



17th July 2001

RODs and ROSs



RODs, ROD-crate DAQ, S-links, ROSs, and implications for final ROD design

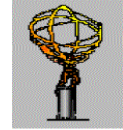
- **Part 1: RODs, S-links, & implications for final ROD design**
- **Part 2: ROD-crate DAQ and ROS**

C .N .P .Gee

Rutherford Appleton Laboratory



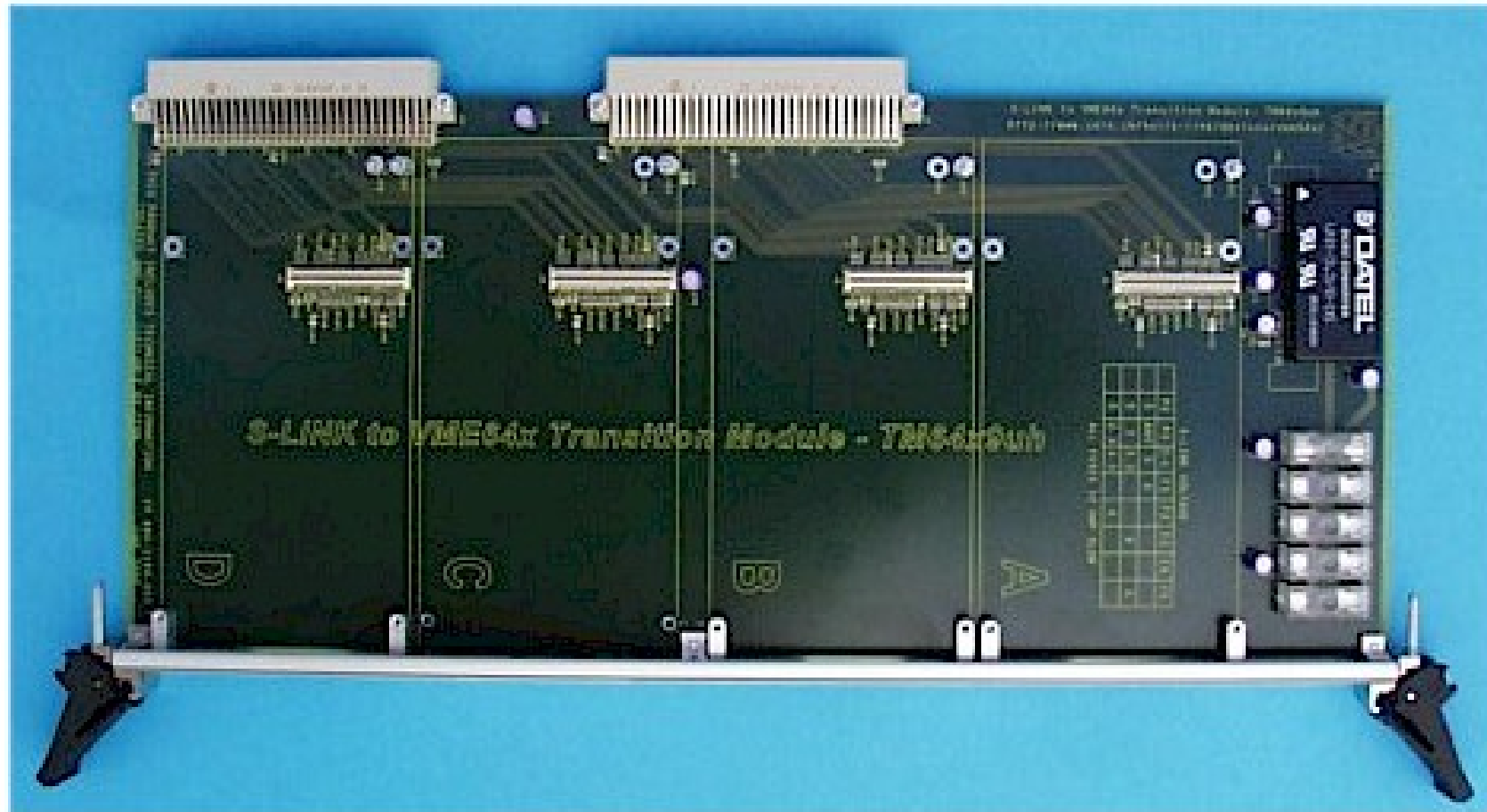
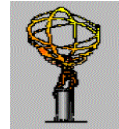
RODs and S-Links...



- **At Mainz, discussion of options for reducing the no of RODs by using more S-Links per ROD.**
 - RODs with 18 G-Links could read out all modules in any one CP or JEP crate (16 JEMs + 2 CMMs, 14 CPMs + 2 CMMs).
 - But there seemed to be a problem putting 4 optical S-Link “ODIN” daughter boards on one ROD.
- **As circulated from Atlas TDAQ week, McLaren & van der Bij have made a 4-ODIN transition module which could solve our problems.**

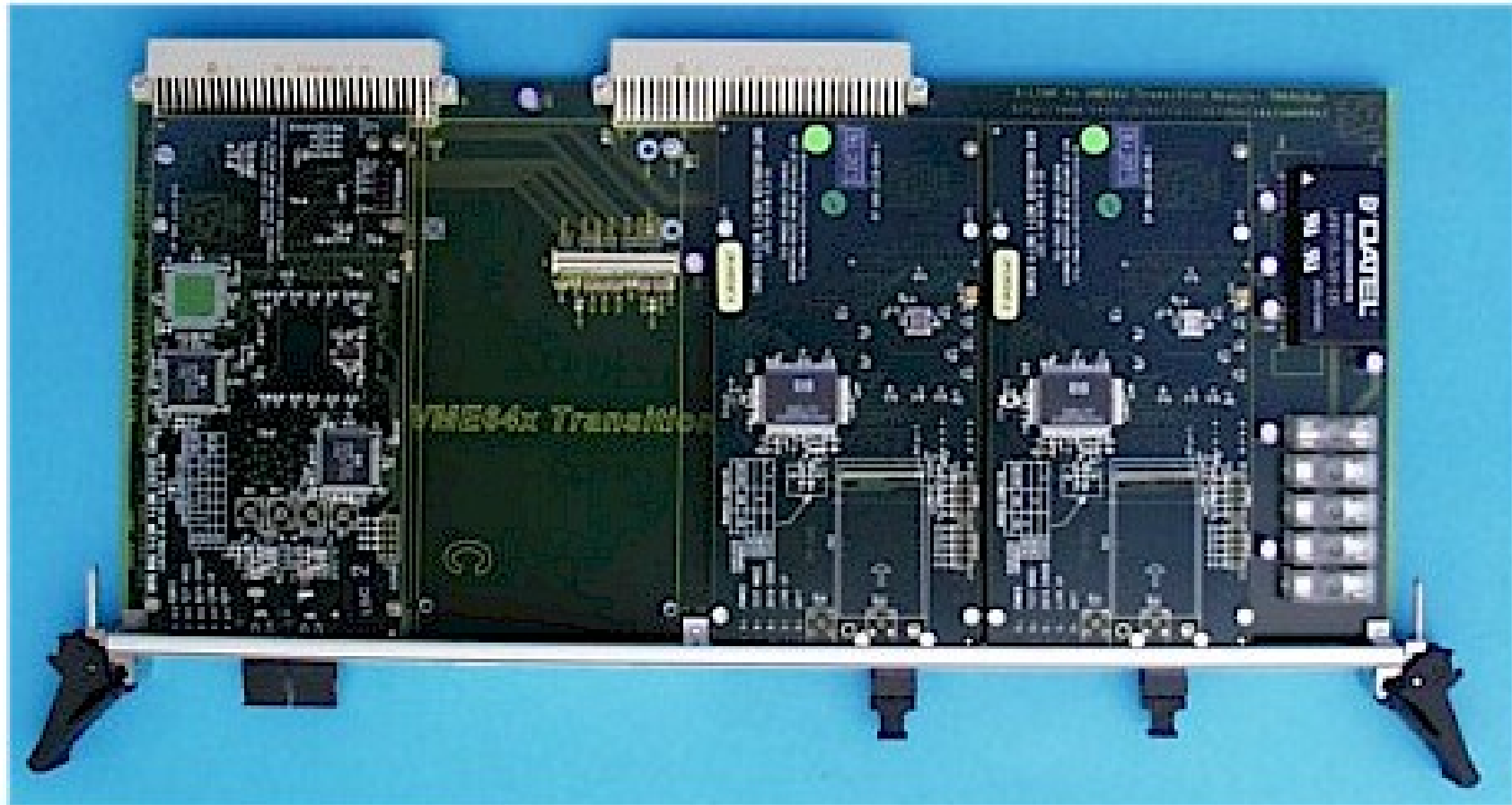
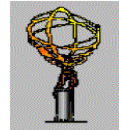


S-Link Transition Module



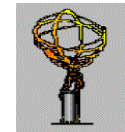


Transition Module with 3 Slinks

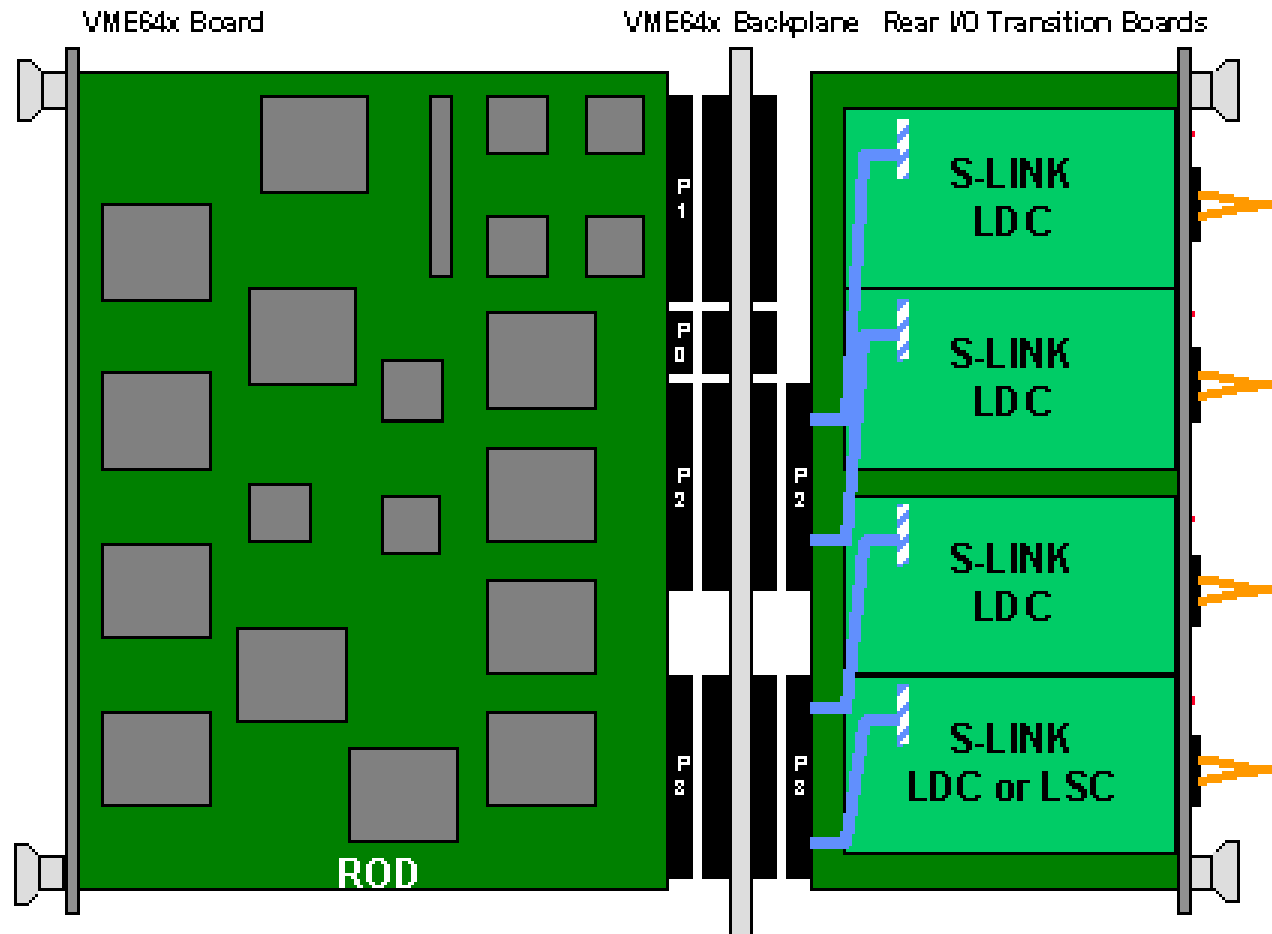




ROD with Transition Module

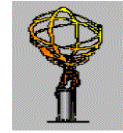


9U ROD or ROB with rear mounted S-LINK





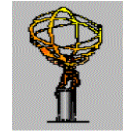
Consequences for ROD



- **We can rear-mount 4 S-Links on a ROD crate and read out each crate to DAQ with a single 18 G-Link ROD.**
- **A further RROD is needed to collect RoI information from each crate.**
 - The total no of CP RODs reduces from 18 to 12.
 - Saves Cost
 - Easily fits in one crate.
- **R. McLaren's group would probably make the boards for us or give us the design.**
- **Recommend plan for this including bulk G-Link purchase.**



ROD-crate DAQ and ROS

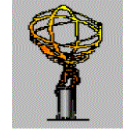


RODs, ROD-crate DAQ, S-links, ROSs, and implications for final ROD design

- Part 1: RODs, S-links, & implications for final ROD design
- **Part 2: ROD-crate DAQ and ROS**



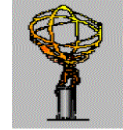
Definitions - 1:Online Software



- **“Online Software” - a collection of components of software infrastructure - supported, documented, tested, open source.**
- **Configuration Databases**
- **Inter-Process Communication**
- **Information Service**
- **Message Reporting System**
- **Process Manager**
- **Run Control**
- **Resource Manager**
- **Online Bookkeeper**
- **Test Manager**
- **Integrated User Interface**
- **Diagnostics Package**
- **Event Dump**
- **Monitoring**
- **These components are intended and tested to run in an arbitrary configuration of PCs and single-board computers.**



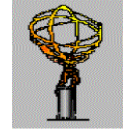
Definitions - 2:ROS Software



- **Software to collect data from ROBs - evolving, some documentation, source available “as is”, limited support.**
- **4 sub-components:**
 - “ROB” collects data from S-Link ODIN cards or Robin cards.
 - “TRG” receives trigger signals from CORBO in VME/PCI.
 - “L2IF” gets fragments for lvl2 and receives lvl2 decisions.
 - “EBIF” gets fragments for event builder
- **Components communicate over VME or TCP/IP. Can run as one task (or several separate tasks. Can probably be split between different computers .**



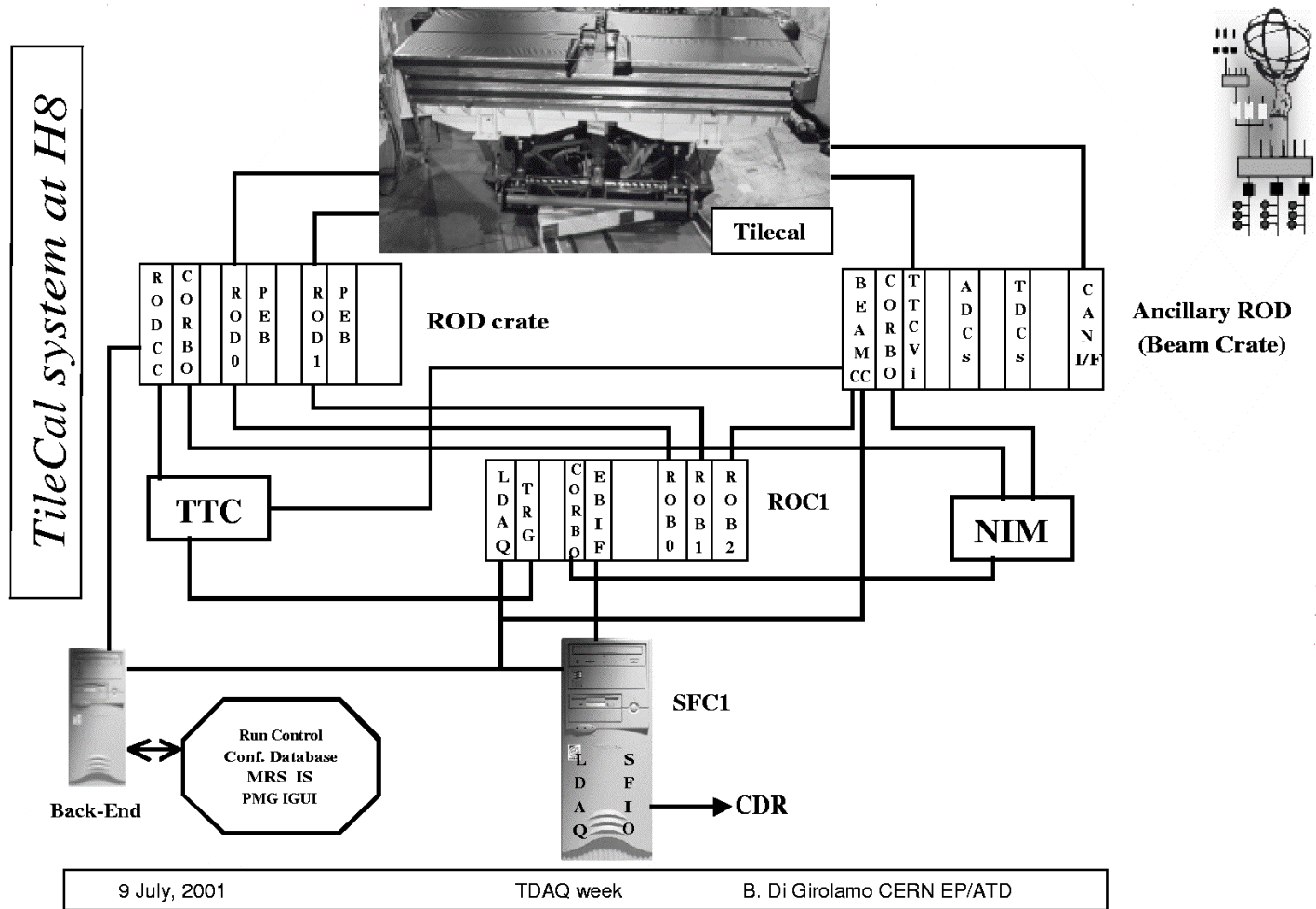
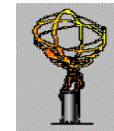
Definitions - 3: Testbeam/ROD crate DAQ



- **Mixture of Online, ROS and detector software resulting from tilecal intervention at EB. Evolution of Online, ROS, DAQ-1 + detector specific software. Supported by L Mapelli et al.**
- **Intended for use in labs and test beam.**
- **Used in Tilecal and Muon test beams and LAr and MIROD lab tests.**
- **Requires detector groups to supply and/or configure some parts.**

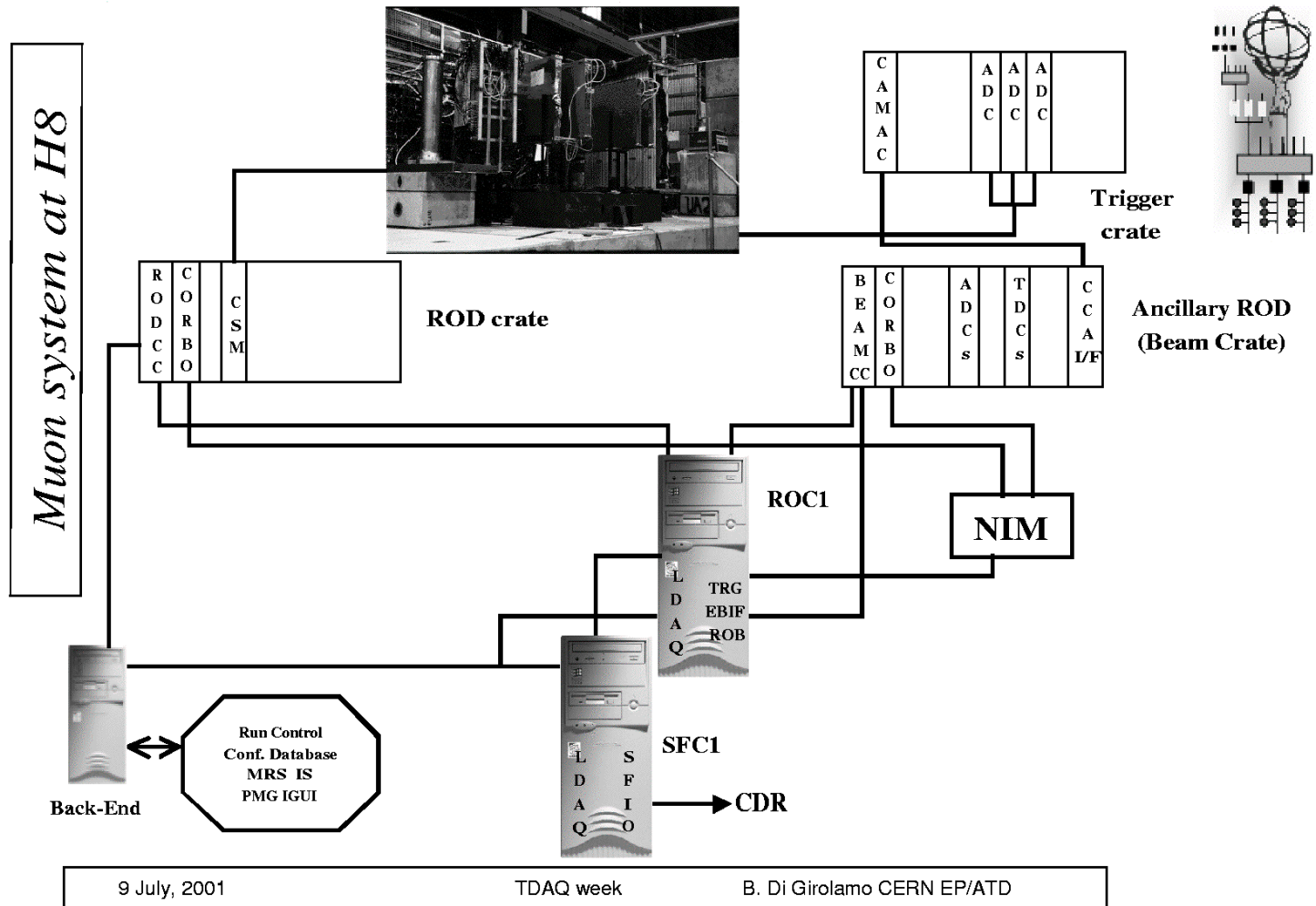
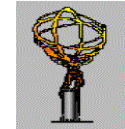


Tilecal Test Beam DAQ



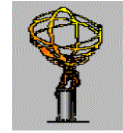


Muon Test Beam DAQ





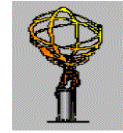
Options for Test Systems



- We have separate CPUs in all our crates, and we have separate PCs available. They are linked by fast Ethernet.
- We have ODIN S-link hardware to read out 6 RODs.
- We have to configure and load modules with settings and test vectors.
- We then have to assemble event fragments from RODs into complete events which should be passed to analysis software for checking.
 - Do we try to use the ROS framework running on a ROS PC, or do we use a development of ROD-Crate/Testbeam DAQ?



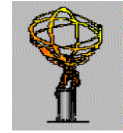
Pointers



- **We need to be able to run the trigger at 100kHz L1A while checking a proportion of the events by DSS and/or software.**
- **The ROS-PC can't sustain 100kHz event rate over ODINs without using ROBIN cards.**
 - ROBINs cost around £2k each and are prototypes which may not be used later. They have on-board CPUs and an empire of software infrastructure.
- **We need an industrial PC/ PCI Bridge to support >3 S-Links or ROBINs.**
- **It is hard to use the ROS-PC with the DSS. The “event mismatch” signal is hard to associate with a specific event in the readout.**



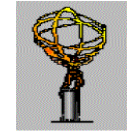
More pointers



- **The ROS-PC software is not yet necessarily in a state where we could actually use it.**
- **We must integrate with the ROS at some time. But it is not essential as part of the Slice test unless we need features it provides.**
- **We need a test system which can be provided at several centres outside CERN - systems should be as simple as possible.**
- **The test beam DAQ appears to work for several groups, so is probably built into the future of integrated test beam work. It is used by two calorimeter groups from whom we get our input.**



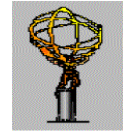
My Conclusion



- **Rather than trying to use a ROS-PC system, we should now be designing a ROD Crate/Test beam DAQ system. It should be...**
 - Fully compatible with the “Online software”;
 - As compatible we possible with existing test beam DAQ systems.
 - As compatible as possible with usable parts of the ROS.
- **It should run on SBCs in the Slice test: up to 5 crates - PPr, CP, JEP, +2 ROD/DSS, plus two or more PC workstations.**
- **It should also run on much smaller subsets of this system.**
- **Once our aims are agreed, we should inform Online & ROS groups, but also ask for comments/advice etc from DIG and calorimeter groups.**



End



The End