

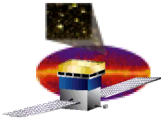
Event Reproducibility

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Analysis Group Meeting

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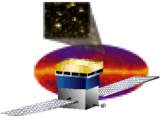
Random Seed Generation

in `GlastSvc/src/GlastRandomSvc/GlastRandomSvc.cxx`:

```
int multiplier = 1;
int dummy = 0; // for 2nd argument to setSeed
EngineMap::const_iterator dllEngine;
for ( dllEngine=m_engineMap.begin(); dllEngine!=m_engineMap.end(); ++dllEngine ) {
    long theSeed = multiplier * 100000 * ((runNo+1) % 20000) + 2*seqNo+1;
    dllEngine->second->setSeed(theSeed,dummy);
    ++multiplier;
}
```

multiplier 1 (Linux): 20000 runs with 50k events each

multiplier 6 (windows): 3333 runs with 300k events each



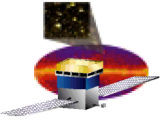
Initial Conditions

in the job options:

```
GlastRandomSvc.RunNumber = -1;  
GlastRandomSvc.InitialSequenceNumber = 0;  
FluxSvc.StartTime = 0;
```

The first event will have:

```
EvtEventId = 0  
EvtElapsedTime = 0 + dt(random)
```



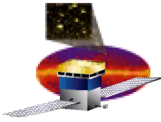
Initial Conditions for nth Event

in the job options:

```
GlastRandomSvc.RunNumber = -1;  
GlastRandomSvc.InitialSequenceNumber = <n>;  
FluxSvc.StartTime = <StartTime of (n-1)th event>;
```

creates an event with:

```
EvtEventId = <n>  
EvtElapsedTime = <StartTime of (n-1)th event> + dt(random)
```



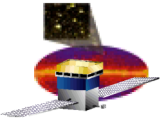
When Are Two Events Equal?

If every single bit in the MeritTuple is equal!

Class `checkSum` (in `ntupleWriterSvc/src/checksum.cxx`) sums all bytes of an event of the `MeritTuple` and writes `EvtEventId`, `EvtElapsedTime`, and the "checksum" to file.

```
FluxAlg.source_name = "muon_pencil_angle";  
GlastRandomSvc.InitialSequenceNumber = 0;  
FluxSvc.StartTime = 0;  
RootTupleSvc.checksumfilename = "c1.txt";
```

0	2.25349044172052405e-02	87410
1	8.27345332713414899e-02	86760
2	2.27063284529481935e-01	88886
3	4.27511578234473943e-01	87016
4	4.81300049419533471e-01	87760



When Are Two Events Equal?

If every single bit in the MeritTuple is equal!

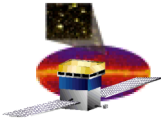
```
FluxAlg.source_name = "muon_pencil_angle";  
GlastRandomSvc.InitialSequenceNumber = 0;  
FluxSvc.StartTime = 0;  
RootTupleSvc.checksumfilename = "c1.txt";
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0	2.25349044172052405e-02	87410
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4	4.81300049419533471e-01	87760

```
FluxAlg.source_name = "muon_pencil_angle";  
GlastRandomSvc.InitialSequenceNumber = 3;  
FluxSvc.StartTime = 2.27063284529481935e-01;  
RootTupleSvc.checksumfilename = "c2.txt";
```

3	4.27511578234473943e-01	87016
4	4.81300049419533471e-01	
	87760	

Cave: doesn't work for GR v7r0p[1-3]. Fix is in CVS!



When Are Two Events Equal (II)?

When the check sum file is missing:

- extract from the root files all information of the event in consideration
- re-simulate the event using the appropriate `StartTime` and `InitialSequenceNumber`
- extract from the root files ...
- compare

Should be equal (famous last words)!