ATLAS EXPERIMENT

M.Nessi, June 18th 2010

WP4: Radiation Hard Semiconductor Detectors

(1) How is this WP fitting in your experiment program?

R&D on rad-hard silicon sensors is pursued by the ATLAS collaboration at various stages. Our first goal is to get a initial comparison across the 3 leading technologies (planar , 3D and diamond sensors). Today this is done through the effort related to the IBL project. We have launched the production of a new readout chip, which will be used in a comparative way across the 3 technologies. By mid 2011 a first comparison should be possible and a first decision on the technology to pursue will be taken. For the phase II upgrade we are following the same pattern and what is done for the IBL will be used a first basis for further investigations. ATLAS has profited manly from the infrastructure provided by this work package.

(2) Are the deliverables expected end of 2011 meeting your requirements?

The work plan foreseen for ATLAS pixels within this WP is timely.
The cooperation between ATE and DT must increase on the benefit of both groups, and will hopefully continue throughout 2011 and beyond. In practice we propose a close cooperation for the IBL project, in particular for its integration in the SR1 clean room. H.Pernegger will drive all this effort and it would be good to work with a similar model to the one adopted for the TRT construction several years ago, where DT provides specialized manpower to the project. We have identified 3-4 strong technicians in DT, who where already active in the TRT project and it would be reasonable in 2011 to start with them this new cooperation.

(3) Which resources are you able to inject in that particular project either to reach completion of new requirements or to customize or to integrate? With which time scale?

ATE is assembling a small team working on silicon R&D, which will profit, when needed, from the technical support of the DT group. Our proposal is that the selected DT technicians for the IBL project operate directly inside this team and under the supervision of the ATE IBL leader. The activities in the SR1 clean room will not be just done by CERN, but will be covered by several collaborating institutes.

(4) How do you see the long term future (beyond 2011) of this WP ? (e.g. extension, reduction, re-focus, conversion to service, absorption in experiment specific upgrade projects, ...).

Silicon or diamond detectors will represent the core of the upgrade activities in the medium and long-term future. ATLAS has a CERN group well established with specialists in the field and the collaboration has a lot of experience with such detectors. In particular the final assembly and testing of the detectors will happen at CERN for clear logistic reasons and in the ATLAS dedicated clean room (SR1 and 180). The collaboration expect CERN to play the role of host lab for such activities, maintaining an adequate level of expertise and tooling necessary to accomplish the job. The bonding and metrology facility of DT is to extent very important and need to be properly maintained and eventually upgraded.

(5) General comments

Avoid unnecessary competition between the ATE and DT effort, in particular when it comes to establish resources to the project within PH. DT in the project should not be seen as a new and different CERN collaborating institution, but should be fully integrated in the ATE responsibilities.

WP5: Micropattern Gas Detectors

(1) How is this WP fitting in your experiment program?

ATLAS is active since sometime, through the effort coordinated by J.Wotschack, to explore the possibility of using detectors of the type micro-megas in the high-rapidity region of the Muon system. It is too early to estimate the likelihood that this work may eventually lead to a construction project. We expect a first indication around end of 2010. In any case the R&D phase in these years has been a very positive experience and the ATE and DT have collaborated in a correct way.

(2) Are the deliverables expected end of 2011 meeting your requirements?

Same comments as above. The same support as in 2010 is expected.

(3) Which resources are you able to inject in that particular project either to reach completion of new requirements or to customize or to integrate? With which time scale?

The ATLAS CERN resources involved at present are rather modest and at the level of 2.5 FTE from the ATE group. A substantial increase can be envisaged only in the context of a possible future construction project. DT has contributed with labs, clean rooms and infrastructure in general, in addition to 3 person working ~20% of their time on mechanical aspects of the project (design, light mechanics, engineering)

(4) How do you see the long term future (beyond 2011) of this WP ? (e.g. extension, reduction, re-focus, conversion to service, absorption in experiment specific upgrade projects, …).

It is strongly dependent on the choices the collaboration will make. Historically the construction work at CERN in this field in ATLAS has been modest and the expertise was assumed to be in the collaboration. For this particular case the situation might be different, with CERN playing a different role as expert. If we move in such a direction the same reasoning done for the Silicon activities should apply here too. But now it is too early to decide. We would expect the CERN contribution to RD51 to concentrate on LHC upgrade projects.

WP6: Quality Assurance and Reliability Testing

(1) How is this WP fitting in your experiment program?

In principle such facilities will be certainly very useful for the upgrade projects in general. It is difficult at this stage to predict the needs and the effectiveness of all this. In general common sense would drive the need to establish a basic program.

WP7: Facilities and Component Analysis for Detector R&D

(1) How is this WP fitting in your experiment program?

ATLAS has been profiting and has made a substantial use of the GIF facility and of other irradiation facilities at CERN. We think all this is part of the host lab duties and the Collaboration strongly counts on it.

(2) Are the deliverables expected end of 2011 meeting your requirements?

It is important that GIF is maintained operational until the new GIF++ facility becomes available. For the PS irradiation facilities same reasoning applies. Here the DT group could even play a more important role of assisting the Collaboration in defining plans and programs.

(3) Which resources are you able to inject in that particular project either to reach completion of new requirements or to customize or to integrate? With which time scale?

ATLAS people carry out tests involving ATLAS detectors and the resources and specific infrastructure needed are made available case by case.

(4) How do you see the long term future (beyond 2011) of this WP ? (e.g. extension, reduction, re-focus, conversion to service, absorption in experiment specific upgrade projects, ...).

Very important. We should add to these facilities also the Silicon Lab, as a facility to be maintained by the DT group.

WP11: Detector cooling

(1) How is this WP fitting in your experiment program?

We have discussed several WPs with the DT group and we have injected in the group 1 staff and 1 fellow, with the idea to be very integrated in this effort with DT.
CO_2 cooling is the baseline for the IBL pixel upgrade, probably it will remain also for the next phase of the inner detector.
These are not the only projects on cooling we have now at CERN. We give great importance to the idea of maintaining operational the relation with the EN group of M.Battistin and with

the Cryolab.

(2) Are the deliverables expected end of 2011 meeting your requirements?

The work planned on CO_2 cooling and on keeping operational the existing plans are fundamental.

(3) Which resources are you able to inject in that particular project either to reach completion of new requirements or to customise or to integrate? With which time scale?

We are and will be injecting important resources both in term of investments and manpower in this project, mostly via M&O funds. We need a new evaporative plan for 2012 and on the same time scale a portable working CO2 unit. In 2014 we will need the final CO2 unit in the cavern.

(5) General comments

On the long term the issue of a unique cooling group at CERN for the detectors must be understood and addressed. Today we have cooling projects across various CERN departments. For us it is working, but we see problems coming up, in particular with CMS, having difficulties with the existing EN group.