DAQ Status and perspectives

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Meeting with ND DAQ Task Force

Aim of the meeting with Asher:

- Start a talk to decide the needs of each sub-detector and start the design of the DAQ;
- estimates of the data rates and requirements for each component of the ND into the DAQ system
- Define the baseline dataflow.



DAQ main idea

 Each detector connected to one or more optical fibers and the data are sent from underground to the external lab;

• The communication will be via TCP/IP.

- Each sub-detector has its own number of fibers according to the following classification (rough classification)
 - Low Rate ~10s MB/s
 - High Rate ~100s MB/s

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SAND DAQ Data Flow

Interaction per spill (650 t)	90	
STT + ECAL		
STT mean digit (internal events)	140	
mean digit (internal events, 2 PMTs)	30	
Num byte / STT digit	6	
Num byte / ECAL digit	6	
Tot. Data Size	~ 100 kByte/spill	
LAr Meniscus (2t) (assuming we read all even for external events)		
Number of channels/ matrix	10 ³	
Total number of matrix	60	
nByte per channel	6	
Tot Data Size	30 MByte / spill	
In case of reading only internal events (in Lar)	< 100 kByte/Splii	

Thanks to Guang we have integrated also the data concerning the 3DST detector.

3DST		
total channels	153600	
hits / spill (including ECAL events spilling in 3DST	2160	
Cosmic rate (muons/s)	13.5	
bytes / fiber / hit	20	
Tot. Data size (beam + cosmics)	0.12 MB/spill	

Thanks to Guillaume we have integrated also TPCs data rate.

TPCs		
total channels	45056	
Tot. Data size (extrapolate from T2K)	1 MB/spill	

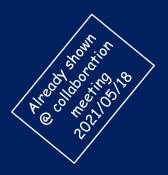
Ingredients:

- neutrino fluxes;
- interactions/spill in the 650 t;
- MC simulation

we assume that all the interactions per spill are then localized in each subdetector → very conservative

Asher asks our needs in terms of calibration runs (LED/Cosmics whatever...) to understand the rates during calibration runs.

SAND will probably fall in the first classification



Other topics to be discussed

needs related to trigger or trigger logic

- relative timing between subdetectors:
 - The planned time resolution is ~2 ns for the different part of the subdetector (probably not enough).
 - Lar and MPD is ~2 ns synchronization.

 SAND plans for a test stand common to others or independent....

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Desiderata by ND Task Force

Understand which interface we want to set down between SAND-DAQ before the next summer reviews in order to write down a document/roadmap

- · Configurations;
- Slow Control;
- · Monitor...
- Data Selection
- Which data to store....

Start to speak with electronic people/engineer by the end of this month about:

- ECAL \rightarrow upgrades needed (main worry is about the problem in integrating old electronics) Plan to discuss also about:
- Lar meniscus: ASIC/Front-End → this is still an R&D
- STT/3DST: postpone until the decision is taken....

Conclusion

- Near Detector DAQ Task Force is pushing to design the DAQ:
 - Understand which interface we want to set down between SAND-DAQ
 - decide the needs of each sub-detector (relative timing, trigger logic,....)
- Start a collaboration with people directly involved on the electronics to discuss about technical points:
 - to avoid possible difficulties in integration afterword;

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