# EIC Detector 1 DAQ WG

June 23rd 2022

- Introduction
- Discussion Front end options (Irakli Mandjavidze)
- Discussion SiPMT readout for RICH (Alexandre Camsonne)
- Discussion conveners meeting
- Quick roundtable updates WG



#### Updates

- Mailing list: <u>eic-projdet-daq-l@lists.bnl.gov</u>
- Indico page: <u>https://indico.bnl.gov/category/409/</u>
- Wiki: <a href="https://wiki.bnl.gov/eic-project-detector/index.php/DAQ">https://wiki.bnl.gov/eic-project-detector/index.php/DAQ</a>
- Schedule: alternating between Tue 3p EDT and Thu 9a EDT every 1.5 weeks, next meeting 6/14 at 15:00 EDT
- Agenda item "Electronics Progress Reports from Detector Groups" is meant for written bullets in the minutes of the indico timetable presenting for each detector group any plans, tests, progress on detector readout and electronics
- <u>Mattermost</u> channel: <u>https://eic.cloud.mattermost.com/main/channels/det1-daq</u> (signup: <u>https://eic.cloud.mattermost.com/signup\_user\_complete/?id=i8gnmob4stdrpjfrezhegxs3ew</u>)
- Talks from last Streaming Readout Workshop: <u>https://indico.jlab.org/event/519/timetable/#all.detailed</u>
- <u>Live Notes</u> from SRO workshop: <u>https://docs.google.com/document/d/1vFz1Z9c4Ck7eaE\_eMcJgzg\_UNUsYwC1OnygzIX95yic/edit#heading=h.</u> <u>175xdrpf8ddv</u>
- A <u>summary report</u> for the SRO workshop is here: <u>https://docs.google.com/document/d/1X6Ms\_oubcWx-8DUiExMFIJdCC6svWNbWKiz7OQjMCeQ/edit?usp=sharing</u>
- Next workshop likely organized by this WG, with single-topic agenda (one day meeting at BNL?): first pressing item is <u>definition of the electrical-optical interface for FEEs</u>, both hardware and logical (protocol); next item: <u>timing distribution system</u>



### (Preliminary) Detector Contacts

Detector	Contact From DAQ	From Detector	Meeting Times
Tracking (Silicon)	Jo Schambach*	Jo Schambach	Thursday @ 11am
Tracking (MPGD)	(Iraqli Mandjavidze)	Kondo Gnanvo	
PID (TOF)	Tonko Ljubicic*	Tonko Ljubicic	Monday@11:30am
PID (Cherenkov)	Alexandre*	(Pietro Antonioli)	Friday @ 8:30am
dRICH simulation	(don't need an assignment)		Wednesday @ 12pm
Calorimetry	(2?)*	Oskar Hartbrich	
Far Forward	(Jeff or Chris)*	(Alex Jentsch)	Tuesday @ 9am (bi-weekly)
Far Backward	(Jeff or Chris)*		Thursday @ 9am
Computing	(choose from all convener?)	Sylvester(*)	Wednesday @ 11am
Simulation/QA	(choose from all convener?)*	Andreas	Thursday @ 2pm
Global Integration	(choose from all convener?)*		Monday @ 9am



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**Preliminary Design ~50-60%; Final Design**  $\geq$  **85%** 

**CD-2** – Approve Performance Baseline: CD-2 is an approval of the preliminary design of the project and the baseline scope, cost, and schedule. What is most relevant is that CD-2 means there is now a definitive plan that the project will be measured against in cost, schedule and technical performance.

 $\rightarrow$  pre-TDR is required for CD-2

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	Timeline – What is Coming for EIC			
(		CD-0 approval	December 19, 2019	
(		Community-wide Yellow Report effort	Dec 2019 – Feb. 2021	
(		CD-1 review (includes CDR)	January 26-29, 2021	
(		Call for Collaboration Proposals for Detectors	March 6, 2021	
(		CD-1 approval	June 29, 2021	
(		DOE/OPA Status Review	October 19-21, 2021	
-		Status Update to Federal Project Director	June 28-30, 2022	
(		Cost and Schedule Event(s)	May-June 2022	
(		Technical Subsystem Reviews	Jan. – Dec. 2022	
(		OPA Status Review	January 2023	
Į.		Preliminary Design Complete & Review	May 2023	
(		Final Design/Maturity Readiness for CD-3A Items	May 2023	
(		CD-2/3A review (expectation), requires pre-TDR	~October 2023	
(		CD-2/3A (expectation)	~January 2024	
(		CD-3 review (expectation)	~January 2025	
(		CD-3 (expectation), requires TDR	~April 2025	

CD-3 – Approve Start of Construction: CD-3 is an approval of the project's final design and authorizes release of funds for construction. What is most relevant is that projects can now proceed with construction related procurements and activities. CD-3 is sometimes split in CD-3A in a tailored approach to approve start construction for long-lead procurements. → TDR is required for CD-3

#### Timeline Clarification from Project Management

- Global charges were communicated to the WG in April
- The goal emphasized by the EIC PM is to confirm the reference "advanced conceptual design" by the July EICUG meeting (end of July)
- There may still be open issues on important items, but the goal should be to converge by the end of July and raise early on if any issues come up and/or more time is needed
- After addressing the main and most urgent questions, the optimization work will continue towards the pre-TDR



### Detector 1 interim DAQ WG

The overall goal of the detector WG's is to optimize the ECCE reference design towards a technical design within the constraints listed above. In working towards this goal, the DWG's should collaborate with existing detector consortia (EICSC, EEEMCAL, MPGD, DIRC, DRICH, AC-LGADs, etc.), all detector R&D efforts relevant for Detector-1, and any additional efforts within the EIC scientific community.

- All working groups will work closely with the Global detector / integration working group and the EIC project towards a technical design that optimizes the global detector performance, taking into account global integration and physics performance.
- Each joint WG should hold at least one kickoff meeting where the designs of each proposal are presented in detail. It is critically important that WG members understand the scientific and technical reasoning behind different design choices before engaging in optimization discussions.
- The WG conveners will lead a discussion to identify any non-trivial differences and/or aspects in need of further optimization.
- For each non-trivial difference working groups will then work to prepare a pro/con list accounting for technical performance, risk and cost. The resolution of non-trivial differences should be discussed in close consultation with the Global detector/integration WG, physics working groups, the EIC project, relevant detector consortia and R&D efforts.

# DAQ WG additional charges

- evaluate expected data rates (physics) including possible backgrounds (physics and detector noise)
- gather detectors and electronics associated requirements
- (set up dialog which each individual detector to define protocols and requirements of readout) and add to each WG charge
- specify early data format and protocol (data format and physical signal ) to be commonly used (Specification and standardization as much as possible protocol, signals, electronics )
- ((Develop clock/time system for streaming readout and high resolution TOF (10 ps)))
  2 points : fast control for synchronization, flow control, timestamp busy timing resolution : 10 ps is difficult everywhere, only TOF require could have two systems and one dedicated for TOF
- update and refine cost estimate, work with project to finalize design with cost envelop (market survey : have estimates of potential solutions ( commercial or custom ))
- (Prepare for drafting DAQ preTDR)
- How organize with interim WG and actual future WG . What do we need to accomplish by July ? Maybe main charge of group is creating final WG

# Convener meeting

- We would like that you focus on the following points:
  - general status
  - links with detector WGs
    - Nearly final
      - DIRC
      - Far forward
      - MAPS tracking (need more information about occupancies and streaming redout)
    - Open
      - Calorimeter : technology still needs to be finalized but SiPMT readout, current default readout sPhenix might be difficult because of cabling density
      - PID Cerenkov : mRICH vs pfRICH but SiPMT readout likely
      - Far backward
      - Backgrounds
      - MGPDs : technology still need to be finalized but seems consensus for Salsa
      - High resolution Timing : dedicated system for TOF
      - Event building vs stream : try record stream if possible otherwise event building and record
      - Integration : still need to be finalized -
  - Planning

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