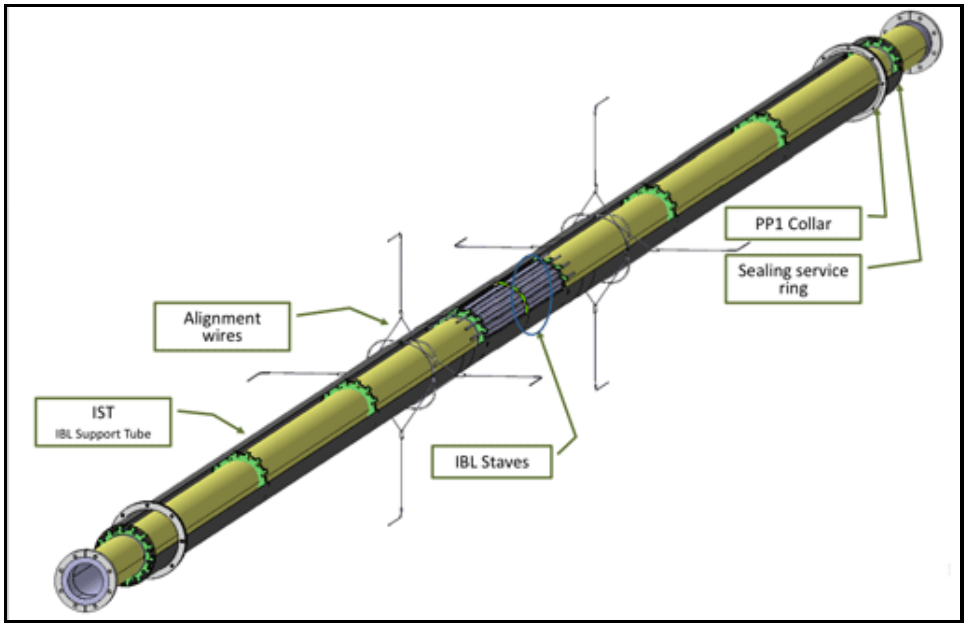
# Thumbs up for Insertable B-Layer

19 October 2010




Schematic of the Insertable B-Layer

**The Insertable B-Layer (IBL) is a fourth layer to be added to the present Pixel detector during the sLHC upgrade in 2016. It will sit between a new, slimmer, beam pipe and the existing innermost Pixel layer, and represents ATLAS's first large-scale upgrade project. The IBL Technical Design Report (TDR) was approved by the ATLAS Collaboration Board on Friday October 8$^{th}$, and then submitted to the LHC Committee and announced to the CERN Resources Review Board.**

“[Anticipating the recommendation of the LHCC] means that all the institutes involved in the project can start applying for funds from the funding agencies, because the project is considered to be sound, well described, and needed for the performance of ATLAS,” says Mar Capeans, who led the editorial team*, along with Kevin Einsweiler.

The report outlines the justification for the new Pixel layer and the technicalities of its construction and installation. Details of how the IBL could extend the physics and performance of ATLAS were worked out this summer in record time and, according to Mar, seriously strengthened the finished document.

“Markus [Elsing, also part of the editorial team] took it on at a very late stage. He got in with all his team and did some amazing work consolidating the physics case. Now we have a full chapter on the physics that can be done with the IBL and how the overall performance of ATLAS improves with its installation.”

"The physics goals of ATLAS during sLHC Phase-1 will be the same as today, but exploring a new energy regime,” says Markus. “Of course, the program will evolve as discoveries are made, but signatures involving b-tagged jets will almost certainly remain central.”

The IBL will offer improved b-tagging performance, as well as better tracking and vertexing, in the face of the expected high pile-up, which should average 50 events per bunch crossing after 2018. "It will be placed even closer to the beam than the present Pixel Detector and significantly enhance the tracker's performance," says IBL Technical Coordinator Heinz Pernegger.

“In the TDR, we demonstrated quite convincingly that, with the IBL, b-tagging

performance with high luminosity pileup is similar to the current detector performance without any pileup," adds Markus. The performance studies also showed that with the IBL it should be possible to recover from eventual failures and from occupancy induced inefficiencies in the innermost layers of the current Pixel system, which, by 2016, will have taken quite a battering.

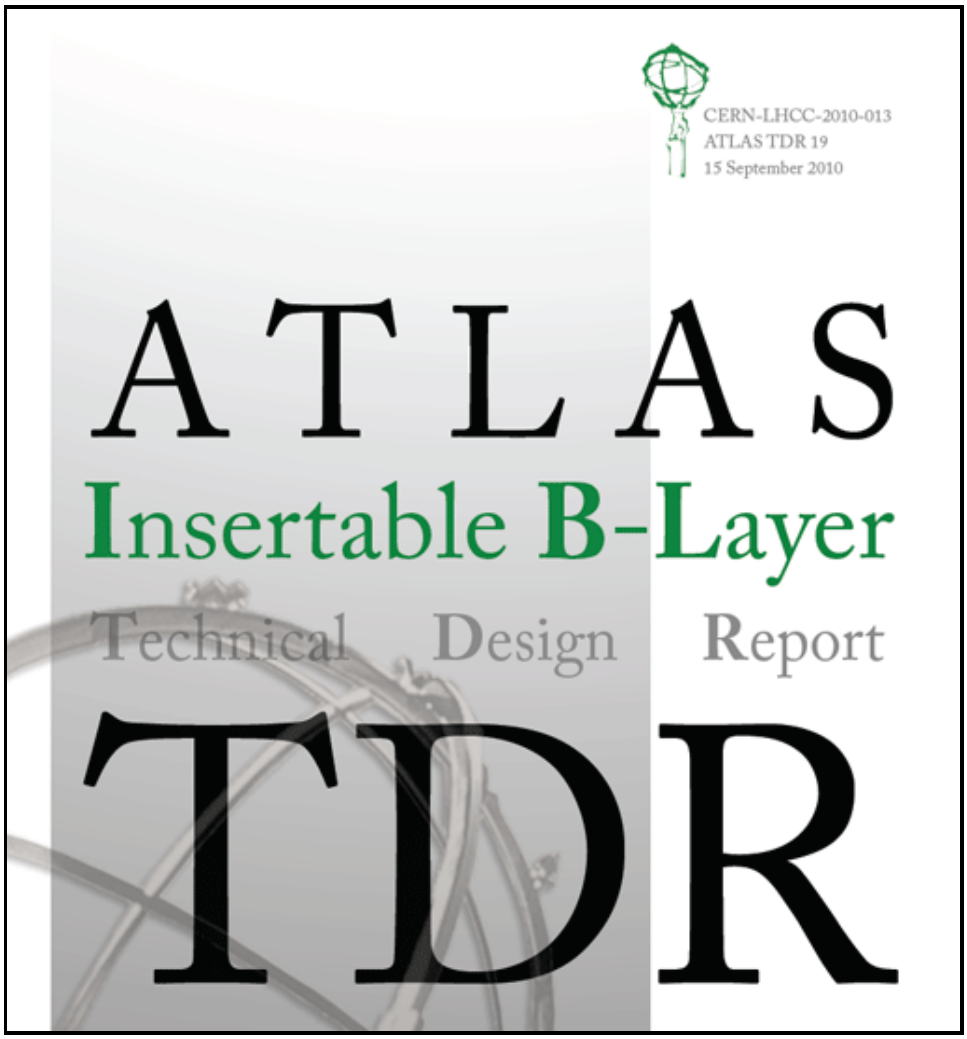
Work on the report began in earnest in July 2009 and a first draft was ready by March of this year. As well as reshuffling the content over the summer to take account of the new physics studies, many technical decisions were actually taken in parallel with the report writing.

"What was nice in building up this document at this stage was that the IBL was also a very new project, so it helped to focus a little bit all the ideas and the technical aspects," says Mar. "When we started, there were still many possible options for some of the key decisions. Sometimes they were contradictory or incompatible, so we had to decide as a team – do we put all the possible technical options into the TDR or take a decision already and write it there."

"For the IBL we will exploit several next generation technologies in sensors, electronics and mechanics," says Heinz, adding that dedicated prototyping has "already [led] to several technology decisions on mechanics, cooling and electronics."

"The final step was the endorsement of the TDR from the Collaboration Board," says IBL Project Leader, Nanni Darbo, who presented it to them during the October ATLAS Week. "All institutes approved and a spontaneous applause made stronger the support to this TDR that is the first in the ATLAS upgrade. Most of the contributors to the project and the TDR where not there, but it was to them that the applause was addressed."

*The IBL Technical Design Report was prepared by an editorial team consisting of Mar Capeans, Nanni Darbo, Kevin Einsweiller, Markus Elsing, Tobias Flick, Maurice Garcia-Sciveres, Claudia Gemme, Heinz Pernegger, Ole Rohne and Raphael Vuillermet.




The front cover of the report breaks with traditional ATLAS style, signifying the first of a

new series of TDRs that are not for constructing ATLAS, but rather upgrading.

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**ATLAS e-News**