Moore Packages, Repackaging and Design Status

Michela Biglietti
Univ. of Naples INFN/Naples

Gabriella Cataldi
INFN/Lecce

ATLAS CVS Repository

- **Under offline/MuonSpectrometer/Moore (a container) you find:**

- MooAlgs
- MooEvent
- MooiPat
- MooStatistics

Currently under development

- MooG

Package for graphics, needs to be updated

- MooreLib

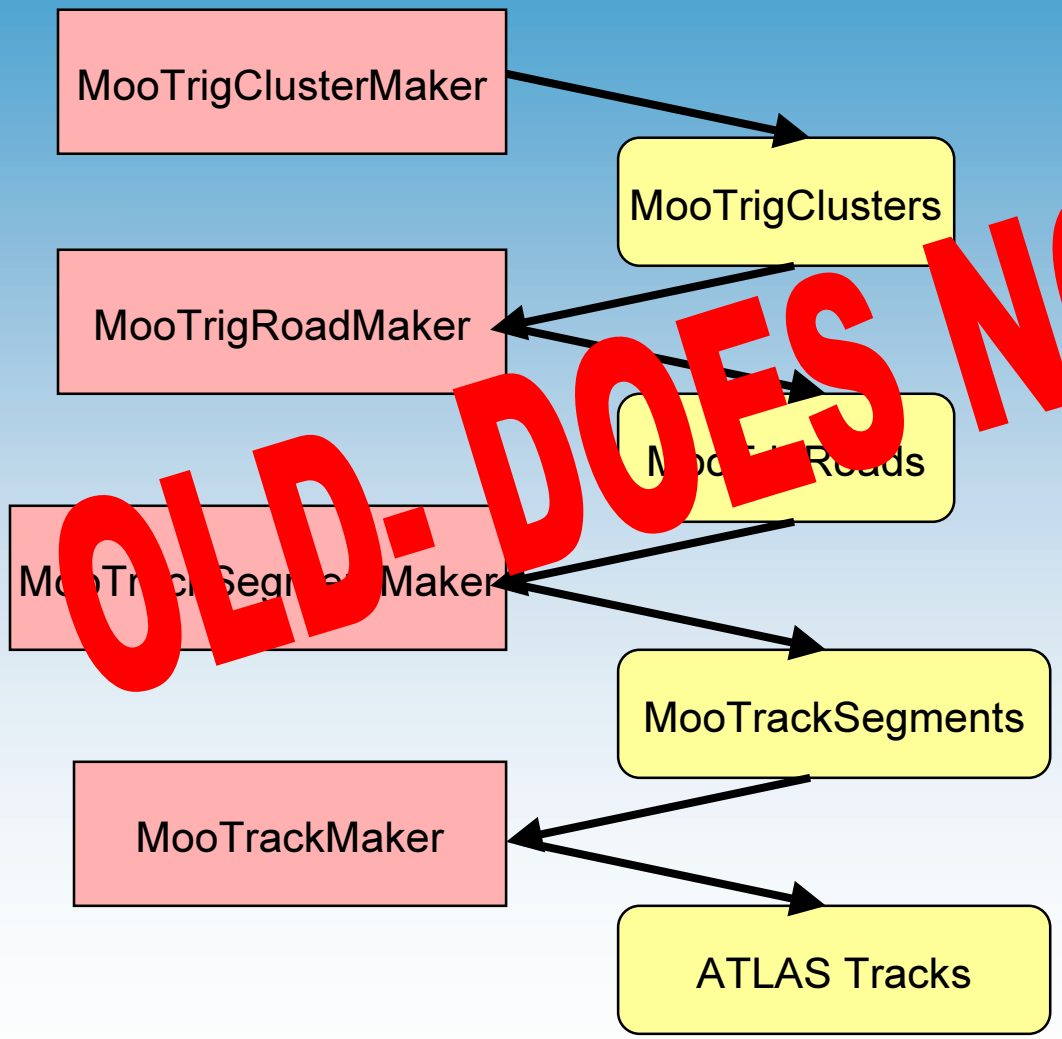
Old Moore - does not work

- DRT
- (MooreApp)
- (MooreTest)

Very very old

At the beginning there was the "MooreLib" reconstruction process

Manager class 'Moore' (the Algorithm) invokes a series of sub-component 'Makers':



Iterate over RPC(later also TGC) digits from Event and make trigger clusters

Build clusters into trigger roads

Iterate over MDT (later also CSC) digits from Event and make track segments along roads

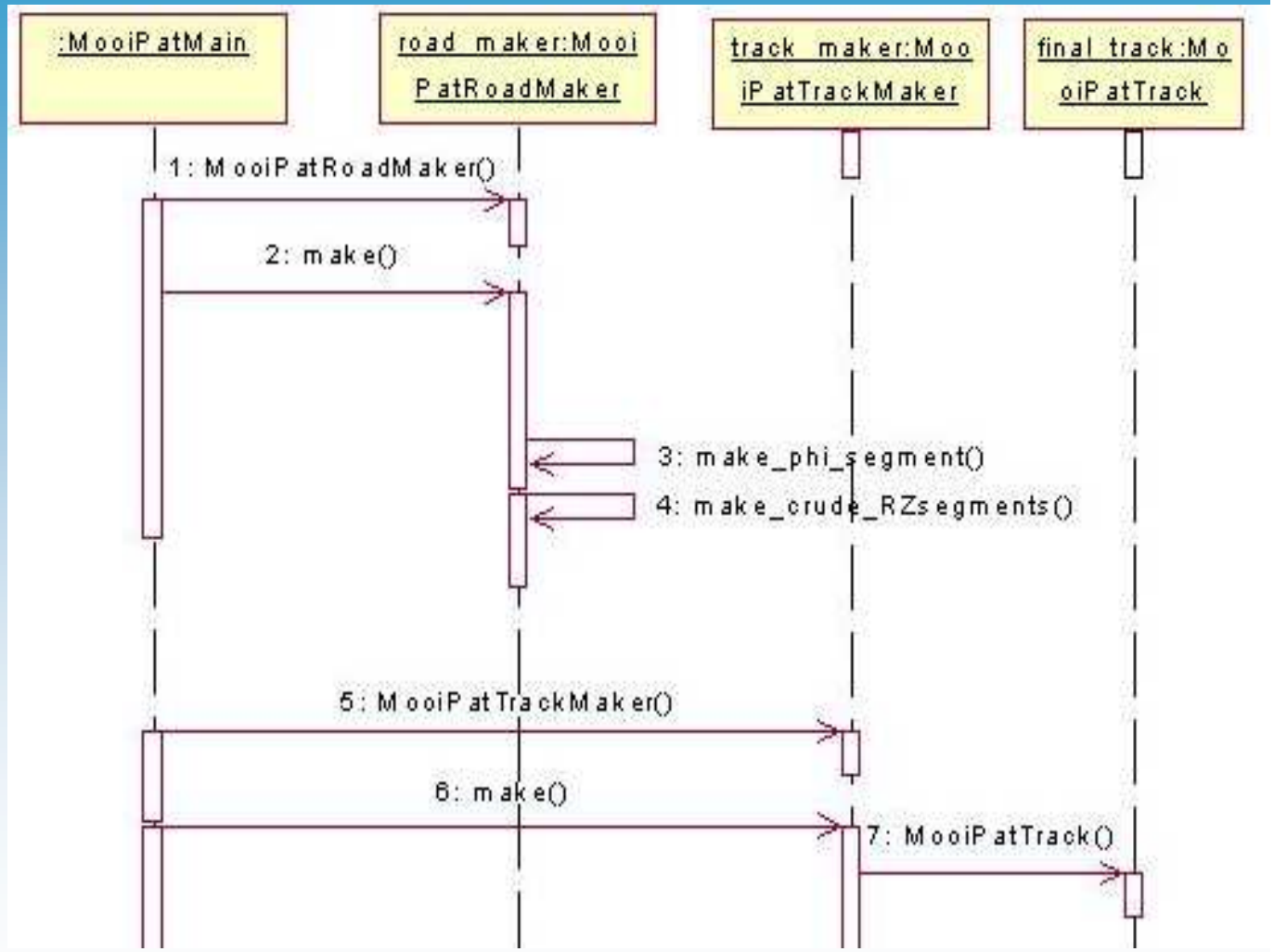
Match segments within trigger roads to make track candidates; fit; and apply quality cuts to produce final track list

OLD- DOES NOT WORK

MooiPat

(first version)

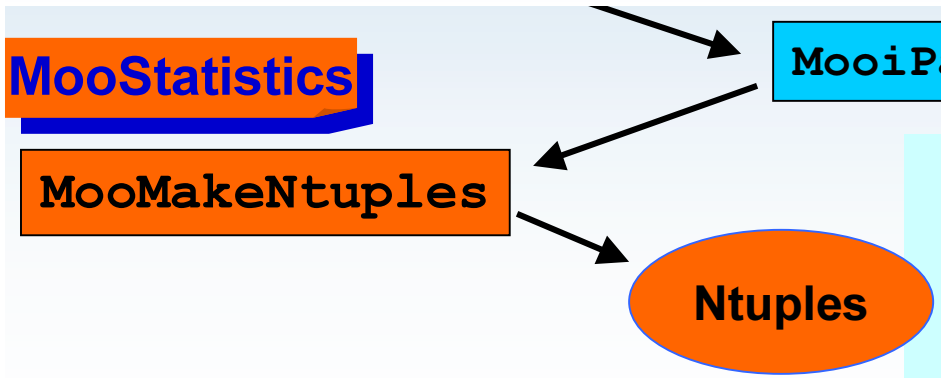
- **One Athena algorithm (MooiPatMain) drives the reconstruction**
- **Step-by-step reconstruction partially abandoned**
- **it works**



We decided Moore needs to be…

- A more modular, flexible code
  - A step-by-step reconstruction process, more similar to MooreLib
  - “Makers” are Athena Algorithms
    - Makers use “helper” class to perform pattern recognition and track fitting
    - Makers exchange Events with TDS via SG
  - No dependencies between makers
  - TDS Events do not know makers
- Repackaging
  - XXXAlgs-XXXEvent, following D.R./D.Q. proposal
- … We started from MooiPat

Back to the previous reconstruction scheme



- Each step is driven by an Athena top-algorithm
- Transient objects are passed via TDS/StoreGate
- Independent algorithms, the only coupling is through the transient objects

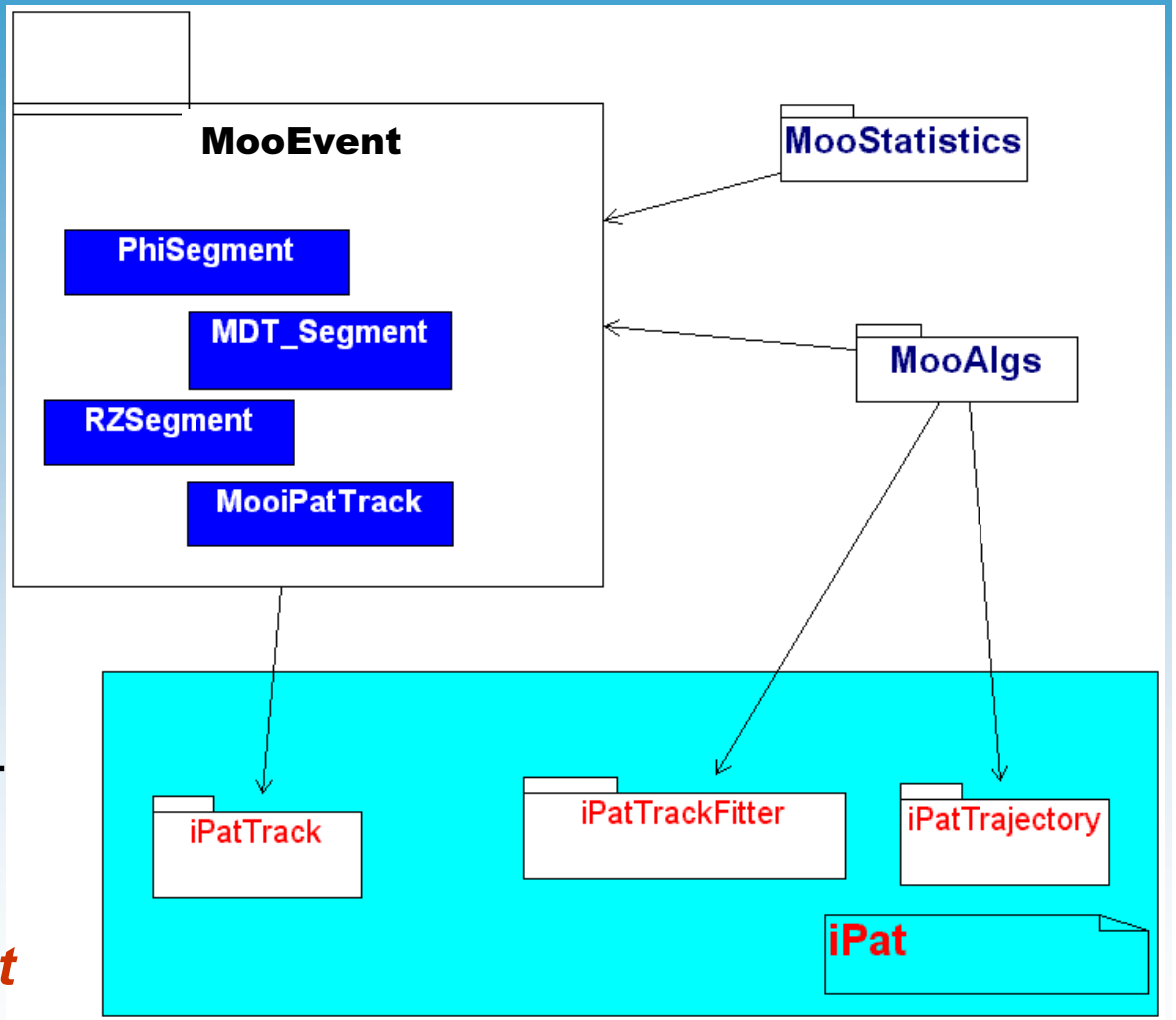
Results : less dependencies, code is more maintainable, modular, easier to develop new reconstruction approaches

Repackaging

Event dependencies on Makers and related classes removed as well as general restructuring

- MooAlgs : algorithms for pattern recognition and track fitting
- MooEvents : transient objects
- MooStatistics: CBNT ntuples

Both MooAlgs and MooEvent depend on the external container iPat

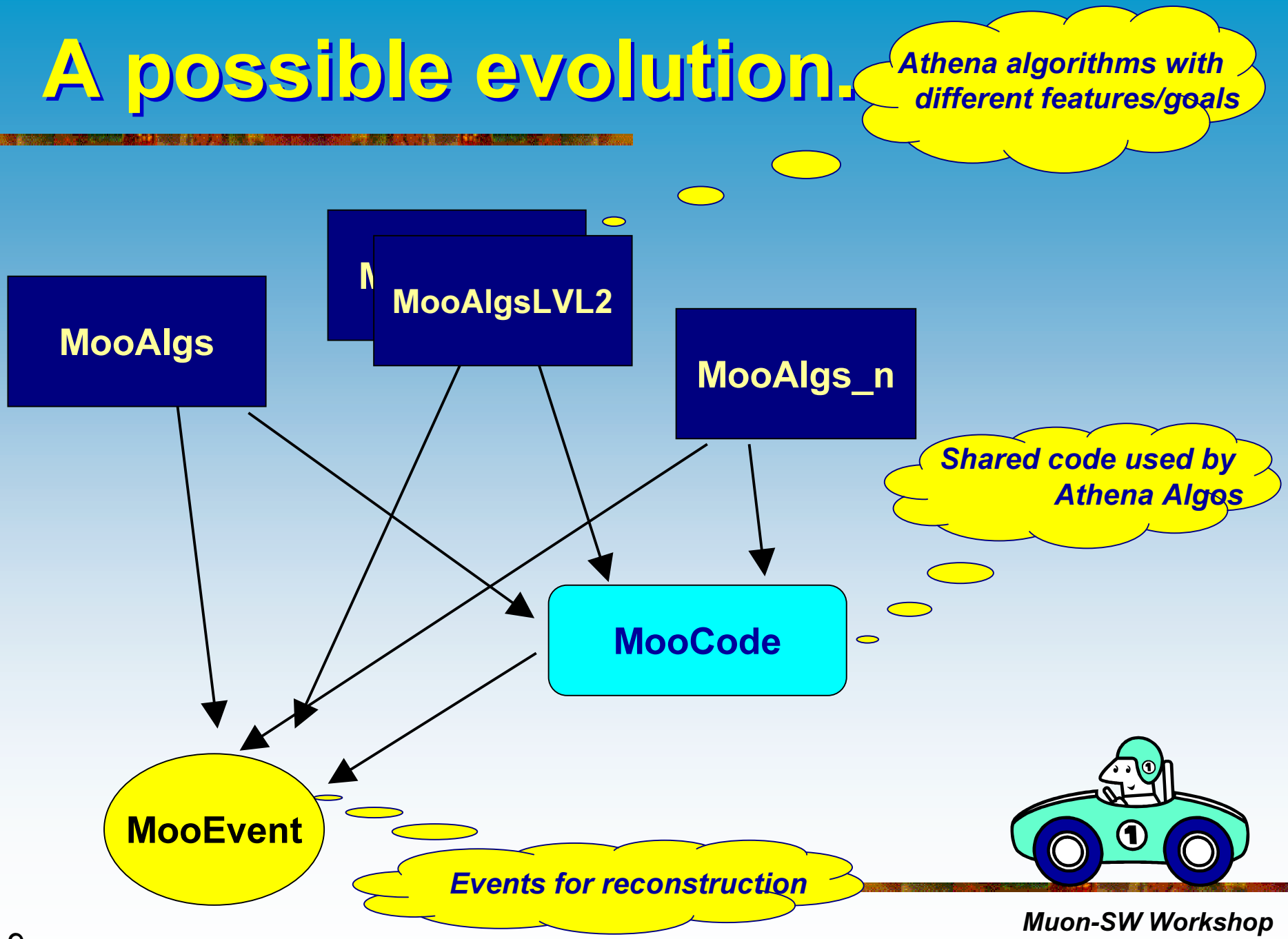


Content of new packages

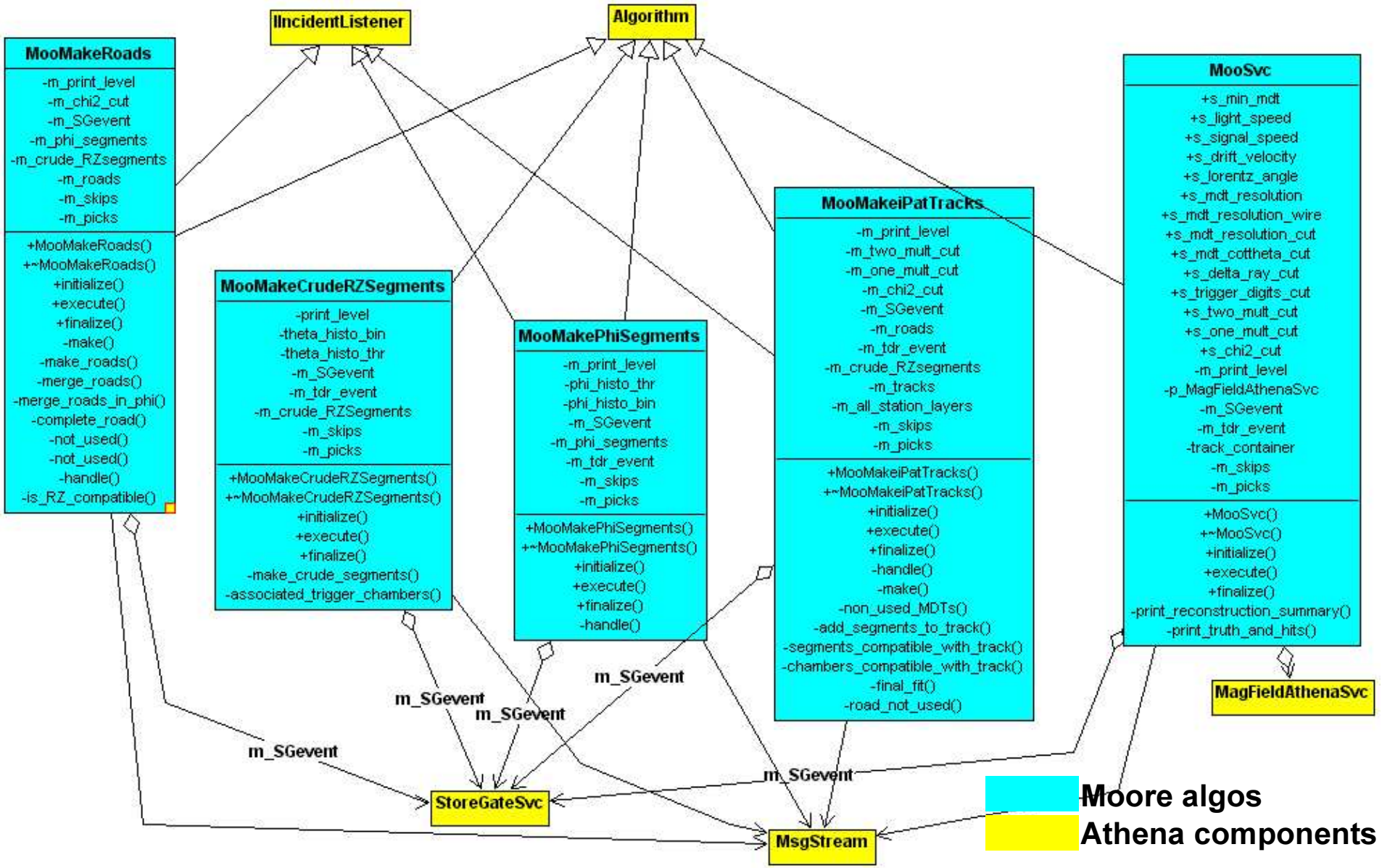
- MooAlgs
  - MooMakePhiSegment
  - MooMakeCrudeRZSegment
  - MooMakeRoads
  - MooMakeiPatTracks
  - MooSvc
  - CombinationMaker
  - RZSegmenMaker
  - MooiPatFitter
  - MooiPatHisto
  - MooChecker
  - MooCleaner
  - by_quality
- MooEvent
  - PhiSegment
  - MDTSegment
  - RZSegment
  - RZSegmetMap
  - MooiPatTrack
- MooStatistics
  - MooiPatNtuple
  - MooMakeNtuple

(New CBNT_Athena member for MooEvent tracks)

A possible evolution.



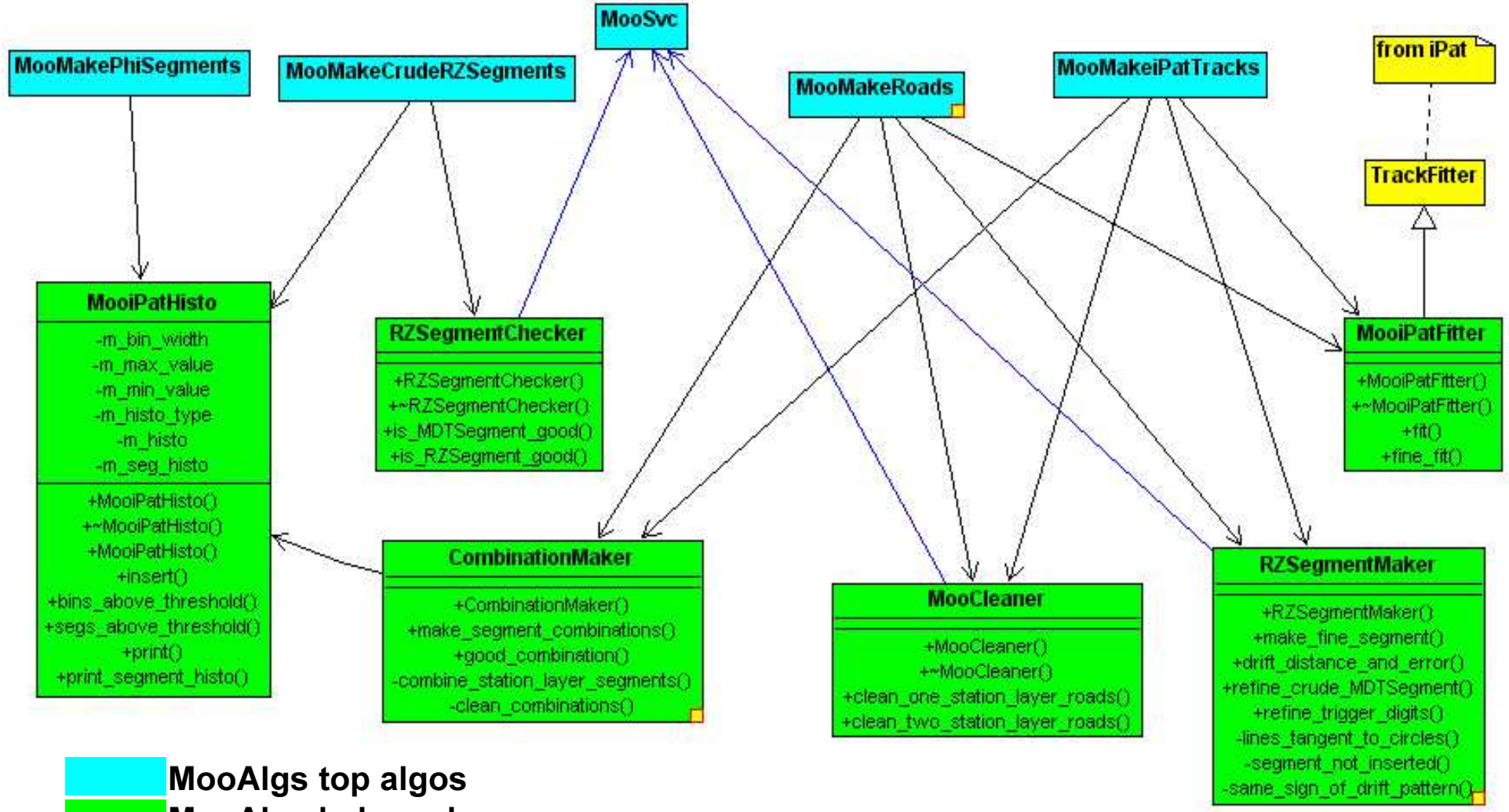
Relations with Athena components



Relations with Athena framework /services

- Each Athena algorithm
  - has private non static ”jobOptions” variables
  - has a private pointer to the StoreGateSvc
  - the pointed objects are deleted “by hand” at the end-of-event using the Athena IncidentSvc
    - Memory leak under control
  - print-outs can be driven by MsgStream Svc
- Problem: you need to be an Athena Algorithm for access to jobOptions data -> MooSvc class
  - gives “run time” jobOptionSvc variables (public and static!) to non Athena-Algorithms classes
  - has Athena MagneticFieldSvc
  - has final print-out methods, debug methods …
- Other possible (and mybe better) solution : implement the constructors/data members of the NonAthenaAlg class, and in the Athena-Algorithms class declare something as
  - `NonAthenaAlg non_athena_alg(jobOptionData);`

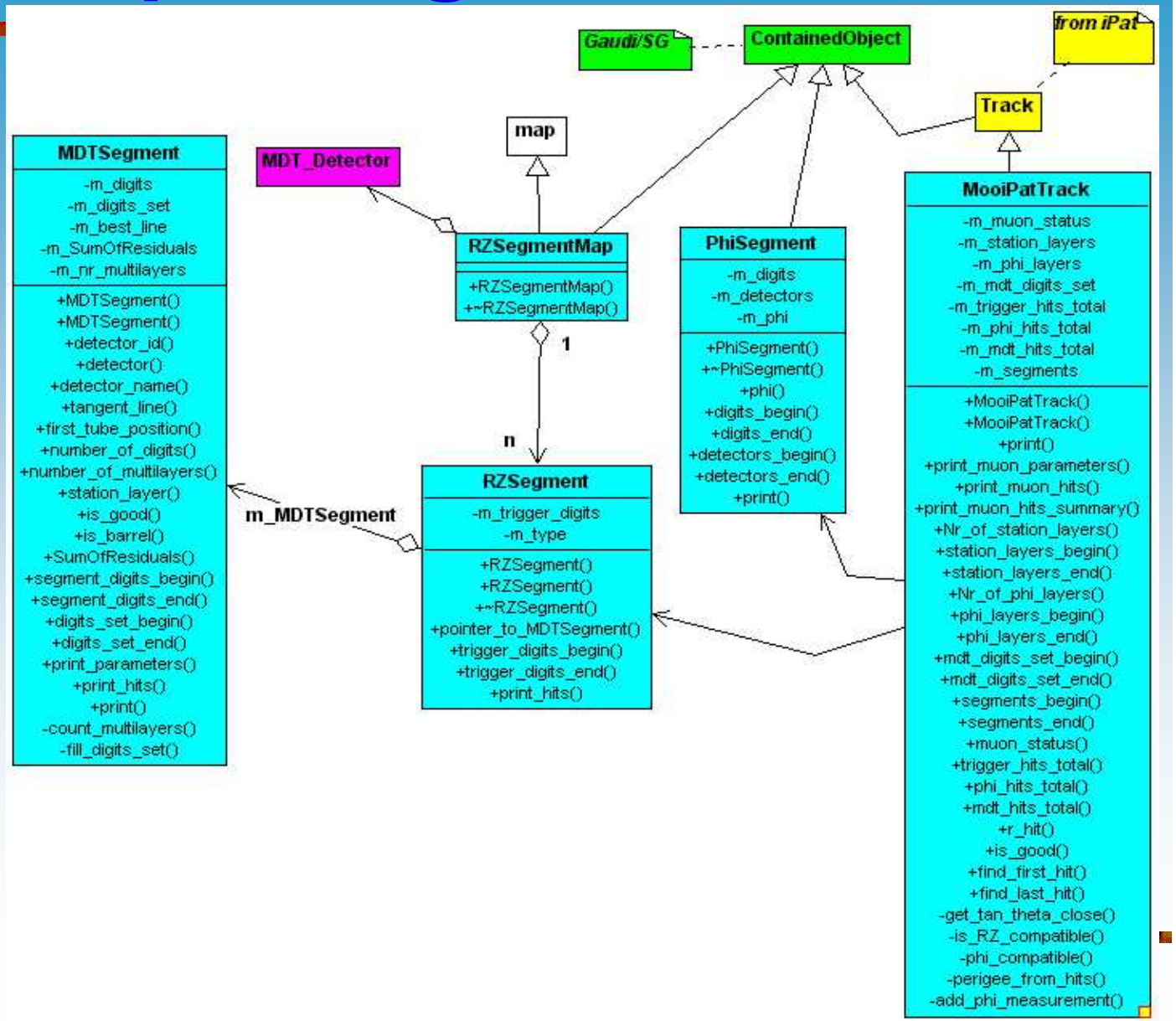
MooAlgs top-algs/helper class relations



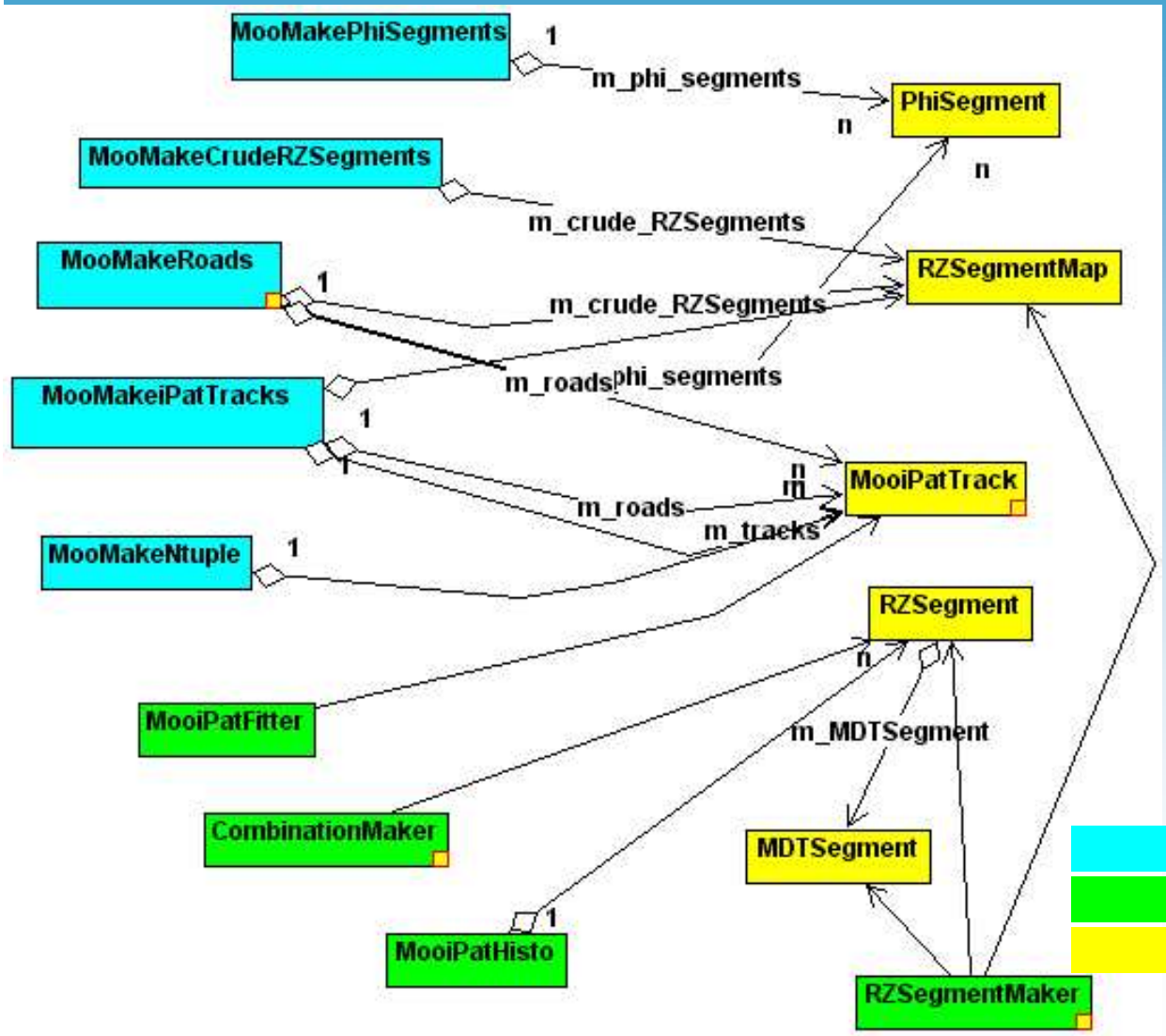
MooAlgs top algos
MooAlgs helper classes
iPat classes

MooEvent package

- Contained Objects are exchanged with TDS



MooAlgs-MooEvent dependencies



- ✓Each Athena alg. has private pointers to the TDS/SG objects
- ✓Non Athena MooAlgs classes also use MooEvent
- ✓Events do not depend on MooAlgs classes

CMT *requirements* files

Moore

```
use MooEvent          MooEvent-*              MuonSpectrometer/Moore
use MooAlgs           MooAlgs-*               MuonSpectrometer/Moore
use MooStatistics     MooStatistics-*         MuonSpectrometer/Moore
use MooiPat           MooiPat-*               MuonSpectrometerMoore
…
```

MooAlgs

```
use AtlasPolicy             AtlasPolicy-01-*
use GaudiInterface          GaudiInterface-*        External
…
use MooEvent                MooEvent-*      MuonSpectrometer/Moore
…
library MooAlgs *.cxx
apply_pattern component_library
apply_pattern declare_runtime
```

MooStatistics

```
…
use MooEvent          MooEvent-*          MuonSpectrometer/Moore
use MuonDetDescr          MuonDetDescr-00-*  MuonSpectrometer
use MooiPat       MooiPat-*           MuonSpectrometerMoore
…
apply_pattern component_library
```

MooEvent

```
…
use MuonEvent               MuonEvent-*       MuonSpectrometer
use MuonDetDescr          MuonDetDescr-00-*  MuonSpectrometer
use iPatTrack             iPatTrack-*         Reconstruction/iPat
…
apply_pattern dual_use_library files=*.cxx
```

"use" DRT
MooG and MooreLib
removed

New *Test_jobOptions.txt* file

In .../Moore/.../share/ Test_jobOptions.txt

```
// Load relevant libraries
ApplicationMgr.DLLs += { "MooEvent" } ;
ApplicationMgr.DLLs += { "MooAlgs" } ;
ApplicationMgr.DLLs += { "MooStatistics" } ;
ApplicationMgr.DLLs += { "CBNT_Athena" };
ApplicationMgr.DLLs += { "HbookCnv" };
ApplicationMgr.DLLs += { "MagneticFieldAthena" };
...
//Athena Top-Algorithms
ApplicationMgr.TopAlg = { "MooMakePhiSegments" };
ApplicationMgr.TopAlg += { "MooMakeCrudeRZSegments" };
ApplicationMgr.TopAlg += { "MooMakeRoads" };
ApplicationMgr.TopAlg += { "MooMakeiPatTracks" };
ApplicationMgr.TopAlg += { "MooSvc" };
ApplicationMgr.TopAlg += { "CBNT_Athena" };
...
// ----- CBNT_Athena algorithm
CBNT_Athena.Members = { "CBNT_EventInfo", "MooMakeNtuple"};
...
//jobOptions data
MooMakePhiSegments.print_level =  0;
MooMakePhiSegments.phi_histo_thr = 1;
MooMakePhiSegments.phi_histo_bin = 0.0015;
...
MooSvc.print_level = 5;
MooSvc.min_mdt = 3;
MooSvc.light_speed = 29.97925; // Speed of light (in cm/ns)
...
```

Conclusions

- **In Moore we now have (4.0.0):**
  - MooiPat package
  - MooAlgs+MooEvent are a “sliced” implementation of MooiPat
    - Latest improvements from Giorgos are included
    - Same outputs (not fully checked with high pt muons)
  - MooStatistic can use outputs from both MooiPat and MooEvent
    - Run-time loading of the right CBNT_Athena member