



## LCG/AA review

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# Simulation

# Generators

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- Huge amount of work has been done since the last review
  - New activities emerged in the subproject – DBMC (interest expressed by experiments), Generator Level Production Framework
- GENSER already used actively by ATLAS & LHCb, CMS is starting to use it
- The size of GENSER distribution is quite big, it is recommended to consider more granular packaging distribution options
- There are some concerns related to HepMC (persistency, missing translators). Since the common format is a requirement we need to make sure that HepMC is supported well.
  - More detailed comments/recommendations will be specified in the final report



# Physics Validation

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- The experiment contribution to the validation process has been significantly increased during past 18 months
- Big amount of work has been performed for validation of various G4 physics lists
- FLUKA has also been involved into the validation process. We encourage continuing FLUKA validation especially for the hadronic physics
- The central repository for the test results is welcome
- The coming significant decrease of manpower is from 2.3 to 0.8 FTE very worrying. If GEANT4 shows that this is essentially CERN concern/task, we would suggest LCG should try to add manpower here
- The active participation of the experiments in this activity by validating various physics packages against testbeam data should continue. That can become extremely important in the case of Physics Validation project manpower difficulties
- We recommend that physics validation team should revisit with experiments the effects on the systematics of the present simulation uncertainty



# GEANT4

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- GEANT4 has proved that it reached a level of maturity in terms of performance, physics results, reliability and stability. The interactions with collaborations are also very good.
- GEANT4 has become the main simulation engine for three experiments. ALICE is encouraged to clarify its doubts concerning GEANT4 hadronic physics by providing physics validation results.
- The possible issues connected with different strategies of the usage of CLHEP libraries by GEANT4 and other LCG applications should be addressed. The immediate solutions might be necessary.



# FLUKA

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- The three experiments are not using FLUKA as a main simulation engine but express the interest to use it
  - In general or for special studies (radiation)
- Should be usable via fully functional, available and documented conversion mechanism (FLUGG as an already working example)
- It is expected that FLUKA installation together with source code will become available in near future
- We recommend to solve distribution problems for FLUKA in the more regular way, like other AA related s/w (using SPI tools)



# Simulation Framework (I)

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- The simulation framework work packages mainly have been used internally within Simulation project (Physics Validation)
  - There is no interest from experiments to have a common generic simulation framework and any new development is not encouraged
  - VMC remains a vital solution in the case such interest is expressed by more than one experiment
- The further development of GDML is encouraged (missing elements, modularization etc.).
  - Some experiments have already expressed their interest in GDML, its usage is also included in GEANT4 planning as geometry interchange format and possible solution for geometry persistency



# Simulation Framework (II)

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- The Python interface to Geant4 needs some effort in creating the documentation. It is recommended to exchange experience in this field with experiments who already have their own and well advanced (ATLAS) solutions
- The geometry persistency with ROOT seems useful. The possible functionality overlaps with GDML should be addressed
- The MCTruth is considered to be an important part of the project and it would be good to have common development in this area
- Is <1 FTE enough for all that??

