

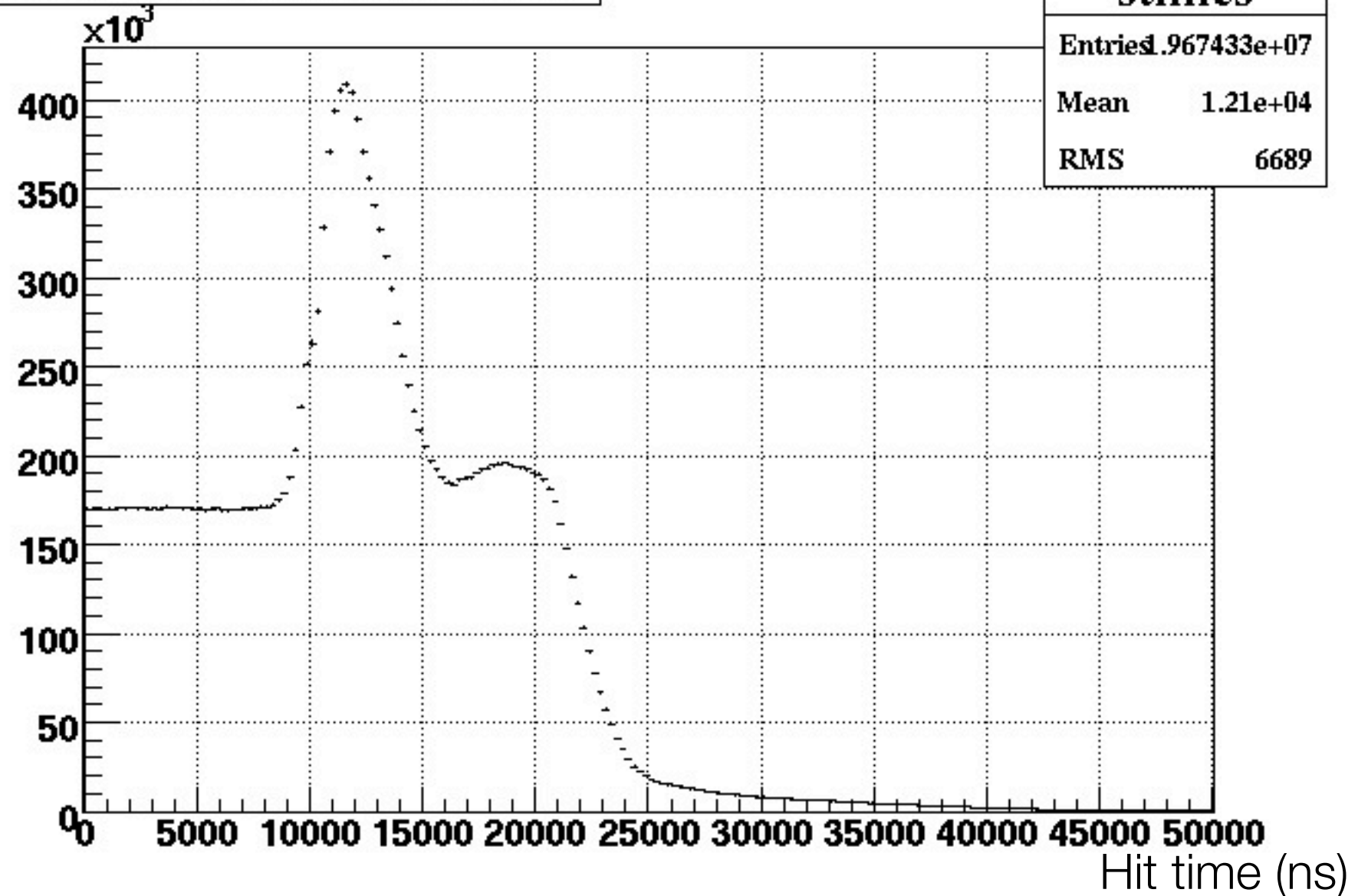
Detector Data Rates

Erik Blaufuss and Kael Hanson
IceCube Science Advisory Committee
May 20-21, 2009

New Items in IC59 physics run

- Readout of SLC isolated hits
 - These hits are not used in online filtering or trigger decision
 - Expected to help sensitivity to low energy tracks (~ 100 GeV)
- Modified readout windows (reduce SLC data rates)
 - For SMT8/std String trigger, readouts for InIce DOMS (-4usec,6usec)
 - IceTop and other triggers still use ± 10 usec window as before.
- Anti-Meteor settings.
 - Increased gains for ~ 100 DOMs
 - Keeps 0.25 PE threshold (new this year) on all InIce DOMs

SLC Hit Times relative to event start

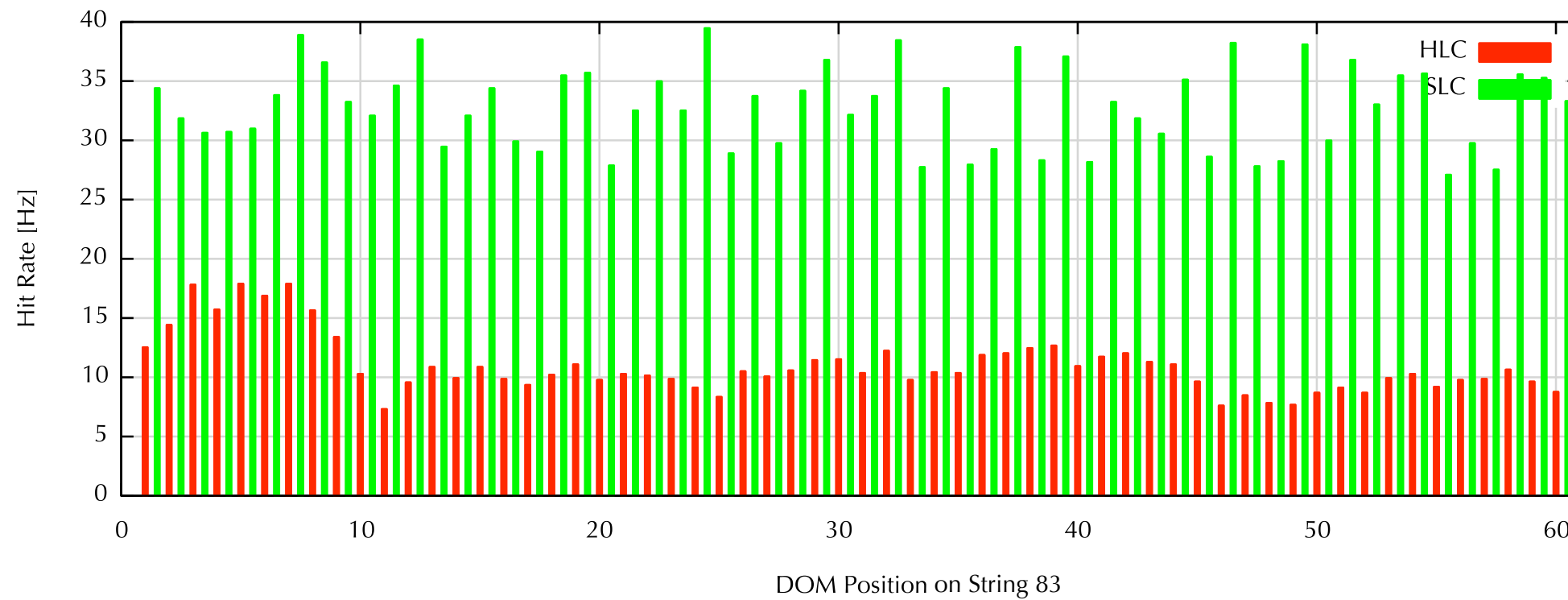


- Time distribution of in-ice SLC hits.
- Flat noise component
- SLC hits correlated with the trigger (@10000) clearly visible
- Time/Space cuts can be used to separate noise.

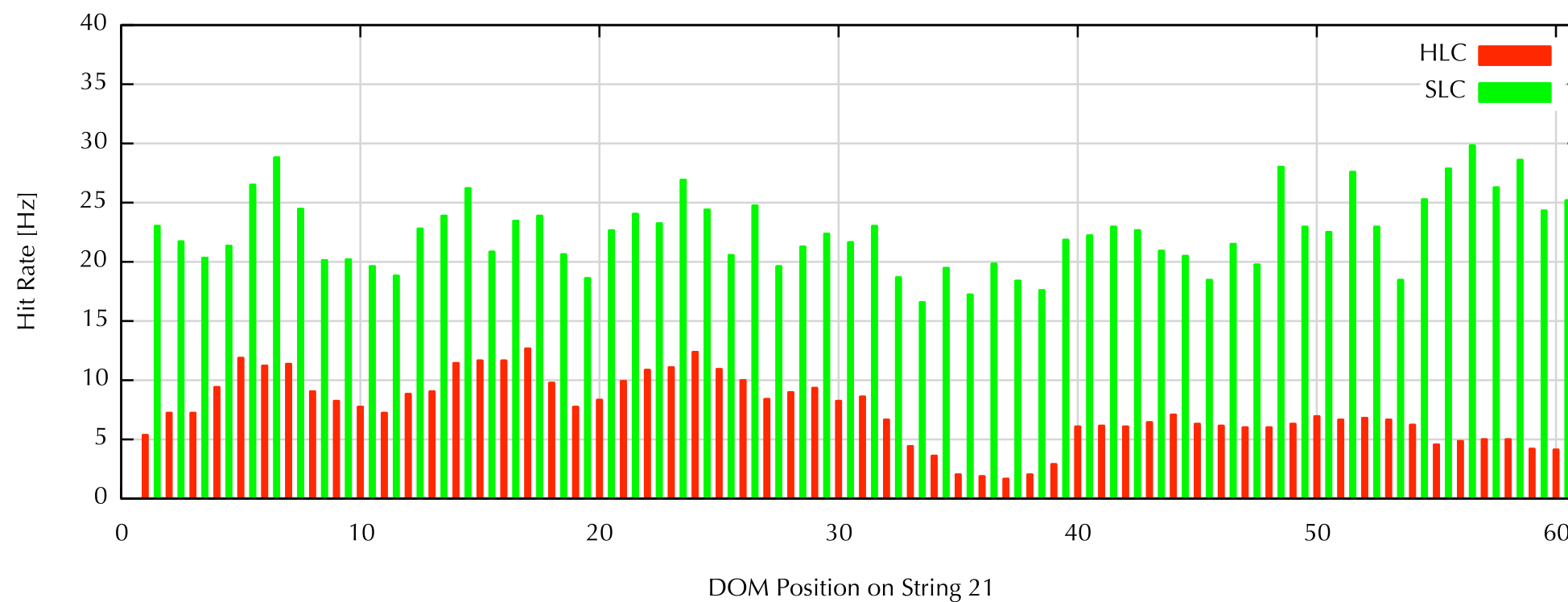
IC59 - Current status.

- Addition of SLC hits increased the raw data rate more than originally predicted.
 - IC40 DAQ output data rates (HLC readouts only): 4.5 MB/sec
 - IC59 DAQ output data rates (HLC+SLC readouts): 14 MB/sec (up to ~18)
 - Originally expected ~9 MB/sec
- Reasons are understood:
 - Underlying readouts from DOMs is very small (12 bytes) but DAQ adds similar overhead as HLC readouts (full time stamps, full payload wrapping)
- High QE doms in Deep core string produce increased rates as expected

SLC and HLC DOM readout rates for 2 strings



DeepCore

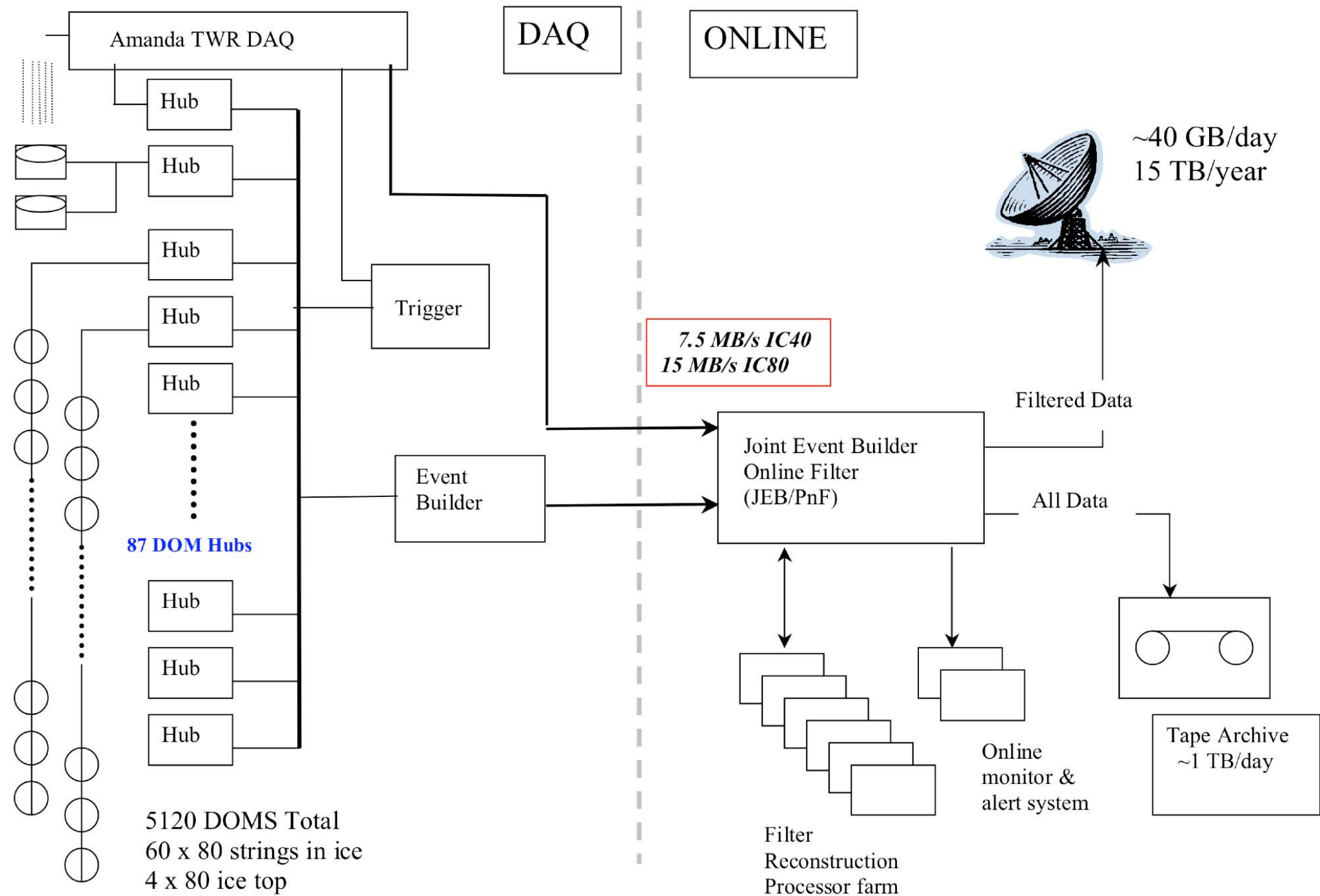


Standard

IC59 - Current status.(2)

- For IC59, we are handling this rate, with several plans to mitigate this:
 - Reduced the readout window around each trigger from 20 usec to 10 usec minimum.
 - Repeated structure of headers gzips very well (reducing amount of satellite BW and tapes needed)
 - DAQ plans to “reformat” payloads in the next few weeks.
 - Early studies indicate ~10 MB/sec achievable.
- Still added bandwidth a challenge for downstream systems.
 - Online filtering system
 - Online taping system (specifically gzipping overhead)

Online systems overview



Future seasons

- Going forward in future seasons, some optimization of configurations may be required to go forward.
 - Balance physics needs with the system capabilities to achieve a stable operating detector configuration (job of TFT board)
- Several options available
 - Increased trigger thresholds -> physics needs met by specialized trigger algorithms
 - Not write all every triggered event to tape -> Write only events above a higher trigger threshold to reduce taping load.
 - Another compression system for “simple” single pulses.