23rd September 2003

Test Planning

C .N .P .Gee
Rutherford Appleton Laboratory

Status of Interface tests (4 July 03)

	PPM	CPM	JEM	CMM	ROD	TTC	CTPD
PPM							
CPM							
JEM							
CMM							

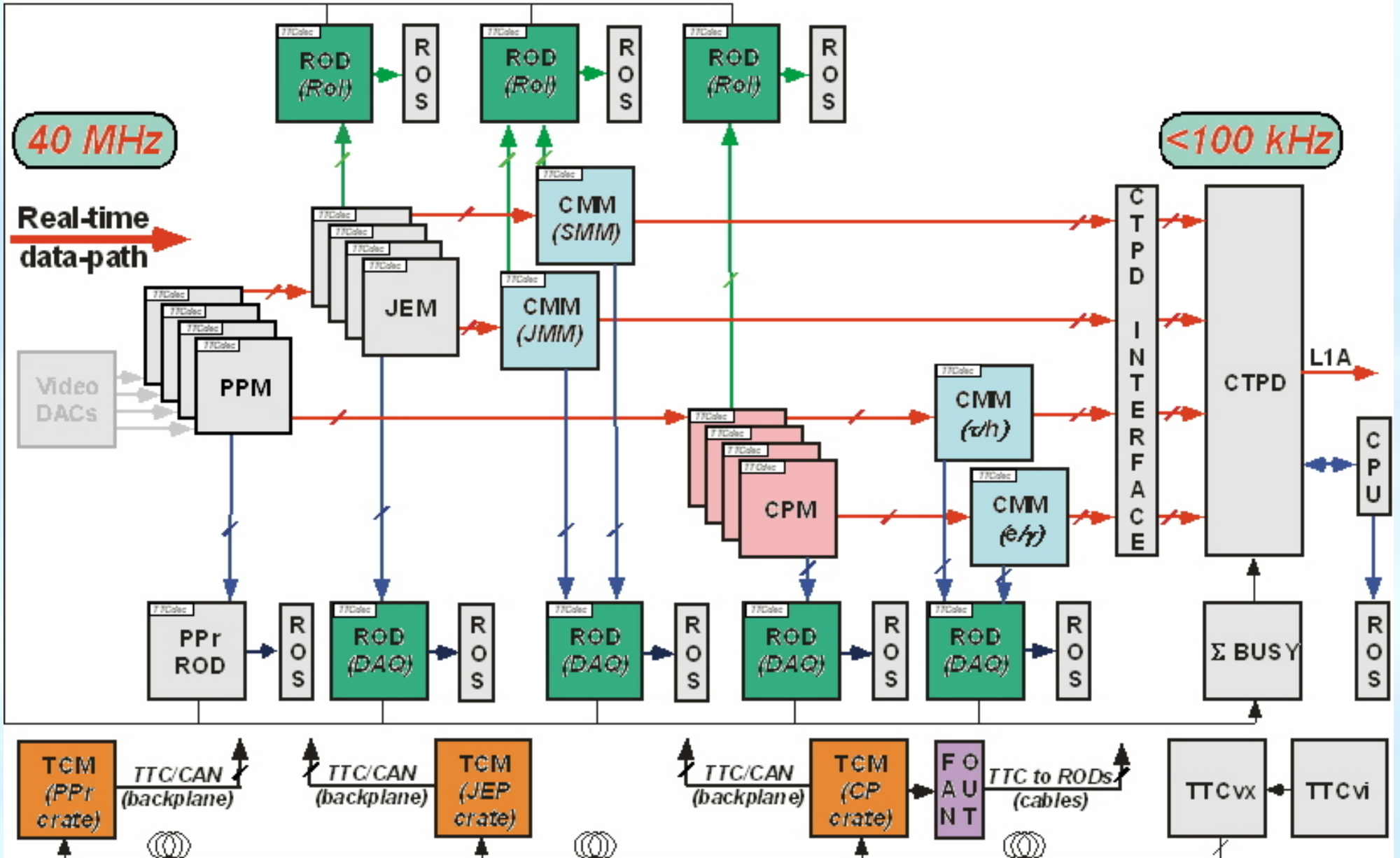
Status of Interface tests (Now)

	PPM	CPM	JEM	CMM	ROD	TTC	CTPD / CTP
PPM							
CPM							
JEM							
CMM							

Integration Tests

- **Several modules now available for system integration tests**
  - CPM hardware rigorously tested. Simulation & Module agree.
  - JEM 0.1 (& energy firmware) stable, simulation very advanced.
    - ***Still some details of signal mapping; also 1 G-link dead.***
  - RODs and DSSs more stable and simulation very advanced
  - CMM (e/γ) firmware bugs being eliminated; simulation tests.
    - ***Help from Ian, Panagiotis, Steve & Bruce much appreciated.***
- **Infrastructure is quietly working**
  - Crates, power supplies, VMM, TCM, TTC fanout soon.
  - Robust computing infrastructure
  - Software is coming together.

ATLAS Level-1 Calorimeter Trigger
Full System "Slice" Tests (Heidelberg: Q1-Q2 2003)



Proposed Plan – several threads:

1. **Finish individual module checks, readout to RODs, simulation**
   - CMM e/gamma, CMM energy, JEM energy backplane outputs
   - Connect CMM-CMM
2. **Match Data and BCN to L1A in processors & ROD**
   - Needs mod to f/ware & s/ware in all modules for correct BCN!!
     - ***This is a problem only seen when doing system integration.***
3. **Obtain ROS and move to analysing built events**
   - So that analysis can see all ROD data concurrently and at high rates via multiple concurrent S-Links including RoIs
   - Requires computer (chasing), HOLAs (ordered), FILARs (ordered)
     - ***ROS software, new analysis code, integration into existing system, multiple inputs per ROD***

Overall Plan threads(2)

4. **Run the system as fast as possible into ROS, with a range of chosen or random or physics test data, over parameter space**
   - Include 8MHz instantaneous L1A rate; 100 KHz sustained.
     - ***Either parasitically analyze as many events as possible while running at speed, or run in bursts and analyze every event.***
5. **Search for low-rate errors with DSS – e.g. at CMM output.**
6. **Integrate and run with CTPD (see slide 9)**
7. **Systematic sampling of testing phase space, keeping careful records.**

Aim to do much of this by Christmas 2003. In 2004, insert (when available) PPM, CPM-1, JEM-1, ROD-1 (9u), CTPD/CTP

Full system for beam test in 2004.

JEP subsystem

- **JEM-1 is needed for combined Energy and Jets in one module.**
  - To test Jets soon, I've been pushing for firmware for a Jet-only JEM-0.
    - ***Attilla is working on this. It will need rigorous testing including readout to CMM, DAQ, RoI, and simulation, to ensure that any necessary hardware updates are included to JEM-1.***
- **CMM-JEP firmware: Jet f/ware to be completed; both Jet & Energy f/ware debugged, readout checked, and simulation completed and verified. Then the same careful and systematic tests.**

CTPD / CTP, CTPDI, etc

- **Need to run system tests in the most realistic way possible**
  - triggers determined from data and (CTP) L1A timing/latency and busy handling (Rod-Busy), interface modules, etc.
- **Main CTP not expected till spring 2004. Therefore use CTPD to emulate timing & test our controls. Run in three modes:**
  - DSS_L1A to TTC as now, and to "Golden bit"
    - ***initial checks of CTPD, readout, etc.***
  - DSS_L1A only to Golden bit, CTPD_L1A to TTC
    - ***tests of timing***
  - CTPD_L1A to TTC, no DSS_L1A, "trigger vectors"
    - ***system control tests, L1A derived from data.***

CTPD / CTP, CTPDI, etc (2)

- **Software:**
  - (1) CTPD/Patchpanel control – via Rod-crate DAQ?
  - (2) Simulation for two fixed CTPD f/ware configurations (Golden bit/ non-golden bit) with much less than full CTPD flexibility.
  - (3) CTPD readout – which S-Link?
  - Discussions needed with CERN group on responsibilities (Wednesday!).
- **When CTP available (to us, for a sustained period):**
  - Tests of controls, data transfer quality, timing, software integration including trigger menus, handling pre-pulsing…
  - I don't know which parts of the multi-module CTP we need to start with. Obtain copies of other modules when available.

Software & Operations

- **Significant learning effort to operate & interface to ROS.**
- **Expansion and changes needed in data analysis, statistics, histograms for pattern data.**
- **Large set of System Test vectors needed.**

- **Organisation:**
  - As before for integration – weeks with gaps for consolidation?
  - Rotate network access to full system for soak/system tests?
  - Essential to keep Accessible Records of systematic tests.

Other Things

- **Do we need a training programme to inform one another about techniques for setting up and running tests?**
- **What about systematic register-level tests for modules.**
- **Can we survive without a writable database?**
  - What do we do to obtain one?
- **What else? Complete Canbus architecture;**