GLAST Large Area Telescope:

Integration and Test Two Tower Integration Readiness Review

SVAC

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I&T Manager

OUTLINE

Planning

SVAC requirements

Current Status of Documentation

Data Taking Plans

Implementation

Data Processing Chain (pipeline)

Data Quality Monitoring

Calibrations

Data Analysis

Summary

Future Work

Main Concerns and/or Risks

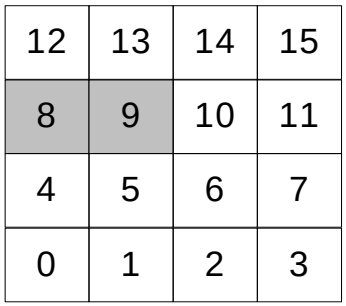
List of Documents

	LAT DOCS	Responsibility	Status
LAT SVAC Plan	LAT-MD-00446	SVAC	released
SVAC Plan for LAT Integration at SLAC	LAT-MD-00575	SVAC	released
SVAC Contributed Manpower	LAT-MD-00613	SVAC	in sign off

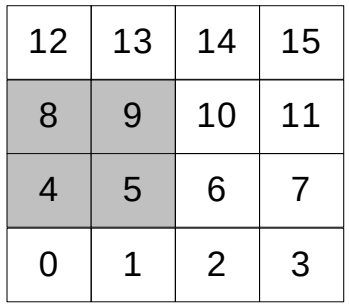
- SVAC Plan LAT-MD-00446-06
  - Master Plan : Level 3
  - Covers pre and post launch activities
    - Expect updates after transition into FSW (during I&T)
- SVAC Plan LAT-MD-00575-01
  - Describes implementation details : Level 4
  - Covers all LAT integration at SLAC
    - Baseline for integration at SLAC is already described
    - Expect updates after 1 and 2 tower tests (lessons learned)
- SVAC Contributed Manpower LAT-MD-00613-02
  - Captures existing commitments – Level 3

Cosmic Ray Data Taking

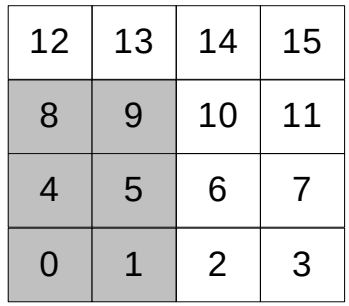
1 Tower
(Single bay, special grid)



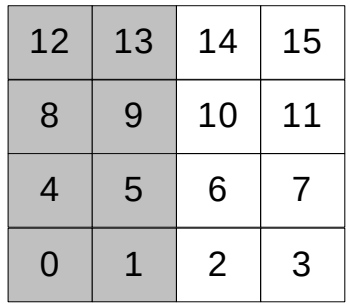
2 Towers



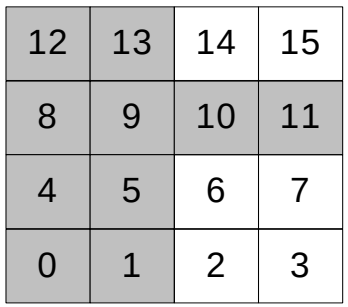
4 Towers



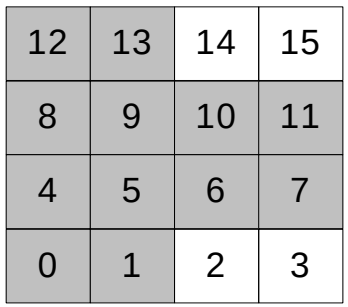
6 Towers



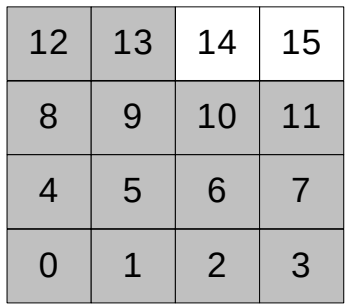
8 Towers



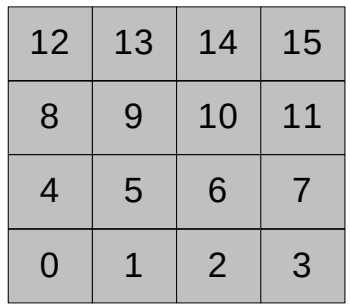
10 Towers



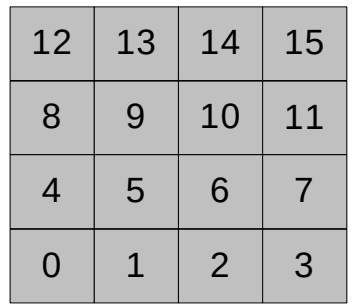
12 Towers



14 Towers



16 Towers



LAT

VDG Data Taking

1 Tower
(Single bay, special grid)

12	13	14	15
8	9	10	11
4	5	6	7
0	1	2	3

2 Towers

12	13	14	15
8	9	10	11
4	5	6	7
0	1	2	3

LAT

SVAC Scripts (ECD by online 12/15)

- SVAC Requirements for Data Taking
  - Shall produce several data runs
    - 30 to 60 min (TBR) : for one and two towers
  - Shall produce the data taking configuration for each run with information about the hardware under test
    - external info
      - » VDG rate used, solicited trigger rate for E2E tests
    - internal info
      - » to support calibrations and data analysis
      - » e.g. zero suppression ON/OFF, etc
      - » Full list provided in LA-MD-00575
  - Shall produce data taking configuration in time reasonably small when compared with the duration of run
    - Snapshots of registers currently take ~ 1 min to be produced
    - rc.report (summary info)

Data Flow – 1 hr of Cosmics Single Tower (1 of 2)

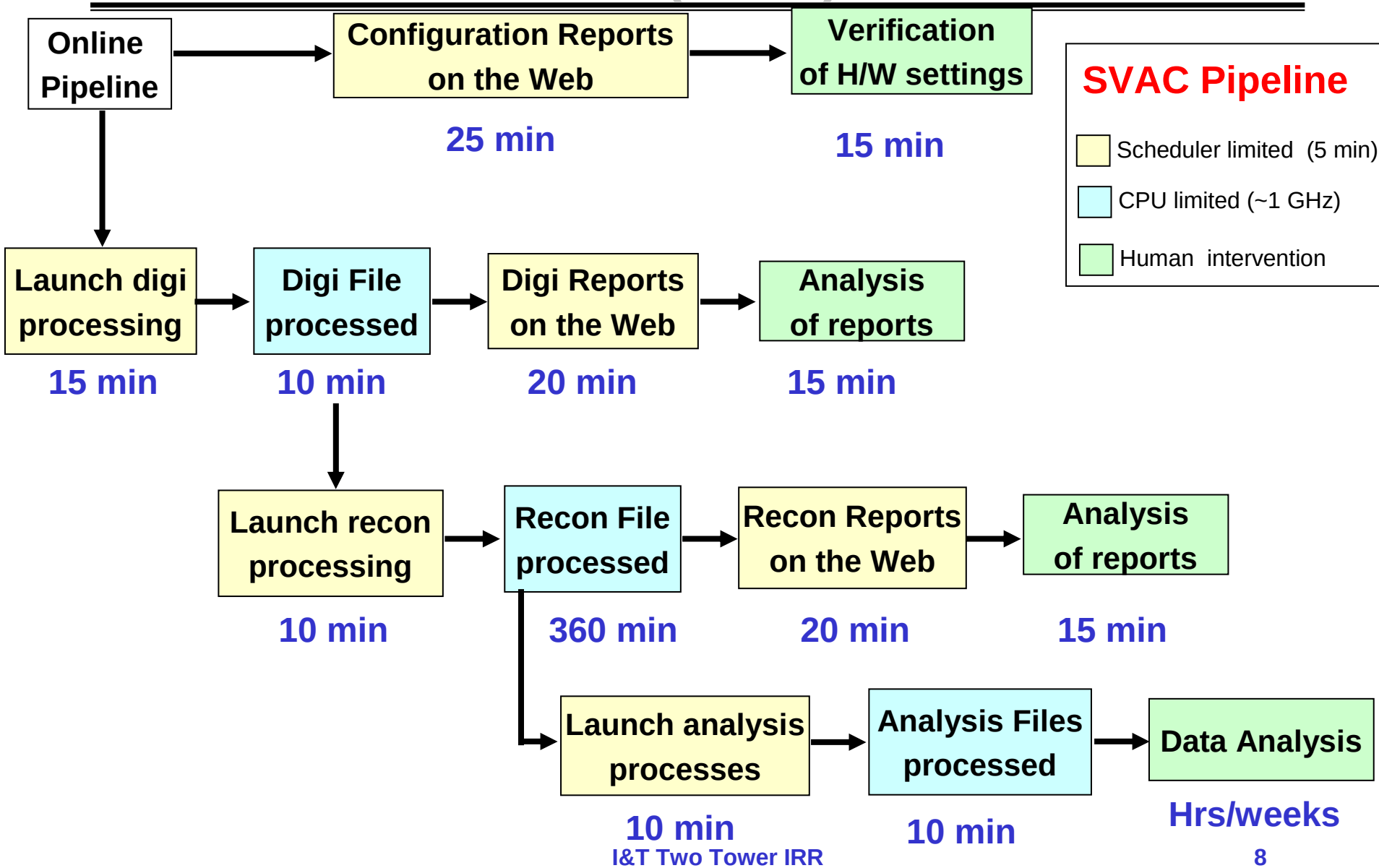
Data Taking | **Online Pipeline**

Record data → Transfer Data within Firewall → Data arrives In SLAC farm → SVAC pipeline is launched

Record data	Transfer Data within Firewall	Data arrives In SLAC farm	SVAC pipeline is launched
1 hr	20 min	5 min	10 min

Time is being improved by SLAC Network people.

Data Flow – 1 hr of Cosmics single tower (2 of 2)



SVAC Reports

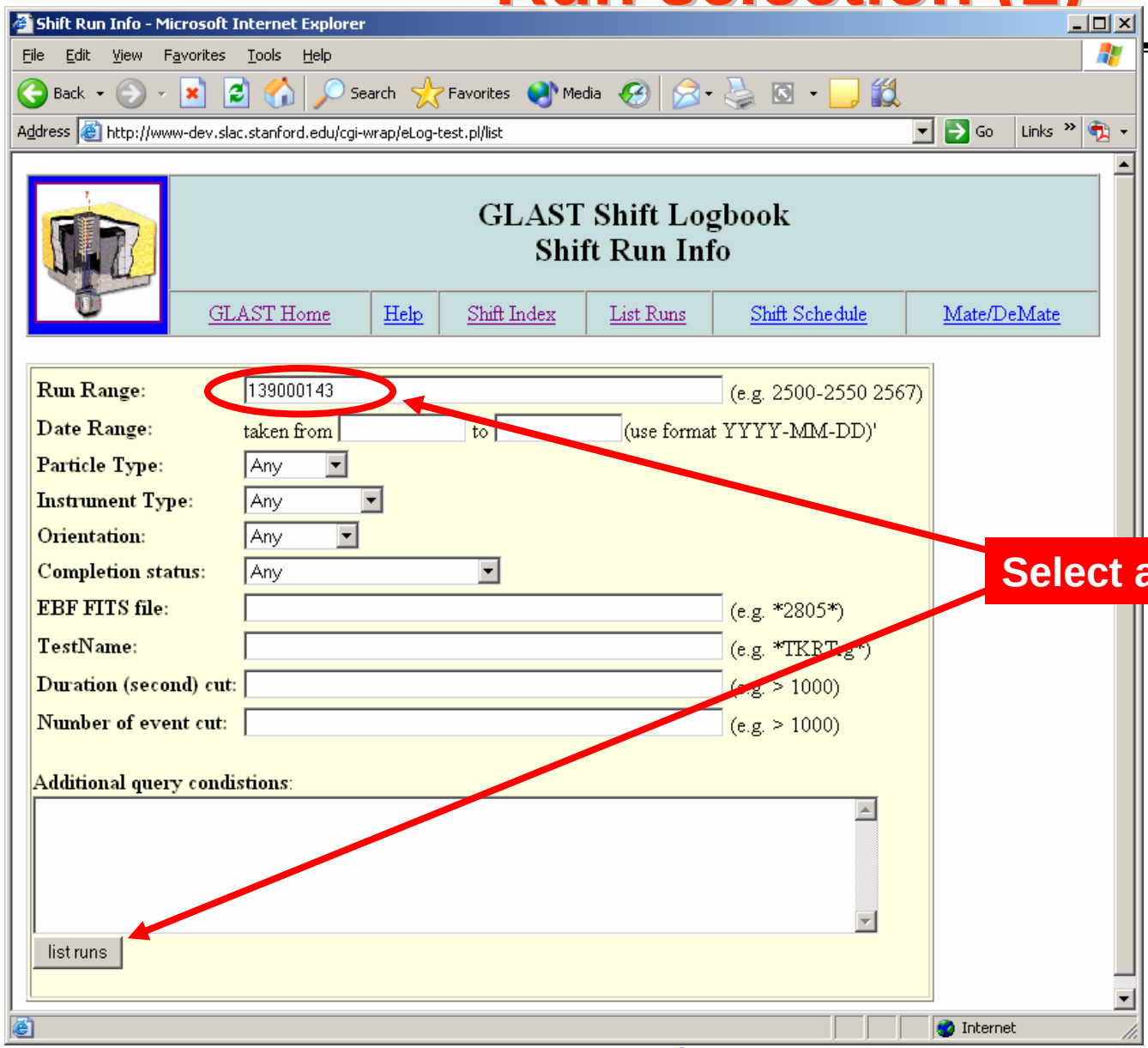
- The Quality Monitoring System
  - uses the pipeline to automatically generate reports
  - Reports are uploaded to the Web
  - We are adding more information an a per need basis

- Report format is designed for 16 towers (no ACD yet) and works for 1, 2, …16 towers.

  - Configuration Reports (parsed from online files)
    - CAL FLE/FHE/LAC thresholds
    - TKR GTRC splits
    - Etc

  - Digitized and Reconstruction Reports (parsed from offline files)
    - Hit multiplicities
    - Number of crystals hit
    - Trigger bits set
    - Number of reconstructed tracks
    - etc

Run selection (1)



Select a run

Run selection (2)

Shift Run Info - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www-dev.slac.stanford.edu/cgi-wrap/eLog-test.pl/list

GLAST Shift Logbook
Shift Run Info

GLAST Home | Help | Shift Index | List Runs | Shift Schedule | Mate/DeMate

Run Range: 139000143 (e.g. 2500-2550 2567)

Date Range: taken from to (use format YYYY-MM-DD)'

Particle Type: Any

Instrument Type: Any

Orientation: Any

Completion status: Any

EBF FITS file: (e.g. *2805*)

TestName: (e.g. *TKRTrg*)

Duration (second) cut: (e.g. > 1000)

Number of event cut: (e.g. > 1000)

Additional query condistions:

list runs

Run	TestReport	ConfigReport	Events	Duration (s)	Start (GMT)	End (GMT)	Status	Particle	Instrument	Orientati
139000143	TestReport	ConfigReport	14400	320	2004-06-29 17:39:31	2004-06-29 17:44:51	UNDEFINED	Cosmics	TKR EM	Vertical

Internet

Get run info produced by the online

Get digitization and reconstruction reports

Get register configuration info

Instrument Configuration (1)

Configuration for run 101 - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop http://www.slac.stanford.edu/~focke/ConfigTables.html Search Print

Home Bookmarks Google SLAC Seminars MapQuest Google Groups

Configuration for run 101

Created by ConfigTables version v1r0p0 from files:
snapshot: snap.xml
schema: junk

CAL register configuration

LAT globals

CAL Zero Supression is OFF.
CAL Four Range Readout is ON.

EM2 hardware (only 5 planes)

TKR GTRC Layer Readout Split Points

TKR GTRC Layer Readout Split Points (Left:Dead:Right)

Layer	Tower 2 X	Tower 2 Y	Tower 3 X	Tower 3 Y	Tower 4 X	Tower 4 Y	Tower 5 X	Tower 5 Y
5	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
4	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12
3	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12
2	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12	12:0:12
1	4:0:20	12:0:12	4:0:20	12:0:12	4:0:20	12:0:12	4:0:20	12:0:12
0	0:24:0	0:24:0	0:24:0	0:24:0	0:24:0	0:24:0	0:24:0	0:24:0

TKR GTRC Layer Readout Split Points (Left:Dead:Right)

Done

Instrument Configuration (2)

Configuration for run 101 - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop http://www.slac.stanford.edu/~focke/ConfigTables.html Search Print

Home Bookmarks Google SLAC Seminars MapQuest Google Groups

CAL Low Energy Trigger Discriminator (GTEM/GCCC/GCRC/GCFE/fle_dac:*)

CAL Low Energy Trigger Discriminator for Tower 2 side +X

layer	crystal											
	0	1	2	3	4	5	6	7	8	9	10	11
0	7	7	9	15	11	0	6	7	11	10	8	10
2	1	6	6	7	5	12	3	11	7	7	8	7
4	13	6	5	7	10	9	3	13	5	3	11	9
6	12	11	4	3	2	12	12	15	7	5	8	10

CAL Low Energy Trigger Discriminator for Tower 2 side +Y

layer	crystal											
	0	2	3	4	5	6	7	8	9	10	11	
1	2	0	0	2	2	0	2	1	0	2	0	
3	1	5	0	2	0	0	1	1	2	5	1	
5	0	0	0	3	5	1	4	0	0	0	0	
7	0	3	0	0	0	3	0	4	0	0	6	

CAL Low Energy Trigger Discriminator for Tower 2 side -X

layer	crystal											
	0	1	2	3	4	5	6	7	8	9	10	11
0	12	9	10	7	10	8	8	10	10	10	11	4
4	7	9	9	7	4	8	6	8	7	3	1	7
6	9	4	6	8	3	10	8	11	8	9	5	6

CAL Low Energy Trigger Discriminator for Tower 2 side -Y

layer	crystal											
	0	1	2	3	4	5	6	7	8	9	10	11
1	0	Absent	0	5	5	0	7	0	0	2	0	1
3	7	0	0	3	0	2	5	0	0	0	0	0
5	3	0	0	0	2	0	0	3	5	3	0	0
7	1	0	4	0	3	2	0	1	0	0	6	3

CAL Low Energy Trigger Discriminator for Tower 3 side +X

layer	crystal											
	0	1	2	3	4	5	6	7	8	9	10	11

CAL Low Energy Trigger Discriminator for Tower 3 side +Y

layer	crystal											
	0	1	2	3	4	5	6	7	8	9	10	11

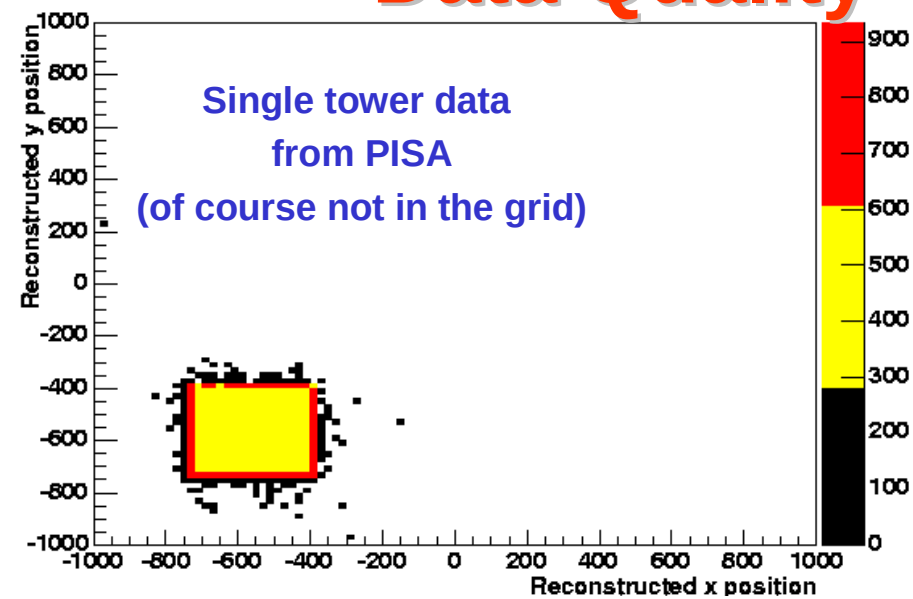
Done

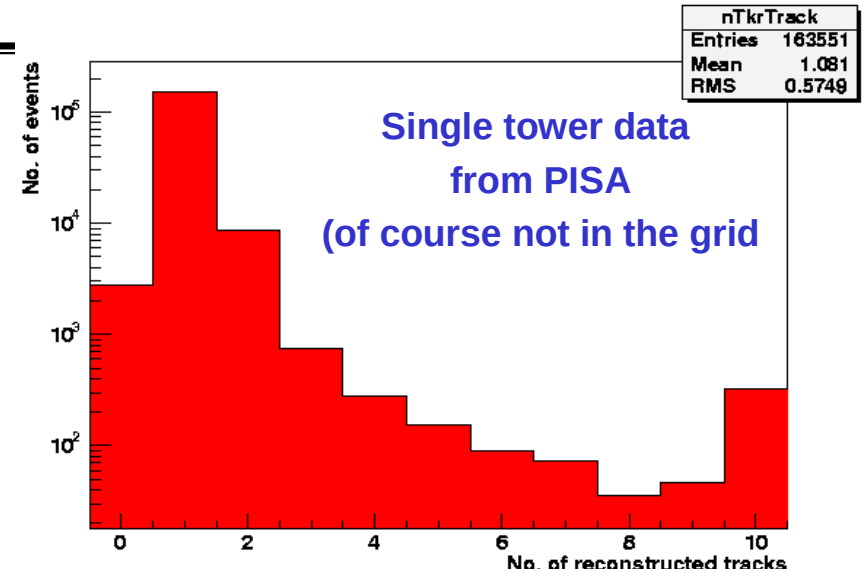
Code accommodates missing elements (just in case…)_

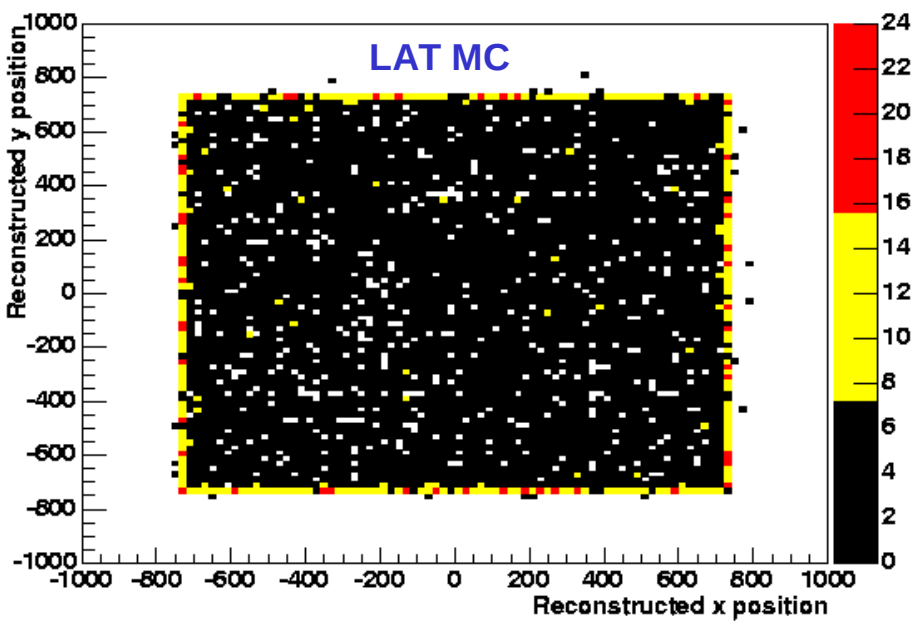
Retrieval of Large Number of Runs

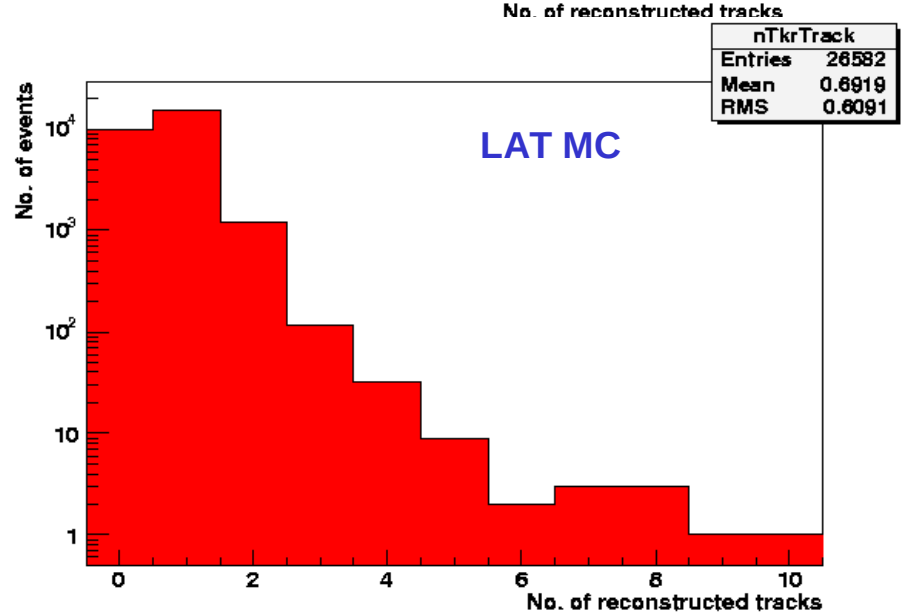
- For massive production needed for calibration all runs must be retrieved in a convenient format (application dependent)
- The infrastructure is in place and needs to be tailored to user needs

Data Quality – SVAC Reports









Calibration Requirements

- Calibration delivery shall include
  - Algorithms for calibrations
  - an executable that combines data from different runs
  - runs on the SLAC batch farm
  - reference datasets
  - Documentation describing usage and algorithm description
  - Metadata to address serial number and bay location in a grid

- SAS Calibration types are defined in the SVAC Plan LAT-MD-00446
  - TKR
    - Dead and Noisy strips
    - TOT Conversion Parameter (produced by EGSE scripts)
    - TOT MIP Conversion (in progress)
  - CAL
    - Pedestals
    - Gains (muon peaks)
    - Light asymmetry (muon slopes)

There is an operational version, but CAL-SAS calibration package is being rewritten.

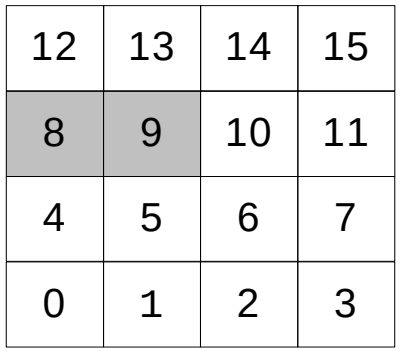
Delivery scheduled for 1 month prior to beginning of SVAC tests.

E2E Tests - Data Analysis

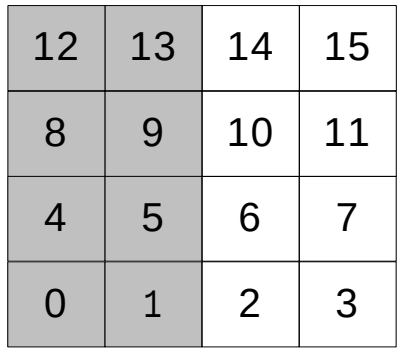
- Requirements
  - Support the analysis of the data from trigger and data flow tests for the LAT when is fully assembled as recommended by the End-to-end Committee report
- Datasets
  - Obtained using Cosmic Rays and VDG photons as particle sources
  - will be produced by changing configuration settings as defined in the End-to-End Committee Report and captured in LAT-MD-04136 (See Particle Test Peer Review)
- Results
  - Reports automatically generated at the end of the run
  - Reports contain tables and plots to identify *coarse* problems and establish that data is analyzable
  - Final acceptance and sign-off occurs at LAT level
- Timescale for Results
  - few hours (TBR) after completion of the data taking
    - Turn around is determined by the complexity of tasks
    - Preliminary verification will be performed for 1, 2 and 8 Towers (TBR) during LAT integration

Monte Carlo Simulations

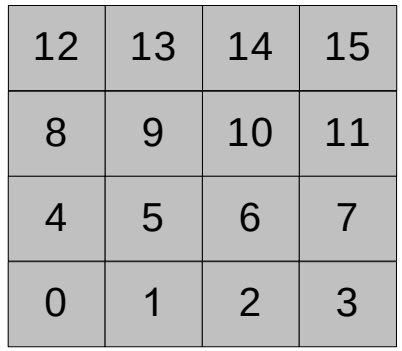
1 Tower
(Single bay, special grid)



2 Towers



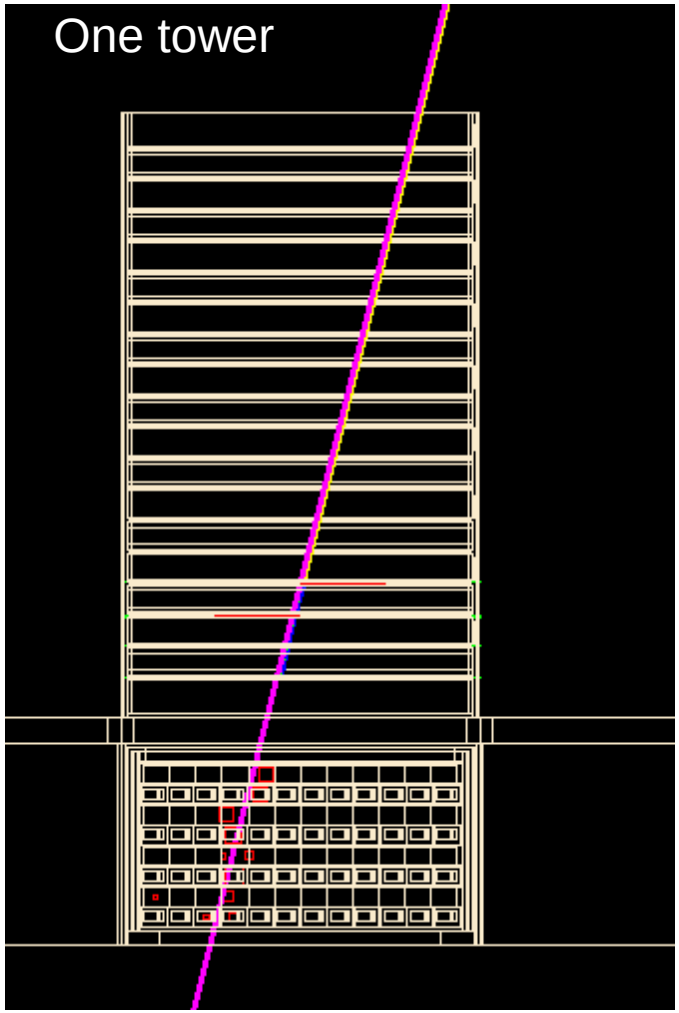
8 Towers

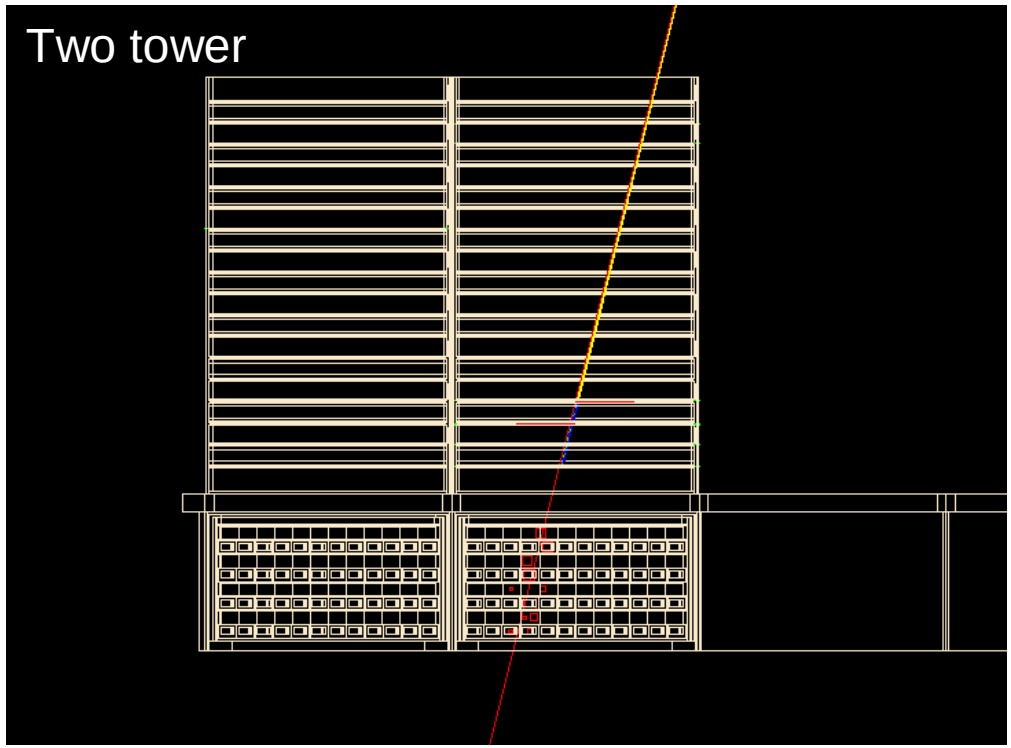


LAT

Cosmic Rays and Van de Graaff photons

Examples of Monte Carlo Simulation (1)





Summary

- If tower delivery occurs on Dec 22
  - SVAC will be ready to start
    - Data Processing
    - Data Quality Monitoring
    - Calibrations
    - Data analysis