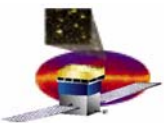


E2E Test Sequence for first two tower tests (a proposal)

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May 10, 2004



Roadmap to Two-Tower CPT

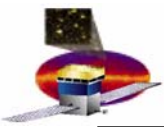
The goal for this talk is to propose a list of tests for the first 2 towers based on the Event Data Handling Tests recommended by the E2E report

- The E2E Report provided recommendation for the LAT tests
 - **Power on Sequencing** – was discussed in previous meetings
 - **Subsystems Tests** – were discussed in previous meetings
 - **Integrated Trigger Tests** – under development

- **Event Data Handling Tests**

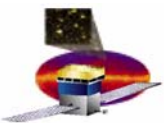
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|-----------------------------------|-----------|
| 1. Baseline Cosmic Ray | (BCR) |
| 2. Condition Scan CR | (CSCR) |
| 3. Baseline CR Trigger | (BCRT) |
| 4. Nominal-Rate CR | (NRCR) |
| 5. Nominal-Rate Condition Scan CR | (NRCSCR) |
| 6. CAL Nominal-Rate CR | (CALNCCR) |
| 7. Baseline CR Data Volume | (BCRDV) |
| 8. Nominal-Rate CR Data Volume | (NRCRDV) |
| 9. VDG | (VDG) |

This talk



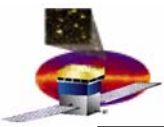
Test Description (1)

- **Test Assumptions**
 - Nominal settings from the Integrated instrument are known (e.g, voltages, DAC settings, timing)
 - Data is taken from cosmic rays unless explicitly stated (e.g. VDG)
- **Test Philosophy**
 - For the data handling tests we will only vary one parameter at the time while keeping the others fixed at their nominal values
- **Baseline Cosmic Ray (BCR) 1 hour**
 - Reference data taking
 - nominal settings
 - CAL Zero suppression ON
 - CAL FOUR RANGE Readout OFF
- **Condition Scan CR (CSCR) 4x1 = 4 hours**
 - Vary thresholds
 - TKR hit threshold (2 settings: min, max)
 - CAL hit threshold (2 settings: min, max)
- **Baseline CR Trigger (BCRT) 4x1 = 4 hours**
 - Enable only one trigger at the time
 - Trigger inputs are TKR, CAL_LO, CAL_LO (4 MeV), CAL_HI



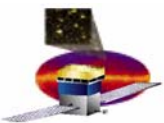
Test Description (2)

- **Nominal Rate Cosmic Ray (NRCR) $6 \times 4 \times 1.5 = 32$ hrs**
 - **Vary rates overlaying a Poisson distribution**
 - **Use solicited trigger condition to get rates (0.2, 0.5, 1, 2, 10, 20 kHz)**
 - Enable TKR trigger only
 - Enable CAL_LO trigger only
 - Enable CAL_HI trigger only
 - Enable ALL trigger inputs
- **Nominal-Rate Condition Scan CR (NRCSCR) $2 \times 2 \times 1.5 = 6$ hrs**
 - **Vary thresholds with ALL trigger inputs enabled**
 - **Use solicited triggers to overlay a Poisson distribution (5 kHz) – no ACD**
 - TKR hit threshold (2 settings: min, max)
 - CAL hit threshold (2 settings: min, max)
- **CAL Nominal-Rate CR (CALNCCR) $2 \times 2 \times 1.5 = 6$ hours**
 - **Enable only TKR trigger and use solicited trigger condition**
 - **Use solicited triggers to overlay a Poisson distribution (5 kHz) – no ACD**
 - CAL_LO threshold (2 settings: min, nom)
 - CAL_HI threshold (2 settings: min, nom)



Test Description (3)

- **Baseline CR Data Volume (BCRDV) 1 hr**
 - Same as reference test but with CAL zero suppression OFF
- **Nominal-Rate CR Data Volume (NRCDV) 4 x 4 x 1.5 = 24 hrs**
 - Vary rates overlaying a Poisson distribution with CAL zero suppression OFF
 - Use solicited trigger condition to get rates (1, 2, 10, 20 kHz)
 - Enable TKR trigger only
 - Enable CAL_LO trigger only
 - Enable CAL_HI trigger only
 - Enable ALL trigger inputs
- **Van de Graaff (VDG) 4 x 6 = 24 hrs**
 - Tower is positioned horizontally use TKR Trigger with CAL_LO at 4 MeV
 - Nominal settings
 - overlaying a Poisson at 5 kHz with CAL zero suppression off
 - overlaying a Poisson at 5 kHz with CAL zero suppression on
 - High rate VDG (2h) + 4 CR background control samples of 1 h each
 - *Time estimates for VDG tests based on performance of VDG accelerator during EM operations*
- **Total Time for Data Handling Tests for 2 Towers**
 - $1 + 4 + 4 + 32 + 6 + 6 + 1 + 24 + 24 = 102 \text{ hours} \times 1.25 = 128 \text{ hours}$ 25% overhead



Issues

- **Can we afford the total time of 128 hours?**
 - ~ 8 days for a 16-hour shift
 - ~ 5 days for a 24-hour shift
- **Is it sufficient to do these only for the major hardware configurations?**
 - 1 tower – because it is the first
 - 2 towers – first time with have a multiple tower system
 - 16 towers – before we put the ACD on
 - Do we want to add any other configuration in between?
 - For example when we add one of the ELX components (e.g. SIU)?
- **For future discussion (NOT today), we list, just for the record, some implementation issues**
 - If one piece fails at the end of the sequence (e.g. hour 120) do we have to repeat the entire sequence to meet the requirements?
 - For the high rate tests do we know what is the fraction of events to be prescaled because of EGSE limitations? (E2E report suggests 1% to 10%)
 - How does this affect the duration of the data taking?
 - Can we afford to wait a day or two of turnaround from tests that depend on SAS reconstruction?