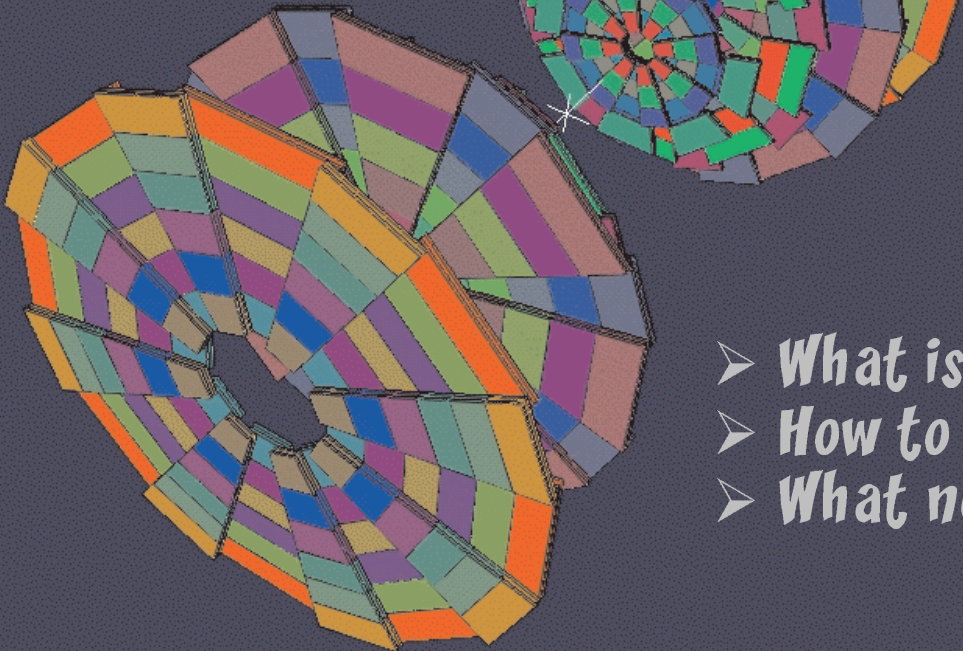


Gr aXML

J.Hrivnac, 30 November 00
Atlas Software Week, CERN



- *What is it*
- *How to use it*
- *What next*

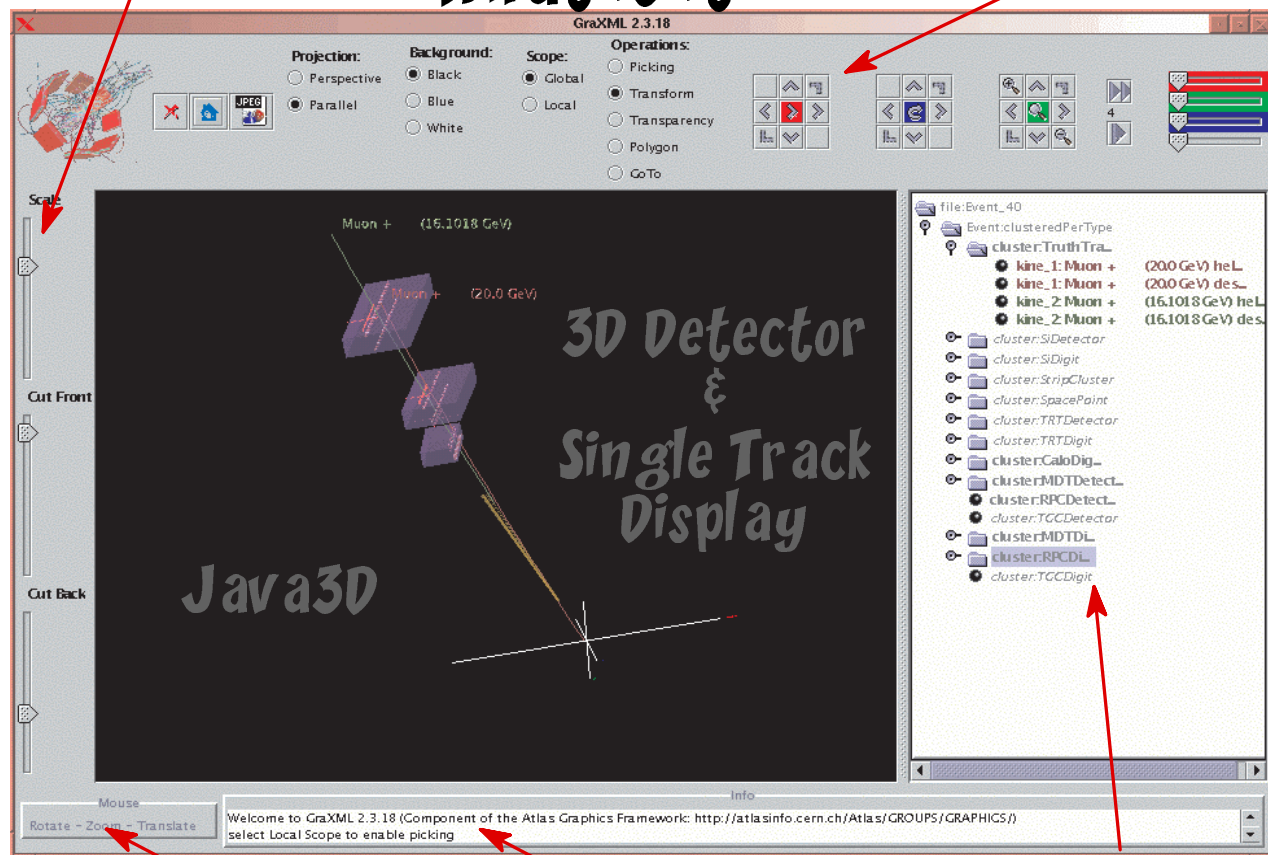
1

- one year ago started as evaluation of Java & 3D technology for Detector Description
- evolved into full featured product
- used as testbed for "playing" with 3D (Java3D, VRML, X3D)
application => one can expect changes (mainly to GUI)
- executable + source + documentation < half MB
- profits from Java enormously

Operations on Scene

What is it

Operations on Objects



Context Sensitive Help

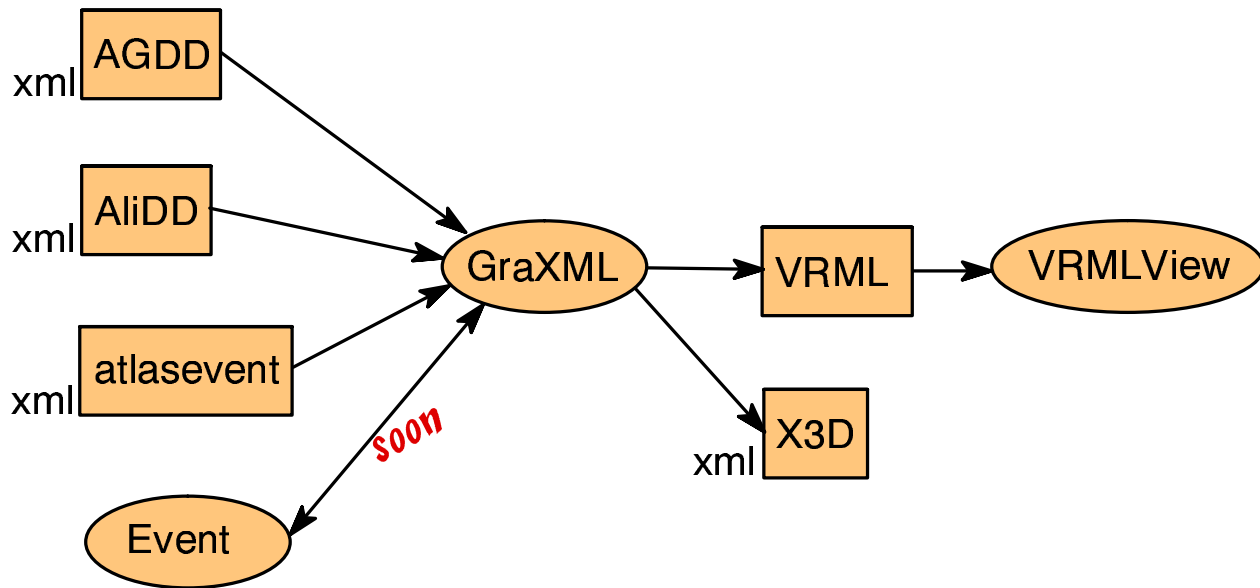
Picking and Feedback

Object Tree

2

- don't try to give it the whole Event (no realistic 3D Display could do that today)
- some parts of menu are dynamic

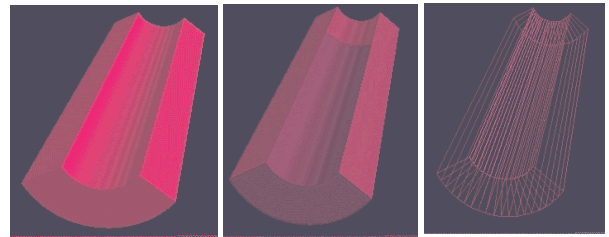
Flow



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- can read several kinds (dtds) of XML files for both Detector Description and Event
- AliDD is extension of AGDD used in Alice (general Transformation and additional Geant4 elements are added)
- VRML can be read by any standard VRML 2.0 browser (e.g. vrmlview or vrwave on Linux)
- X3D is the future standard of VRML using XML

Operations on Objects



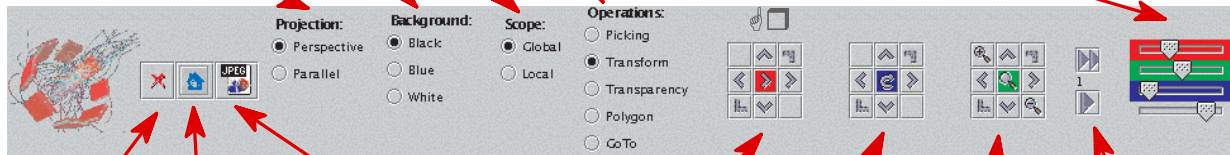
Apply Operations on Whole Picture / Clicked Object

Change Background

Change Projection

Just Pick
Change Transformation / Transparency / Polygon Status
Go To

Change Color / Transparency



Exit

Reset - Go Home

Dump JPG

Translate (x-y-z)

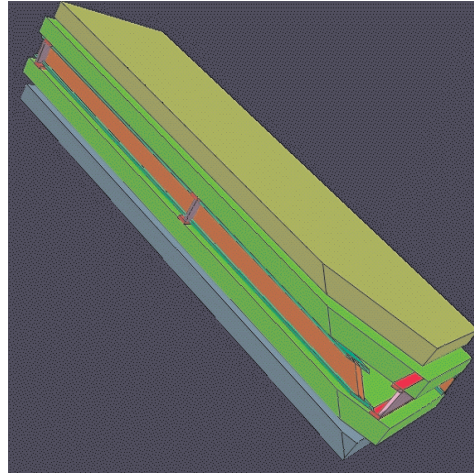
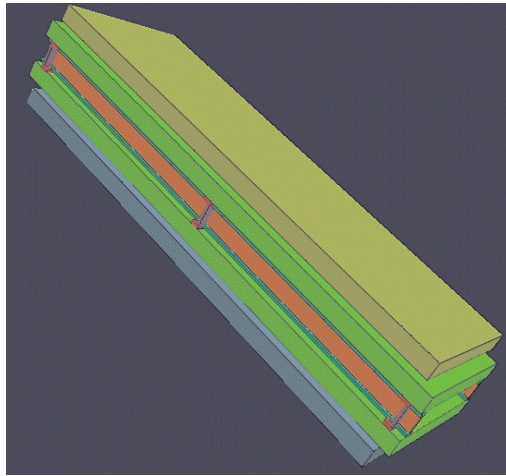
Rotate (x-y-z)

Scale / Sheer (x-y-z-all)

Change Speed

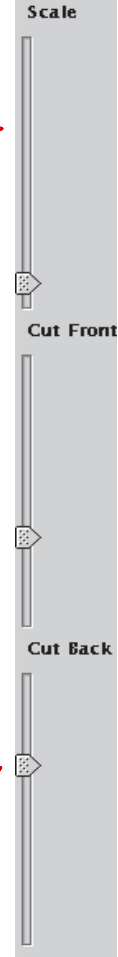
Operations on Scene

Change Scale (different than Zoom)



Cut from Front

Cut from Back



- Scaling much faster than Zooming
- Scaling to be used in Parallel Projection (it doesn't do anything usefull in Perspective Projection, while Zooming doesn't do anything usefull in Parallel projection)

Other Operations

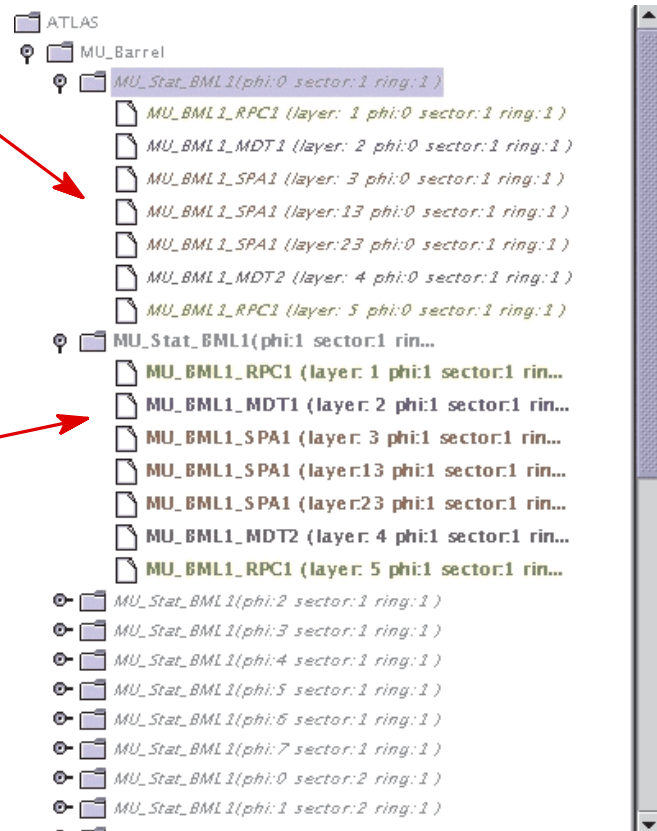
- **Transformations**
(Translate-Rotate-Zoom):
 - **Mouse**
 - **Keyboard**
 - **Menu**

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- all three way behave in different ways
- Menu based Transformations usefull for big Scenes

Tree View

- Tree of element mapped into Tree of breakable connections
- Allows switching On/Off
- Uses identifiers
- Uses object's colors
- Can allow other operations



- identifiers not yet fully debugged

Modes

- Interactive [default]: `-i | -n`
 - *Access to per-Object features*
 - *Slower & bigger*
- Optimised (compressed): `-o`
 - *Equivalent Objects as references*
 - *Faster & Smaller*
 - *Objects can't be always switched off (as they may have hidden references)*
 - *some local Interactivity is lost (as Objects may be just references to other Objects)*
- Browser: `-b [vrmview|xml|vrm|...]`
 - *External output or browser*
- Quality (1-9, default = 5) `-q <quality>`
 - *More Quality means more memory and CPU, but nicer picture*
- Event Rearrangement `[-atlasevent,perType|-alasevent,perKind]`
 - *is reflected in Tree View*

Selectable at start-time.

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- the way how the SceneGraph is build and shown
- Optimised mode can bring several orders of magnitude in CPU and memory needs, but some Interactivity is lost
- Quality changes granularity of curved shapes, antialiasing,...

Options

- What to display:
 - *Objects contributing into the SceneGraph*
- How to display:
 - *Representation to use (asLine, asBox, ...)*
 - *Cuts, colors, dimensions,... to use*
- How to render:
 - *Wireframe, Outline, Antialiasing,...*
- How to optimise SceneGraph

**Currently selectable at compile-time,
will use GUI / XML Options Files / Command-line.**

- large amount of Options
- some Options handled by Quality parameter

Context Sensitive Actions *soon*

- *3D Rep Objects are alive and carry references to their Plottable origins*
- *Context sensitive Popup Menu*
- *Will use **JACO** access to C++*
- *Authors of original objects should define context sensitive actions (via Model)*

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- not yet fully implemented as meaningless without access to real Objects

What next

- GUI
- Performance
- Missing pieces
- Connection with Framework
- Modularisation & Moving to **FreeHEP/HEPStudio**:
 - 3D Solids **done**
 - Inter actors
 - Tree Navigator/Selector
 - VRML Writer

Currently GraXML is used mainly as a playground for developing code based on Java3D. It is usable at the same time.

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- 3D Solids: Java3D implementation of Geant4 Solids (all primitive solids and some others are implemented)
- Interacter: adds local interactivity to any Java3D BranchGroup
- Tree Navigator/Selector: breaks Java3D SceneGraph into detachable pieces and creates JTree to operate on them
- VRML Writer: originally from CyberVRML package, heavily debugged and extended, the only know package which is able to write Java3D into VRML