

News about TRT-related work on offline software

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Testbeam and Software Session

TRT Workshop at Peñíscola, Spain

Talk Outline

- Overview of ATLAS SW Issues
- TRT Software Web Pages
- GEANT3 Simulation & Digitization
- Detector Description / GeoModel
- GEANT4 Simulation:
 - TRT Geometry and Hits
 - TR Model
 - Validation
- C++ Digitization / TRT RDO work
- Alignment Calibration
- Combined Testbeam

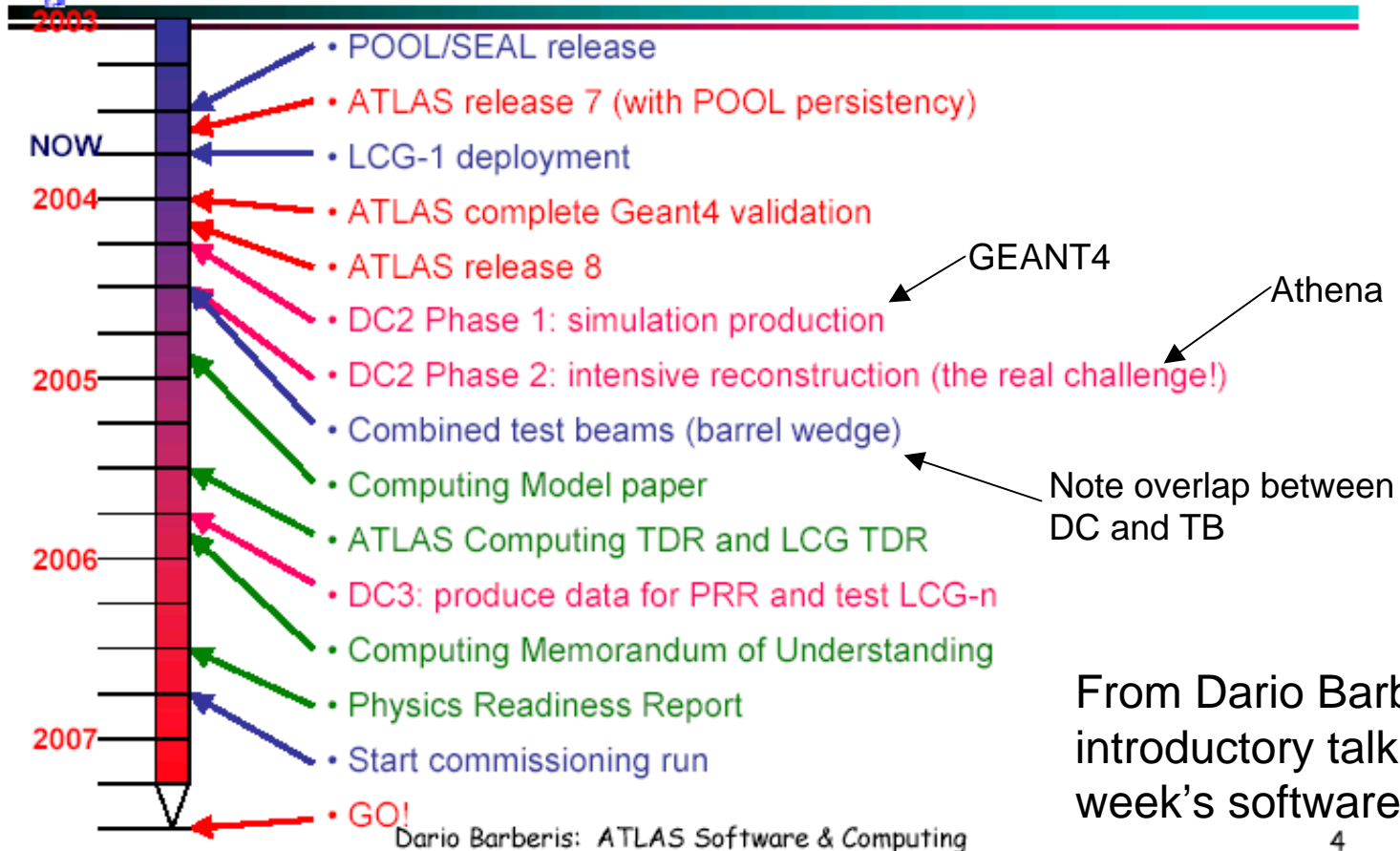
Please upload your talks to the Agenda System.

Atlas Software

ATLAS Software Week - 22 Sep. 2003



ATLAS Computing Timeline



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Release 8.0.0 & DC2

- Release 8.0.0 of the ATLAS software will be used for data challenge 2.
 - Release 8.0.0 is planned for February 27 2004.
 - Data challenge 2 will be in two parts:
 - Phase 1: Event simulation using GEANT4 (Starts in April)
 - Phase 2: Reconstruction using Athena (Starts in June)

This is a direct schedule conflict with the combined TB!

- The major goals for DC2 are:
 - Full detector simulation using GEANT4
 - Persistency of hits and digits using POOL
 - Pileup in Athena
 - Implementation of Recon Task Force Recommendations
 - Use of GRID for batch and Python for interactive

This is a very aggressive work plan / schedule.

Other ATLAS Software

- Recent ATLAS SW News:
 - The LHC-wide Computing Manpower Review found that ATLAS (and all the LHC experiments) are short of people
 - Not a surprise to anyone actually working on software
 - The alignment & conditions group has had much activity
 - Richard Hawkings has been appointed coordinator
 - Combined Testbeam has much activity
 - Ada Farilla has been appointed offline testbeam coordinator
 - Roberto Petti has been appointed inner detector offline testbeam coordinator
 - More on this later in the talk
 - The LCG persistency package POOL just had a major release (1.3.3)
 - Work is ongoing to incorporate POOL into all parts of the ATLAS software.

TRT Software Web Pages

- At Markus Elsing's request, I created web pages for the TRT software work:

http://atlas.web.cern.ch/Atlas/GROUPS/INNER_DETECTOR/TRT/SOFTWARE/

- The TRT pages are under Markus' main Inner Detector software pages:

http://atlas.web.cern.ch/Atlas/GROUPS/INNER_DETECTOR/SOFTWARE/software.html

- Please check the pages.
 - In particular, check that I have not left anyone off of the list of people involved with the TRT software effort.

TRT GEANT3 News

- No GEANT3 problems have occurred since the last meeting and the TRT GEANT3 code is unchanged.
 - Need to check that full chain still works after recent releases.
- The barrel services & electronics are close to being designed and we need to revisit the material issues.

Detector Description / GeoModel

- GeoModel is the new detector description package that will provide information about the basic geometrical parameters of the ATLAS detector independent of usage (simulation, recon, etc.)
 - Work is underway on a package (G4Builder) to build a simplified GEANT4 geometry from the GeoModel info.
 - There is an on going discussion about the use of GeoModel in the combined testbeam simulation.
- Joe Boudreau (the GeoModel author) with help from Andrei and Yura has put the needed information about the TRT into GeoModel.
 - Andrei and Yura have confirmed that the GeoModel information is correct.
 - Information is taken from the Nova database by the GeoModel routines.

GEANT4 Simulation & Hits

- With Andrea dell'Acqua's help the code that Andrei and Yura wrote describing the TRT geometry has been put in the official ATLAS repository.
 - The code has been made compatible with Athena.
- The TRT GEANT4 hits have been defined for some time in both compressed and uncompressed formats.
 - Work is urgently required so all of the inner detector hits (not just the TRT) can be stored using the new POOL database system being written by LCG.
- More information is in the following talk which I am presenting for Andrei and Yura.

Use of TR in GEANT4

- Mogens Dam has been actively working on how to accurately model TR in the TRT GEANT4 simulation.
 - We have had a number of discussions with the GEANT4 team over using their models.
 - Mogens is pursuing developing scheme similar to what Pavel provided for GEANT.
 - Mogens will speak in this session.
- We need to make careful comparisons between GEANT3, GEANT4, and data.
- We need to firm up the schedule for this work.
 - Hopefully the GEANT4 TR simulation can be ready for DC2 & the combined testbeam.

GEANT4 Validation

- There has been work on comparing the GEANT3 geometry simulation with GEANT4 and GeoModel.
 - Andrei and Yura have been comparing the GEANT3 barrel geometry with the detector description in GeoModel.
 - Andreas Salzburger (Innsbruck) has been comparing the TRT GEANT3 and GEANT4 hits.
 - Andreas is working with Davide Constanzo and Markus Elsing. I have also consulted with him on various things.
 - Andreas has also been doing similar comparisons for the Pixels and SCT.

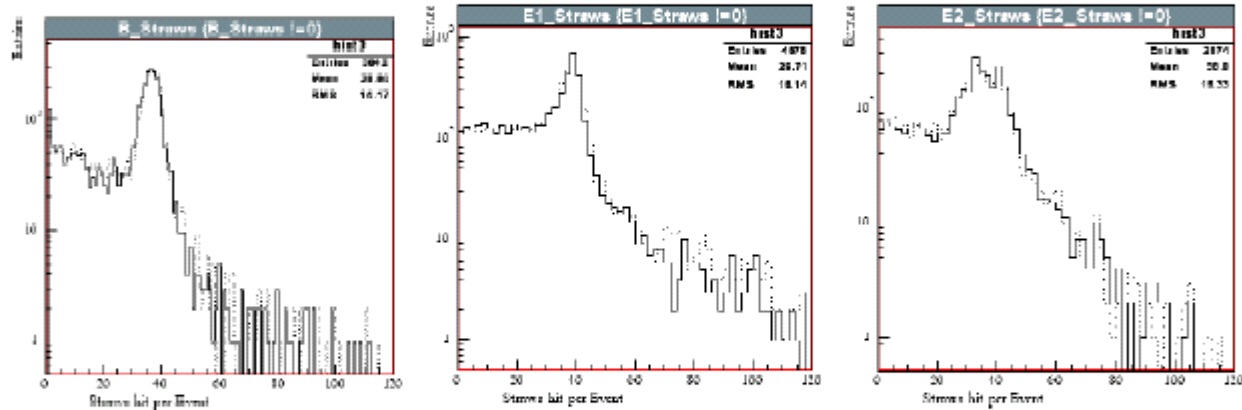
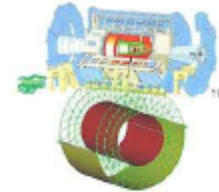
GEANT4 Validation

TRT Detector, Barrel

TRT Detector, Endcap S1

TRT Detector, Endcap S2

Results I - Geometry μ



Overall view looks good!

Slide from Andreas Salzburger's talk during software week. Shows number of hits on muon tracks for Barrel, A/B, & C.

C++ Digitization / TRT RDO work

- Andrei and Yura have put the C++ digitization into the ATLAS software repository.
 - The code works with Athena.
 - The code is compiled for the nightlies but is not officially part of the ATLAS software release because no other packages are using it.
- There is one remaining task to make the entire TRT GEANT4/C++ simulation/digitization chain useable with the Athena reconstruction: completing the code to write Raw Data Objects (RDOs) from the digits.
 - Andrei and Yura expect a first release of this functionality next week for ATLAS software release 7.1.0
- I will present a talk written by A & Y next.

Alignment & Calibration

- Peter has been working on alignment using Athena.
 - This area will require considerable effort in the near future and we need to identify people to work in this area.
 - There is need for work for both the combined testbeam and for the full detector.
 - I won't say more on this because Peter is giving two talks on it during this session.

Combined Testbeam Offline SW

- The combined testbeam plan includes GEANT4 simulation of the combined testbeam setup.
 - We need to identify people to work on this.
 - This is in addition to the monitoring work.
 - This work will require the use geometry information that will be stored in GeoModel or some other way.
- We will have to develop offline code using Athena to reconstruct tracks in the TRT.
 - Peter has been worrying this for the full simulation as part of his work for the alignment group.
 - We will have to deal with alignment in the course of doing the offline analysis.
- Roberto has been made the inner detector offline software coordinator for the combined testbeam.

Conclusions & Task List

- The amount of work is both large and growing:
 - Material Updates
 - With the electronics and services nearly fully designed, it is time to revisit the amount of material in the detector.
 - GeoModel work
 - This could include work for the combined testbeam.
 - GEANT4 code maintenance
 - Most parts of TRT GEANT4 work are completed but problems will inevitably arise when the code is used for production.
 - Connectivity to PNPI could be a problem.
 - Verification that GEANT4/ C++ digi is producing valid results
 - Includes an ongoing effort to verify that code to be used DC2 is producing correct results.
 - Integration of TR model into GEANT4.
 - Must be done for TRT GEANT4 simulation to be fully usable.
 - Work on the simulating the ROD and Readout

Conclusions & Task List (Continued)

- The conflict between the efforts to prepare for DC2 and the Combined Test Beam could be a problem.
 - People mainly on the offline work:
 - Mogens
 - Fred
 - Andrei
 - Yura
 - People mainly on the testbeam
 - Chafik
 - Roberto
 - Serge
 - Vladimir
 - In both worlds
 - Peter
- We need to actively seek additional workers