

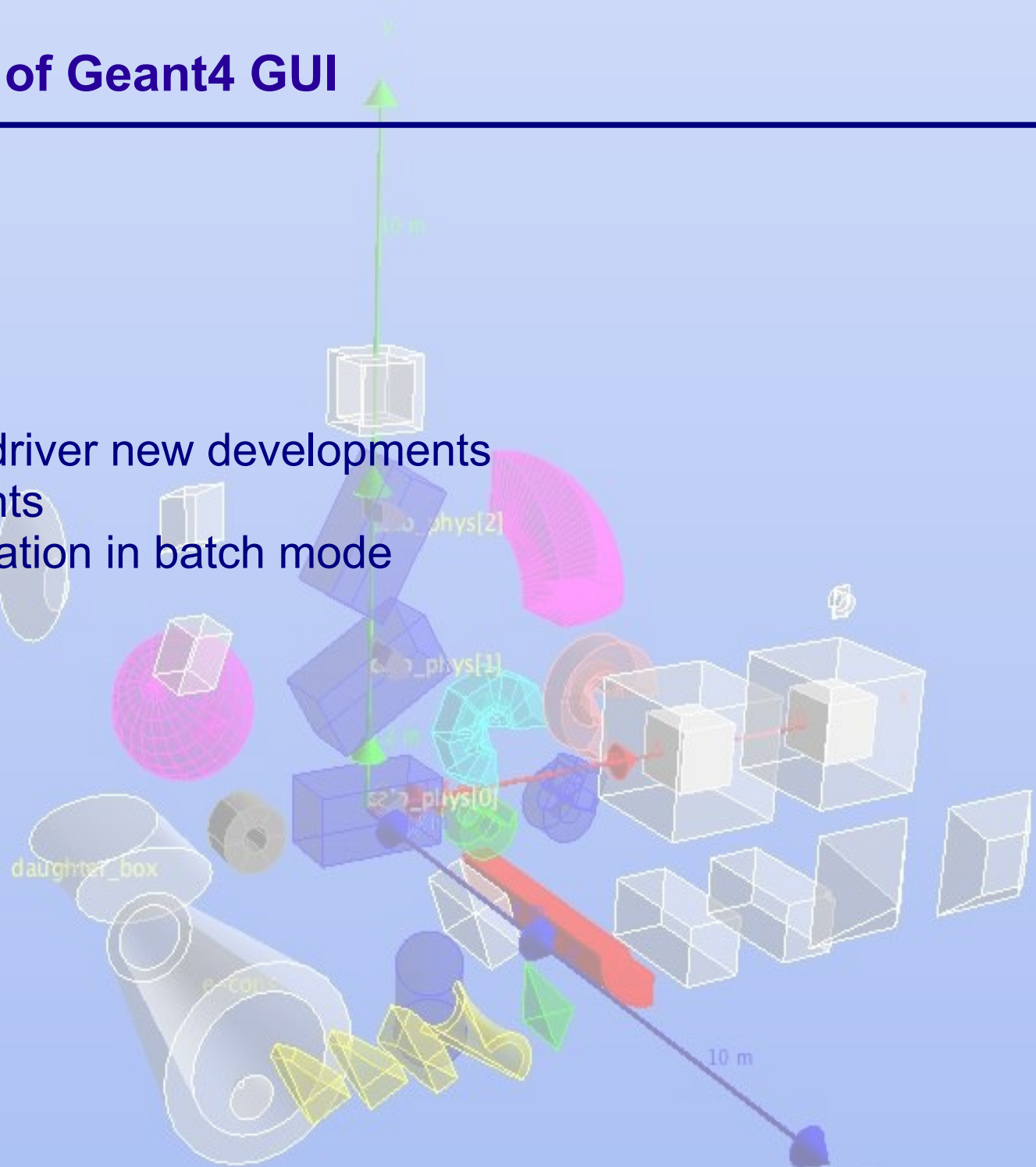


# Status and Evolution of Geant4 GUI

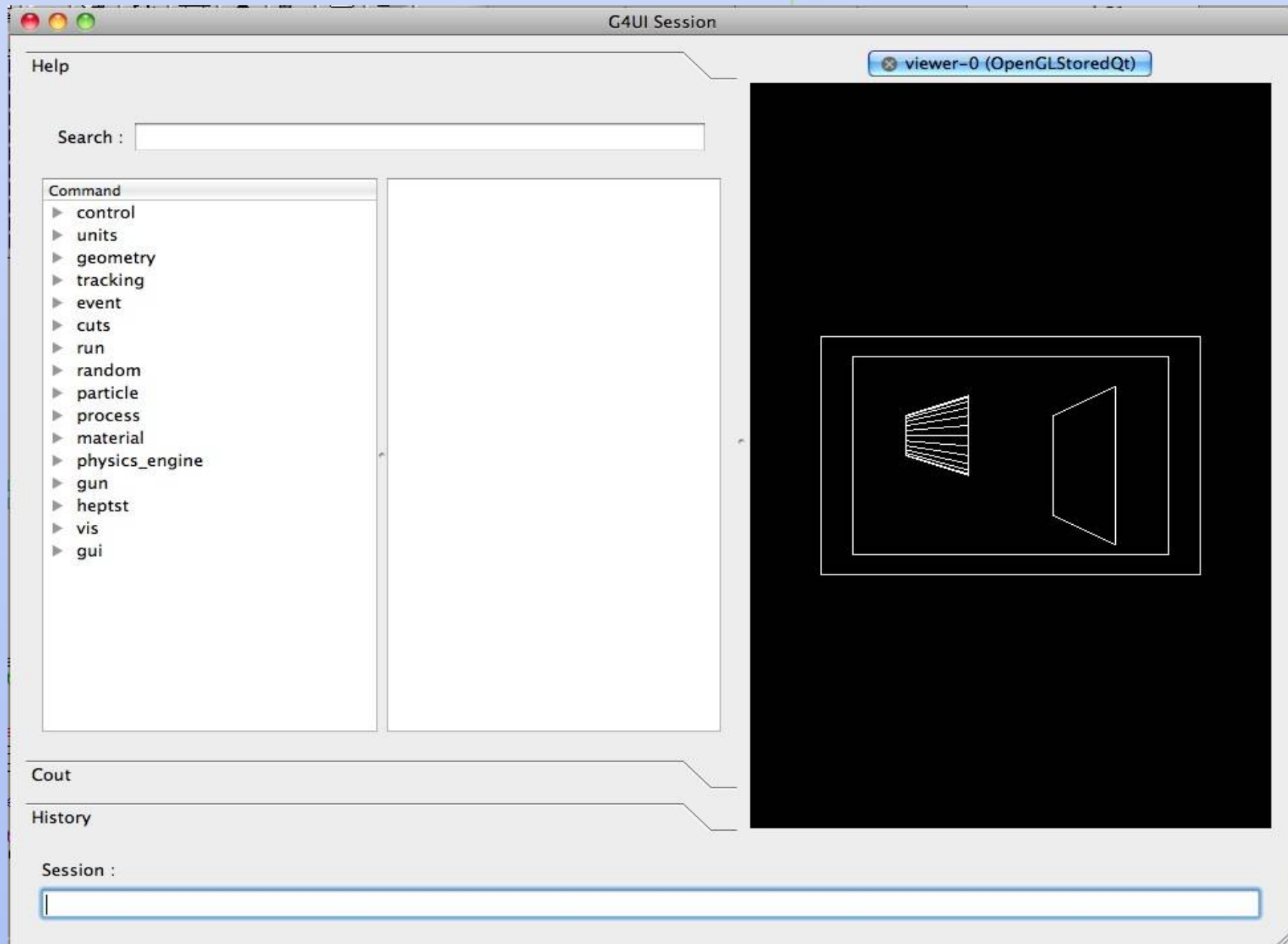
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*On behalf of Visualisation and interfaces WG*

# Status and Evolution of Geant4 GUI

- Qt visualization driver new developments
- Text improvements
- Running visualization in batch mode



# Qt Visualisation Driver – geant4-09-05 version -



# Qt Visualisation Driver – geant4-09-06 version ? -

Qt driver is originally in two parts :

- User interface in « interface » package
- Viewers in « visualization » package

This modularity allow users to define their own user interface or to integrate only viewer in their own program.

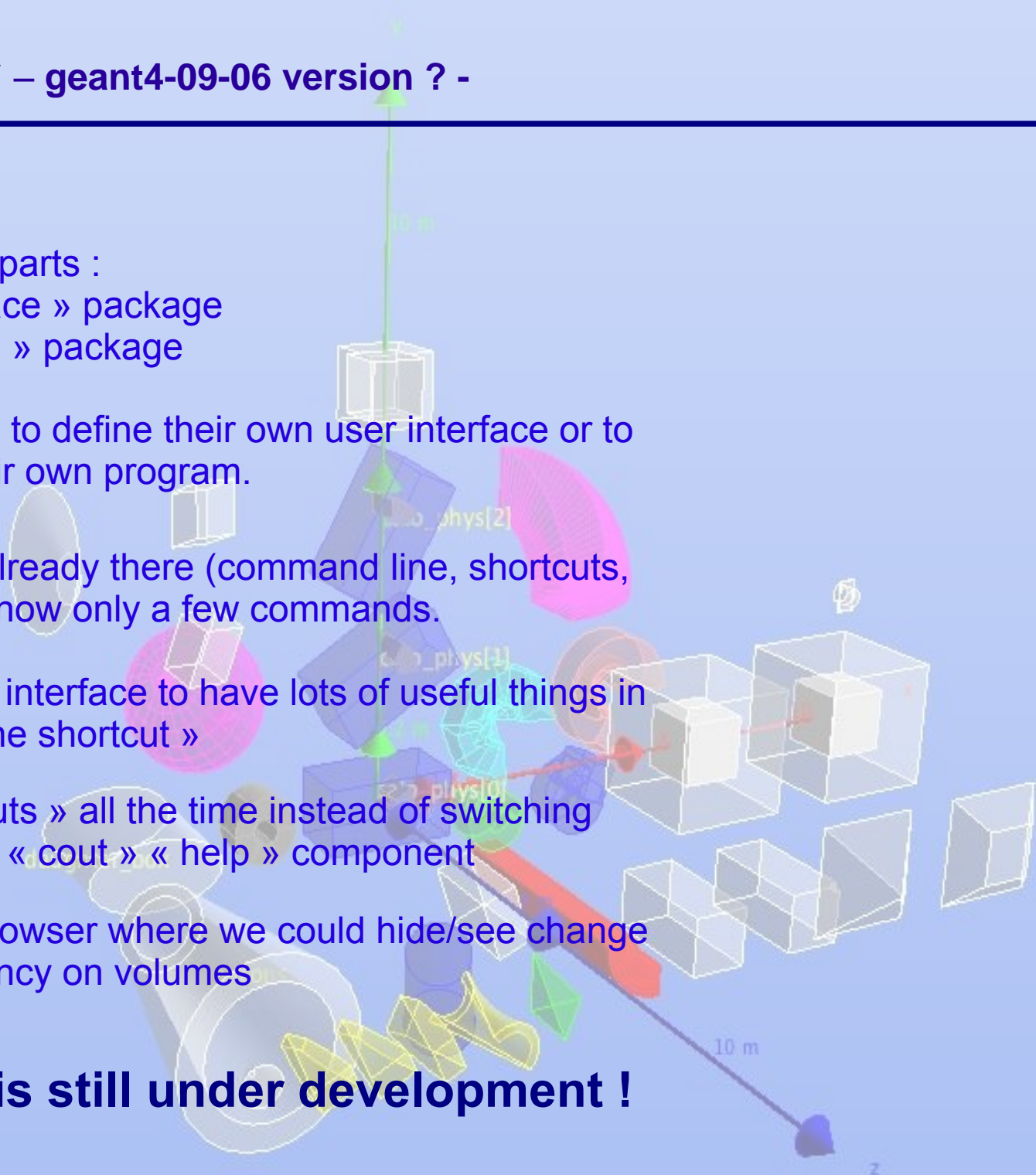
Lots of functionalities are already there (command line, shortcuts, context menu), but users know only a few commands.

⇒ Try to redefine user interface to have lots of useful things in « one click » or « one shortcut »

⇒ Allow to see « outputs » all the time instead of switching between « history » « cout » « help » component

⇒ Add a scene tree browser where we could hide/see change color and transparency on volumes

**Everything is still under development !**



# Qt Visualisation Driver – geant4-09-06 version ? -

The screenshot displays the G4UI Session application window. The title bar reads "G4UI Session". The main interface is divided into several sections:

- Menu Bar:** Includes "scene", "viewer", "Scen...", "Help", and "History".
- Viewer Tab:** Labeled "viewer-0 (OpenGLStoredQt)".
- 3D Viewport:** Shows a 3D scene with a white cone labeled "Shape1" and a grey rectangular prism labeled "Shape2". A coordinate system with x, y, and z axes is visible. The text "Mon Sep 10 15:35:00 2012" is displayed in the top right of the viewport. The "Geant4" logo and "exampleB1" are shown at the bottom of the viewport.
- Control Panel (Left):**
  - name:** A list of objects with checkboxes: Axes, Date, Frame, Logo, Logo2D, Scale, Text, Text2D, and Touchables.
  - Touchables slider:** A slider between "Show all" and "Hide all".
  - Search:** A text input field and a "select item(s)" button.
  - Session:** A text input field.
- Output Panel (Bottom Right):** Contains a text area with the following commands:

```
/vis/viewer/set/style surrface
/vis/viewer/set/hiddenMarker true
/vis/viewer/set/viewpointThetaPhi 120 150
#
# Re-establish auto refreshing and verbosity:
/vis/viewer/set/autoRefresh true
/vis/viewer/refresh
```

Below the text area are "clear" and "Filter:" buttons.



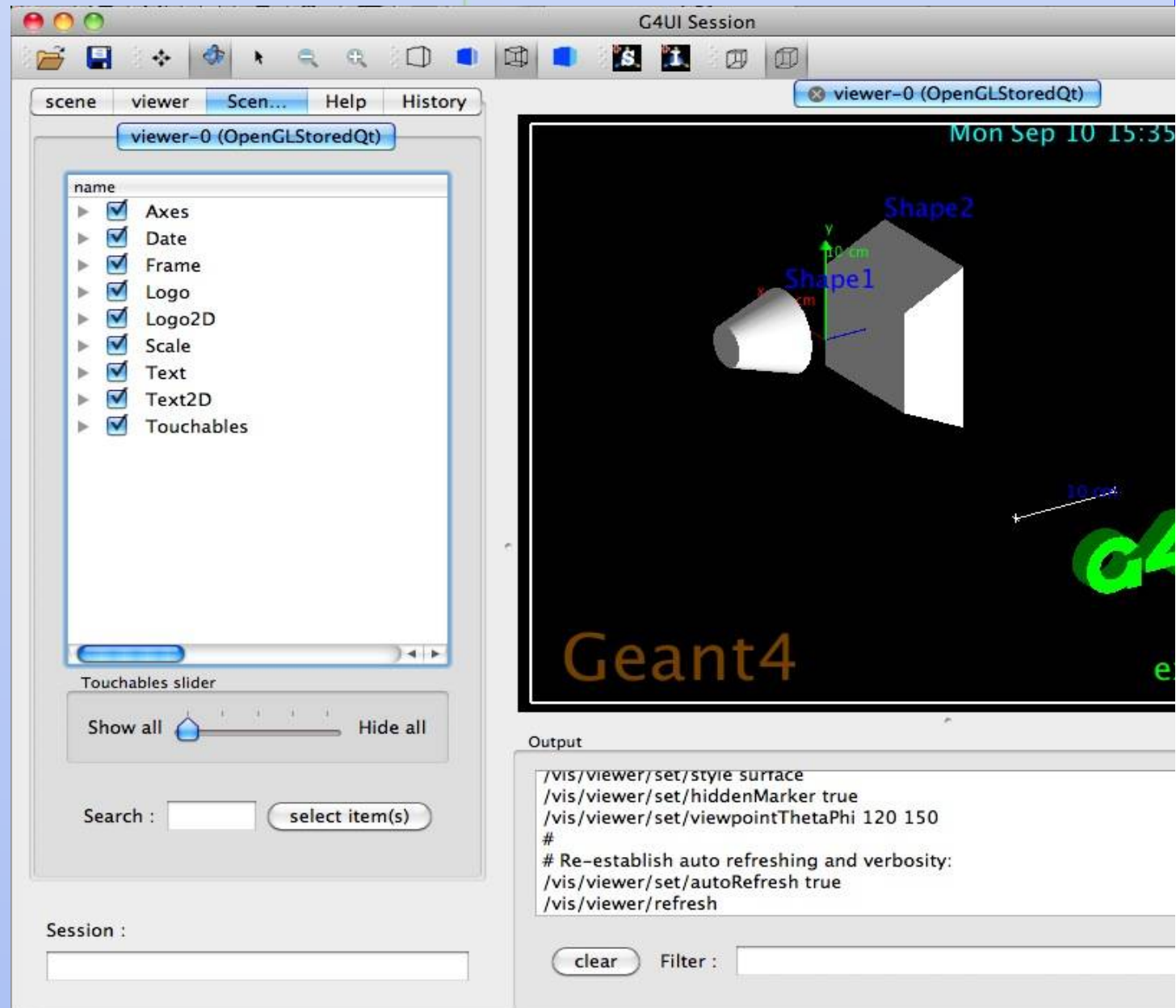
# Qt Visualisation Driver – geant4-09-06 version ? -

## What's new ?

- Icon toolbar
- Left widget tabstack
- Scene tree browser

All previous components are still there :

- Help widget
- Output window
- History
- Viewers
- Session





# Qt Visualisation Driver – Test202 example -

The screenshot displays the G4UI Session application window. The title bar reads "G4UI Session". The interface is divided into several sections:

- Top Panel:** Contains a menu bar with "scene", "viewer", "Scen...", "Help", and "History". Below the menu is a toolbar with various icons for scene manipulation.
- Left Panel (Control Panel):**
  - Header: "viewer-0 (OpenGLStoredQt)"
  - Tree view: A list of scene elements with checkboxes, including "Axes", "Date", "Frame", "Text", and "Touchables", all of which are checked.
  - Touchables slider: A slider labeled "Touchables slider" with "Show all" on the left and "Hide all" on the right.
  - Search: A search box with a "select item(s)" button.
  - Session: A text input field labeled "Session :".
- Right Panel (3D View):**
  - Header: "viewer-0 (OpenGLStoredQt)" and a timestamp "Mon Sep 10 15:38:17 2012".
  - Content: A 3D visualization of a particle detector structure, showing various components like "calo\_phys[2]", "calo\_phys[1]", "daughter", "phys", and "con".
- Bottom Panel (Output):**
  - Header: "Output"
  - Content: A log of system messages, including:

```
G4VisManager::SetCurrentviewer: viewer now viewer-0 (OpenGLStoredQt)
G4VisManager::SetCurrentSceneHandler: scene handler now "scene-handler-0"
/vis/scene/add/text 0 4000 0 mm 12 0 0 calo_phys[2]
Text "calo_phys[2]" has been added to scene "scene-0".
/vis/scene/notifyHandlers
G4VisManager::SetCurrentViewer: viewer now viewer-0 (OpenGLStoredQt)
G4VisManager::SetCurrentSceneHandler: scene handler now "scene-handler-0"
Traversing scene data...
Traversing scene data...
Viewer "viewer-0 (OpenGLStoredQt)" of scene handler "scene-handler-0"
refreshed at request of scene "scene-0".
G4VisManager::SetCurrentViewer: viewer now viewer-0 (OpenGLStoredQt)
```
  - Footer: A "clear" button and a "Filter:" input field.



# Qt Visualisation Driver – Test202 example – scene tree

The screenshot displays the Qt Visualisation Driver interface, titled "G4UI Session". The interface is divided into several sections:

- Scene Tree:** A hierarchical tree view on the left side, listing various objects and their visibility status. The tree is expanded to show the "expHall\_P [0]" folder, which contains several sub-objects like "B [0]", "BoxInBox [0]", "C [0]", "PD\_physical [0]", "Polycone\_Test [0]", "Polyhedra\_Test [0]", "Test orb [0]", and several "TestTessCut-phys [0]" and "TestTrapCut-phys [0]" objects. Checkmarks indicate which objects are currently visible.
- Viewer:** A central 3D viewer window titled "viewer-0 (OpenGLStoredQt)". It displays a 3D scene with various colored objects (spheres, cones, boxes) and text labels like "calo\_phys[2]", "calo\_phys[1]", "daughter", and "conf". The viewer also shows a timestamp "Mon Sep 10 15:38:17 2012" in the top right corner.
- Output:** A text area at the bottom right showing the log output of the visualization process. The log contains several lines of messages, including "G4VisManager::SetCurrentviewer: viewer now viewer-0 (OpenGLStoredQt)", "G4VisManager::SetCurrentSceneHandler: scene handler now 'scene-handler-0'", and "Text 'calo\_phys[2]' has been added to scene 'scene-0'".
- Touchables slider:** A slider control at the bottom left of the scene tree, labeled "Touchables slider", with "Show all" and "Hide all" buttons.
- Search:** A search box and a "select item(s)" button located below the touchables slider.
- Session:** A text input field at the bottom left labeled "Session:".
- Clear and Filter:** A "clear" button and a "Filter:" input field at the bottom right of the output area.

# Qt Visualisation Driver – Test202 example – changing color and transparency

The screenshot displays the Qt Visualisation Driver interface for a 3D scene. The main window, titled "G4UI Session", shows a 3D visualization of a scene with various objects, including a pink sphere, a blue cube, a red cylinder, and a yellow object. A date stamp "Mon Sep 10 15:38:17 2012" is visible in the top right corner of the viewer.

On the left side, there is a "viewer-0 (OpenGLStoredQt)" panel with a tree view of scene objects. The objects listed include:

- Axes
- Date
- Frame
- Text
- Touchable
- expHall\_P [0]
- B [0]
- BoxInBox [0]
- C [0]
- PD\_physical [0]
- Polycone\_Test [0]
- Polyhedra\_Test [0]
- Test orb [0]
- TestTessCut-phys [0]
- TestTessCut-phys [0]
- TestTrapCut-phys [0]
- TestTrapCut-phys [0]

Below the tree view, there is a "Touchable slider" with a "Show all" button and a "Hide all" button. A search bar is also present with a "select item(s)" button.

In the center, a "Get color a..." dialog box is open, showing a color selection wheel and an "Opacity" slider set to 100%. The dialog has "Cancel" and "OK" buttons.

At the bottom, a console window displays the following log messages:

```
Viewer: viewer now viewer-0 (OpenGLStoredQt)
SceneHandler: scene handler now "scene-handler-0"
00 0 mm 12 0 0 calo_phys[2]
een added to scene "scene-0".
Viewer: viewer now viewer-0 (OpenGLStoredQt)
SceneHandler: scene handler now "scene-handler-0"
Traversing scene data...
Viewer "viewer-0 (OpenGLStoredQt)" of scene handler "scene-handler-0"
refreshed at request of scene "scene-0".
G4VisManager::SetCurrentViewer: viewer now viewer-0 (OpenGLStoredQt)
```

At the bottom of the interface, there is a "Session:" label and a "clear" button next to a "Filter:" input field.



# Qt Visualisation Driver – Test202 example – touchables slider

The screenshot displays the G4UI Session interface. The main window, titled "viewer-0 (OpenGLStoredQt)", shows a 3D visualization of a particle detector. The scene contains various geometric objects, including a pink sphere, a blue cylinder, and several rectangular boxes. A red line segment is visible, and a scale bar indicates 10 m. The date and time "Mon Sep 10 15:41:41 2012" are displayed in the top right corner of the viewer.

On the left side, there is a "Touchable slider" control. The slider is currently set to "Show all". Below the slider, there is a search field and a "select item(s)" button.

The "Output" window at the bottom right displays the following text:

```
drawing style: not forced, auxiliary edge visibility: not forced
line segments per circle: not forced.
time range: (-1.79769e+308,1.79769e+308)
G4AttValue pointer is zero, G4AttDef pointer is zero
/vis/scene/notifyHandlers
NOTE: The scene, "scene-0", of viewer "viewer-0 (OpenGLStoredQt)"
of scene handler "scene-handler-0" has changed. To see effect,
"/vis/viewer/select viewer-0" and "/vis/viewer/rebuild".
G4VisManager::SetCurrentViewer: viewer now viewer-0 (OpenGLStoredQt)
G4VisManager::SetCurrentSceneHandler: scene handler now "scene-handler-0"
Traversing scene data...
Traversing scene data...
```

# Qt Visualisation Driver – Test202 example – looking for a volume

The screenshot shows the G4UI Session application window. The main 3D view displays a complex 3D model of a particle detector with various components labeled, including 'daughter\_box', 'e-cons', and several 'phys' volumes. A red cylinder and a blue line are overlaid on the model. The top right of the 3D view shows the date and time: 'Mon Sep 10 15:44:02 2012'.

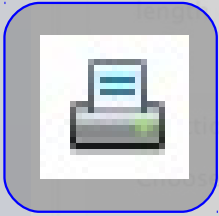
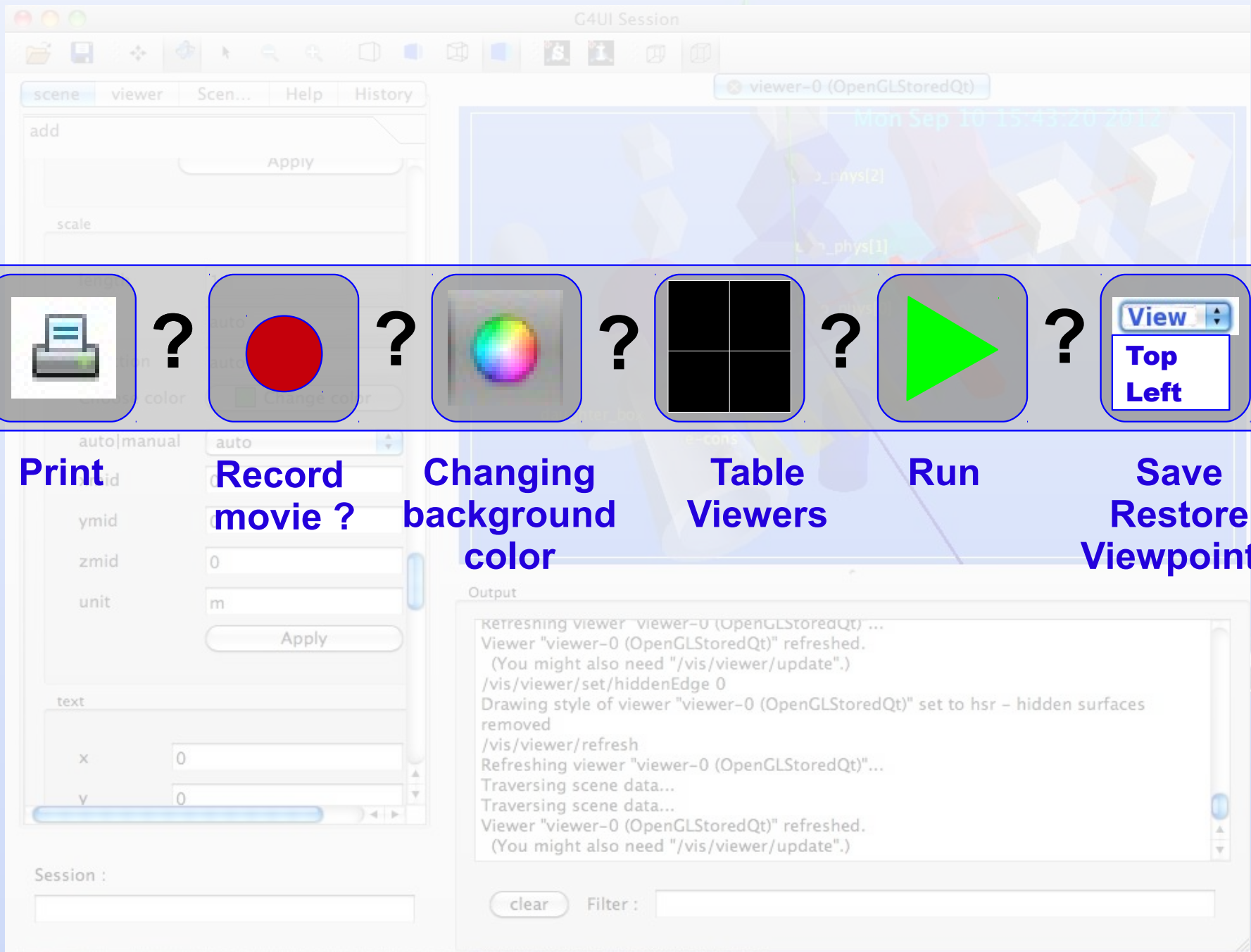
The left sidebar contains a tree view of the scene objects. The 'Touchables' folder is expanded, showing a list of objects with checkboxes. The 'Polyhedra\_Test [0]' object is selected and highlighted in purple. Below the tree view is a 'Touchables slider' with a 'Show all' button on the left and a 'Hide all' button on the right. A search bar contains the text 'Poly|' and a 'select item(s)' button.

The bottom right of the window features an 'Output' panel with a text area containing the following log messages:

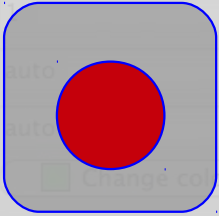
```
Refreshing viewer "viewer-0 (OpenGLStoredQt)" ...  
Viewer "viewer-0 (OpenGLStoredQt)" refreshed.  
(You might also need "/vis/viewer/update".)  
/vis/viewer/set/projection p  
Projection style of viewer "viewer-0 (OpenGLStoredQt)" set to perspective  
with half angle 30 degrees.  
/vis/viewer/refresh  
Refreshing viewer "viewer-0 (OpenGLStoredQt)"...  
Viewer "viewer-0 (OpenGLStoredQt)" refreshed.  
(You might also need "/vis/viewer/update".)  
0x11a31ec700x11a4750900x11a4750900x11a4f4590Traversing scene data...  
Traversing scene data...
```

Below the output panel are 'clear' and 'Filter:' buttons.

# Qt Visualisation Driver – What next ? –



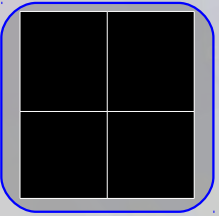
?



?



?



?



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?

**Print**

**Record  
movie ?**

**Changing  
background  
color**

**Table  
Viewers**

**Run**

**Save  
Restore  
Viewpoints**

Output

```
Retreshing viewer "viewer-0 (OpenGLStoredQt)" ...  
Viewer "viewer-0 (OpenGLStoredQt)" refreshed.  
(You might also need "/vis/viewer/update".)  
/vis/viewer/set/hiddenEdge 0  
Drawing style of viewer "viewer-0 (OpenGLStoredQt)" set to hsr - hidden surfaces  
removed  
/vis/viewer/refresh  
Refreshing viewer "viewer-0 (OpenGLStoredQt)"...  
Traversing scene data...  
Traversing scene data...  
Viewer "viewer-0 (OpenGLStoredQt)" refreshed.  
(You might also need "/vis/viewer/update".)
```





clear

Filter :



# Text improvements

Driver	Variant	Geometry	Text	Text 2D	Text Layout	Other 2D
OpenGL	X	Implemented	Implemented	Implemented	Implemented	Implemented
	Xm	Implemented	Implemented	Implemented	Implemented	Implemented
	Qt	Implemented	Implemented	Implemented	Implemented	Implemented
	Win32	Implemented	We should put effort into implementing	We should put effort into implementing	Would be nice to implement	We should put effort into implementing
	printEPS	Implemented	Implemented	Implemented	Would be nice to implement	Implemented
Open Inventor	Xt	Implemented	We should put effort into implementing	We should put effort into implementing	Would be nice to implement	We should put effort into implementing
	Win32	Implemented	We should put effort into implementing	We should put effort into implementing	Would be nice to implement	We should put effort into implementing
DAWN & DAWNFILE		Implemented	Implemented	Implemented	Would be nice to implement	Would be nice to implement
VRML1/2 & VRML1/2FILE		Implemented	Would be nice to implement	Would be nice to implement	Would be nice to implement	Would be nice to implement
HepRep		Implemented	Would be nice to implement	Would be nice to implement	Would be nice to implement	Would be nice to implement
HepRepFile		Implemented	Would be nice to implement	Implemented	Would be nice to implement	Would be nice to implement
gMocren		Implemented	Not necessary nor possible to implement	Not necessary nor possible to implement	Not necessary nor possible to implement	Not necessary nor possible to implement
Ray Tracer		Implemented	Not necessary nor possible to implement	Not necessary nor possible to implement	Not necessary nor possible to implement	Not necessary nor possible to implement

-  Implemented
-  Not necessary nor possible to implement
-  Would be nice to implement
-  We should put effort into implementing

# Running visualization in batch mode

Nothing to do !

- add some print command inside your macro file
- Run your favorite example with mac file in parameter
- That's all...

It's time for a demo ;-)

