



COMPUTING & SOFTWARE

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CM 44

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COMPUTING & SOFTWARE

- Controls & Monitoring
 - H/w controls, Run Control, archiver, alarm handler....
- Online
 - Trigger, DAQ, Readout monitoring, online reconstruction
- Offline
 - Detector reconstruction, simulation, global tracking & PID
- Infrastructure
 - Data processing, data curation, database, networking



CONTROLS & MONITORING

- Major improvements
 - Channel and Run Control IOCs complete
 - RC operation stable during data-taking
 - Expert layer controls added
 - Structural changes to ensure robust operation
 - Failover tests
 - Review of C&M network stability
- More from Pierrick...



ONLINE

- DAQ readout & software:
 - Stable
 - Now have rollback functionality
 - “Daily” tracker calibration ~ automated
- Online Reconstruction
 - New framework
 - Tested during Feb/March, now fully operational
- More from Yordan...



OFFLINE

- Geometry
 - Lingering issues with tracker rotations resolved
 - Incorporated corrections from beam-based alignment
 - Opera field model folded in
- Reconstruction
 - Tracker: several fixes & improvements to Kalman
 - Tracker: straight tracks optimized, helical tracks next
 - Speedup & structural changes to EMR reconstruction
 - Globals now in MAUS, allows us to use, debug, fix, improve it
 - Progress developing event viewer for online & offline use
- More from Adam...



DATA QUALITY

- Important to know & flag the quality of data
- Data recorded (raw)
 - Readout, unpacking, event building
 - DAQ catches some, Online Monitoring catches others
 - Errors now reported to shifters via Run Control
- Data reconstructed
 - Online reconstruction should pick up any issues from reco.
 - Need something more robust
 - Working on finalizing the workflow and interface to generate (& store) reconstruction quality flags so that analyses can pick runs



INFRASTRUCTURE (NETWORK & TESTS)

- Since CM43, several failover tests performed
 - EPICS servers
 - Configurations database
 - DHCP server
- Nagios-monitoring beefed up
 - Must integrate critical ones w/ MLCR alarm handler
- C&M network stability review (report from PMH)



INFRASTRUCTURE (DATABASE)

- Lots of on-going work
- Structural improvements to the 'beamline' and 'cooling channel' database tables for Run Control stability
- In preparation: Geometry corrections table
 - To hold analysis-based corrections to surveys
 - Allowing for run-by-run
 - Table design confirmed at this CM, API written, to be tested
- Absorber table: designed
- Reconstruction quality table: designed, pending tests
 - Reconstruction quality flags from each detector
 - Will be set from official reconstruction job
- Data quality table
 - Need to converge



DATA PROCESSING

- Offline reconstruction now routinely done in MLCR
 - Bundled with ROOT output, logs, geometry...
 - Automatically triggered at the end of each run
 - Official recon output available for use shortly after a run ends

The screenshot shows a web browser window with the URL `reco.mice.rl.ac.uk`. The page title is "MICE Reconstructed Data". Below the title, there is a "Show 25 entries" dropdown and a search box. The main content is a table with the following columns: Run Number, Run Date, Optics, Triggers, Reco Version, Download, and Reco Date. The table contains six rows of data, each representing a different run.

Run Number	Run Date	Optics	Triggers	Reco Version	Download	Reco Date
7866	2016-03-24 21:32:31	3-172+M0_WDS	101638	MAUS-v2.1.0	07866_offline.tar (1 GB) (md5)	2016-03-25 00:03:36
7865	2016-03-24 19:26:42	3-172+M0_WDS	96126	MAUS-v2.1.0	07865_offline.tar (583.7 MB)	2016-03-24 21:46:55
7864	2016-03-24 17:22:50	3-172+M0_WDS	95279	MAUS-v2.1.0	07864_offline.tar (988.7 MB) (md5)	2016-03-24 19:40:35
7863	2016-03-24 16:40:03	3-172+M0_WDS	29187	MAUS-v2.1.0	07863_offline.tar (302.2 MB) (md5)	2016-03-24 17:24:48
7861	2016-03-24 14:19:20	3-172+M0_WDS	96507	MAUS-v2.1.0	07861_offline.tar (1006.2 MB) (md5)	2016-03-24 16:51:32
7860	2016-03-24 12:31:28	3-240+M0	63099	MAUS-v2.1.0	07860_offline.tar (824.9 MB) (md5)	2016-03-24 14:25:58

- All Step IV data since June 2015 reprocessed with MAUS-v2.0.0
- Want to make this better
 - Include reconstruction plots with output bundle
 - Reconstruction quality flags



MONTE CARLO

- MC lagging behind real data reco/processing
- Problem found with quad field description in geometry
 - Problem Fixed
- Issue with distributions going into TKU
 - Being worked on
- At the time of CM43, MC production was stalled
- Dimitrije Maletic (Belgrade) has now stepped in as MC production manager
 - Rapid progress
 - Some representative runs already through GRID w/ latest MAUS
 - Brought some issues to light e.g. output files too big [we have a solution]
 - Book-keeping & structural improvements (node utilization) will come
 - Allows us to provide for the needs of various analyses
- Next priorities: Inefficiency in transport D2->TOF & Speed



SUMMARY

- Major improvements in all areas
 - Run Control, channel IOCs, network stability
 - DAQ stable, new online reconstruction framework
 - Several major geometry issues resolved
 - Fixes & optimizations to track reconstruction
 - Fast-reconstruction automated
 - MC production taking off
- More effectively serving physics