Phases: to be 2 or to be B?
The question of new timescales

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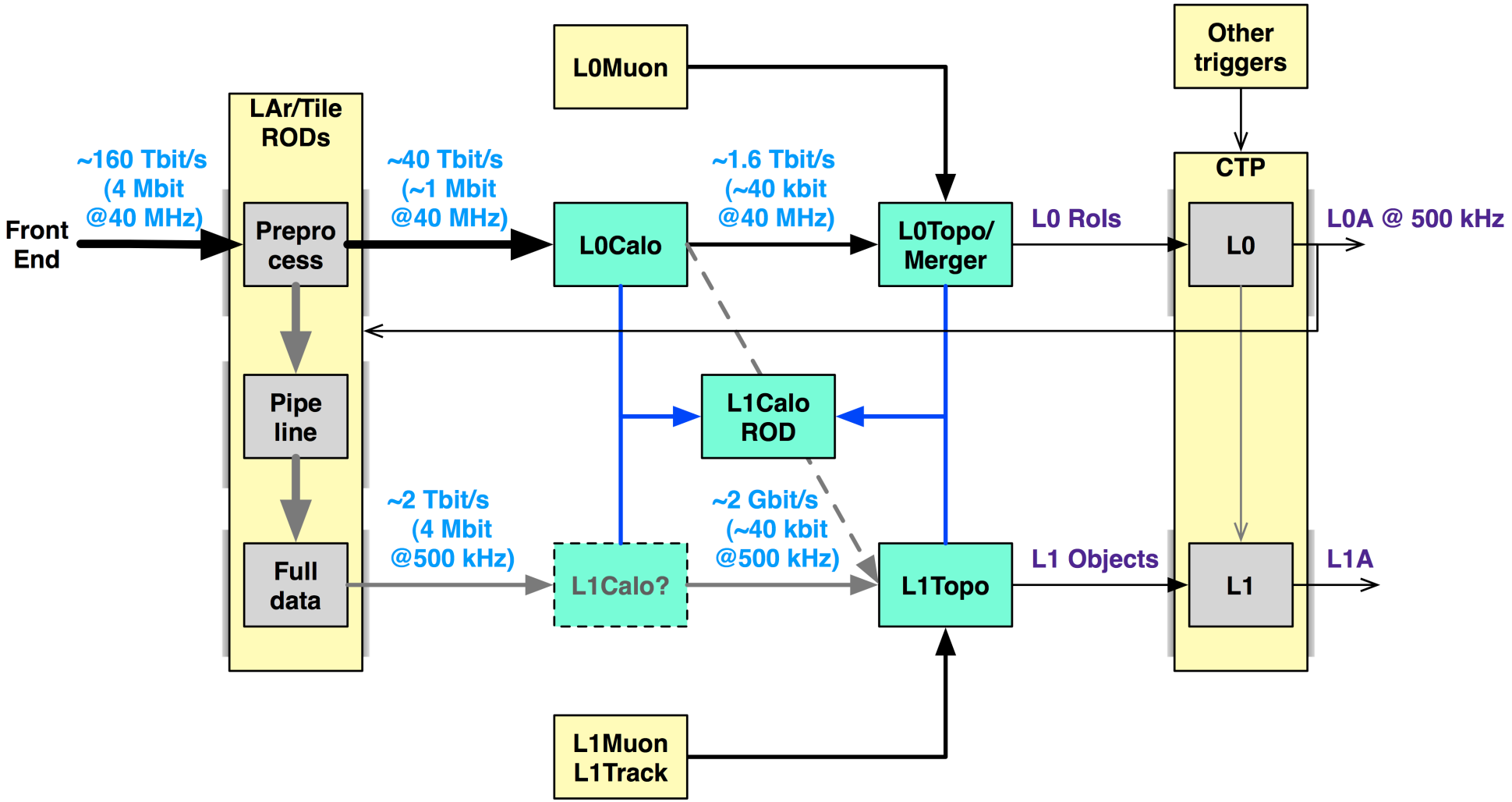
- L1Calo phase 2 → phases B and C?
- Implications for design
- Example timescales
- Organising the work?

Possible Change to Phase 2 Timescale

- In the last two years, phase 2 was delayed by ~4 years
  - Last L1Calo upgrade phone meeting: "it seems so far away"
- Now it may have got earlier again by ~3 years
- Phase B (2017?)
  - Replace Calo electronics, most of ATLAS stays the same
  - Need completely new L1Calo & TP giving L1A in <3μs
    - Roughly the "L0Calo" and "L0Topo" in my previous diagrams
  - Need new CTP (talking TTC & GBT, L0A & L1A)
  - Need new ROD<=>DAQ "contract" for Calo/L1Calo RODs
- Phase C (202x?)
  - New ID, FCAL, L1Track/L1MDT triggers, L1A=>L0A, new L1A
  - L1Calo=>L0Calo, possible refined L1Calo stage
  - L1Topo=>L0Topo, new L1Topo including L1Track/L1MDT

Last Months Block Diagram



Design Impact

- Phase B must anticipate Phase C
  - CTP and Calo/L1Calo RODs need to know about L0A and L1A
    - L0A only used in phase C, until then mapped to L1A
  - CTP must provide GBT but continue support for TTC
  - New RODs need new "ROD contract"
  - Calo RODs may need to provide outputs for a future "refined L1Calo" stage years before that is designed
  - Stage B L1Calo/L1Topo must be prepared to provide L0 RoIs to the L1Track trigger years before that is designed
  - L1Calo (and RODs) need to design for new FCAL before that gets finalised and installed
  - etc

Example Timescales (1)

- Suspend disbelief, assume we must install phase B L1Calo during 2017 shutdown
- Consider an imaginary scenario:
  - Assume LHC runs until December 2016
  - Jan 2017: remove existing L1Calo modules and cables
  - Feb 2017: start installing new L1Calo system
    - Must have full system ready on schedule to provide noise/cosmic trigger for testing new Calo FE electronics (unlike last time!)
  - End 2017: new Calo+L1Calo system completely installed, tested and working, ready for beam in Jan 2018 (or earlier?)
- Work backwards...
  - Remember that even our most "realistic" schedules for building the current L1Calo were still hopelessly optimistic

Example Timescales (2)

- 2016
  - Full scale test of ROD+L0Calo system outside USA15?
  - Spillover of production that should have been finished by now
- 2015
  - Final production and testing of new L0Calo/L0Topo system
    - About 100 ATCA modules of about 5 different types
    - Last time production/testing of full system took at least a year
      - Without the need for transatlantic synchronisation and coordination
- 2014
  - Final prototypes, full slice test with new Calo RODs
  - All those awful but essential reviews (FDRs, PRRs)
  - Ready to launch production by the end of the year
    - Preproduction this year?

Example Timescales (3)

- 2013
  - Start full system tests
  - Design and build final prototypes
    - Module specifications and preliminary design reviews
- 2012
  - First real prototypes, final R&D, technology choices?
  - New online software for ATCA based system
  - Write detailed technical design report (TDR)?
    - Need full (preliminary) design details of phase B L1Calo
    - Sufficient detail for phase C to build phase B to be ready for it
- 2010-2011
  - Simulation, design studies, technology R&D
- Provision for unrealistic optimism: start now!

Parallel Working?

- Phase B might still revert to delayed phase 2...
  - So we cannot stop work on current phase 1 ideas
- Or it might not
  - So we need to start taking it more seriously
- However there is much commonality
  - Need experience with ATCA, fast serial links, etc
  - Phase B/C/2 will need topological triggers
    - L0Topo as phase 1 (just calo and muons)
    - Later L1Topo (with calo, muons, tracking)
  - Many topological algorithm ideas will be the same or similar
    - Even though phase B/2 can offer object energies and finer eta,phi
  - Work on simulation can be widened to cover phase B/C/2