Highlights from the GDN session at the IEEE conference in Portland (& Montpellier)

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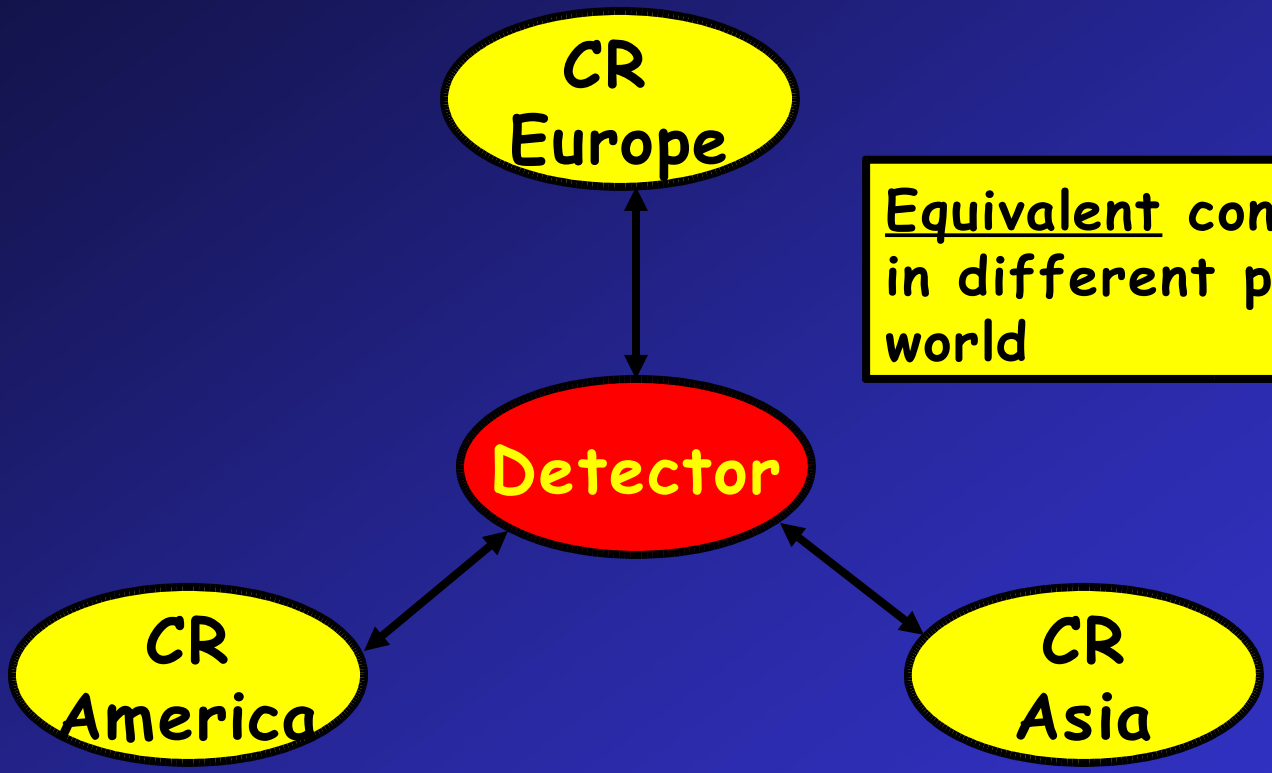
Montpellier
November 2003

Global Detector Network

Operation and maintenance of the detector



Equivalent control rooms in different parts of the world

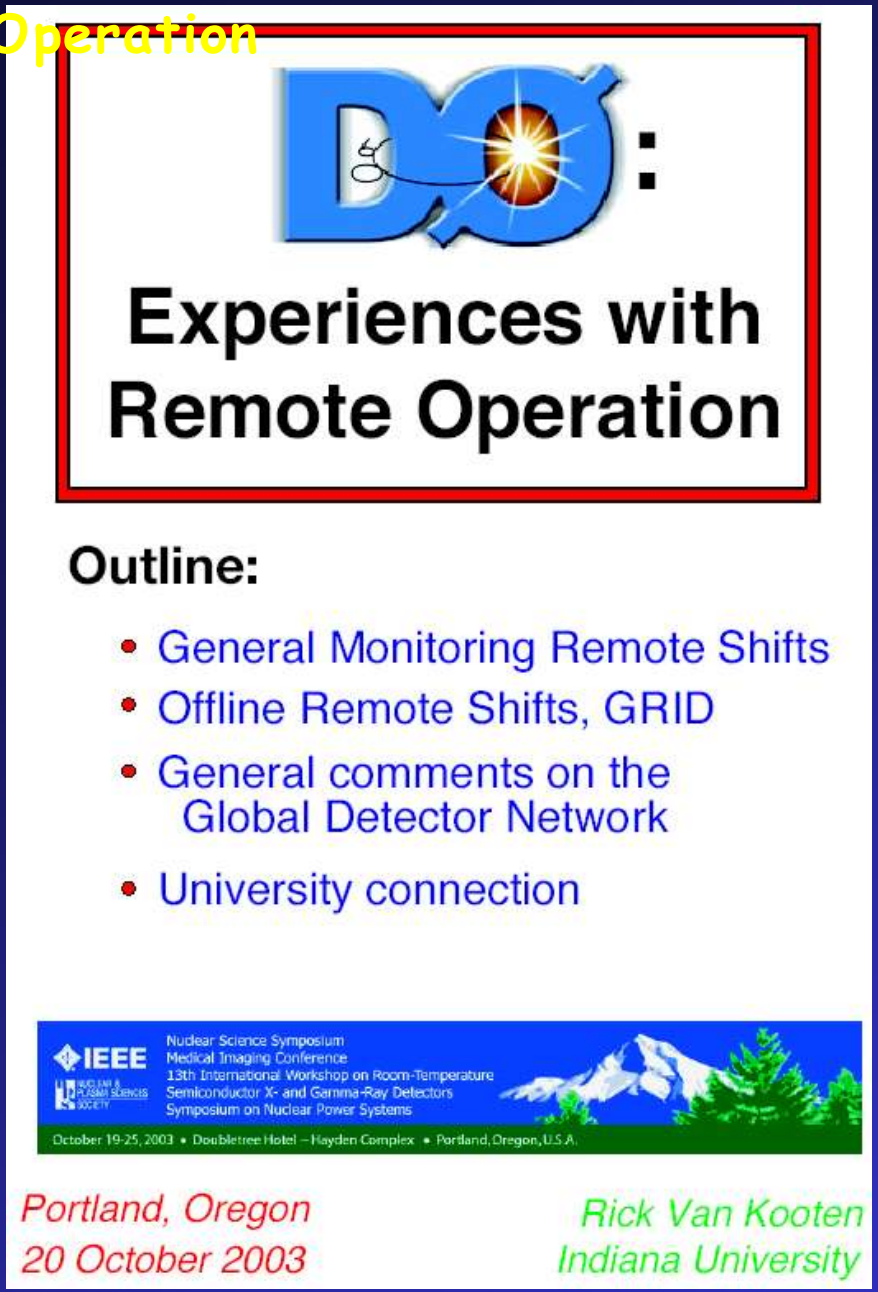
- Full monitoring & control over entire detector from remote control rooms (CR)
- Minimisation of local intervention

2003 IEEE conference at Portland

GDN Satellite workshop on October 20th

- ≈ 3 hours
- ≈ 15 participants
- Very good & interesting talks (D0, CMS & AMS)
- Very lively & constructive discussion

Rick van Kooten: DO Experiences With Remote Operation



- Normal shift operation classical detector runnin
  - local shift crew +
  - close-by experts
- Global Monitoring Shifts
- Offline Remote Shifts

➔ First step towards GDN

D0 Offline Shifts

SAM GRID INFORMATION & MONITORING SYSTEM

Launching the Monitoring System:

Please click at the map to monitor the execution sites.
Get information about the submission sites
Get information about the advertised sites.

Participating Experiments:

● D0 ● CDF

Rick van Kooten: Advanced Communication Technolog

Local progress at Indiana University:

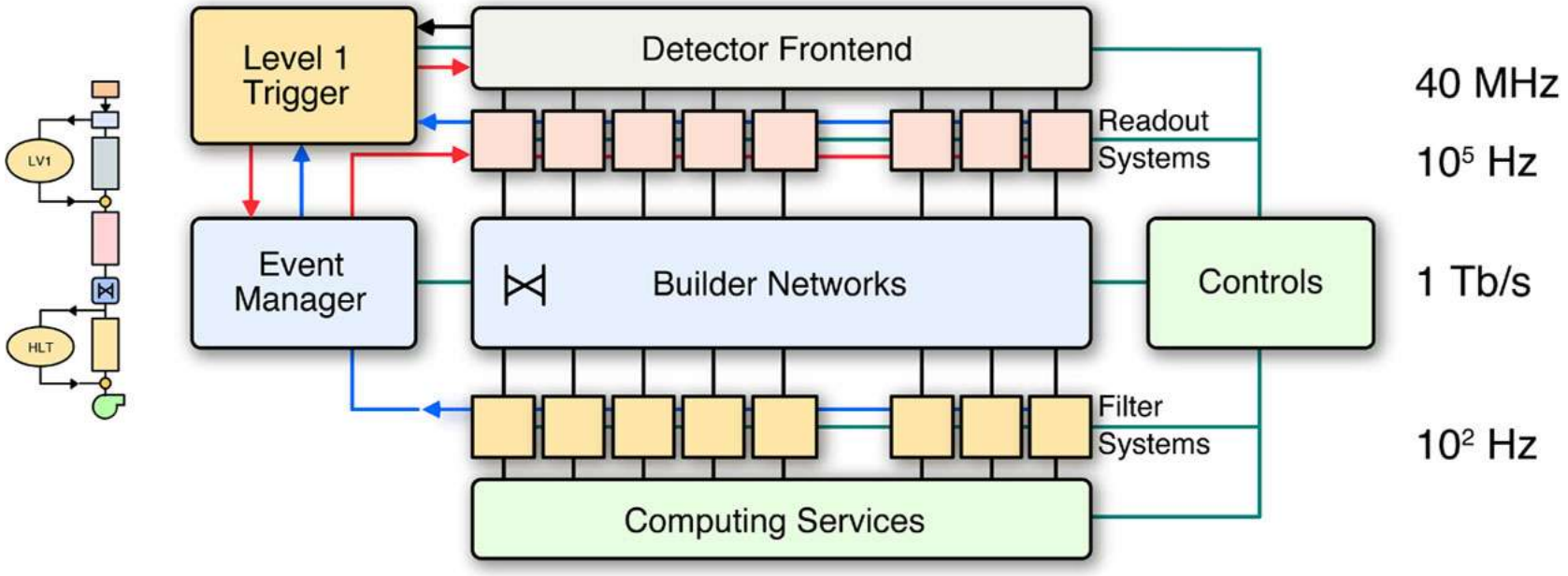
- Geoffrey Fox (of Fox-Wolfram moments) heads the IU Center for Pervasive Computing
  + I.U. Community Grids Project
  + I.U. Advanced Network Management Lab
- Very interested in using GDN pilot programs as a "test-bed" for collaborative tools:

e.g., Access Grid (Argonne):

From Olson,
Univ. Michigan

CMS DAQ Baseline

- Two Trigger levels

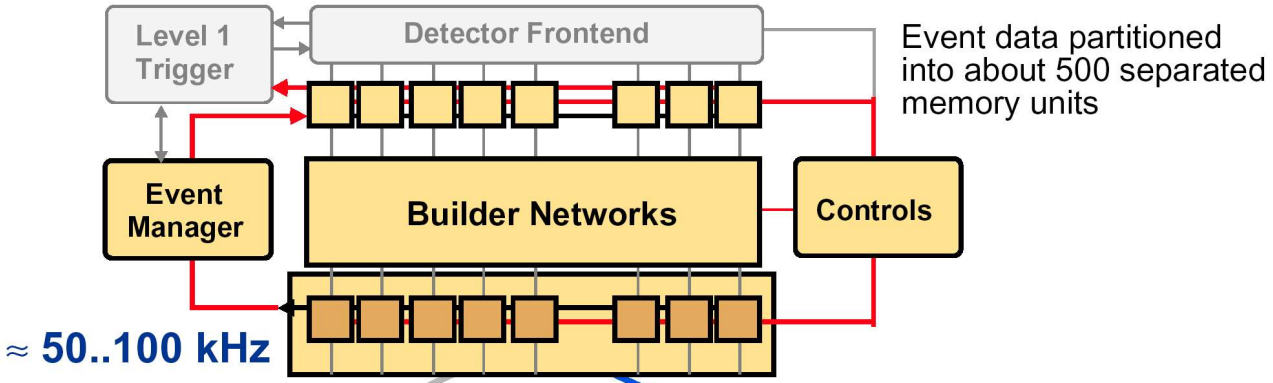


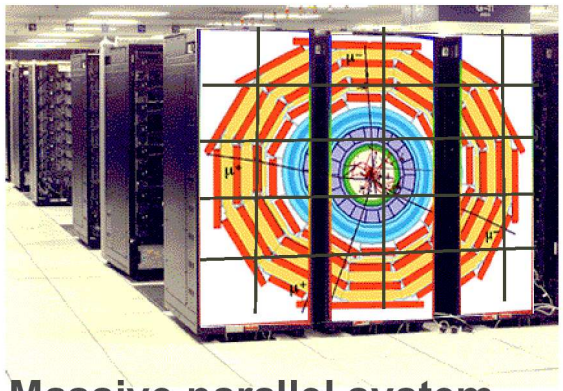
Collision rate	40 MHz	No. of In-Out units	**512**
Level-1 Maximum trigger rate	**100 kHz†**	**Readout network bandwidth**	**? 1 Terabit/s**
Average event size	**? 1 Mbyte**	**Event filter computing power**	**? 10^6 SI95‡**
Event Flow Control	? 10^6 Mssg/s	Data production	? Tbyte/day
		No. of PC motherboards	? Thousands

† 50 kHz at startup (DAQ staging)

‡ 6×10^5 at startup

High Level Trigger Farm

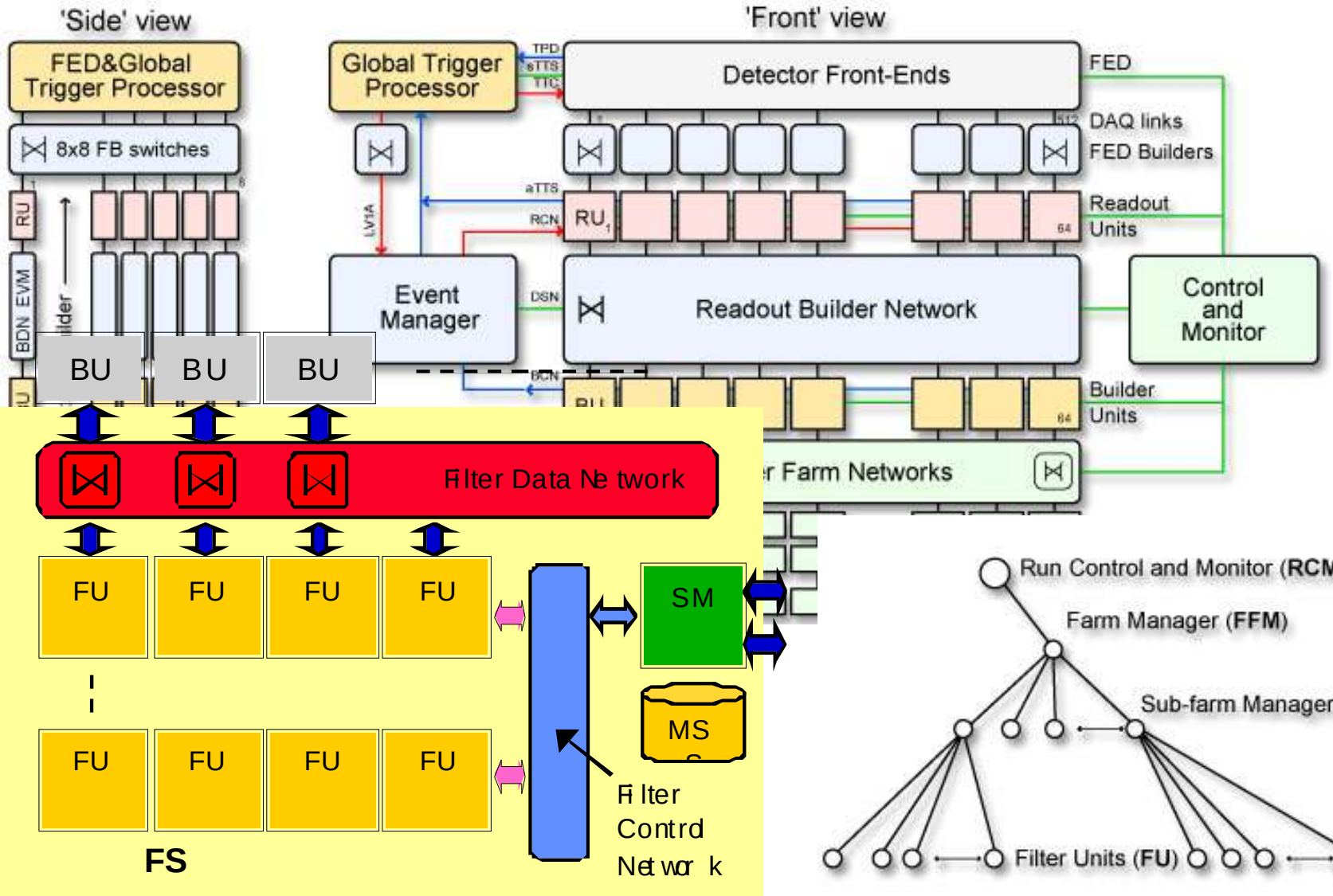




Massive parallel system
ONE event, ALL processors
- Low latency
- Complex I/O
- Parallel programming

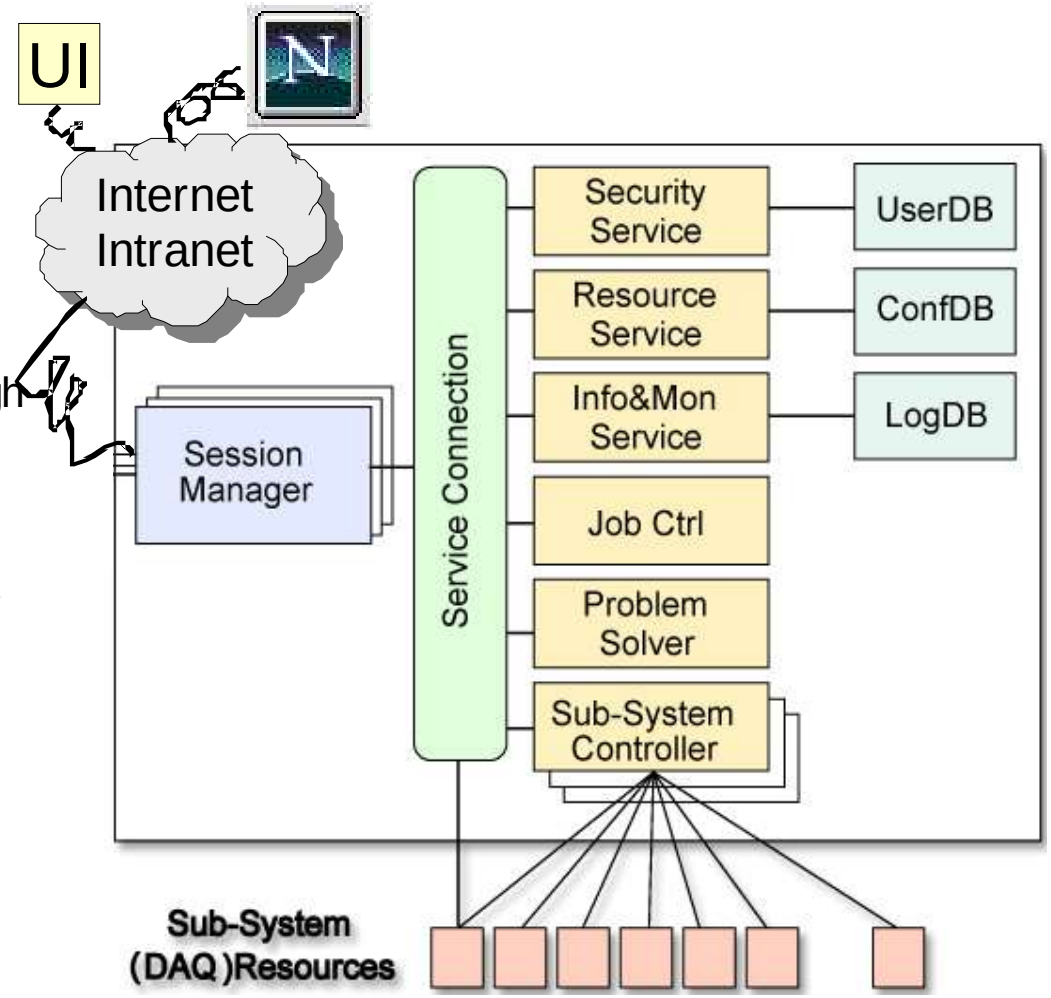
Farm of processors
ONE event, ONE processor
- High latency (larger buffers)
- Simpler I/O
- Sequential programming

Filter Farm Baseline



RCMS

- The Run Control and Monitor System enables users worldwide to access, control and monitor the experiment providing a "virtual control room"
- Each operation is made accessible by means of appropriate web services, which can be used through specialized GUI applications or accessed using web browsers
- RCMS views the experiment as a set of partitions, where a partition is a group of entities that can be operated independently.
- Interoperability of various subsystems is guaranteed by homogeneity of XDAQ interfaces (from front-end to filter unit)



Where we are

- The dream: Control Room⇨ any meeting room, office, home, bar street etc.
- Today:
  - videoconferencing heavily used by CMS (vrvs etc.): several transcontinental meetings daily
  - Collaborative tools (virtual whiteboards, shared desktops, e - logbooks etc.) used mainly by sw developers
    - Need to train physicists
  - Online data monitoring via web services (publish/subscribe, db access, plotting applets and server-side applications)
    - mainly in DAQ demonstrators, limited amount of data
  - Remote control and monitoring using web tools
    - Farm demonstrators

AMS02

Alexei Klimentov AMS02 Computing and Ground Data Handling

(apologies for not having slides to show)

The AMS02 detector is supposed to search for anti-matter on the ISS

- AMS01 was flown on the space shuttle in 1998
  ➔ experience in remote detector operation
- Very limited possibilities for interventions by astron
  (prohibitive costs)
- Redundant electronics & data storage
  „online" transmission to earth + local storage
- Very complicated communication routes
  (imposed by NASA requirements)

Brief summary of talks and discussion at Portland

Important issues for GDN:

- **Detector design:**
  Hierachical structure of detector (electronics, trigger, DAQ)
  Redundancy at higher level

- **Advanced communication technology**

- **Question of commissioning phase**
  What is it? What defines end of it?

- **More input from non-HEP experiments**
  (large area cosmic ray experiments)

Montpellier GDN session
Günter Eckerlin: DAQ & slow control in GDN

Conclusion

ECFA Study
Physics and Detectors for a Linear Collider

GDN will work from the technical point of view

- GDN does not make a difference in the design phase or in the construction and coding phase. (But it will influence the design itself !)
- GDN will be of little use for the implementation and commissioning phase, but this is a limited time only.
- GDN will need proper design of hardware and software for remote control, configuration, diagnostics and intervention, but tools and examples exist.

From the psychological point of view we have to take care (same for GAN)

- Audio/Video connection tools for expert / shift / local technicians ?
- How to identify with the experiment ?
- 'coorporate identity' ?

What should happen next on the route to GDN?

- Next GDN workshop at LCWS in Paris (April 2004)

  Invite experts for talks and discussions

  - LHC experiments
  - Large area cosmic ray shower experiments
  - Advanced communication technology
  - Establish close collaboration with GAN

- Proceedings of Paris

  Short document describing

  - important issues identified during discussions
  - first approach to guidelines for detector design

People interested in GDN are encouraged to contact

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