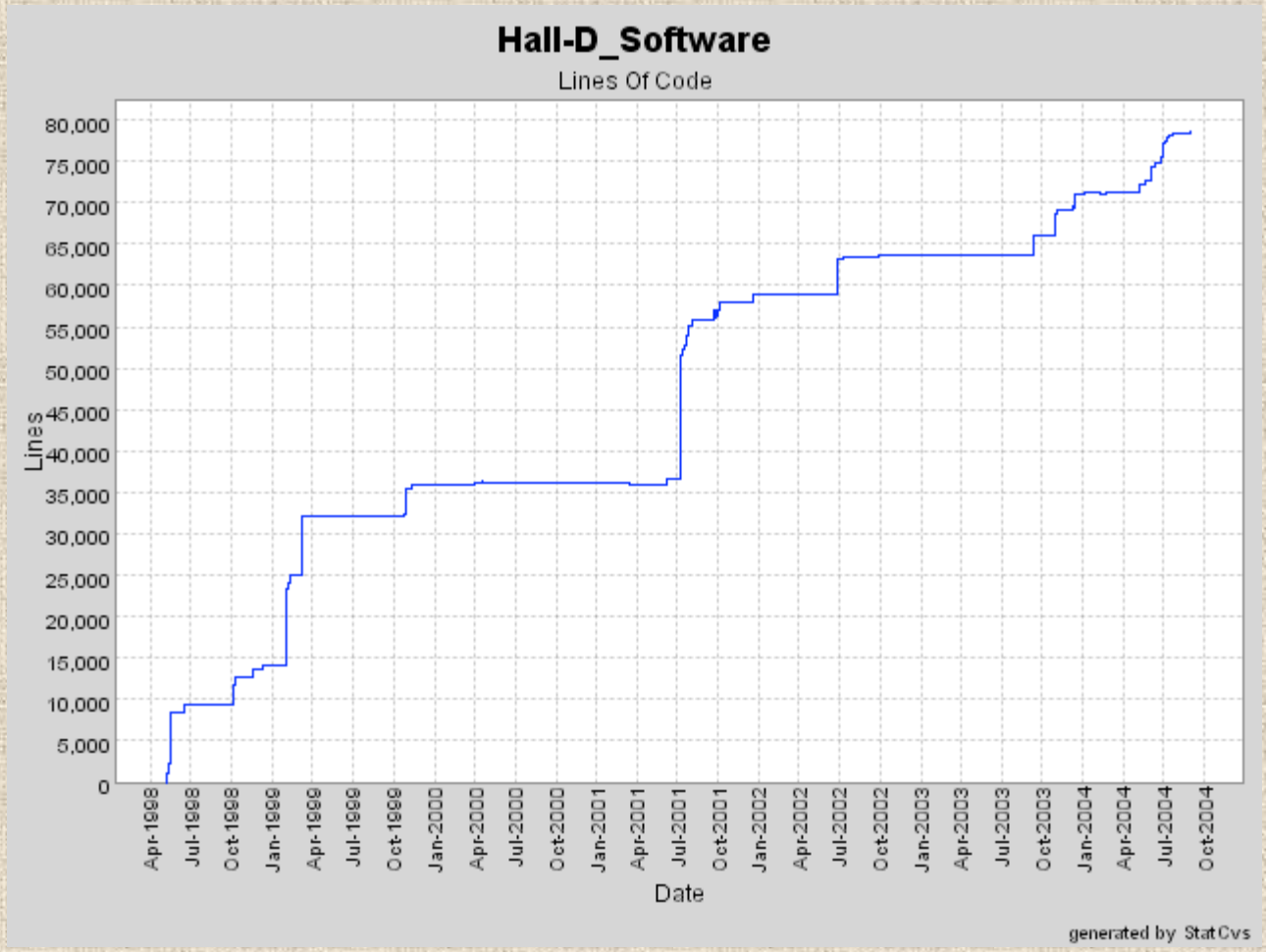
Hall-D Software Status

September 10, 2004

D. Lawrence JLab

History of Code Development



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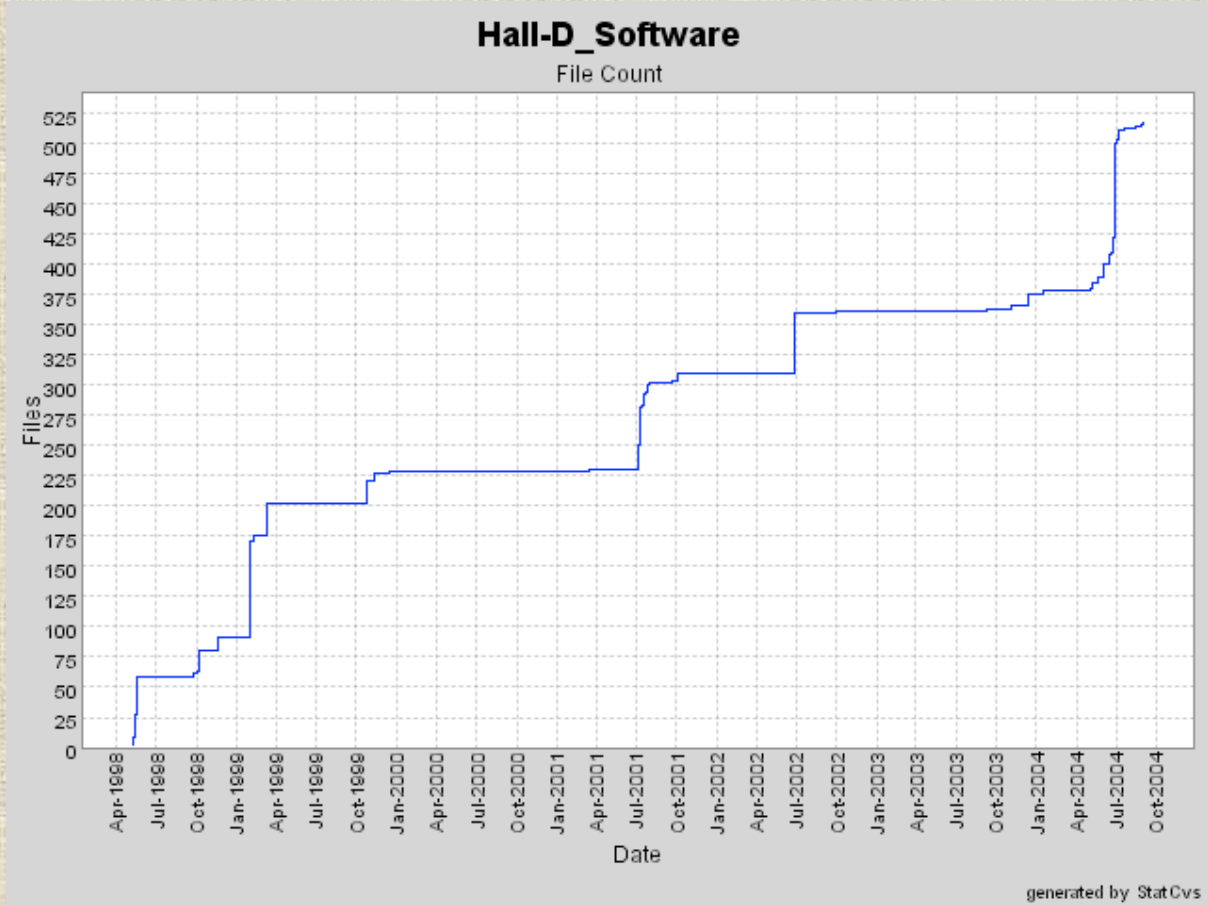

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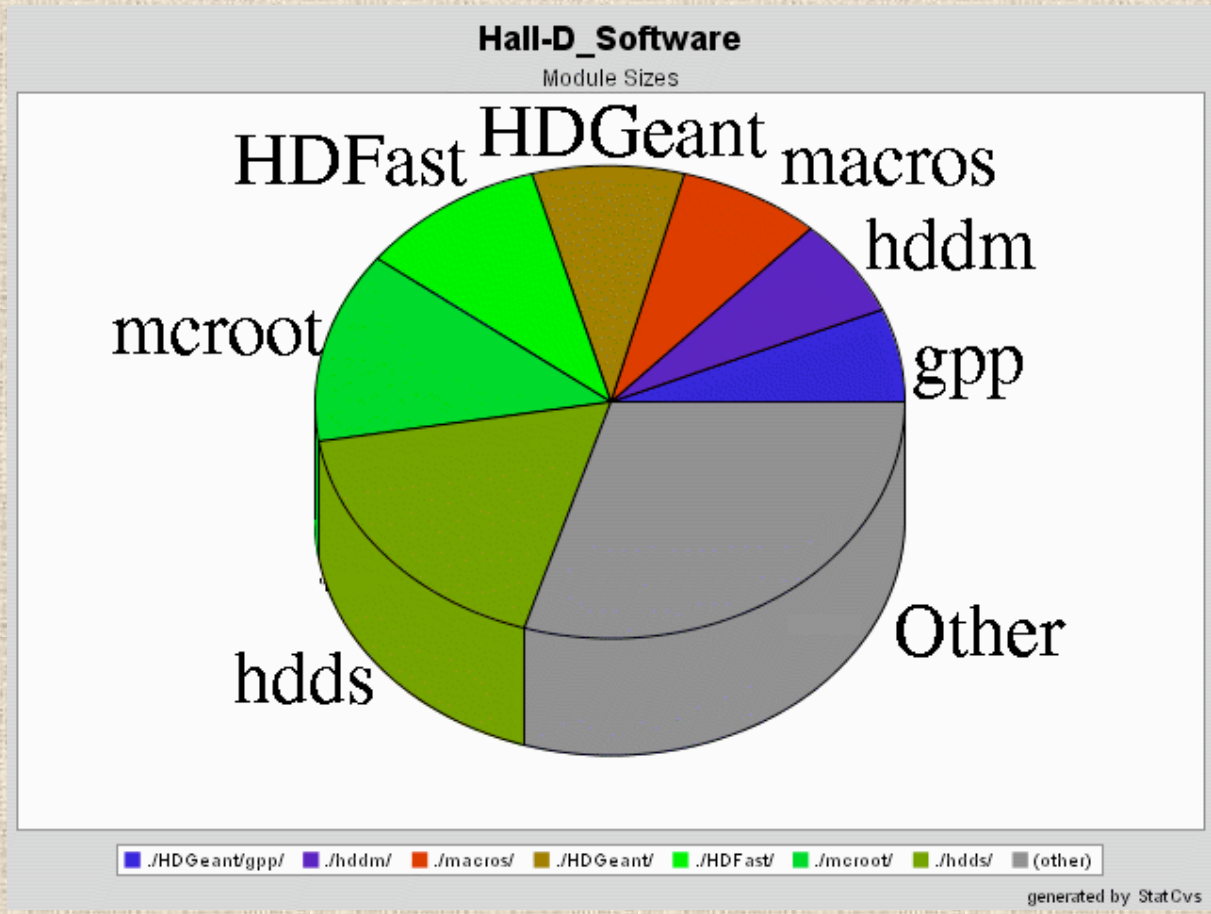


Weekly Software Meetings

- Meetings almost every week since May 5th(~17 meetings)
- Discussions of policy, philosophy and design specifics of Hall-D software
- Anyone is welcome to connect to the meeting via VRVS or telephone. Meeting announcements sent out to halld-computing@jlab.org

Software Topics Discussed

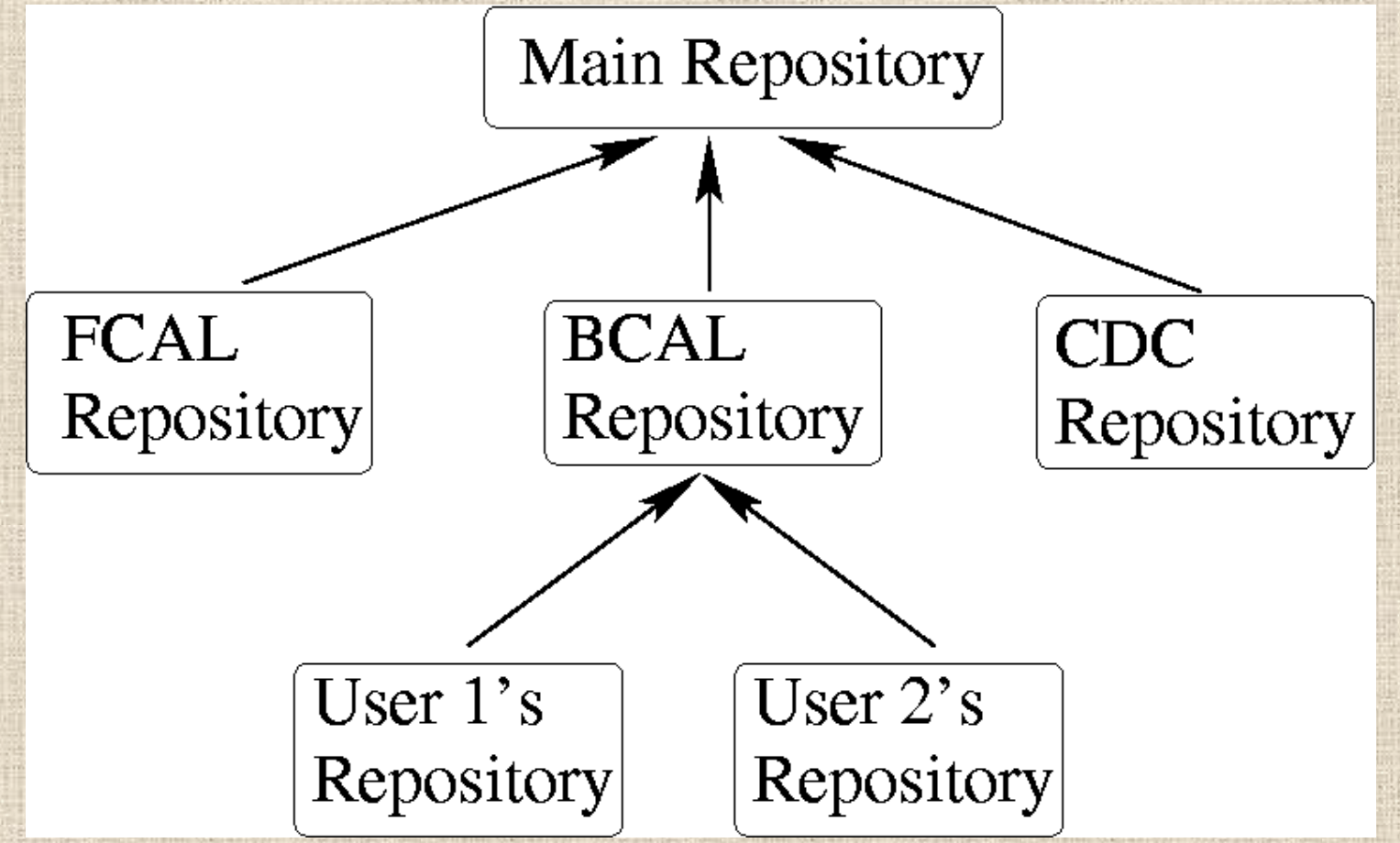
- Data Model (HDDM)
- PID/Gas Cherenkov detector GEANT studies
- GlueX Portal
- Analysis Framework
- Version Control: CVS vs. BitKeeper
- Make system
- Tagger simulation
- Code documentation

Version Control

BitKeeper will be tested first on **hdds** package *after* detector review

See Hall-D note “Why BitKeeper” GlueX-doc-183-v1

GateKeeper Model



Redefining Forum Topics

Software Related Forums

- HDFast
- HDGeant
- HDDS Geometry Package
- Standards and Porting Issues
- HDDM Data Model Package
- PWA

Use Doxygen to generate code documentation

Example

Use ROOT for 3-vector and 4-vector classes

- TVector3, TLorentzVector are based (partly) on CLHEP classes
- Some methods:
  - Boost(bx,by,bz)
  - RotateX(radians)
  - M(),M2()
  - SetPhi(),SetTheta()

```
TRotation R;
TLorentzVector d, dprime, a;

dprime = a + d*R;
```

In-memory data structures defined in XML schemas

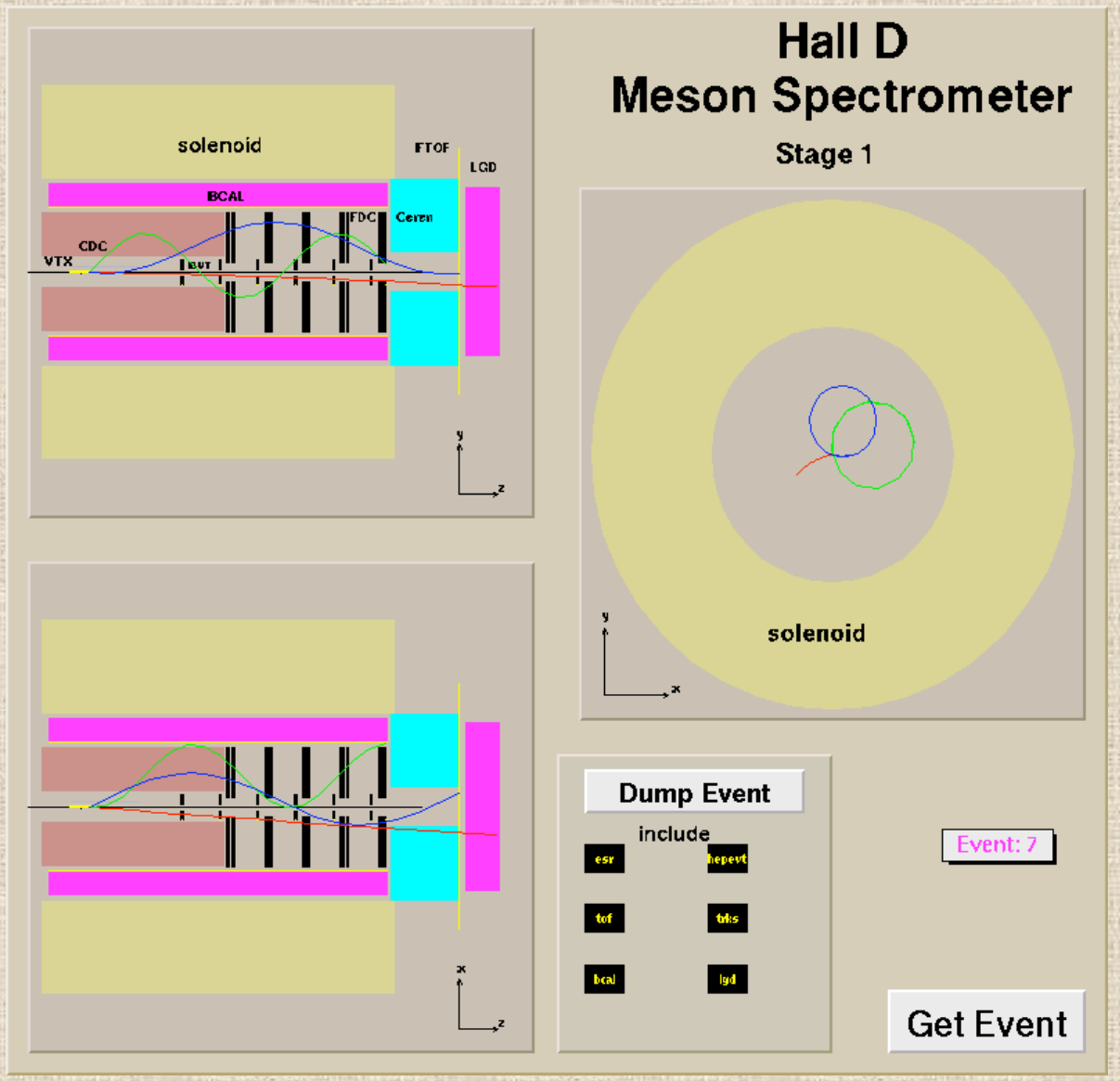
```
<xs:element name="fdcPoint">
 <xs:complexType>
  <xs:attribute name="dEdx”    type="hddm:float” use="required"/>
  <xs:attribute name="dradius” type="hddm:float" use="required"/>
  <xs:attribute name="track”   type="hddm:int”   use="required"/>
  <xs:attribute name="x”       type="hddm:float" use="required"/>
  <xs:attribute name="y”       type="hddm:float" use="required"/>
  <xs:attribute name="z”       type="hddm:float” use="required"/>
 </xs:complexType>
</xs:element>
```

So Where Are We?

HDFast

- Provides parametric simulation of entire Hall-D detector
- Provides full tracking results with smearing based on individual detector resolutions
- Numerous tools for looking at data
- Runs on RH Enterprise Linux

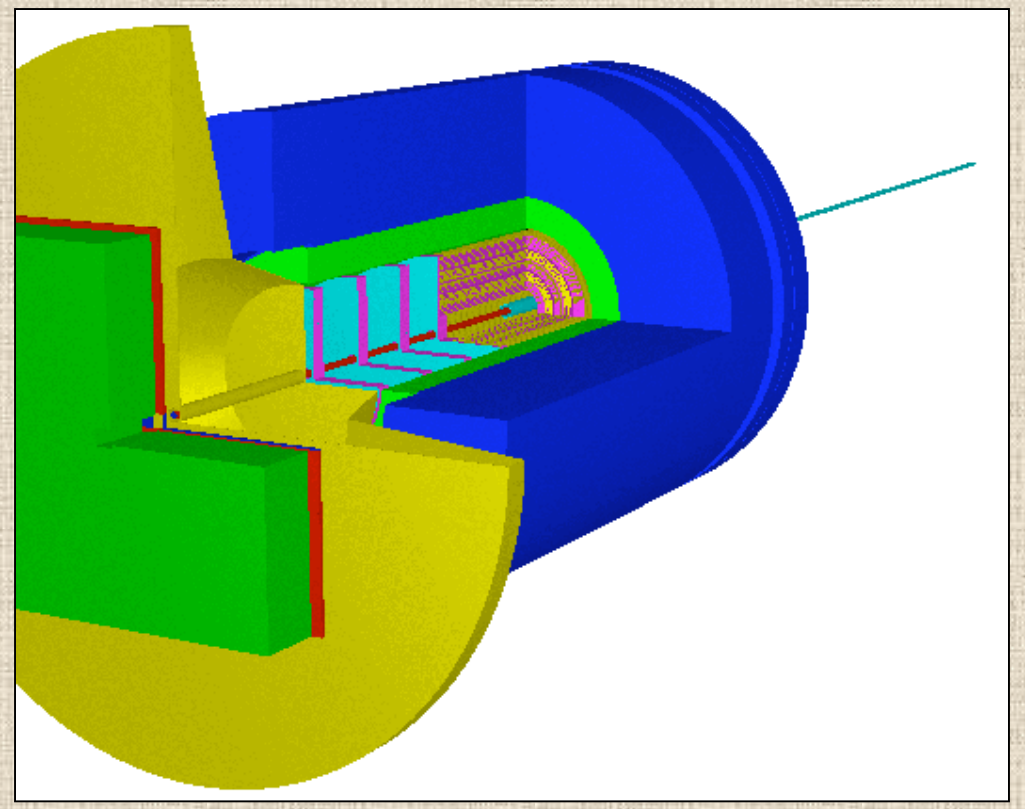
HDFast


solenoid
FTOF
LGD
BCAL
FDC
Ceren
CDC
VTX
Hall D
Meson Spectrometer
Stage 1
solenoid
Dump Event
include
esr
hepevt
tof
trks
bcal
lgd
Event: 7
Get Event

HDGeant

- Fully detailed physics simulation using Geant3
- Useful for background studies
- Provides data which can be used to develop reconstruction packages

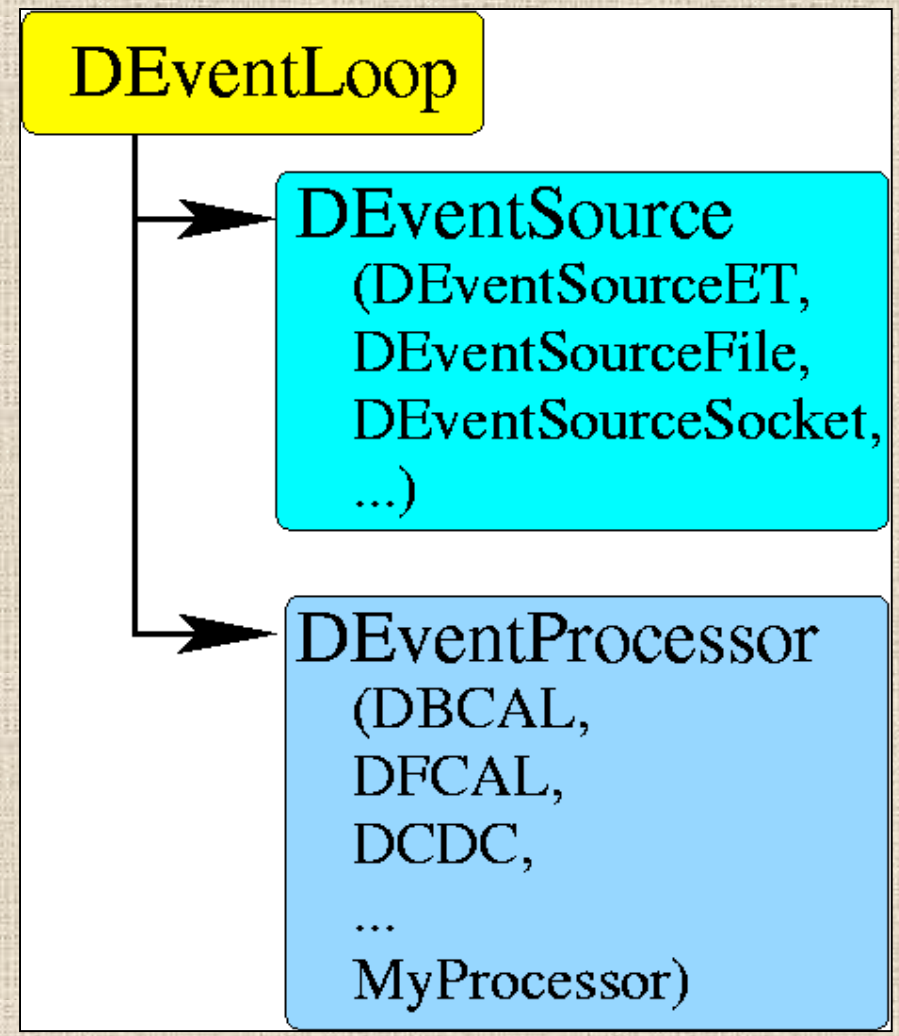
HDGeant



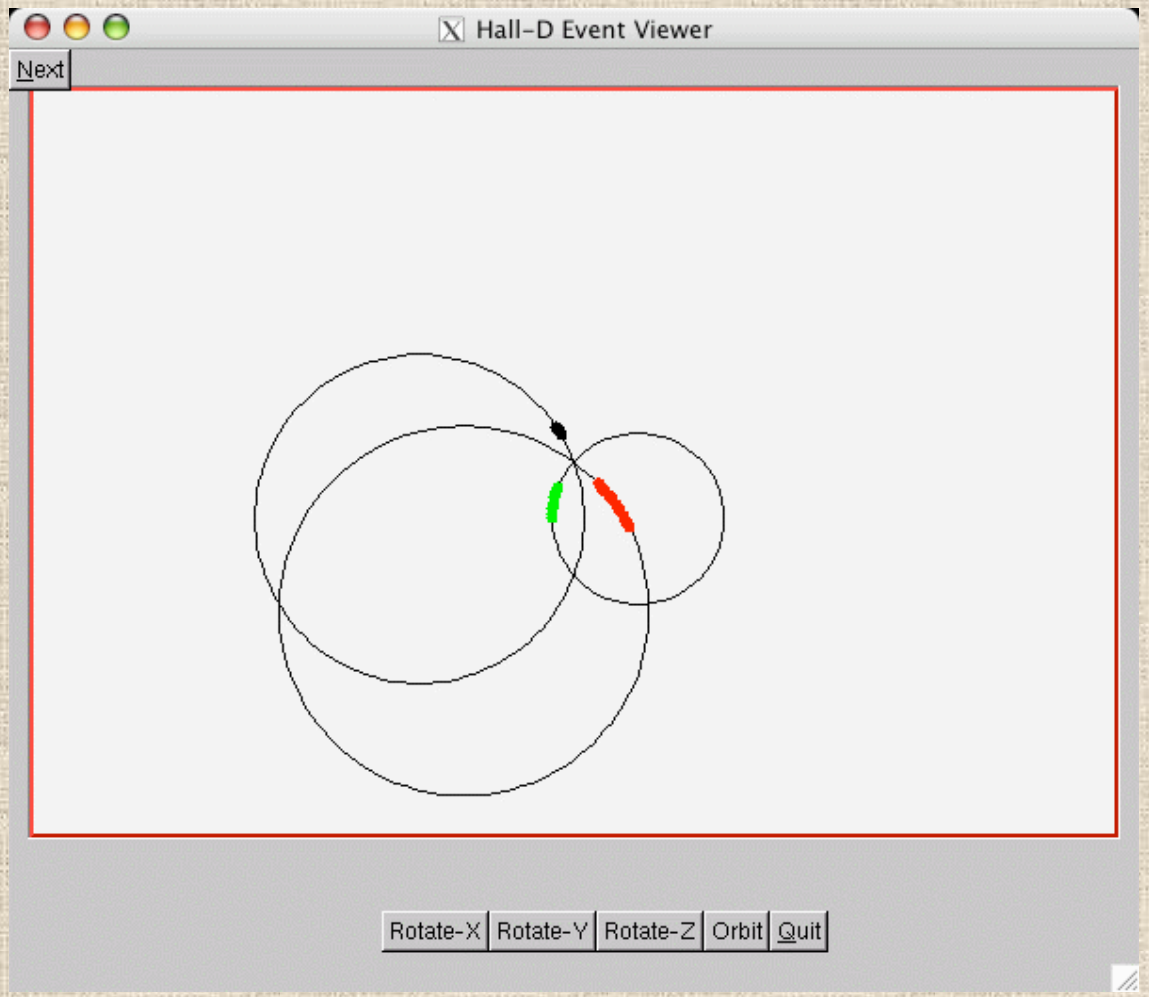
HDDM : Data Model

- Data structures defined using XML schemas
- C code generated from schemas
- Platform independent I/O routines generated from schemas

DANA : Hall-D Analysis Framework



CDC “First Guess”



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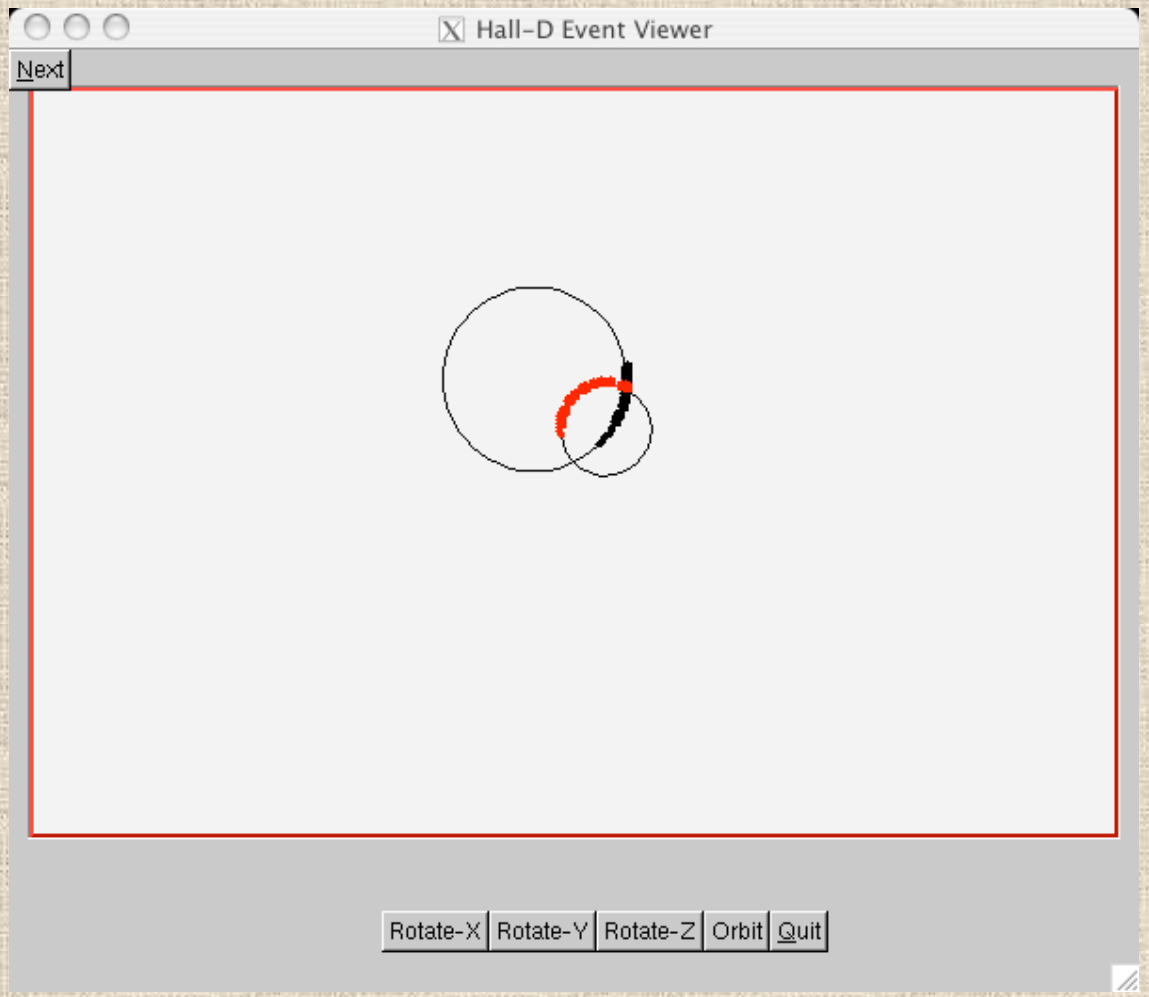

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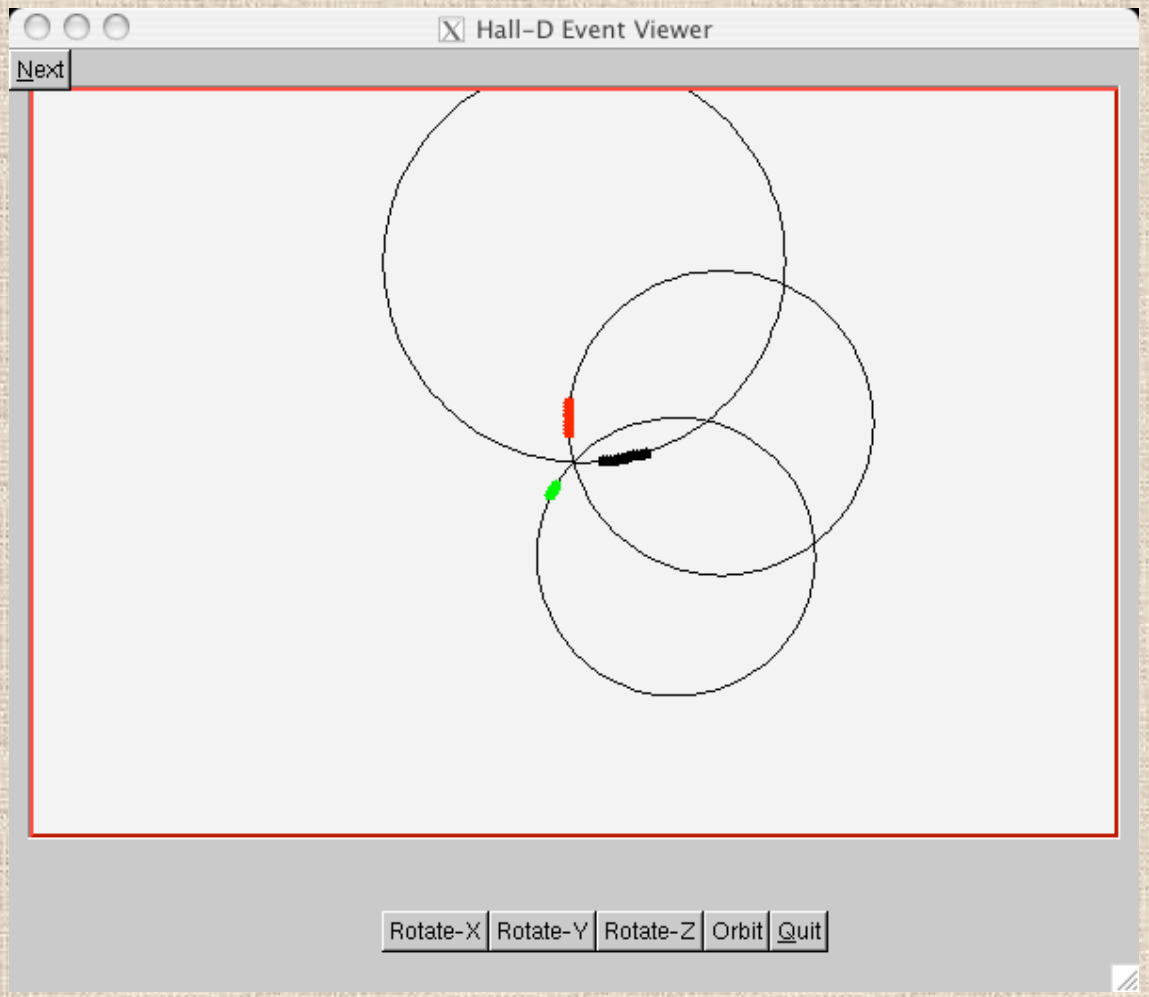
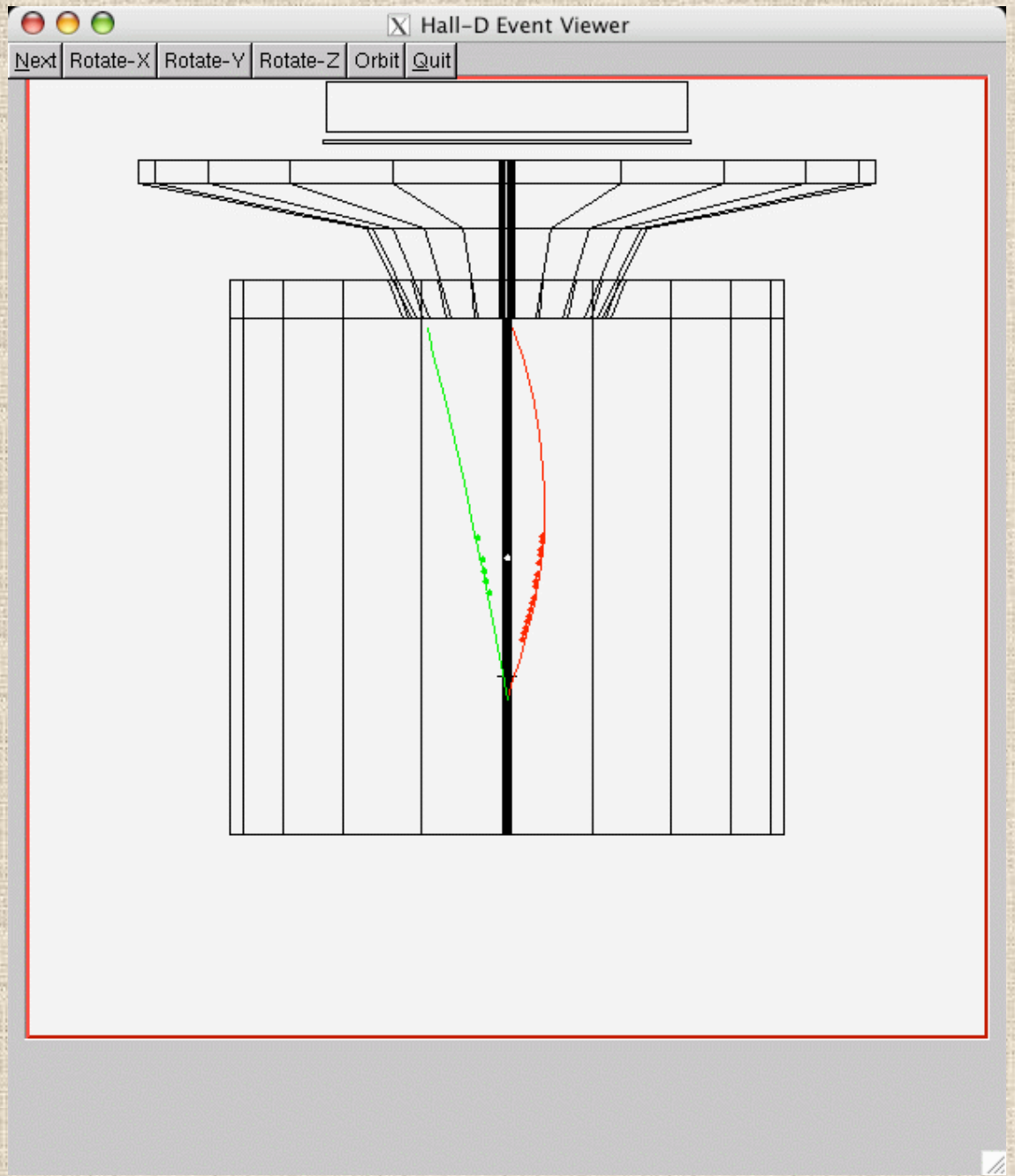


Looking Ahead

- Adopt coding guidelines, establish gatekeepers, identify validation tests
- Continue with Analysis Framework
- Reconstruction (tracking, cluster finding, ...)
- Calibration/Parameters Database
- GEANT4


Hall-D Event Viewer
Next
Rotate-X
Rotate-Y
Rotate-Z
Orbit
Quit