Offline software

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Status of simulation/reconstruction

- TPC wire signals, inner scintillation light and CRT signals have been implemented in the Geant4 simulation, as well as the corresponding of the associated physical information.

- The first MC production (MCC1) of large samples of different event categories was launched to provide:

  - full and realistic simulation of relevant events

  - relevant technical test of the processing of large data sets in preparation of real data processing.

  - first end to end exercise of full reconstruction with the available tools.

  - qualification of the presently available reconstruction tools;

  - test sample for developing strategies for the identification and measurement of different categories of events.

  - input for the initial studies of trigger strategy

MCC1 production

- The goal of MCC1 is to simulate and reconstruct complete events, including the TPC wires, the inner PMTs and the external CRT

- MCC1 production aims at O(100k) samples of different event categories

  ➢ single cosmic events and electron events

  ➢ BNB ν interactions in LAr

  Exercize reconstruction of single events

  ➢ cosmic events in a ~3 ms window

  ➢ BNB ν + overlapping cosmics

  Test and develop ν event id. disentangling cosmics

- Many developments included in the production as will be shortly described in the following presentations

- ~3 months cooperative effort by many people to permit the production of produce even first smaller size samples.

- Some first results on the produced events are being showed, detailed study of the reconstructed events will come later

Status of reconstruction

- Both Raw and deconvolved signal processing have undergone significant revisions and will be touched in F. Varanini talk
  - ✓ The 1D deconvolution has seen several bug fixes and a much better tuning and is now working well.
  - ✓ The raw hit finding has also been significantly improved
  - ✓ There is also a "hit filtering" module now in place to help select "good hits" for pattern recognition
- Both of these were significant efforts which should result in much improved hit finding efficiency which will improve the overall tracking
- Pandora pattern recognition package has been updated to handle horizontal wires and is now fully operational in the ICARUS reconstruction
- The alternative "TrajCluster" pattern recognition has also seen improvements and is operational as part of the standard reconstruction
- We have a basic PMT hit reconstruction and are ready to work on the flash reconstruction

Status of simulation/Infrastructures

- Simulation:
  - ✓ Inclusion of noise model based on the electronics tests at CERN, these include a model of the coherent effects. This is an important addition and will help us prepare for the actual data taking.
  - ✓ Updating of the geometry to include a semi transparent cathode as well as the field cage
  - ✓ Full CRT simulation
  - ✓ The PMT simulation has seen many improvements. A recent example is the fixing of the memory/cpu issues surrounding trying to handle the PMT simulation being live during the full drift time.

- Infrastructure:
  - ✓ The POMS system for the production is almost working and will become the standard meanwhile we used for the present round project.py with parts of the overall job submission system
  - ✓ The continuous integration system is almost ready