# LAr Software

# Progress Report

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# Presentation Plan

- Training
- Time scale
- Software development
- Reconstruction
- G4 activities + first feedback
- Detector description
- Performance

# Time Scale wishes

- 1st fully−functional new software : 2 years
- Geant4 implementations and tests : 1 year
- Test beam sim/rec/DB : 1 year (decision beginning of 2000)

# Training during summer and fall

- John Deacons' lectures
- G4 sessions given by A. Dell'Acqua
- Training sessions at home labs :
  - OO Analysis and Design with UML at BNL
  - OMT methodology at Grenoble
- Web training sites
- Reading

# Architecture

- First directions from ATF
- no major objection to the ATF report conclusions
- check realization of crucial Use−Cases
- encourage nomination of an ATLAS architecture team soon to stimulate the work progress

# Inception phase

- 1st step : get started + 1st use−cases , finished
- 2nd step : more use−cases, a bit of analysis and design, CASE tool : end of October 1999
- 3rd step : crucial use−cases, analysis, design, architecture : end of Nov. 1999

# End of inception phase

- Conclusive phase: 12/1999 – 01/2000
- Products & artifacts : most crucial use–cases, draft models (use–case, analysis, design), Entity list , tentative architecture, risk idenfication, priorities and planning of the elaboration phase and tentative planning of whole project

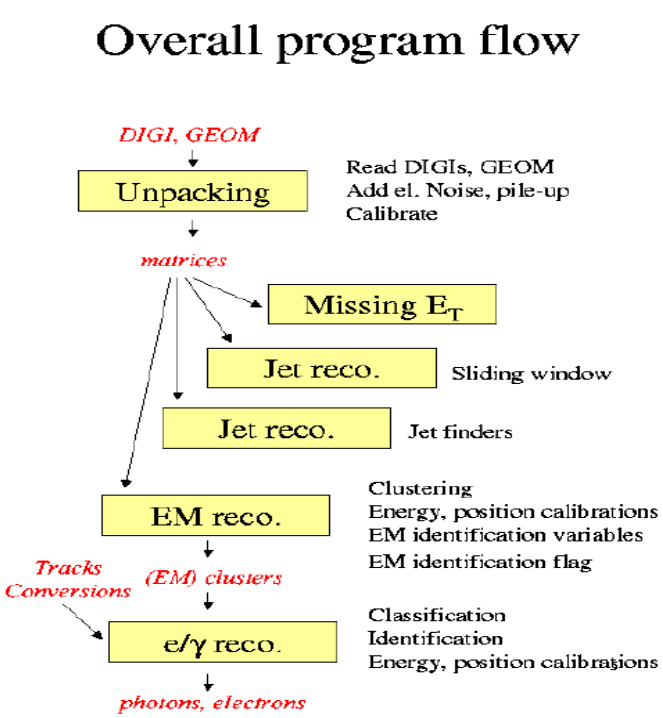
# Accompanying activities

- Geant 4 implementations : validation of the package for calorimetry − description 6 to 8 months, 1st results 8 to 10 months
- Reconstruction : "reverse engineering" of ATRECON , PASO
- DATA BASE: detector description with XML

# Accompagnying activities

- Physics performance : lists of relevant studies were prepared by Jim Pinfold and Jorgen Beck−Hansen. Qualified for Ph.D. subjects.

# Reconstruction




- schematic description of ATRECON : ~schwind/public/code.ps
- keep the experience and the tested algorithms of the existing code at least for the 1st version

# Reconstruction

- OO Analysis being pursued by S. Rajagopalan et al.
- separation of DATA and ALGORITHM objects
- Being implemented in PASO
- copious use of STL

# G4 activities

- witnessed a surge in G4−related activities during the summer
- More than 20 persons have committed themselves to implementing a part of the LAr system in the close future
- OO design − reusable code for ATLAS ?
- Use  XML detector description package

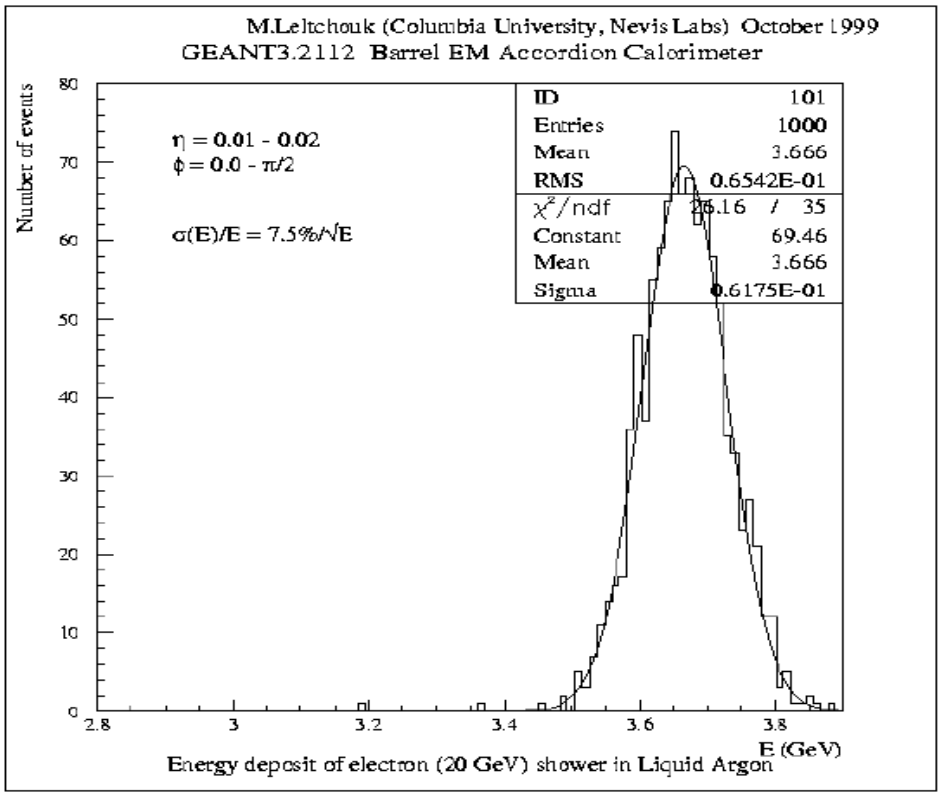
# Geant 4 activities

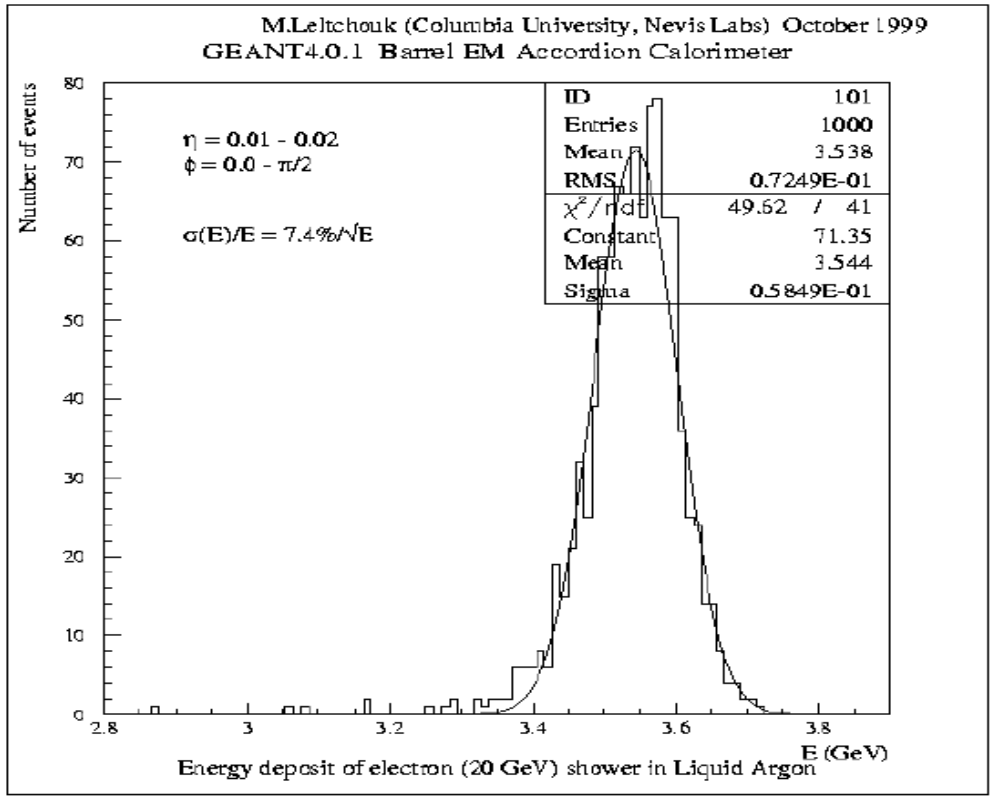
- Hadronic calorimetry
  - geometry not too complicated
  - physics of hadronic showers never was well mastered in G3 ( G4 ? )
- Electromagnetic calorimetry
  - geometry is really complicated
  - physics is in principle under control

# Geant 4 – early feedback

- EM accordion geometry implementation
  - 60 k independent volumes : 100 MBytes, 2−4 s/GeV (depending on cuts and CPU)
  - parametrized geometry : very small memory occupency, 50 times more CPU time/GeV
- Conclusion : very difficult to implement the ATLAS EM in present G4 version − Need boolean volumes to try to solve this

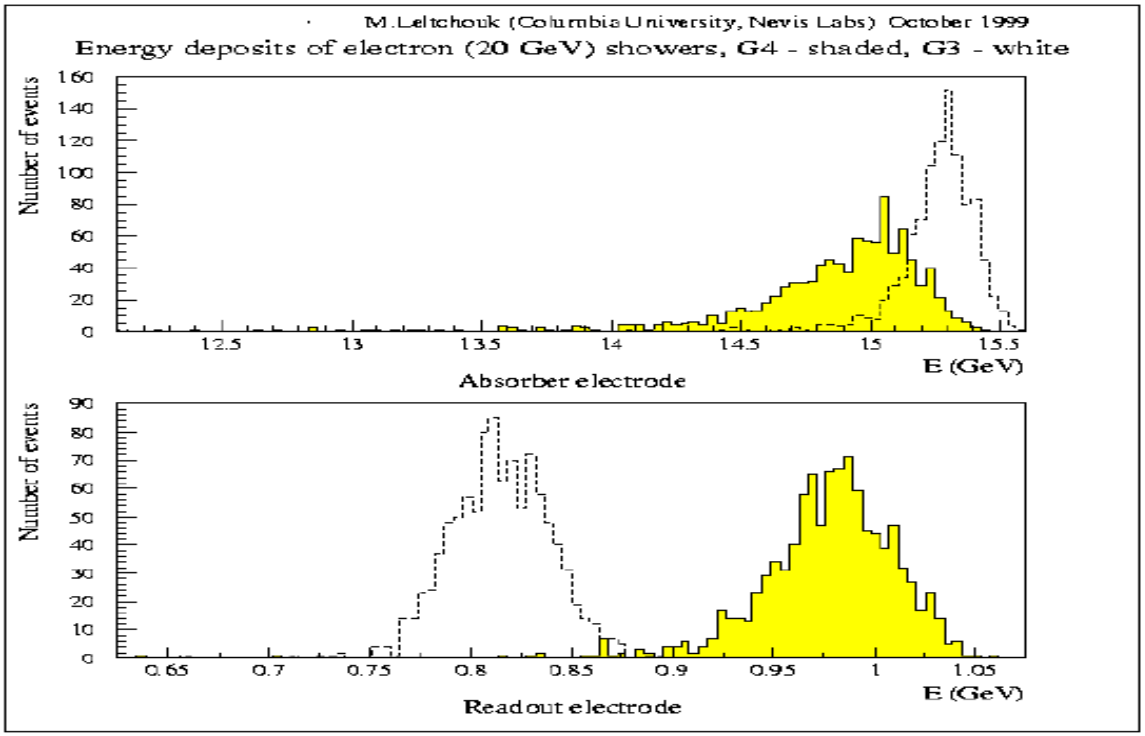
# Geant 4 – first feedback



# Geant 4 – early feedback

$G4 \neq G3$



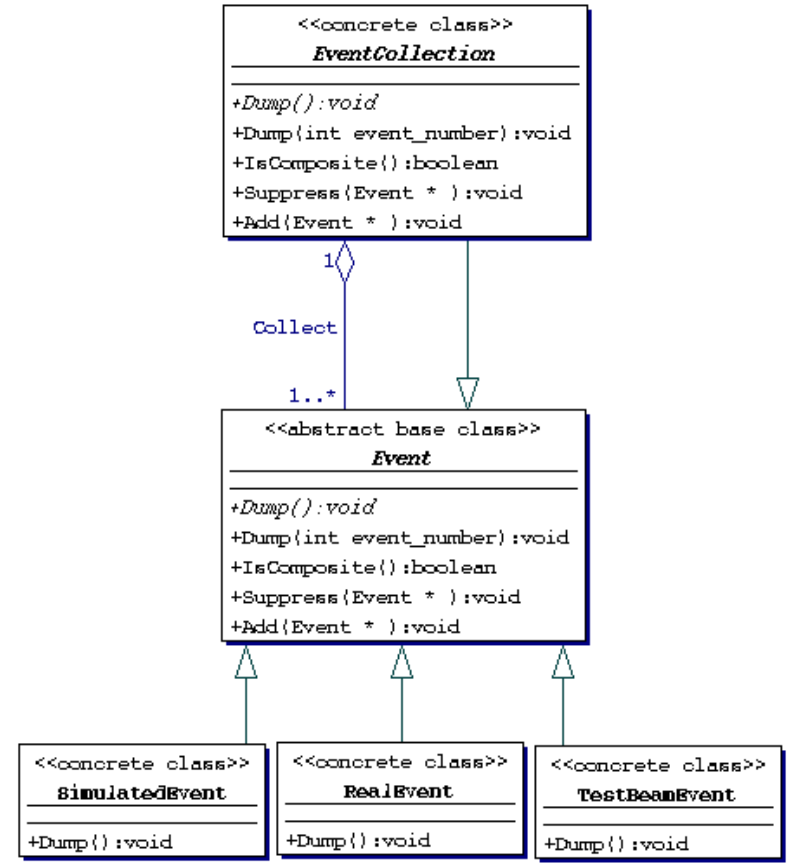
# Data Base

- Work has essentially concentrated on the XML detector description package
- Package is under evaluation
  - analytic expressions ?
  - type checking ?
- Deemed difficult to use for the final G4 code design and implementation

# Performance studies

- What need to be made beyond the physics TDR and for the trigger TDR
- Jet & Etmiss list (prep. by J.Pinfold) :
  - http://atlasinfo.cern.ch/Atlas/GROUPS/PHYSICS
  - /JETS/jets.html
- Electron and gamma list (prep. by J. Beck−Hansen) :
  -

# CASE tool ?




- helps manipulate & exchange UML diagrams
- helps document the project
- some have started to test Together

# Computing MoU

- Hardware :  O.K.
- Regional centers : O.K.
- infrastructure software : O.K.
- Physics software : ?
  - Do we really want a MoU for this ?
  - Or something that could be annually revised?

# Conclusion

- Inception phase : 01/2000 Most crucial use−cases, models , entity list, tentative architecture, risks , priorities and planning of next phase − case tool ?
- Strong effort being deployed on G4 : need improved G4 version − December 1999 ?
- Reconstruction: "reverse engineering" , UML model?, PASO
- Data Base : Detector description package under construction and evaluation :expressions ,type checking
- Physics performance : sign up on the lists