



COMPUTING & SOFTWARE

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COMPUTING & SOFTWARE

- Offline
 - Reconstruction, simulation, globals
 - Geometry
 - Processing
- Infrastructure
 - Data curation, processing, database, networking
- Online, C&M
 - In a standby, backup, decommissioning mode
- Overall computing and software performance was very stable during the data-taking campaign
 - Many thanks to all who have contributed to the DAQ, C&M, infrastructure, reconstruction, processing
- Staffing change
 - Adam Dobbs has moved on..Paolo Franchini heads MAUS

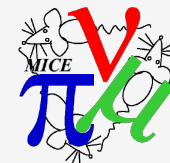
OFFLINE: SOFTWARE

- Reconstruction
 - Currently @ MAUS v3.1.2
 - Several improvements since the Dec data-taking
 - Detectors:
 - Tracker PR fixes and improvements to address efficiency. Need to formally closeout the rolling review.
 - TOF review initiated to address efficiency. Lot of progress
 - Globals:
 - Global (track matching) in MAUS production
 - Performance (speed) is a resource issue
 - Performance (efficiency) needs to be studied
 - Framework:
 - New framework being developed for standardizing cuts in analyses
 - Geometry:
 - more later..
- More on MAUS from Paolo...

OFFLINE: GEOMETRY

- Geometry & Fields:
 - LH2 – endcaps incorrectly filled – fixed
 - LiH – extraneous material – fixed
 - LH2 windows and support structure were in the LiH geometry
 - Incorrect diffuser description – fixed
 - Composition of Brass and Tungsten inconsistent with actual diffuser materials
 - Maybe explains some of the energy loss ‘features’?
 - Interpretation of alignment corrections – fixed
 - *Note: above fixes done for all geometries since 2016/03*
 - Last week, found bug in TOF survey interpretation – *to be fixed*
 - Wedge geometry – *to do*
 - Do not have a GDML wedge geometry: TM’s analysis uses CAD model with G4BL
 - PS & DR discussing steps to creating a wedge geometry for MAUS
 - Field model – discrepancy between hall probes and MAUS model
 - Could be positions of hall probes, or coil positions – to loop back after survey
- Geometry infrastructure:
 - Virtual planes needed at various locations/apertures to store global tracking: Added in GDML so they move with the survey

OFFLINE: DATA PROCESSING



- Offline reconstruction was being done in MLCR
 - Worked very well during data-taking
 - In addition to the quick “no-globals” output, a globals-version was running as a parallel production task
 - All 2017/x data reconstructed with previous MAUS version
- Since the end of data-taking
 - Globals issues were fixed in MAUS
 - Decided that there should be only one production – with globals
- Processing resources
 - With globals, the processing time increases by x3-5
 - As a result, require additional computing resources to keep processing time reasonable
 - Attempted adding “idle” onrec machines to processing chain: x3 cores
 - Discovered memory leaks: ~ fixed.
 - Despite that, would take > 1 month to process entire Step4 data – clearly unacceptable
 - Decided we should use resources meant for farming data, i.e. GRID

DATA PROCESSING...GRID



- Resurrecting the GRID for batch processing required several changes:
 - Old grid submission system defunct, adapted DIRAC framework
 - The reco-mover machine & software – for copying reconstructed data to tape
 - adapted to pick up files from GRID cache.
- Production status
 - Started testing a few days ago. Seems OK so far. First production on GRID started Tuesday night
 - Meanwhile DR started processing LiH data with MLCR resources
 - Note: default production is with Globals, but only with μ pid hypothesis
 - Will have to see if memory issues crop up
 - GRID processing means extra bureaucracy & less direct control – patching code, cards. But it's the only sustainable path in the long-term.
- Staffing: currently DM is the only one who can submit batch & MC jobs



MC PROCESSING

- Dimitrije pushes MC requests to the Grid & turn around time is $\sim < 1$ day
- Status & issues:
 - Have generated beam libraries for the now-standard pion-beam currents & have run MC against those
 - Some discrepancies still noted between generated beam & data
 - CR has tweaked PF's dipole currents for emittance analysis – should this be standard? If so, need to generate libraries with those currents
 - Waiting to generate MC with latest MAUS & geometry fixes
 - Need to check framework for running non-standard MC

DECOMMISSIONING

- Developing plan for decommissioning
 - Core services needed for \geq duration of analysis
 - Micemine, CDB, Archive viewer, Reconstruction mover, e-log..
 - Computing infrastructure in RR, RR2
 - RR2 services need to be maintained until mapping is done
 - Various equipment – DAQ, Online, C&M servers, Target – some owned by collaborating institutions
 - Need to ensure data & software backed up & backups work
 - E.g. calibration data, scripts, software
 - Data curation, data handling infrastructure
 - Need to keep reco-mover alive
- See Paolo's and Henry's talks for more details

DECOMMISSIONING...CDB

- CDB needed for reconstruction, simulation, analysis
- Currently CDB master in MLCR – writable only from here
- Post-MLCR still want ability to write to CDB
 - Calibrations, MC cards
- Plan:
 - Have the CDB master & slave in PPD
 - Requires a new (virtual)machine – in the process of setting one up, thanks to Chris Brew
 - Those who need write-access to CDB (currently DM, DR) will need RAL PPD accounts to access CDB master

PUBLICATIONS

- MICE Software publication:
 - Covers MAUS framework, simulation & reconstruction software
 - More progress recently thanks to help from AD
 - DR cleaning up 1st draft
 - Will have it done for second pass by end of next week.
- Does not cover DAQ, C&M, CDB, Data-handling

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SUMMARY

- Lots of improvements and fixes since end of data-taking
 - Tracker PR, geometry descriptions
- Issues continue to be addressed:
 - TOF efficiency, remaining geometry issues
- Primary processing moving to the GRID
 - Submission & copying framework modified & tested
- Plans being developed for transitioning & decommissioning of computing infrastructure