TPS and the ITS services or the use of only a cooling system for the cooling of the services was discussed.

An update was given on the status of the cooling of the SDD

The numbers on the power consumption of the services where collected.

SSD cone	50	[W]	SSD on muon plug	155	[W]
SDD cone	7	[W]	SDD on muon plug	21	[W]
SPD cone	48	[W]	SPD on muon plug	120	[W]

Given are the pessimistic values.

Action points

Open points

Document regarding corrosion, cooling fluid and tests thin walled pipes.
Jarl Buskop, due at the next Alice week.
Draft version available

Simulation effect localised material cooling pipes.
Flavio Tosello, simulations group.
Input for simulation now available, to be verified for SPD

Document regarding the power dissipation in the services.
The document has to be integrated in the cooling document.
Values now available, the be integrated in the cooling document

Design patch panel segment.
Jarl Buskop, Adriano Pepato, due at the next Alice week.

Procurement document thin walled pipes
Work ongoing

X-ray test thin walled pipes
Jarl Buskop, due at the next Alice week.
Work ongoing

New points

Strategy for the airflow
Proposal each sub detector due for the next ITS engineering meeting

Further details drawings RB24 side
Update due for each sub detector at the next ITS engineering meeting

Thermal screen services

Alignment Proposal for the alignment of the ITS during installation.

Details of the discussions

Vacuum pipe
In the discussions about the requirements around the vacuum, there are several aspects. The required vacuum level needed for the proper functioning of the experiment. The vacuum level needed for full beam current, the bake out requirements and the activation of the NEG coatings. As al the implications of these parameters are not yet fully understood and these parameters will not likely become available before the operation of the machine, the proposal is to take the safe approach. This implies that from point of the design one should assume the ITS will be de-installed and installed each year.

Presentation survey group
There was a general presentation about the capabilities of the CERN alignment group. Their methods and the requirements relating to these methods so these methods can be applied. Main point, for photographic measurement they need free lines of sight to a number of markers. The markers are about 40mm in diameter or larger depending on the actual set-up. The second main methods use theodolites, requiring optical markers to be mounted at reference holes; these markers are somewhat bigger.
First their needs to be a discussion in a small group with the survey group about the installation procedure.

Accessibility parts at RB26
Based on the available drawings at that moment and the foreseen actions at that point, there where some concerns about the space available for the last connections to be made for the SPD and the transfer of the connection of the temporary support plate and the ITS. More detailed drawings or the mock up should clarify this point.

Sag of the TPC rails.
The TPC moves significantly during the transfer from the baby- space frame to the space frame. Sag approximately 12 mm, angular deviation 0.15 mm.
These displacements could induce stresses on the beam pipe or the TPC.
The beam pipe allows a maximum displacement of 5 mm +/- at the bellows.
The allowable stresses for the TPC are not clear at this moment.
This implies that during the transfer the TPC needs to be re- aligned.
What points and how these points need to be monitored for alignment is not yet clear. Bjorn Nielsen has been asked to study this. Whether the alignment possibilities of the TPC can be used in this process needs to be verified. It has to be verified whether the adjustment range of the TPC is sufficient (more then 12 mm).

Services support cylinder.
It will be verified if the services support cylinder can be build up from the cable trays.

It will be studied if the services at the RB26 side can also be connected to the electronics frame of the TPC, decoupling the services from the muon plug and so avoiding stresses being induced by displacement of the muon plug.

Services

The global selection of the cables from the SSD from the ITS to the shoeboxes was presented. The requirements for the patch panel where discussed. For the SSD and SDD the patch panel proposed by Pier Luigi, is more or less how it is expected to be. For the SDD this has been verified. For the SSD the connectors are of the dimensions envisioned though the design of the patch panel needs to be verified, to see if there is sufficient space for the thicker cables running from the patch panel along the muon plug.

For the SPD these points where not verified during the ITS week.

For the SSD and the SDD there is now sufficient info to include this in the mock up.

Airflow

A proposal for the airflow from each sub detector is needed. Its needs to be verified whether there is sufficient space for these duct and that these ducts don't block the services routing of another sub- detector. Important is also that the airflow strategy should prevent hot spots at the top of the ITS near it's connection with the TPC.

Thermal shield

Currently there are two proposals for thermal shields. One from the TPC, which would only ensure temperature stability of the TPC and alternatively there is a proposal to integrate an active cooling system in the cable ducts of the services taking away the heat produced by the services. This though does not give the same guaranty for the TPC as the heat load is never exactly matched to the cooling capacity.

It should be verified if a moderate airflow between the services of the ITS and the TPC can guaranty the temperature stability, required by the TPC.