Visualizer framework for the ITK project

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Motivation & Workplan

- Build a realistic interactive 3D model of the ITK project in a variety of formats (GDML, JSON, ROOT) for stand-alone and Web display
- Use the existing XML files for Step 2.X simulations (used for readout and services)
  - InnerDetector/InDetTrackingGeometryXML/trunk/share - readout
  - InnerDetector/InDetDetDescr/PixelLayouts/BarrelInclinedRef/trunk – support
  - 3rd party files (CAD, STP) from engineers
- Can be a critical link between simulations and engineering designs (CAD, STP)
- Web-based geometry view:
  - Does not require running VP1 on lxplus (how many people can use it?)
  - Can access each detector part, their sizes, dimensions etc.
- Workplan:
  - Make the code public (under github) and later move it to athena
  - Build PixelBarrel and PixelEndCap support structures and services
  - Implement visualization of services beyond simple services
  - Optimize the speed of viewing the models

Initial version using TGeometry (ROOT)

- Build “assemblies”, rather than flat files with TGeometry objects
  - Each subdetector can be visualized separately
- Can be used with:
  - ROOT EVE display (local computer)
  - jsROOT: developers (S.Linev) will add tools to extract sizes, dynamic rulers etc
  - Fastest method: using OpenGL (runs a pyROOT script on GDML file)
- Project wiki:
  - https://twiki.cern.ch/twiki/bin/view/Atlas/ITkVisualiser
  - http://atlaswww.hep.anl.gov/asc/itk/geom/viewdet.php - first web-based version
- Several variations in order to boost performance
  - Whole detector
  - Half detector
  - Module-less detector

Input files for inclined layouts: Quads, Duals, and Alternative

- High-priority: Inclined for Step.2.2. ATLAS-P2-ITK-19-00-00 (InclinedQuads):
- Used XML:
  - `Materials.xml`
  - `InclBrl4Ref_InclinedQuads_PixelBarrel.xml`
  - `ECRing4Ref_InclinedQuads_PixelEndcap.xml`
  - `ITK_PixelModules.xml`
  - `InclBrl4Ref_InclinedQuads_PixelStave.xml`
  - `InclBrl_PixelSimpleService.xml`
  - `InclBrl4_InclinedQuads_DiskSupport.xml`
- For Duals: replace “Quads” with “Duals”
- For Alternative: replace “Quads” with “Alternative”
- Web browser also has links to the above models for easy access
- Material (density) is not implemented (low priority for visualization)

Codding

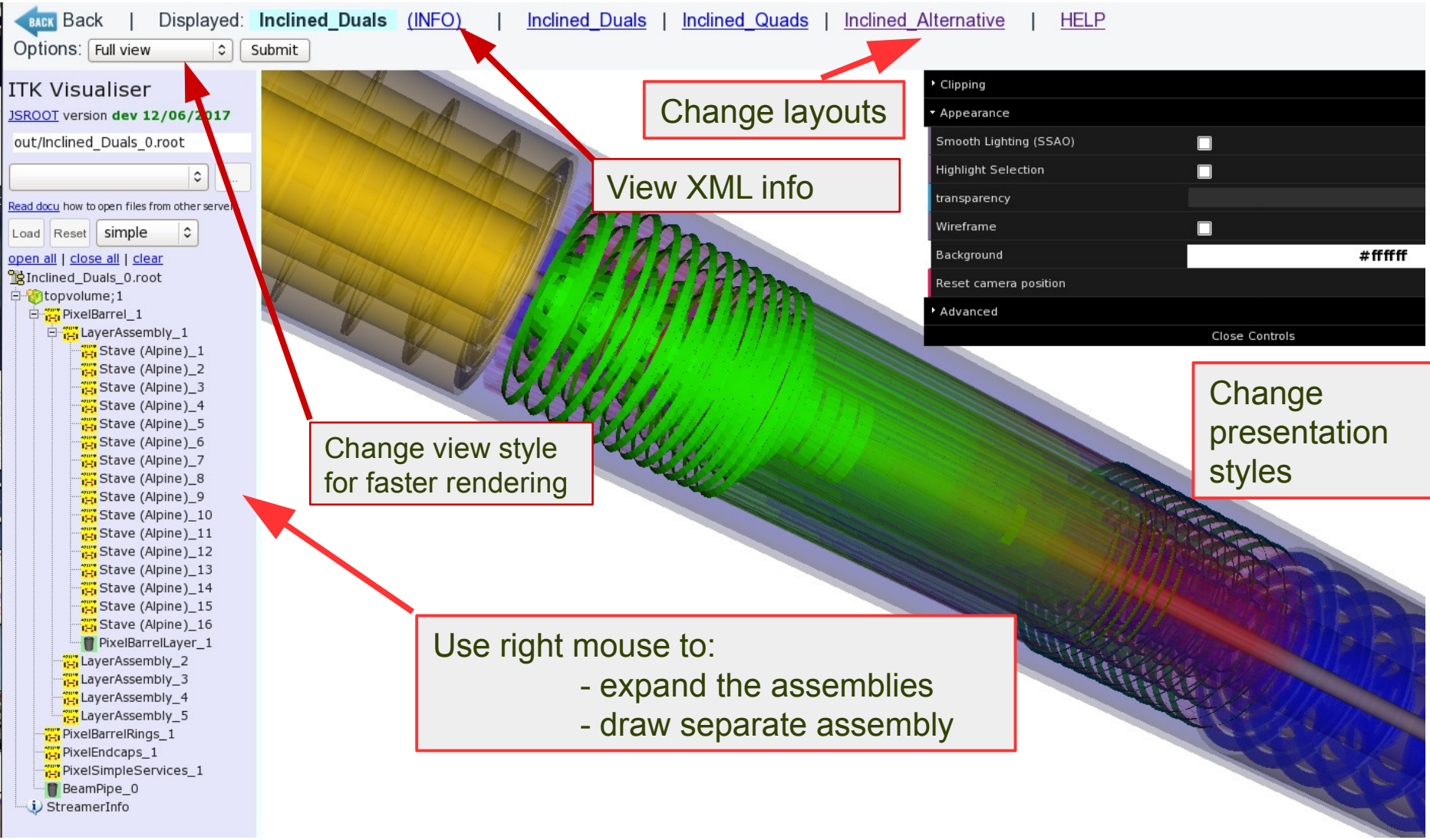
- Each ITK detector can be codded independently as separate source files:
- Currently implemented:
  - `ShowPixelBarrel.cxx`
  - `ShowPixelEndcap.cxx`

- Common interface:
  - `process(InDet::XMLReaderSvc& reader, TGeoVolume* top, TGeoManager* geom, int complexity)`

- One can add additional functionality by adding “SomeDetector.cxx” function
- The code is on GIT: C++/ROOT + xercesc library (no athena)

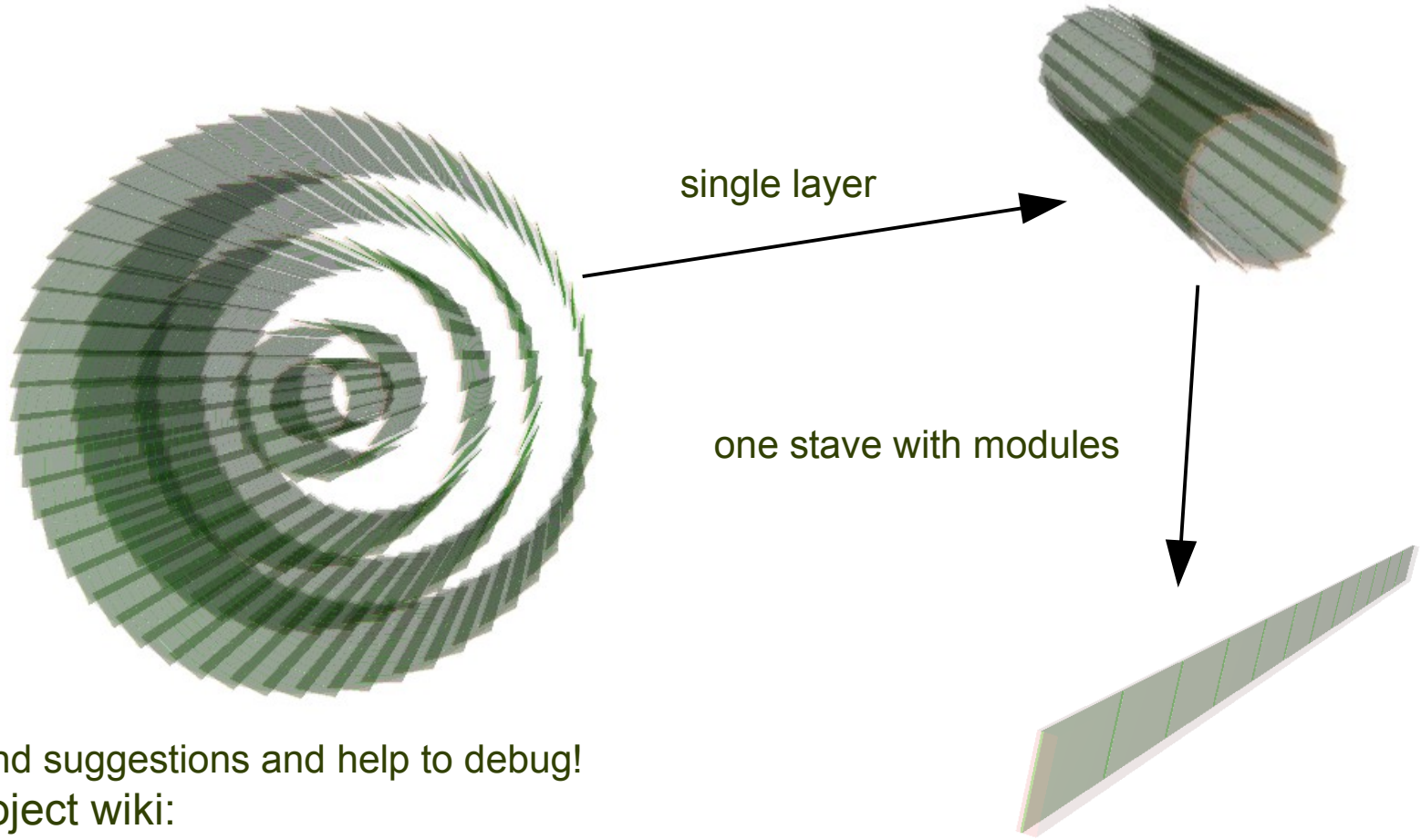
Initial version:

http://atlaswww.hep.anl.gov/asc/itk/geom/viewdet.php



Visualizing separate assemblies

http://atlaswww.hep.anl.gov/asc/itk/geom/viewdet.php



Send suggestions and help to debug!

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