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Simulation Loop between CAD systems, Geant4 and GeoModel: Implementation and Results

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Data_vs_MonteCarlo discrepancy is one of the most important field of investigation for ATLAS simulation studies. There are several reasons of above mentioned discrepancies but primary interest is falling on geometry studies and investigation of how geometry descriptions of detector in simulation adequately representing "as-built"descriptions. Shapes consistency and detalization is not important while adequateness of volumes and weights of detector components are essential for tracking.

There are 2 main reasons of faults of geometry descriptions in simulation: 1/ Inconsistency to "as-built"geometry descriptions; 2/Internal inaccurateness of transactions added by simulation packages itself.

Georgian Engineering team developed hub on the base of CATIA platform and several tools enabling to read in CATIA different descriptions used by simulation packages, like XML/Persint->CATIA; IV/VP1->CATIA; GeoModel->CATIA; Geant4->CATIA. As a result it becomes possible to compare different descriptions with each other using full power of CATIA and investigate both classes of reasons of faults of geometry descriptions.

Paper represents results of investigation of quality of geometry transactions doing by simulation packages and case studies of ATLAS Coils, End-Cap toroid and Bid Wheel structures.

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