



SLHC-PP

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Abstract:

This report describes the implementation of the project management structure and review office for the R&D phase of the ATLAS Upgrade Project for SLHC.



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The Preparatory Phase of the Large Hadron Collider upgrade (SLHC-PP) is a project co-funded by the European Commission in its 7th Framework Programme under the Grant Agreement n° 212114. SLHC-PP began in April 2008 and will run for 3 years.

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1. EXECUTIVE SUMMARY

The ATLAS high luminosity upgrade organization for SLHC consists of an Upgrade Steering Group (USG) and an Upgrade Project Office (UPO).

The USG consists of a coordinator as chair person, the UPO leader being also the USG deputy chair person, the simulation responsible, representatives from the major R&D directions as they are being approved, and some additional experienced physicists from the systems as needed to represent all parts of ATLAS relevant for the upgrade.

The ATLAS Upgrade Project Office (UPO) has been established as part of ATLAS Technical Coordination, to plan and organize the Upgrade efficiently and to ensure the smooth integration within ATLAS. Its mandate is to lead the technical execution of the project in the various phases and provide a central technical reference point for everything concerning layouts, schedules, quality assurance, safety, reviews and integration within the existing detector. In the initial phase it will provide a centralized engineering approach to layouts, design of services, integration and installation plans.

A major part of the upgrade monitoring involves frequent internal reviews, to the benefit of the upgrade community, but also as a working tool for the Upgrade Steering Group. A review office is mandated to execute such reviews, organize reporting and follow-up activities. The review office leader reports to the UPO Leader in first place, and to the ATLAS Technical Management Board/Executive Board if requested.

This organization is now in place and all parts are active. The leader of the USG and the leader of the Review Office are participants in SLHC-PP, from NIKHEF and STFC-RAL, respectively, and their activities are supported by the SLHC-PP project.

2. INTRODUCTION

The ATLAS high luminosity upgrade has been discussed and studied extensively during the last three years in different forums. An ATLAS Upgrade Steering Group has been established to address the needs and the initial plans for an eventual upgrade of the ATLAS detector. A general agreement on the need for a major upgrade of the ATLAS detector was reached within the community:

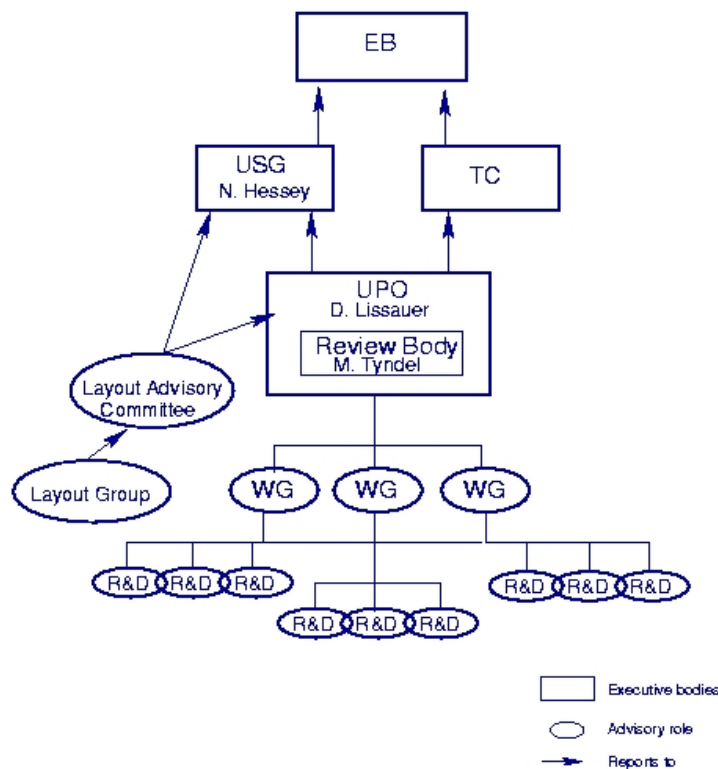
- The Inner Detector will most probably have to be fully replaced.
- The Calorimeter upgrade is limited mainly to the readout electronics and studies of how to cope with the higher luminosity in the forward calorimeter.
- The Muon system upgrade is linked to trigger and readout electronics changes. The general background conditions might imply chamber upgrades in high rate regions.
- New radiation shielding for the detector and possibly changes in the interface to the machine will need to be implemented.
- Trigger and Data Acquisition will need to be adapted to the new physics case.

In order to implement the upgrade, an efficient plan and organization has to be established. Key areas for R&D work have been identified, R&D proposals for upgrade studies are being prepared, and a procedure for evaluating and approving them has been established. The ATLAS Upgrade Steering Group leads this process.

The ATLAS Detector Upgrade will need to be integrated inside the existing, complex structure and so will be constrained by integration and installation issues. Also, the schedule has to be tightly coordinated with the ATLAS detector installation and operation. The Upgrade Project Office has been set up for these purposes. A review process is the mechanism to ensure that the Upgrade project is optimized within all these constraints. It is assumed that the Upgrade needs to be ready by 2017 and that there will be a relatively short period of R&D followed by a pre-series and then production phase.

3. IMPLEMENTATION

ATLAS Upgrade Organisation



Three bodies are set up to, interlinked as shown in the figure above:

- 1) The ATLAS Upgrade Steering Group (USG) lead by Nigel Hessey. It has representatives from all large systems in ATLAS and from the major R&D directions, and additional expertise from the Project Office. The group is operative, meets regularly, and more information about their recent work can be found in [1].
- 2) The ATLAS Upgrade Project Office (UPO) lead by David Lissauer. The group has representatives with expertise in Thermal Management, Electronics, Module Integration, Detector control systems, Layout, Engineering and Integration, Sensors, Radiation issues, Machine Interface, Trigger and DAQ. This group meets the day

before the Upgrade Steering Groups, and reports in the USG meetings. More details about their recent activities can be found in [2].

- 3) The Upgrade Review Office is lead by Mike Tyndel. A major part of the upgrade monitoring will involve frequent internal reviews, to the benefit of the upgrade community, but also as a working tool for the Upgrade Steering Group. The scope and emphasis of the reviews will evolve through the different phases of the project but will have a common theme of ensuring that the Upgrade meets the ATLAS requirements and is executed efficiently. The following points will be systematically addressed during reviews: Requirements, Design and Specifications, Component production and testing, Assembly and Evaluation, Project Planning, Risk Assessment. The nature of the reviews will develop as the project evolves. The following reviews are foreseen:
- Pre-view: Initially all R&D proposals submitted to the USG will be reviewed so as to understand if the R&D is relevant to the needs of ATLAS and further to understand the resources and time-scales involved.
 - Technology Choice Review (TCR): When major choices between competing technologies have to be made, they will be reviewed, particularly where there are difficulties to arrive at a consensus within the groups involved.
 - Final Design Review (FDR): The pre-series phase is the opportunity to allow all partners involved to produce and fully evaluate a pre-series module before the final production. Prototype results and complete production plans are expected to be available.
 - Production Readiness Review (PRR): After the pre-series has been evaluated, and before production, a follow-up PRR will be required.
 - Site Qualification (SQ): The assembly of components into (sub) systems is expected to take place in the collaboration institutes and at CERN.
 - Production Advancement Reviews (PAR): During production, reviews may be useful especially where problems arise.

More information about recent work of the Review Office can be found in [3]. Two more reviews are currently being planned for November.

4. CONCLUSIONS

The ATLAS Upgrade Steering Group, Project Office and Review Office have been set up and are operational. Together they provide an adequate management structure for the R&D phase of the ATLAS Upgrade Project for SLHC.

References:

- [1] July Steering Group: <http://indico.cern.ch/conferenceDisplay.py?confId=26102>
September Steering Group: <http://indico.cern.ch/conferenceDisplay.py?confId=26104>



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[2] July Project Office: <http://indico.cern.ch/conferenceDisplay.py?confId=37155>

September Project Office: <http://indico.cern.ch/conferenceDisplay.py?confId=40566>

[3] Recent Reviews:

June 3, SiGe R&D: <http://indico.cern.ch/conferenceDisplay.py?confId=31867>

June 4, Module Review: <http://indico.cern.ch/conferenceDisplay.py?confId=24959>