

Programmable Visualization of HDF-EOS Data

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HDF-EOS Workshop VI

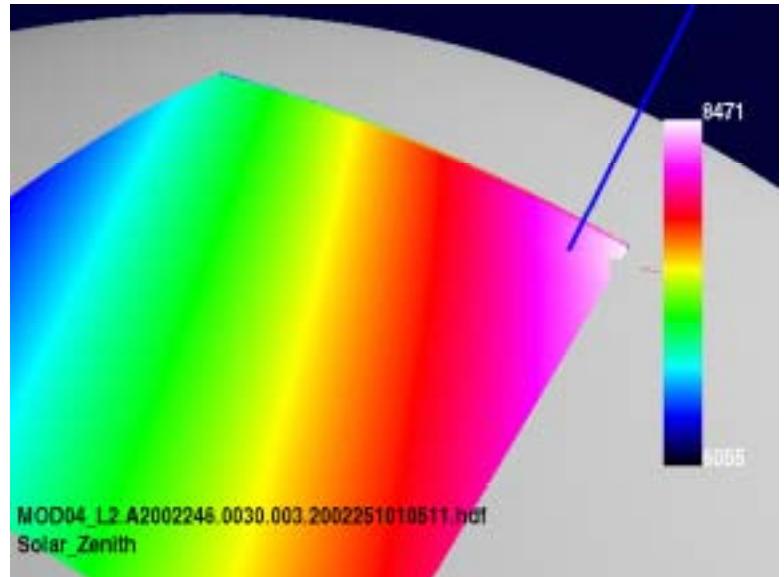
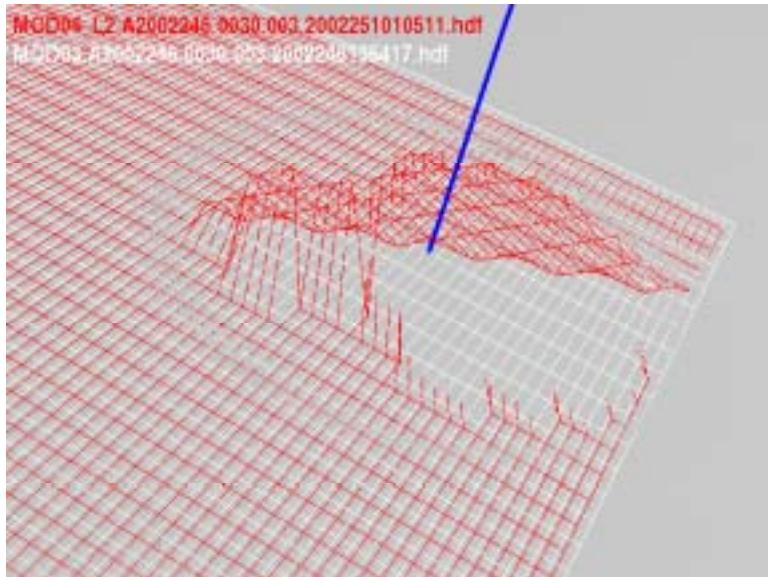
December, 2002

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HDFEOS Data Analysis

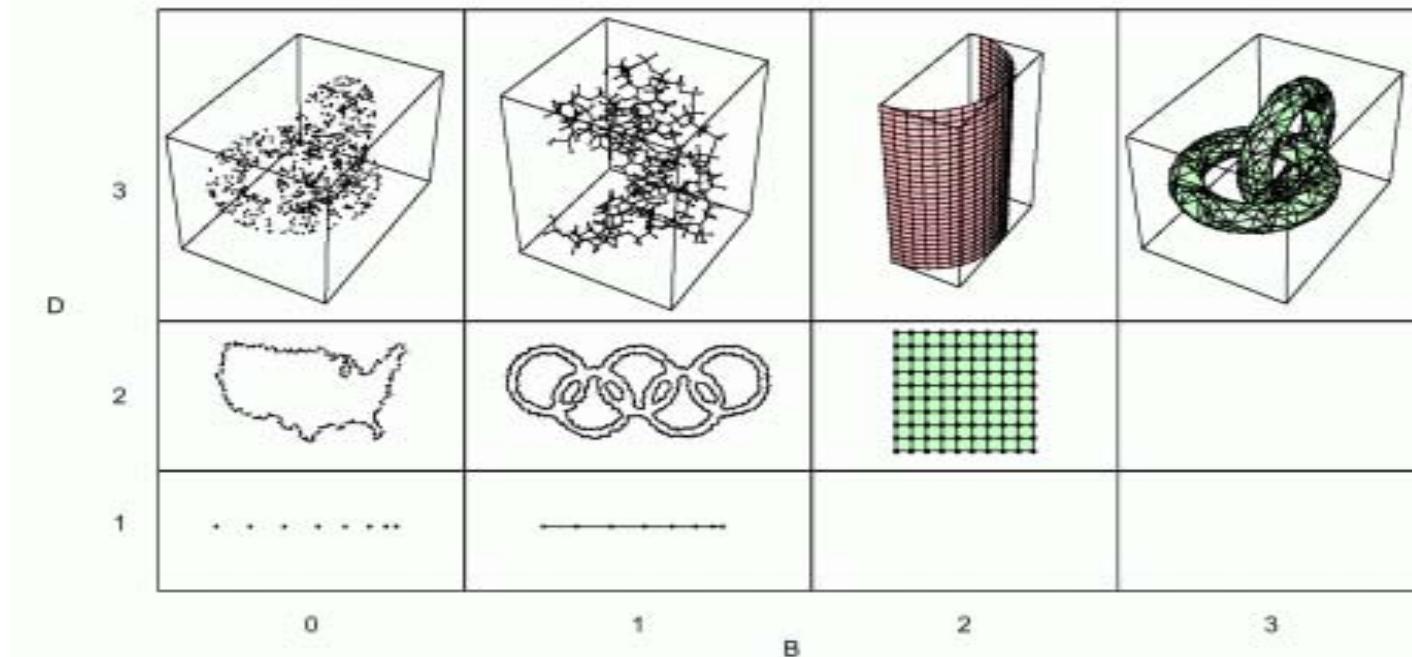


- Looking to combine interactive and automated
 - Interactive to study unexpected features
 - Automated to address large quantity of files
- *Programmable analysis*

C++ and Python

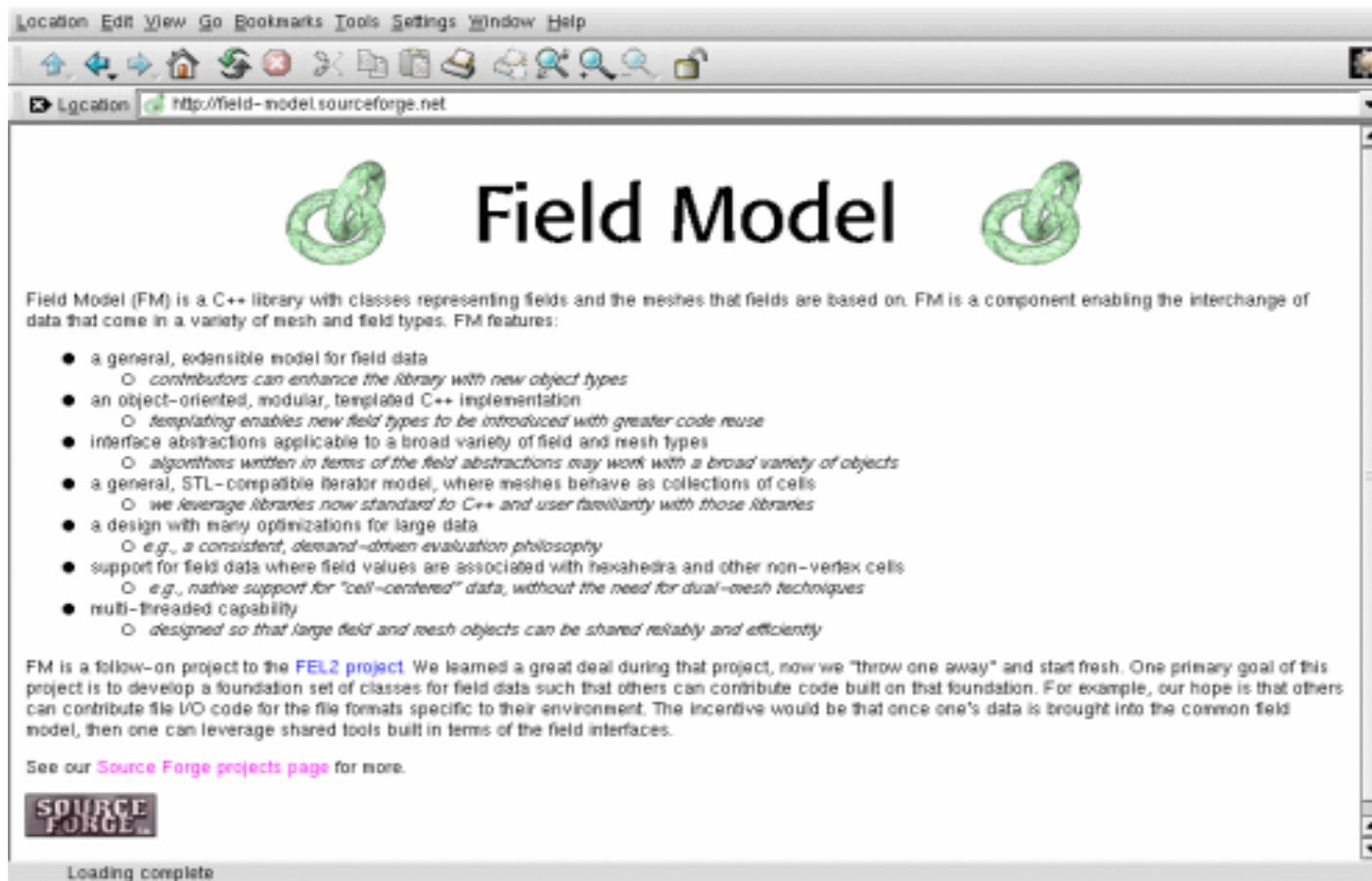
- Field Model
 - C++, open source
 - Performance oriented
 - Interface to other libraries (e.g., HDF)
- Python wrappers
 - Provide dynamic composition
 - Provide standard modules (e.g., web access)
 - Planned open source

Field Model (FM)



- C++, templated base (B) and phys (D) dim.
- Meshes with not necessarily manifold shapes
- “Cell-centered”, vertex-centered, etc.

FM on SourceForge



- <http://field-model.sourceforge.net/>

<http://www.nas.nasa.gov/~pmoran>

Python

- Open Source
- Scripting
- Rich set of pre-existing modules:
 - Graphical user interfaces
 - 3-D graphics
 - Web access
 - XML processing
- <http://www.python.org>

HDFEOS Module

- **Swath:**
 - `Swopen, Swcreate, Swattach, Swdetach, Swclose, Swdefdim, Swdefdimmap, Swdefidxmap, Swdefgeofield, Swdefdatafield, Swdefcomp, Swwritegeometa, Swwritedatameta, Swreadfield, Swreadattr, Swsetfillvalue, Swgetfillvalue, Swinqdims, Swinqmaps, Swinqidxmaps, Swinqgeofields, Swinqdatafields, Swinqattrs, Swnentries, Swdiminfo, Swmapinfo, Swidxmapinfo, Swattrinfo, Swfieldinfo, Swcompinfom, Swinqswath, Swregionindex, Swgeomapinfo, Swdefboxregion, Swregioninfo, Swextractregion, Swdeftimeperiod, Swperiodinfo, Swextractperiod, Swdefvrtrregion, Swdupregion`
- **Grid:**
 - `Gdopen, Gdcreate, Gdattach, Gddetach, Gdclose, Gddeforigin, Gddefdim, Gddefproj, Gddefpixreg, Gddeffield, Gddefcomp, GDbblkSOMoffset, Gdsettilecomp, Gdwritefieldmeta, Gdwritefield, Gdreadfield, Gdwriteattr, Gdreadattr, Gdsetfillvalue, Gdgetfillvalue`
- **Point**
 - `Ptopen, Ptcreate, Ptattach, Ptdetach, Ptclose, Ptdeflevel, Ptdeflinkage, Ptdefvrtrregion, Ptwritelevel, Ptreadlevel, Ptupdatelevel, Ptwriteattr, Ptreadattr, Ptnlevels, Ptnrecs, Ptnfields, Ptlevelinfo, Ptlevelindx, Ptbacklinkinfo, Ptfdlinkinfo, Ptgetlevelname, Ptsizeof, Ptattrinfo, Ptinqattrs, Ptinqpoint`
- Interfaces follow those of HDF4-EOS closely:
 - Green: done, Red: not yet (mostly writing routines)

Example: Programmable Analysis Tool

- Python application
- Utilizes standard modules:
 - e.g., OpenGL, Image, xmllib, ftplib, etc.
- Utilizes custom modules:
 - e.g., FM, HDFEOS4, FITS, etc.
- Scriptable

Conclusion

- Combine interactive graphics with programmability
- With online data in particular, potential for automated analysis
- <http://field-model.sourceforge.net>
- Patrick Moran: pmoran@nas.nasa.gov

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