

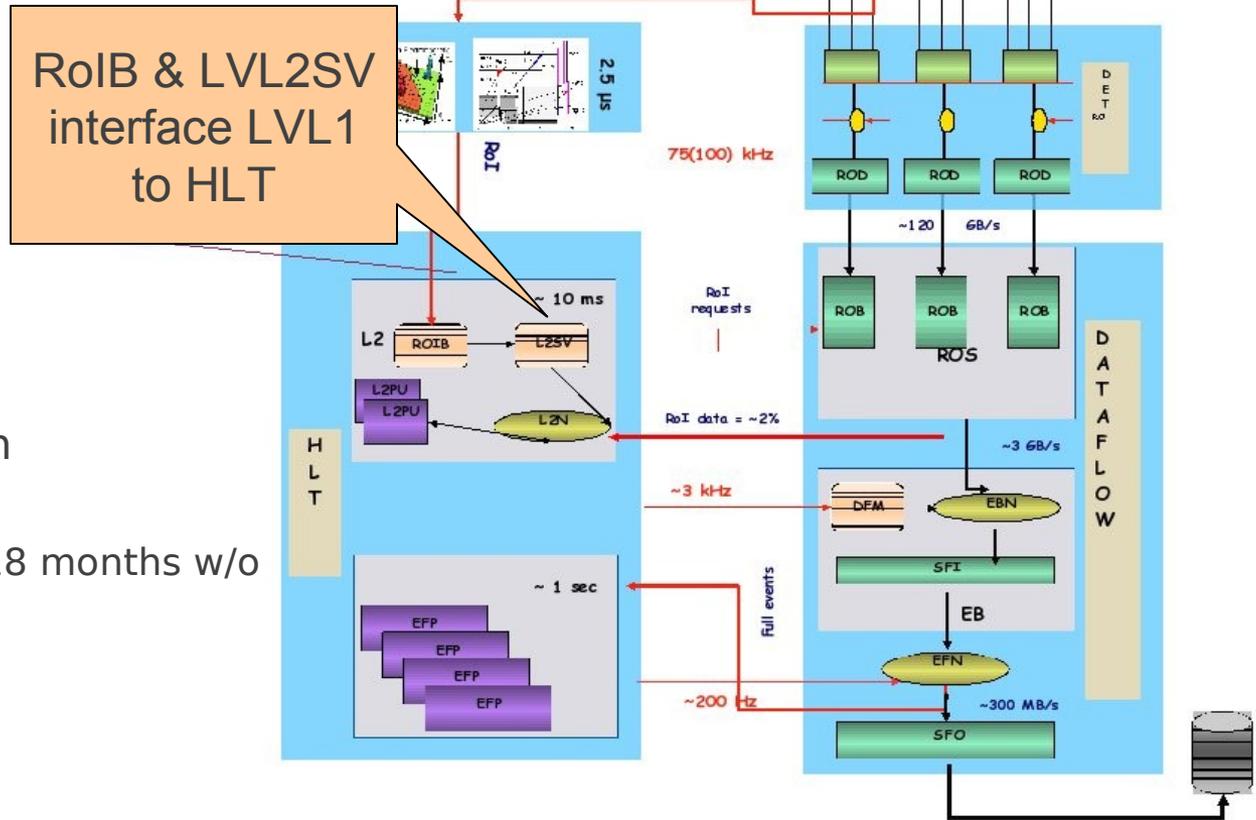
# ATLAS Trigger and Data Acquisition (TDAQ)



Work on the ATLAS TDAQ system.  
R. Blair, Jinlong Zhang & Denis Fellmann<sup>1</sup>

1. Denis is a new hire and will join  
~11/1/09

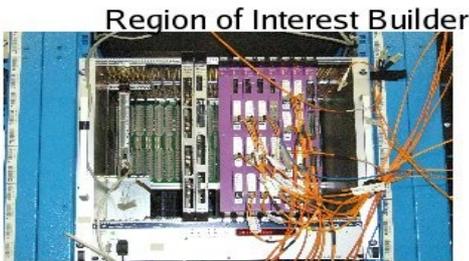
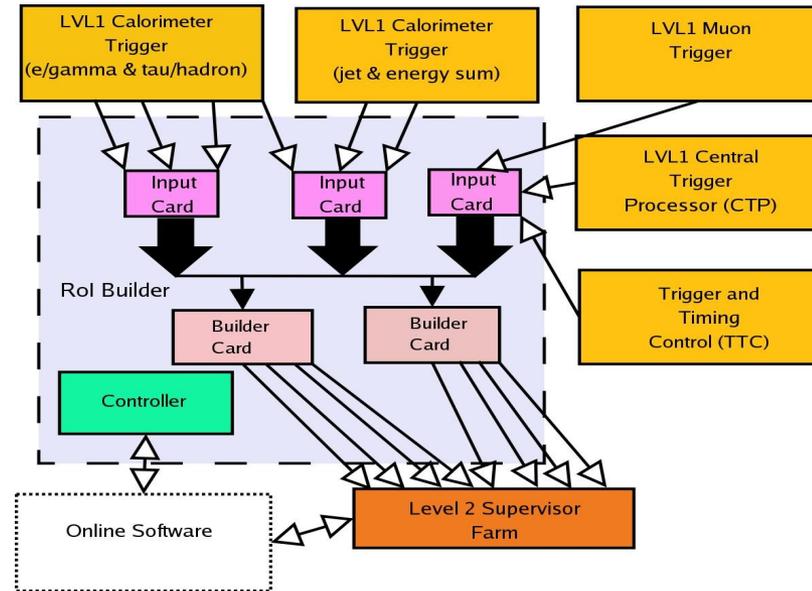
# ATLAS TDAQ Overview



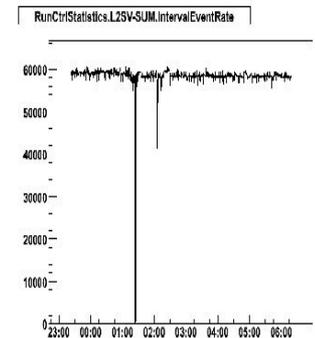
- RoIB Design goals
  - ✓ 100kHz operation
  - ✓ stable & reliable
    - ✓ working for >18 months w/o major failure

# Background

- Argonne and MSU built, documented, commissioned the ATLAS RoIB
- Ready to take data a year ago
- Changes this year are simply refinements & support



- 600 million events have been taken
- millions of MC collision events have been run through the full chain
  - RoIB->HLT->Castor

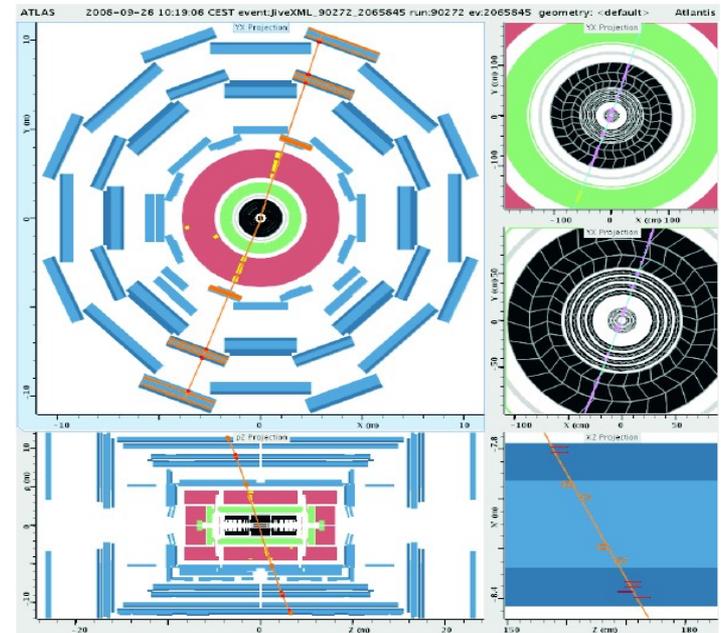
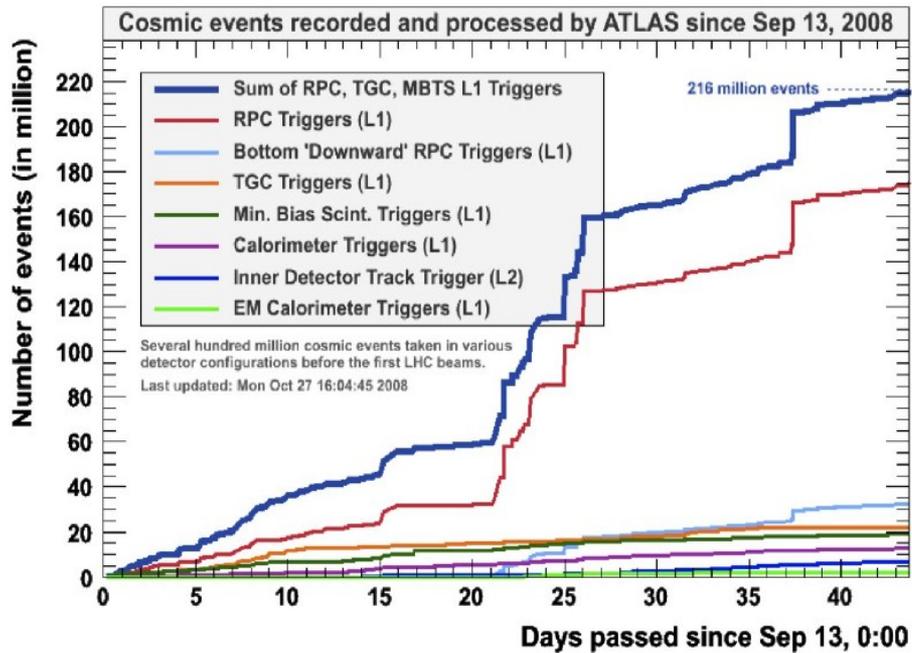


# Operations During the Last Year

- **Many commissioning runs with the full system**
  - **Frequent integration tests**
  - **Subdetector weeks**
  - **Full ATLAS/HLT slice weeks**
- **Some areas improved**
  - **Interface between subsystems (e.g., L1CALO/CTP)**
  - **Timing**
- **Stable performance**
  - **Rate at 80 kHz L1A input**
  - **Data integrity mostly improved**

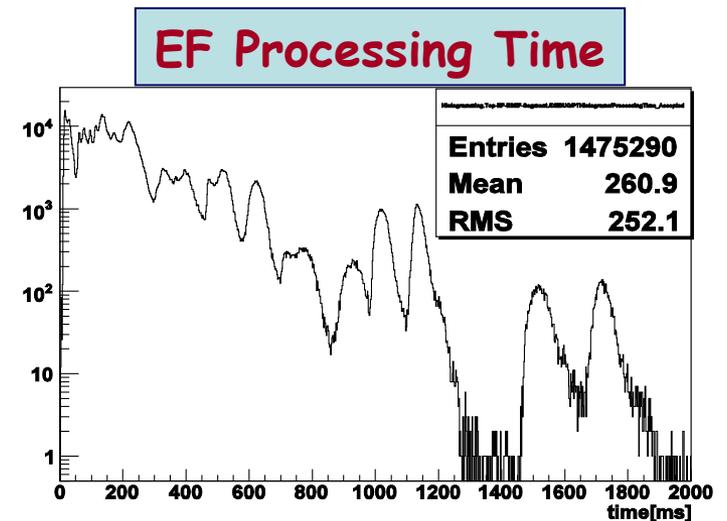
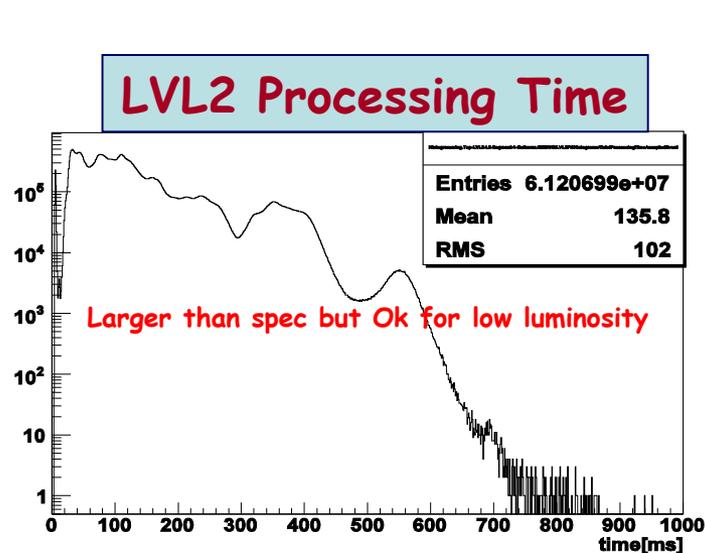
# Operations (waiting for beam)

- Cosmic data taking and integration runs with detectors
- Statistics for last year (Aug 1 – Oct 31 2008 except beam time)
  - ~ 550 million events, ~ 1 PB, > 600 k files



# TDAQ Run Plan

- LHC startup luminosity expected to be  $\sim 10^{31} \text{ cm}^{-2} \text{ s}^{-1}$  with less bunches
- ATLAS commissioning the trigger and detector systems, and studying the basic Standard Model physics signatures
- A trigger menu ( $10^{31}$  menu) deployed by applying low thresholds, loose selections and pass-through mode wherever possible
- The  $10^{31}$  menu continuously exercised in the installed TDAQ infrastructure with simulated data



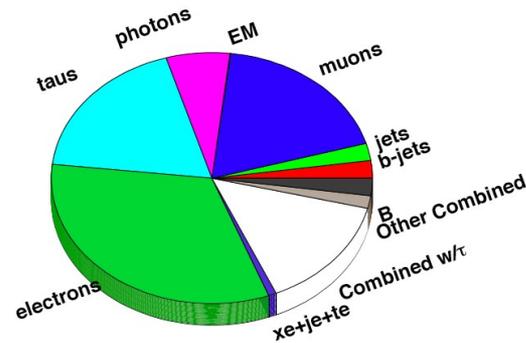
# Trigger Menu at $10^{31}$

- Comprehensive menu developed for early running at  $L = 10^{31} \text{ cm}^{-2}\text{s}^{-1}$ 
  - ◆ Over 300 signatures
    - Including items that are pre-scaled or disabled (but available when needed)
  - ◆ With low thresholds, loose selections and pass-through triggers
    - As will be needed for the early running phase
  - ◆ Exercised in offline and online tests
  - ◆ Total rates well below total bandwidth limits (nominally  $\sim 200 \text{ Hz}$ )

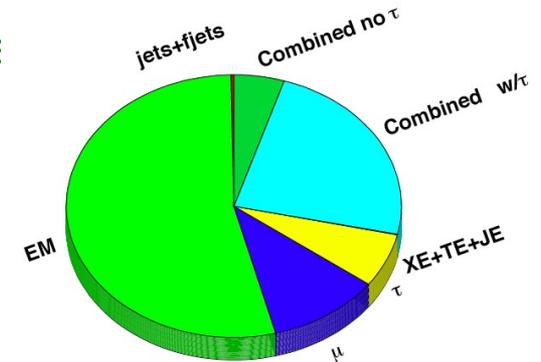
Some lowest-threshold unpre-scaled signatures at  $L = 10^{31}$

Trigger Terms	Rate (Hz)
e10	15
2e5	1
g20_loose	14
mu10	9
2mu4	3
4j20	5
$\tau$ 16 + xE25	7
MinBias	10

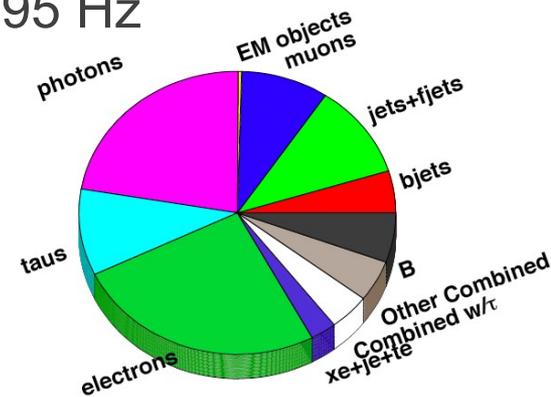
L2 : 427 Hz



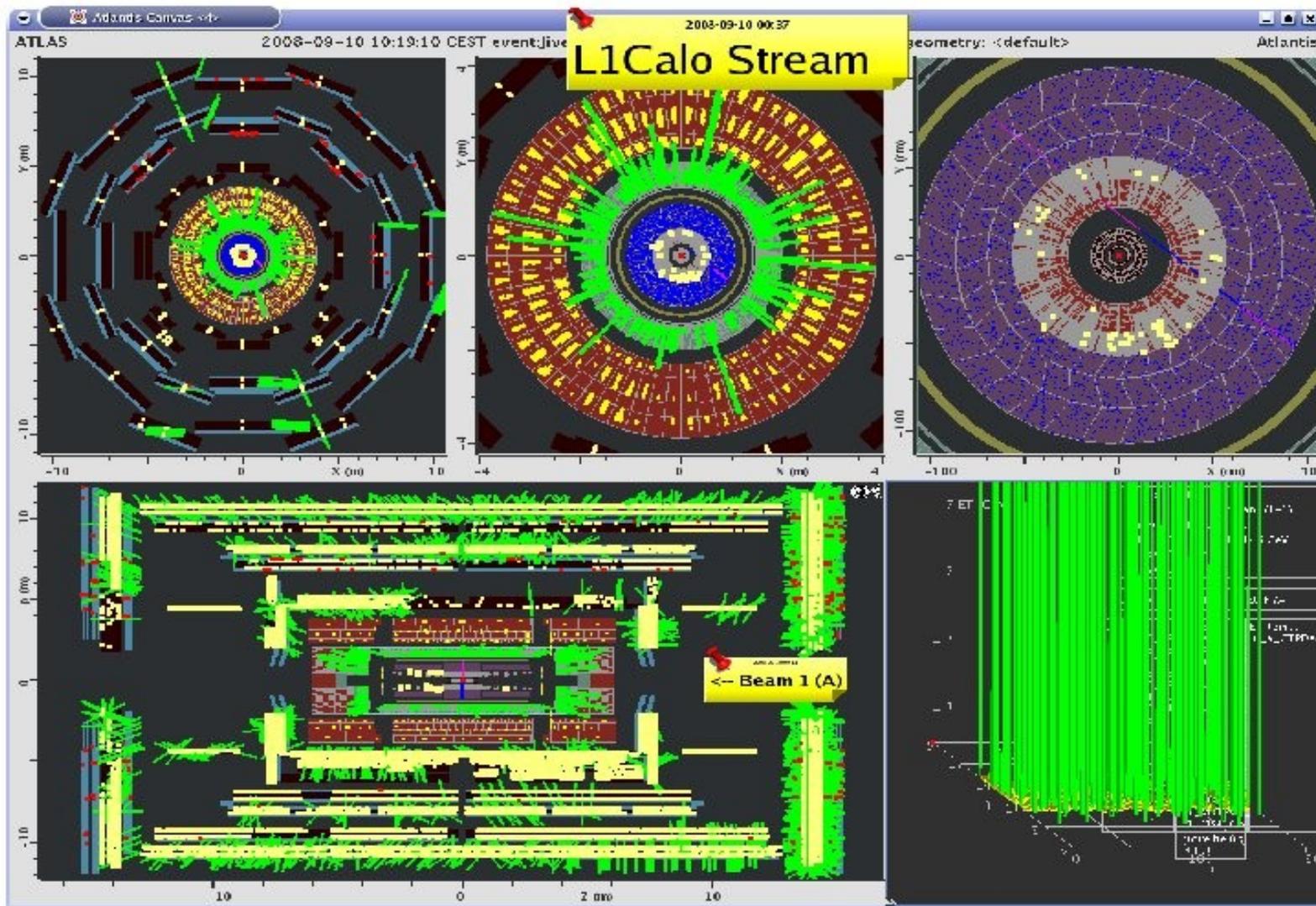
L1 : 6.6 kHz



EF : 95 Hz



# TDAQ was ready a year ago. TDAQ is even more ready now!



Robert Blair, Argonne (HEP)