Virtual Engineering Study in ATLAS Collaboration

SHARMAZANASHVILI Alexander

Dr Professor

ATLAS Collaboration

European Organization for Nuclear Research CERN

Switzerland

Eighth International Symposium on
Tools and Methods of Competitive Engineering
Ancona, Italy, April 12-16, 2010

High Energy Physics Research Goals

- What happened in the first trillion of a second after the Big Bang ?
- How the matter was created ?
- Are there any extra dimensions and microscopic black holes ?
- How to manage the thermal energy 10 time greater than suns energy ?
- How to use matter antimatter interaction to beat nowadays invincible illness ?

ATLAS Collaboration

- LHC, Geneva, Switzerland
- 7’000 Physicist and Engineers, 50 Countries
- Budget 6bn euro

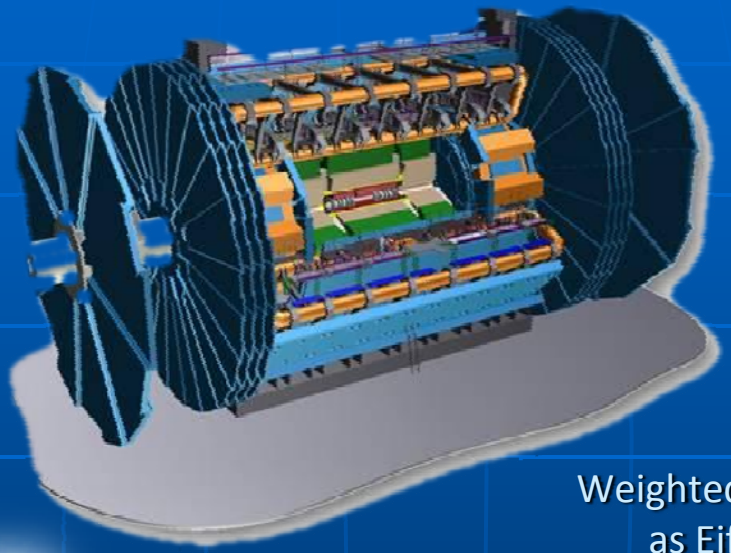
Notre Dame cathedral, Paris

ATLAS Detector, Geneva

46m long, 25m diameter

100m underground

ATLAS Detector



2 time more complex than
US military Boat

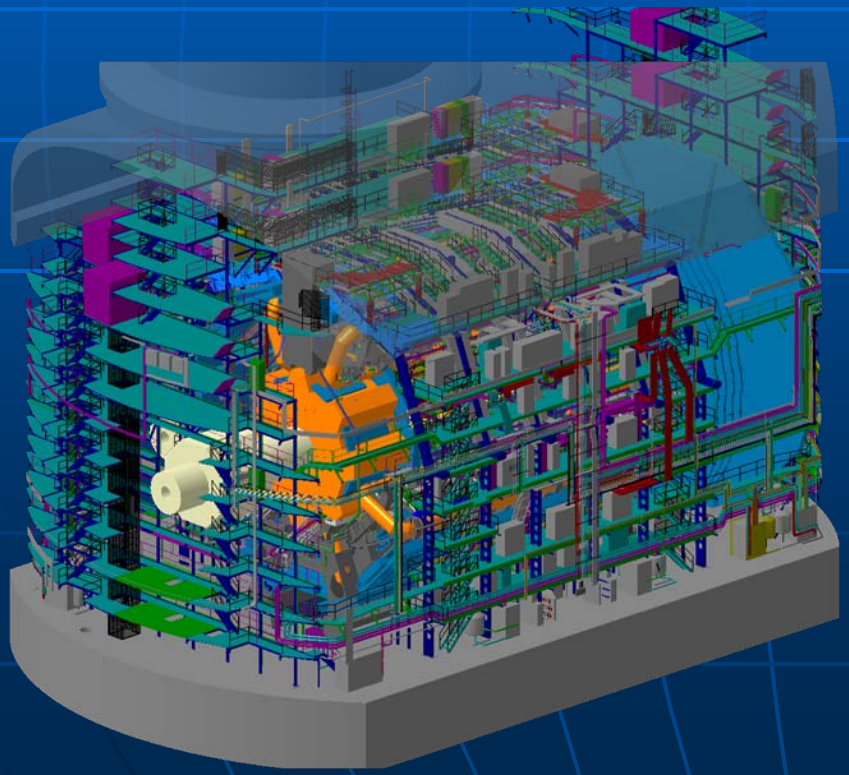
Weighted 7'000 tones
as Eifel Tower

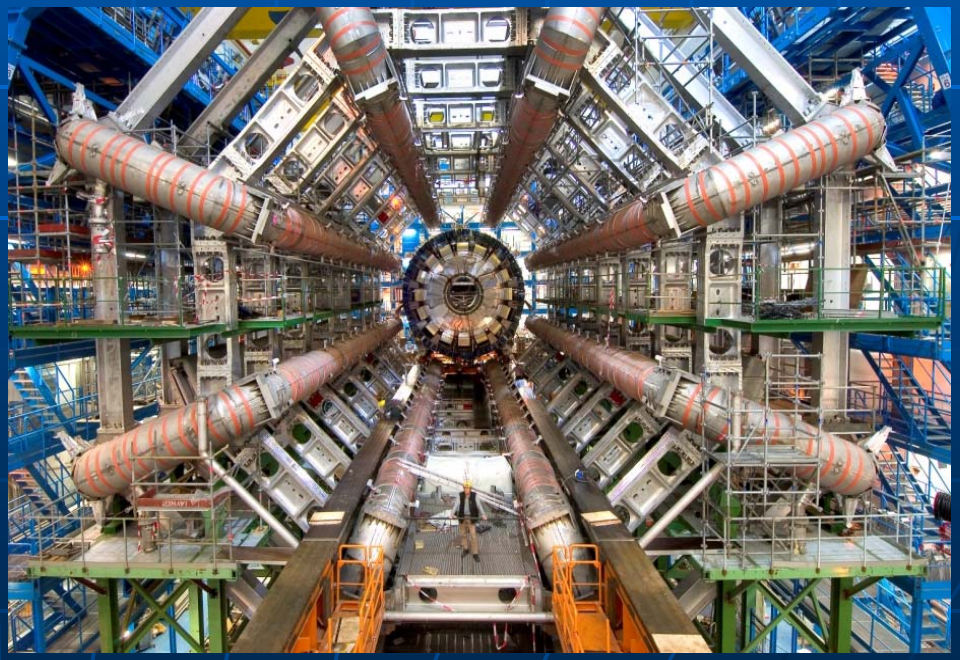
ATLAS Collaboration

- 169 partner Institutes from 37 countries
- 2'500 Physicist and Engineers

Complexity of Geo Modeling

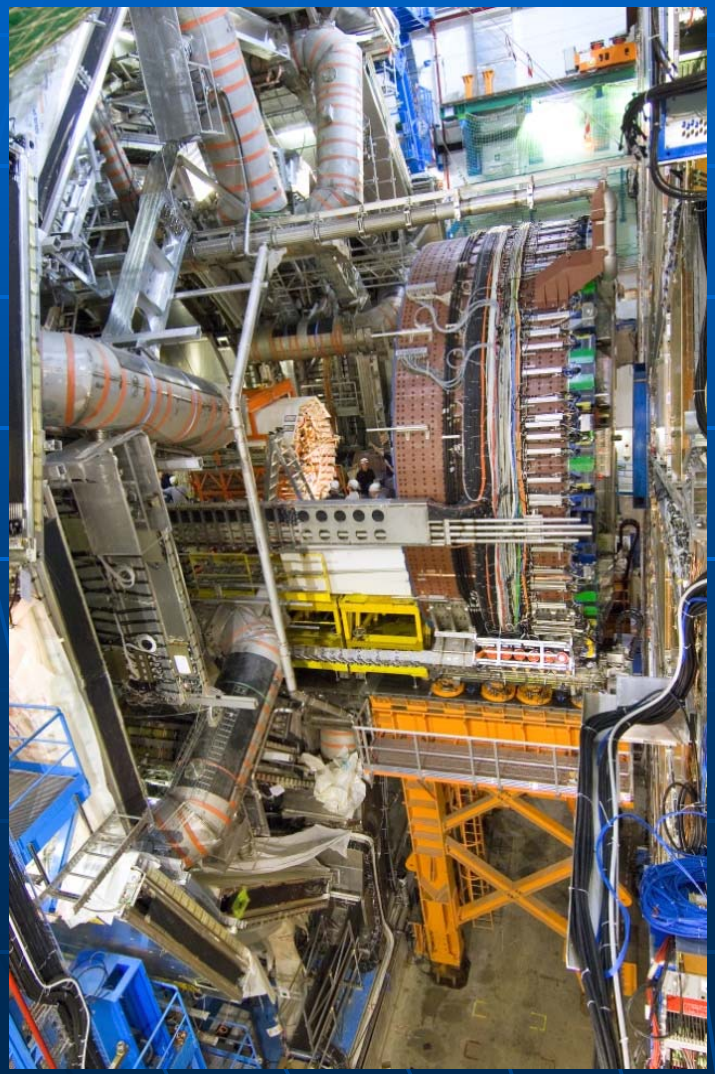
- Simple profiles but enormous complexity
- 3’700 big Assemblies, 62Gb data
- 10’000’000 functional features
- Heterogynous CAD environment, migration necessity

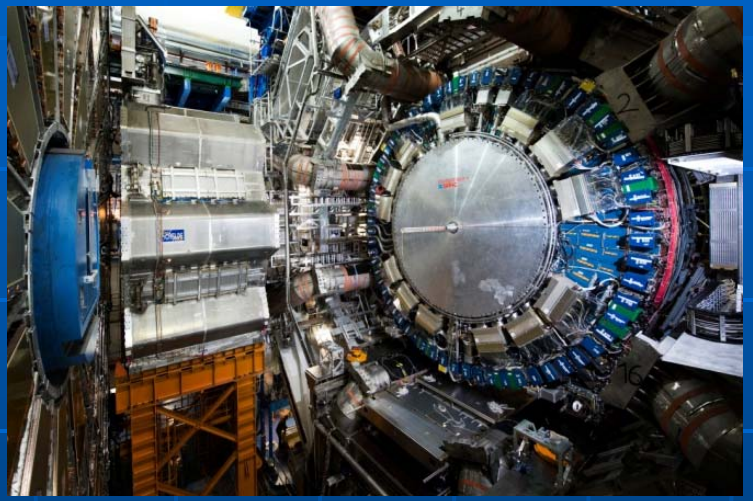


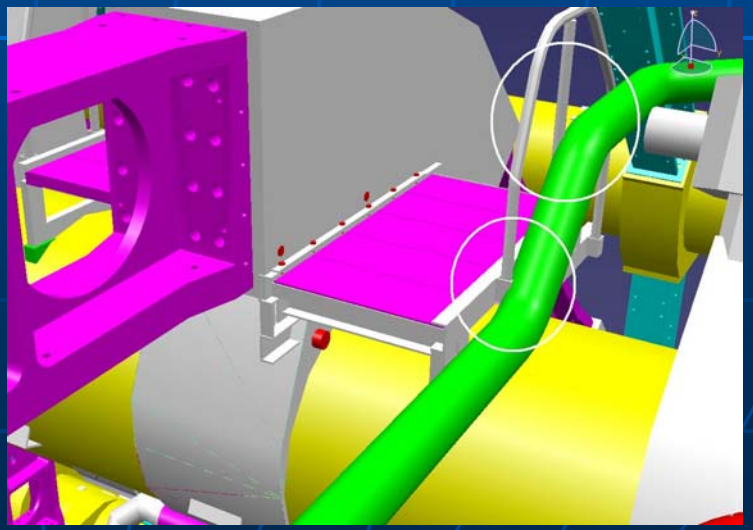


High Dense Environment for the Integration

- 50mm Clearance in ATLAS Detector





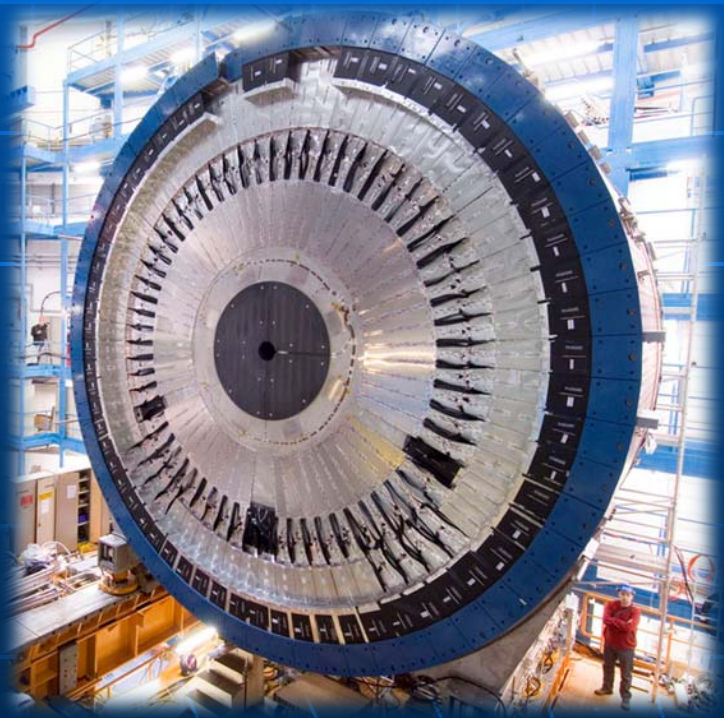


Big Dimensions and High Accuracy for the Fabrication and Assembly

Tile Calorimeter

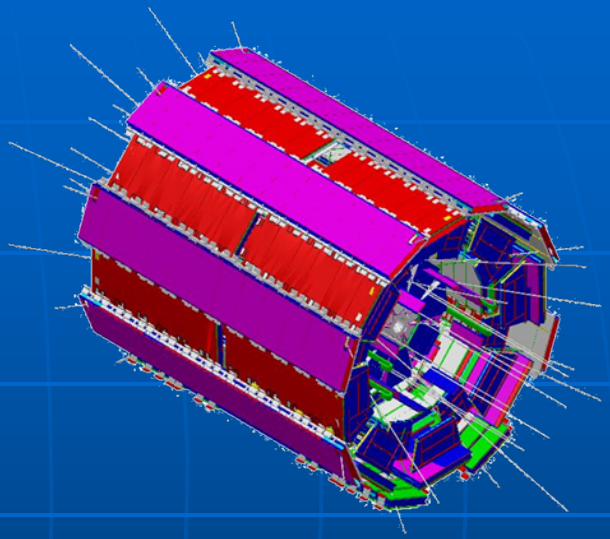
8 meter diameter; 6 meter length; 22 tones weight

64 separate segments; Accuracy 50 micron



Specific Areas and Conditions for the Installation

- Underground Installation
- Alignment rays



ATLAS Virtual Engineering

VE steps:

- Identification of partners
- Development of VE process technology
- Creation of virtual office architecture
- Organizational management

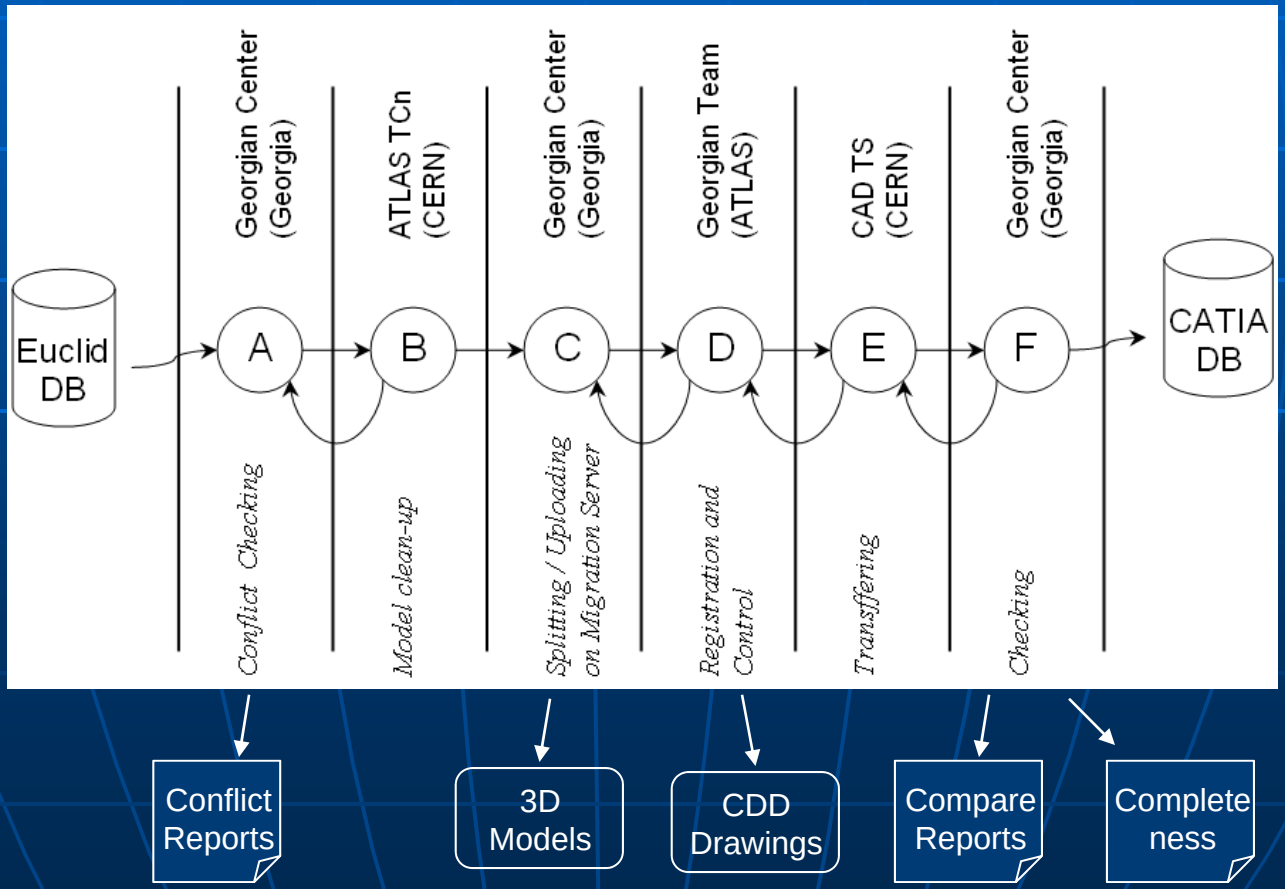
ATLAS Virtual Engineering

VE partners for the project of ATLAS models migration

1. ATLAS TCn, Geneva, Switzerland
2. ATLAS Integration team, Geneva, Switzerland
3. GCCEC, Tbilisi, Georgia
4. CAD Support team, Geneva, Switzerland
5. CERN IT department, Geneva, Switzerland
6. CERN Design Drawing team, Geneva, Switzerland
7. CLRC Rutherford Appleton Labs, UK
8. EDMS team, Geneva, Switzerland
9. DAPNIA - CEA, Saclay, France
10. Institute of Physics, Freiburg, Germany

ATLAS Virtual Engineering

VE process technology for the Models Migration



ATLAS Virtual Engineering

VE platform:

- XP – operation system
- Team Viewer – for desktop sharing and file transferring
- Skype – for audio/video conferencing
- 3 nodes – 3Ghz core and 4Gb memory
- CERN CAD applications – CATIA v5, Pro/Engineering, Euclid, MDT, Workview

Installation of End-CAP Toroid, 5 July, 2007

Geneva, Switzerland

280 tones weight

Thank you for attention

Write e-mail to get the 3D pdf model of ATLAS Detector

LASHA.SHARMAZANASHVILI@CERN.CH