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\*\*\* WBS 4. 1. 5 CALORIMETER (N. Johnson/Carosso)

4. 1. 5. 1 CAL Management

Program re-planning to implement the recent organizational changes is on-going. Schedule and costing being updated. Mitigation discussions continue.

Will re-start detailed technical discussions via telecons and videocons.

A meeting is being planned in early February to discuss the new responsibilities allocation and associated schedule.

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4. 1. 5. 2 Systems Engineering

Continuing documentation update.

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4. 1. 5. 3 Mission Assurance

- Had several meetings with CAL design engineers regarding detailed discussion of the AFEE board design, material, thermal coefficient mismatch, balance design, flex interconnect, manufacturing of board, assembly of board, soldering issues, testing and burn-in of boards, thermal cycling, etc. This exercise is being carried out to mitigate all risks at the subsystem integration and testing and to increase the reliability.
- Had several similar detailed discussions and meetings to discuss alternatives to testing of PEMS and ASICs on the boards.
- Performed several designs of experiment for PIN photodiode bonding to crystals.
- Attended several meetings on verification and environmental test plan and provided input for ICDs which are being developed.
- Attended meeting to discuss future probabilistic risk assessment policy. It should be shown how it affects the CAL subsystem.
- Work is continuing to identify weak links in the subsystem, which includes design margin redundancy, part stress analysis with common and well defined environmental specification.

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4. 1. 5. 5 Crystal Detector Elements

4. 1. 5. 5. 2 Csi (TI) Scintillation Crystals

Optical test benches

The 4 black boxes for the optical test benches are mechanically finished. All 4 will be thoroughly checked for light leakages, and full calibration runs will be made with every box before shipping.

Calibration tests of last delivery

Optical tests of all the 94 crystals from last delivery have been finished. A report on results is being prepared. Mechanical tests of the crystals are in progress.

Radiation hardness tests

We have communicated with people at the Uppsala cyclotron in order to conduct a radiation hardness test in a proton beam. The Stockholm group has carried out a radiation hardness test with strong 60Co-source. They exposed one of the standard boule samples to maximum 8 krad.

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#### 4. 1. 5. 7 Analog Front End Electronics

Testing of GCFE Ver 4 is continuing, we expect to complete the first round testing and have a report written next week. The second version of the calorimeter VM board is undergoing circuit board layout, and is expected to be sent for fabrication next week. This board is an improvement over the first calorimeter VM board which had coupling interference to the Low voltage Differential Signalling lines. Design of the calorimeter EM boards flows directly from this VM board design. We are preparing our hardware and software setup for total dose testing of the commercial analog to digital converters. Minor modifications are being made to a previous test hardware and software. Design of the GCRC test board is nearing completion of the schematic design. We hope to layout the test board next week. This board will support separate functions of radiation testing 1 GCRC chip at a time, and vector testing 10 GCRCs at a time.

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#### 4. 1. 5. 9 CAL Module Assembly and Test

Continuing review of assembly and test schedules following discussions at PDR. Trying to improve flow and minimize redundant testing with separate deliveries of CDEs and mechanical structures from France.

Beginning discussion of CDE shipment with CEA/Saclay.

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#### 4. 1. D. 2. 5 LAT SW Support

Translating electronic and muon calibration routines from IDL to Root/C++. These are required for instrument I&T at SLAC. Goal is to complete routines for EM by May. Root routines are being checked with BTEM data from balloon flight preparations.

Working on GCR calibration algorithms with carbon beam data from GSI. Developing filters to identify charge-changing interactions.

Participated in Documentation Working Group. Began extracting example code documentation blocks from OSSE ground software.

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