Summary of EPIC DAQ Plans and activities

- Several slides we have seen before
  - (Definition of streaming, Schematic of DAQ, Naming convention and roles of DAQ components, Best update of channel counts, fiber counts, technologies)
- Description of take aways from December Workshop (and other goals)
  - Goal is tasks needed for well-formed preTDR
  - Need for some sort of collaboration wide documentation system
  - General plan for using reconstructed clock, Description of need for RDO & Timing subgroup, goals, plans, and status! I'll include FELIX availability here. Also, I'll include the goal of producing documentation for the interface between Detectors/ RDOs to be discussed and signed off on by the wider collaboration.
  - Description of the discussion we had regarding protocols between RDO & DAM
    - Functions that the protocol must achieve
    - That we don't have consensus and the plan for getting consensus
  - The need to define the RDO locations, and to produce simple tables for each detector with best/worst case radiation, background, & data volume loads.
  - (That we are aware of the need to integrate better with the offline computing plans but have not taken much concrete action in this direction?)

EPIC Detector Scale and Technology Summary:

Detector System	Channels	Fiber pair	Data Volume	DAM Boards	Readout Technology	Notes
Si Tracking: 3 vertex layers, 3 sagitta layers, 4 backward disks, 5 forward disks	7 m^2 32B pixels 5,200 MAPS sensors	300	5Gb/sec	6-8	MAPS: Several flavors: curved its-3 sensors for vertex Its-2 staves / w its-3 improvements	400 RDO / Fiber limited by # of ARTIX transceivers
MPGD tracking: 3 layers	100k	200	<10Gb/sec	4-5	64 channel SALSA ASIC	Assume 512 Channel (8 ASIC)/FEE (15RDO? / fiber)
Calorimeters: Forward: LFHCAL pECAL HCAL inset Barrel: HCAL ECAL Imaging Backward: ECAL	 60k 25k 8k 3k (25k?) 8k 50M pixels 25k	 950 400 125 50(400) 125 (note) 400 2050(2400)	15Gb/sec	50	SiPM using HGCROC &/or FPGA bases boards with FLASH ADC	(HGCROC -> 896 channels / RDO FLASH -> 256 channels / RDO) Ecal -> 230 RDO / fibers Hcal -> 100 RDO / fibers → < 15 DAM boards! Also Imaging / barrel HCAL are alternatives not summed
Far Forward: B0: 3 MAPS layers 1 or 2 AC-LGAD layer 2 Roman Pots 2 Off Momentum ZDC: Crystal Calorimeter 32 Silicon pad layer 4 silicon pixel layers 2 boxes scintillator	 3x20cmx20cm (300M pixel) 300k or 600k 1M (4 x 135k layers each) 650k (4 x 80k layers each) 400 11520 160k 72	 6 30 64 42 10 10 10 2	<1Gb/sec	5	 MAPS AC-LGAG / EICROC AC-LGAD / EICROC AC-LGAD / EICROC APD HGCROC as per ALICE FoCal-E	 600^cm layers (1 or 2 layers) 13 x 26cm layers 9.6 x 22.4cm layers There are alternatives for AC-LGAD using MAPS and low channel count DC-LGAD timing layers
Far Backward: Low Q Tagger 1 Low Q Tagger 2 2 Calorimeters (Up/Down) Photon Detector	 1.3M 480k 700	 80 32	100Gb/sec (<1 Gb/sec to tape)	4	 AC-LGAD / EICROC AC-LGAD / EICROC PMT / SiPM	 40cmx40cmx500um 30cmx20cmx500um Possible tracking layers (Better details available)
PID-TOF	3M-50M	240-500	6Gb/sec	6-12	EICROC / AC-LGAD	Channel / Fiber counts depend on sensor geometry. Considering pitches of: .5mm x 1cm, .5mm x .3cm, .5mm x .5mm
PID-Cherenkov: dRICH pfRICH (if selected) mRICH (if selected) DIRC	 300k 225k 225k? 74k	 200 150 288 288	 1830Gb/s (<20Gbps to tape) 1380Gb/s (<15Gb/s to tape) 11Gb/sec	 20 14 5 6	 SiPM / ALCOR SiPM / ALCOR HDSoC64	 Worse case after radiation. Includes 30% timing window. Requires further data volume reduction (software trigger, or AI/ML) 12 boxes x 24 sensor x 4 asic x 64 ch