MICE Tracker Software Overview

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Currently use JSON for data persistency in MAUS
Consists of repeating layers of Python dictionaries and lists
Tracker reconstruction software so far has operated directly on the JSON structure
This is undesirable as:
  ▶ Any future move from JSON will trigger a major code re-write
  ▶ Concerns for JSON speed vs. a binary format
  ▶ Code readability
→ Define Class-based data structure, using JSON only for persistency
Reconstruction Data Flow

- Raw Data (bin)
- Unpacker
- Mapping + Calibration
- SciFi Digit
  - Tracker #
  - Station #
  - Channel #
  - npe
  - t
- Cluster Recon
- SciFi Cluster
  - Tracker #
  - Station #
  - Channel #
  - npe
  - t
- SciFi Space Pt
  - Tracker #
  - Station #
  - Channel #
  - npe
  - x, y, t
- Pattern Recognition
- SciFi PR Track
  - Tracker #
  - vPR
  - cPR
- SciFi Track
  - Tracker #
  - Entrance vPR
  - Entrance cPR
  - Exit vPR
  - Exit cPR
- MC Recon
- MC SciFi Hit
  - Tracker #
  - Station #
  - Layer #
  - Channel #
  - ΔE
## Class Descriptions 1

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### SciFiSpacePoint

**Methods**
- birth()
- death()

**GetClusters()**

**SetClusters()**

**Members**
- SFCluster cls[]
- Int Tracker #
- Int Station #
- Int npe #
- Long t
- Long x
- Long y

### SciFiPRTTrack

**Methods**
- birth()
- death()

**GetSpacePoints()**

**SetSpacePoints()**

**Getters()**

**Setters()**

**Members**
- SFSpacePoints sp[]
- Double vPR[]
- Double cPR[]

### SciFiTrack

**Methods**
- birth()
- death()

**GetClusters()**

**SetClusters()**

**Getters()**

**Setters()**

**Members**
- SFClusters cls[]
- Double Ent_vPR[]
- Double Exit_vPR[]
- Double Ent_cPR[]
- Double Exit_cPR[]
Progress

- Unpacker working and in trunk (Y. Karadzhov and E. Santos)
- Geometry schema defined (O.Lysenko, K. Long, M. Littlefield)
- Interface between CDB and MiceModules working (M. Littlefield)
- Mapping and Calibration going well and working for cosmics (E. Santos)
- Space point reconstruction going well and working for cosmics (E. Santos)
- Pattern Recognition progressing (S. Blot)
- Digitisation and Space Point reconstruction being re-written for class system (E. Santos)
- Class structure and data flow progressing (A. Dobbs, K. Long)
- Streamers written for converting JSON to Classes to ROOT (A. Richards)
- First iteration of SciFiDigit class written and compiling in MAUS (A. Dobbs)
To Do

- Geometry data continues to be verified (O. Lysenko)
- Most code still built around JSON, transfer just beginning (e.g. Pattern recognition)
- JSON streamers need to work for just Class conversion (A. Richards)
- Most classes still to be written (A. Dobbs)
- Full track reconstruction still needs to be written (A. Dobbs)
- Monte Carlo needs proper implementation (A. Dobbs, E. Santos)
- Almost no code in the MAUS trunk
- No unit tests or documentation