

RootIo and DC1

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What's New?

- ◆ Memory Leak

 - 2 problems fixed by Ursula (in2p3)

 - Slow down of reads due to memory fragmentation

 - Memory leak while re-processing (pruning) in ROOT

- ◆ Input of Chains

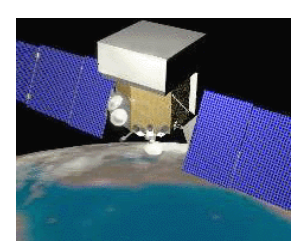
 - RootIo now accepts a list of input ROOT files for mc, digi, recon, and relations

- ◆ Fixes

 - New RootIoSvc to control event loop

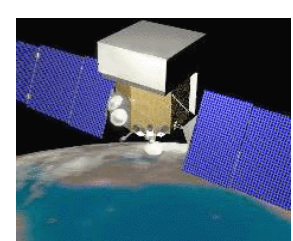
 - AcidDigi LowDiscrim PMT B output fixed

 - TkrDigi LastC0Strip output fixed – thanks Leon!



Memory Leak (Part 1)

- ◆ Slow down of reads were linked to memory fragmentation – too many small objects
After corresponding with Rene Brun, Ursula introduced a fix where the small objects are allocated in buffers and deleted in heaps.
- ◆ Leak was traced to use of TRef in MC files (TRefs allow use to link McParticles and hits)
A TObjArray is associated with the TRef and was growing too large – Ursula fixed this.
- ◆ http://polywww.in2p3.fr/glast/ursula_5-6-3.pdf



Reading Chains of files

- ◆ RootIO can now read back multiple mc, digi, recon, relation Root files.

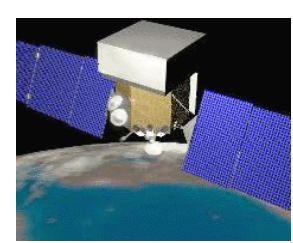
New jobOption parameter:

```
mcRootReaderAlg.mcRootFileList = {"$(ROOTIOROOT)/mc.root",  
    "$(ROOTIOROOT)/mc2.root"};
```

Mods are backward compatible

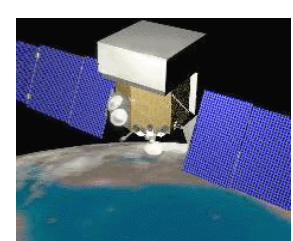
You can still use the old style:

```
mcRootReaderAlg.mcRootFile = "$(ROOTIOROOT)/src/test/mc.root";
```



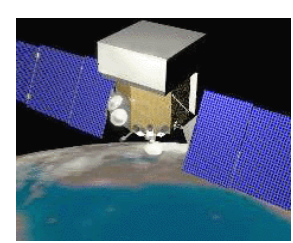
New RootIoSvc

- ◆ Controls the event loop when reading from ROOT files.
- ◆ Reads the $\min(\text{maxEvents}, \text{num events in ROOT files})$
- ◆ Avoids annoying segmentation fault at the end of a run
- ◆ Nicer, cleaner, and it makes Toby happy
Could one ask for more?



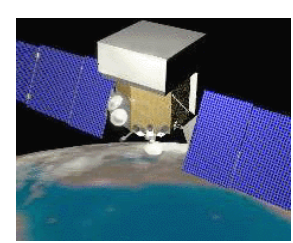
Recent Fixes

- ◆ Leon found and fixed an error concerning the TkrDigis – where the LastC0Strip was always set to -1 .
- ◆ Thanks to JJ – Heather fixed a bug when writing AcdDigis – where the LowDiscrim for PMT B was set to the value of the HighDiscrim for that same PMT.



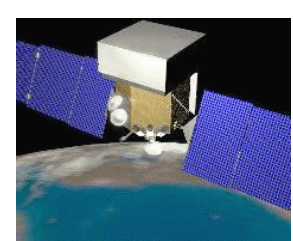
Yet..There Is More To Do

- ◆ Fix Memory Leak when reading
- ◆ Random Event Access in GUI
- ◆ Read/Write Exposure
- ◆ Ntuple Issues



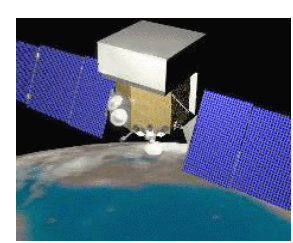
Memory Leak Part 2

- ◆ Yet...a problem persists...reading back MC into Gleam eats up memory – the working assumption is related to TRefs again.
- ◆ Ursula and Heather will be looking for a solution.



Random Event Access

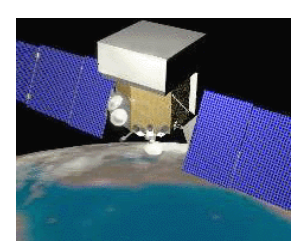
- ◆ Have you ever wanted to replay a particular event?
- ◆ Soon you will be able to.
- ◆ ROOT allows random access
- ◆ Typical read uses the event's seq num in the file – while we identify events using run num/evt id (and soon event time)
- ◆ Could provide a map of Root seq num and actual event identifiers.



Exposure I/O

- ◆ A new Toby TDS class for exposure is in the works.
- ◆ New routines will be added for reading/writing
- ◆ Event Time will be stored in the mc, digi, recon files

- ◆ Due: This week

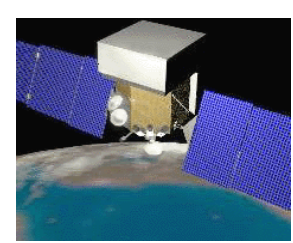


Did we forget the ntuples?

- ◆ `ntupleWriterSvc`

 - Fix tree name in `RootHistCnv`

 - Allow for multiple trees in the same Root file



Any other requests?