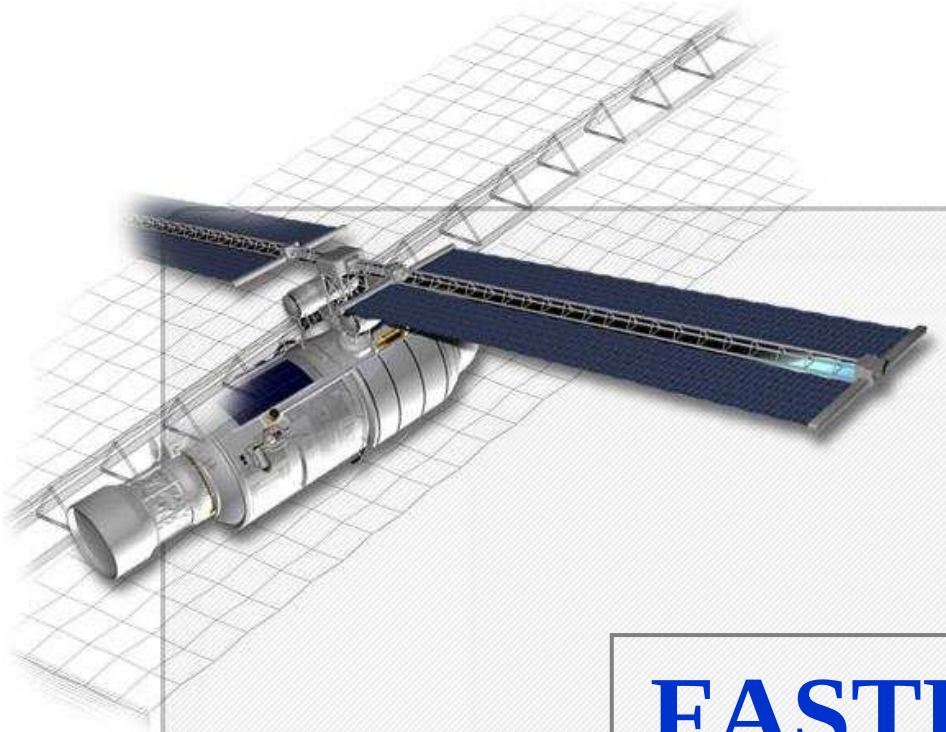
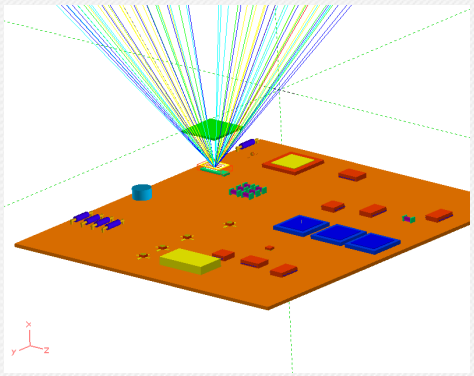


FASTRAD V3

Workshop Geant4 Presentation
September 14th, 2007

Main Functionalities

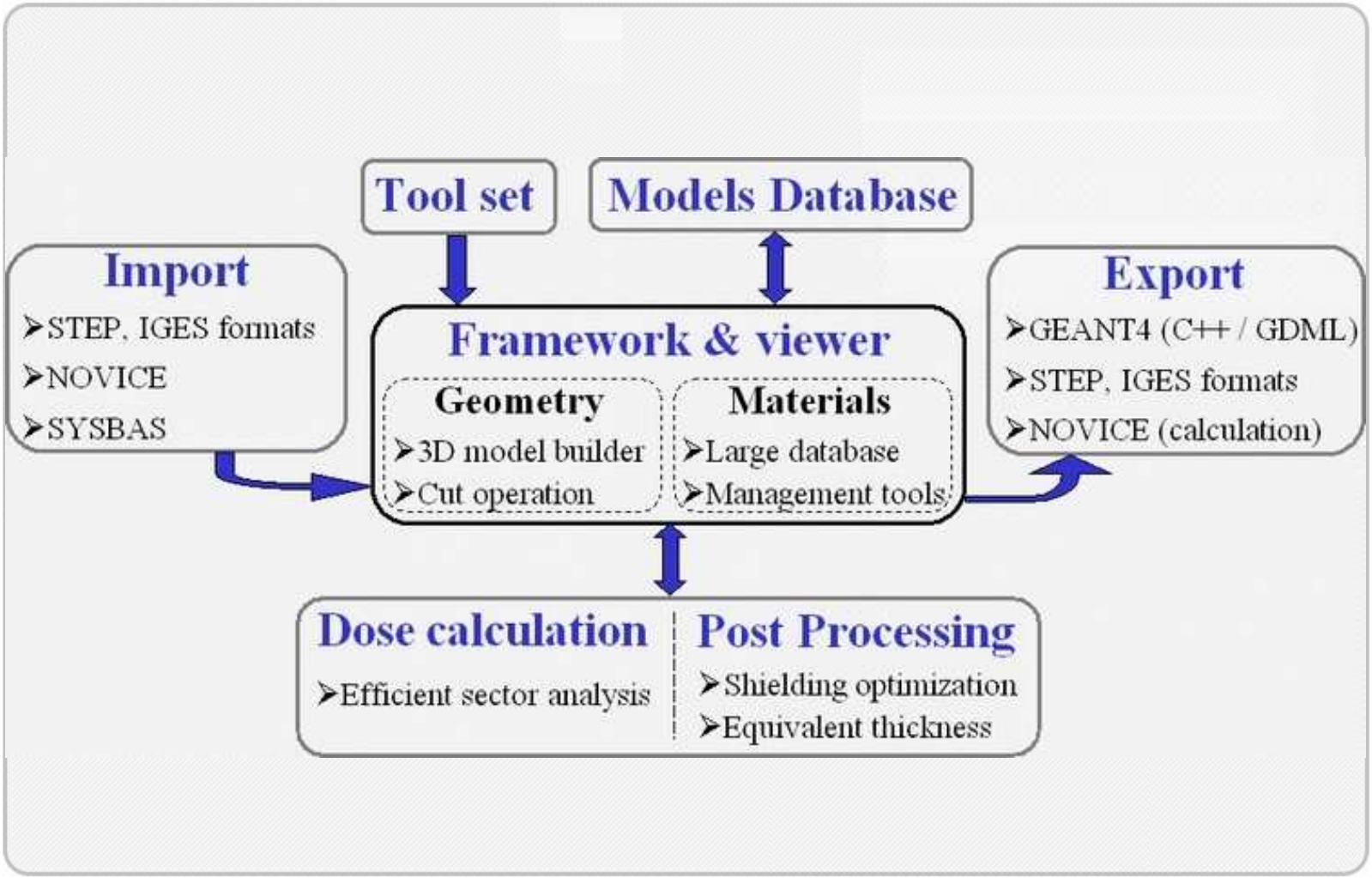
- Radiation CAD (Computer-Aided Design) Tool
  - 3D Geometry modeler, materials, sensitive detectors
  - Design assistance tools.
  - Import 3D models : STEP, IGES



- Sector Analysis Tools
  - Ray-tracing method.
  - Post processing

- CAD Interface for others softwares
  - NOVICE import/export (EMPC)
  - **GEANT4 export (CERN)**

FASTRAD Application



Geant4 interface

Creation of Geant4 type files based on geometrical models designed with FASTRAD.

Interface provides several important tools :

- 16 different Physical Processes
- Detailed source definition
- 3 calculation methods
- Creation of macro files allowing an easier and more efficient use of Geant4

Geant4 interface – Main Dialog Box

Contains the elements to choose the physical models and the type of particles.

It gives also access to two other dialog boxes of the interface :

- GPS Dialog Box (source definition)
- Histogram Dialog Box

Geant4 interface – GPS Dialog Box

Allows the configuration of the GPS that describes the incident particles source:

- Geometry
- Position
- Incident energy distribution
- Directional distribution

Geant4 interface – Histogram Dialog Box

Gives the choice between three different types of post processing for a selected detector:

- Received Dose calculation
- LET (Linear Energy Transfert) Spectrum
- Nuclear Interactions i.e. information about particles hiting the detector

Geant4 Files

FASTRAD provides ready to compile Geant4 files:

- Headers files (.hh)
- Source files (.cc)
- Main file
- Macro files, allowing changes without rebuilding Geant4 executable thanks to Geant4 Messengers:
  - Detector type
  - GPS variables (particles type, source modification)
  - Number of beams
  - Visualisation definition (choice of visual display, creation of visualisation, visualisation's option)

Post processing : Histogram

3 different types of post processing :

- Received dose by primary particles and secondary electrons and gammas + sampling of deposited energy
- Sampling of LET spectrum for primaries
- Sampling of incident energy for primaries and secondaries on the detector + details for each hiting particle : # event, particle type, incident energy, deposited energy, momentum and origin volume (only for secondaries)
- ***Demo…***

Distribution

Independent modules :

- CAD interface
- STEP import
- GDML export

Free distribution

(web site in Oct 07)

- GEANT4 interface
- IGES, SYSBAS import…
- Tool set (mass, clipping view, measuring tool…)
- Sector analysis module
- Post processing
- Data base management tool
- NOVICE interface

Commercial distribution

(annual license)

Conclusion

- The interface FASTRAD/Geant4 is an efficient tool to provide ready to compile Geant4 project from a CAD tool.

- Possible improvements :
  - calculation on multiple detectors
  - including GDML inside the Geant4 project

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