GLAST Large Area Telescope:
I & T Input to Monthly Technical/Cost/Schedule Review 09/01/05

Elliott Bloom
SU-SLAC
Subsystem Manager

Ken Fouts
SU-SLAC
Subsystem Engineering Manager

elliott@slac.stanford.edu, kfouts@slac.stanford.edu
650-926-2469 650-926-2553

Last Month's Accomplishments (1 of 4)

- Management
  - Supported environmental test planning.
  - Tracking hardware shortages for LAT integration.
    - TKR Delivery
    - ELX Boxes
- IFCT
  - Completed 6 Tower Tests
  - Integrated two additional towers
  - Completed 8 Tower Tests
  - Completed receiving tests for all CAL units.
  - Supported ACD Receiving and tests at SLAC
  - Completed Grid 2 Assembly for SLT
  - Completed TPS replacement in the grid.

Last Month's Accomplishments (2 of 4)

- **Online**
  - **Provided updated schema's and test software updates to support 8 tower and ACD tests.**
  - **Completed parallelized test scripts to reduce multiple tower test duration**
  - **LATTE 4.10.1 about to be released for I&T Tower + ACD testing**
  - **ACD scripts received and integrated with the I&T script base (CAL, TKR, TRG, System)**
    - **Script changes necessitated due to different power model and housekeeping from that used during ACD construction**
    - **End-to-End scripts updated for ACD-related parameters**
    - **Modified scripts validated against Qual unit, used on Flight unit**

Last Month's Accomplishments (3 of 4)

- Online (cont'd)
  - LICOS work is well underway
    - Supported accelerated FSW implementation planning
    - Supported LAT configuration TIM
    - Finalizing architecture
    - Testing of interaction with the VSC and its software interface is ongoing
    - User's Manual in progress
  - Mobile rack
    - 6 computers, 1 switch, 1 firewall received and set up
    - Linux operating system chosen
    - Installation process demonstrated
    - Demonstrated LATTE and E-Logbook operation
    - Finalizing and documenting system configuration

Last Month's Accomplishments (4 of 4)

- SVAC
  - Workshop 5 (Aug 29) was successful
    - First results from initial MC simulations with ACD integrated with 8 towers
    - Comprehensive Review of TKR CC FIFO full events for all data taken up to 8 towers
    - Search for photon candidates in cosmic ray data fro 2,4 and6 towers
    - Overview of trending of TKR and CAL calibrations
      - fixed bugs in offline calibrations
    - First memo to document the work produced so far in LAT DOCS
      - 2 other memos in progress
      - Overall summary paper in progress
        - » More to come by the end of the year
    - Two workshops planned to guide us through LAT integration
      - Workshop 6 (end of the year)
      - Workshop 7 (early next year)
    - See the instrument Analysis Web Page for details

Goals for Workshop 5 (Aug 29)

- Study MC generated events with ACD + 8 towers (Done)
  - Need to get familiar with ACD variables
  - Start thinking how we will set up tests using ROIs to do analysis that we could not do so far
    - To support I&T test planning activities
- Present a list of distributions that capture geometrical dependencies since we can not spend too much time when the full LAT is assembled to learn all that (Postponed to the next workshop)
    - These will change as we add more towers
- Show trending results for calibrations (function of time and per tower) (Done)
  - Would like to have a comprehensive presentation from both TKR and CAL
- Alignment (Partially Done)
  - Produce inter and intra-tower results using SAS reconstruction in its native framework
- Educate collaborators to connect science with housekeeping data (Postponed to the next workshop)
  - Only SVAC group does that right now

FIFO Event Error Summary

Conclusion from Giovanni Petri, student from Pisa working with Eduardo

Conclusions

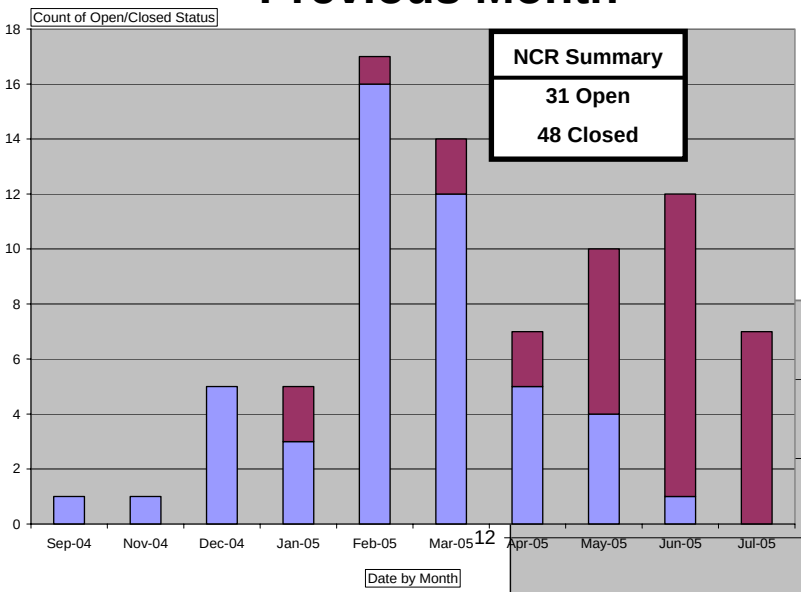
1. The TKR works (poor me…) too well!!
   - FIFO errors are no mistery anymore!!
   - We know how to characterize AND understand them!
   - Rates are low:
     - 1 (lonely) bad guy every 100 thousands!!!!
   - No influence on other events!!!
2. Bad Events are consistent with showers
3. High energy photons MC needs to be further studied
   - What about reducing lower layers buffer bandwidth to improve recon??

Presented at the SVAC Workshop. Charts available at:

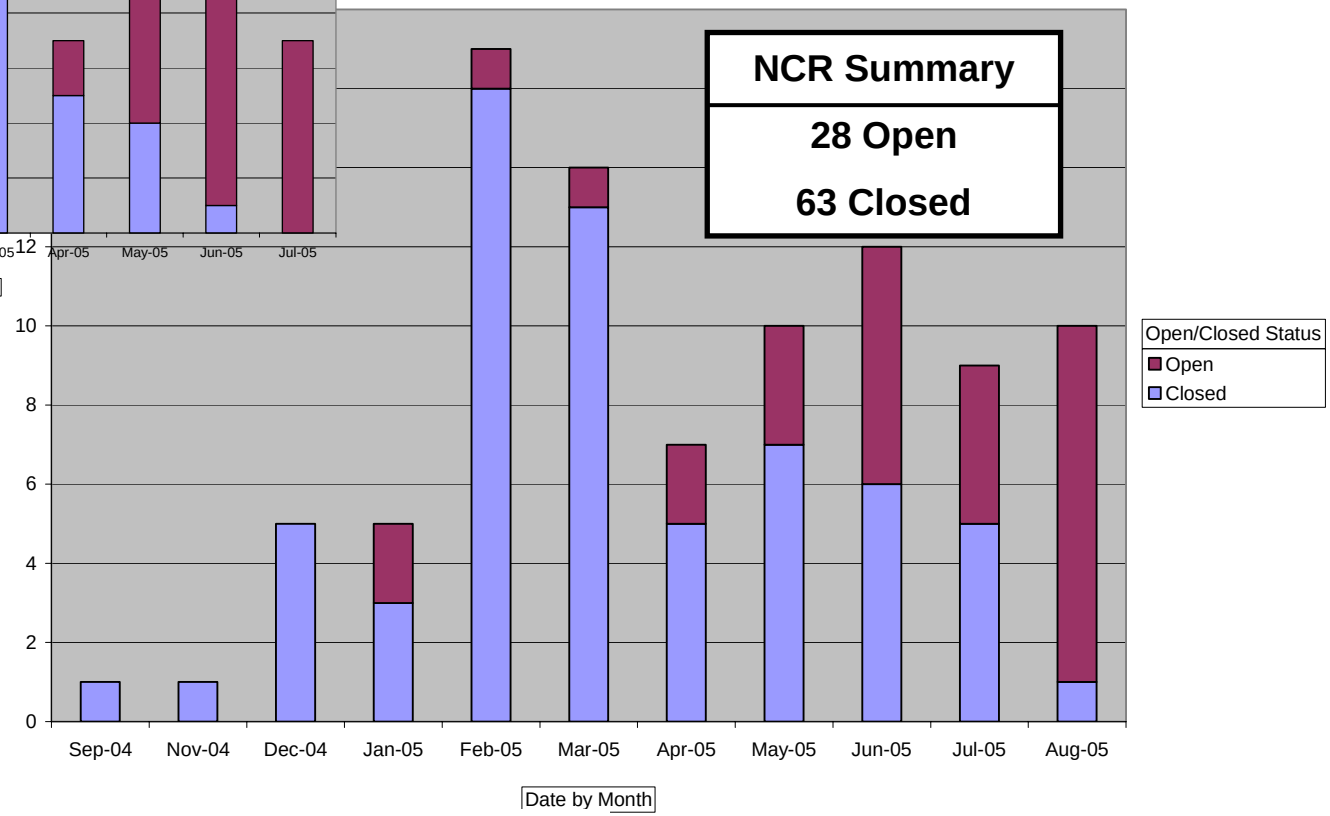
http://www-glast.slac.stanford.edu/IntegrationTest/SVAC/Instrument_Analysis/Workshop-5/Talks/GiovanniWorkshop29AugustWithTitle.ppt

I&T NCRs by Month Open/Closed Status

Previous Month



Current Status



Month NCR Opened

I&T Activities

Eight tower tests complete

ACD receiving at SLAC

ACD Mock-up for lift fixture fit-check

EMI Skirt Fit-check Grid 2

Upcoming I&T Events

- STR #16 Parallelized Test Scripts ECD 7/29 (Complete)
- TKR Hand-off to I&T ECD 7/28 (Complete)
- 8 Tower Integration ECD 8/12 (Complete)
- 8 Tower Tests ECD 8/26 (Complete)
- ACD Receiving ECD 8/12 (Complete)
- ACD I&T Receiving Tests ECD 9/1
- Flight like GASU delivery ECD 9/2
- Shear plate and cable tray installation for 8 towers ECD 9/7
- STR #34 CAL re-trigger characterization
- TKR (2) Receiving ECD 9/9
- ACD Integration Readiness Review 9/9 (9/12)
- ACD Installation with 8 towers ECD ~~9/5~~ 9/13

ACD Integration Status

- I&T ACD Receiving tests ECD 9/2
- ACD lift fixture in work
  - Proof test ECD 9/7
- Additional ACD off tests identified by ELX (STR 19) for ACD Clock Phase Bit Determination
- ACD with 8 Towers Test Plan Complete
  - Pretest Review ECD 9/8
- INT Scripts for ACD w/ 8 Towers Complete
- FSW is working toward 10/3.
  - FSW architecture supports 8 tower tests without impact to code.
- ACD Integration Procedure in work ECD 9/7

Eight Tower w/ACD Test Plan (pre-FSW)

Rev. 8/26/05 L.Wai

Sub-Series	Test	Purpose	Time (hr)	Totals	Time (hr)
ACD Integration	STR17 - ACD Cable / BEA connector EICITs	LAT interface safe-to-mate	8		
ACD Integration	STR17 - ACD Cable EM BEA Tests	LAT interface verification	12		
ACD Integration	STR18 - ACD aliveness test	ACD post-integration test	4		
ACD Integration	STR19 - AEM/ACD Clock Phase Bit Test	ACD/DAQ clock	4		
ACD Integration	STR20 - GASU register test	ACD register test	8		
ACD Integration	STR22 - ACD full functional (TKR/CAL off)	ACD post-integration test	8	**ACD Integration:**	**44**
TRIGGER	STR30 - ACD Map Uniformity	Tune ACD delays/stretches	4		
TRIGGER	STR21 - ACD TREQ scan	ACD TREQ alignment	2		
TRIGGER	STR29 - ACD TACK scan	ACD TACK optimization	6		
TRIGGER	STR32 - Muon Run w/ ACD veto	ACD veto efficiency	3		
TRIGGER	STR24 - trigger efficiency test	ACD efficiency	3	**TRIGGER:**	**18**
LAT CPT	STR23 - ACD full functional (TKR/CAL on)	LAT CPT w/ ACD	8		
LAT CPT	STR23 - LAT CPT - TKR Section	LAT CPT w/ ACD	4		
LAT CPT	STR23 - LAT CPT - CAL Section	LAT CPT w/ ACD	4		
LAT CPT	STR23 - ACD Muon Collection	LAT CPT w/ ACD	2	**LAT CPT:**	**18**
SVAC	e2e runs (1 min ea.)	Configuration Validation	2		
SVAC	STR25	ACD threshold calibration	TBD		
SVAC	STR26	TKR eff. studies w/ACD	TBD		
SVAC	STR28 - Muon Run w/ ACD veto	ACD veto efficiency	4		
SVAC	STR27 - 8-tower ACD Trigger	baseline ACD triggered data	2		
SVAC	STR27 - 8-tower ACD Trigger, TKR all left	TKR hit capture efficiency	2		
SVAC	STR27 - 8-tower ACD Trigger, TKR all right	TKR hit capture efficiency	2		
SVAC	STR27 - 8-tower ACD Trigger, TKR L/R	TKR hit capture efficiency	2	**SVAC:**	**14**
				TOTAL:	**94**

Sign-off: **I&T Management** _____

Systems Engineering _____

Quality Assurance _____

Online Plan

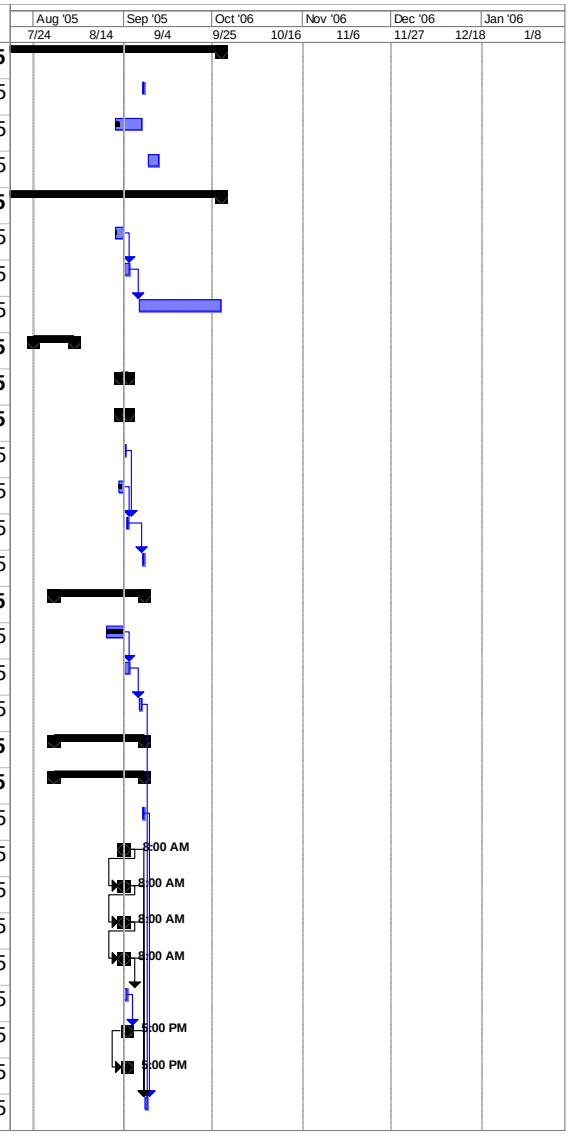
- **Transition to LICOS**
  - **Functionality is similar but procedures will need to be modified.**
    - **User interface (even with different operating system) is very similar between LICOS and LATTE => minimal retraining required**
  - **Configuration and output products are different**
    - **Configuration snapshots replaced with FSW confirmation**
    - **LDF definition augmented**
  - **Commanding portion of scripts must be replaced with telecommands.**
    - **Some scripts will no longer be needed in FSW realm, however some new scripts will be required.**
    - **Parallelized analysis scripts will be modified for LDF changes and bookkeeping, but otherwise will be about the same**
  - **MOOT/MOOD (ISOC configuration tool) will require modifications at a later date.**

Early ACD Integration Risks and Concerns

- Delay in science data format definition from FSW.
  - Expected any day now.
- Delay in completion of science data handling by VSC/FSW.
  - Needed ASAP.
  - Responsibility split between FSW, ELX and Online.
- Missing functionality in LCI (FSW's LAT Charge Injection package) that prevent conversion of LATTE scripts.
  - Need to assess whether ACD scripts will fit in the paradigm.
- Flight crates (SIU/EPU) don't contain ground-only debugging interfaces.
  - No ethernet, no serial line connection.
  - Proposal to run LATTE via the VSC to test Flight SIU/EPU crates
    - Requires modifications to LATTE for ELX to pass messages over 1553 for ELX flight hardware tests.
    - Anticipated to be a minimum 1 week job.

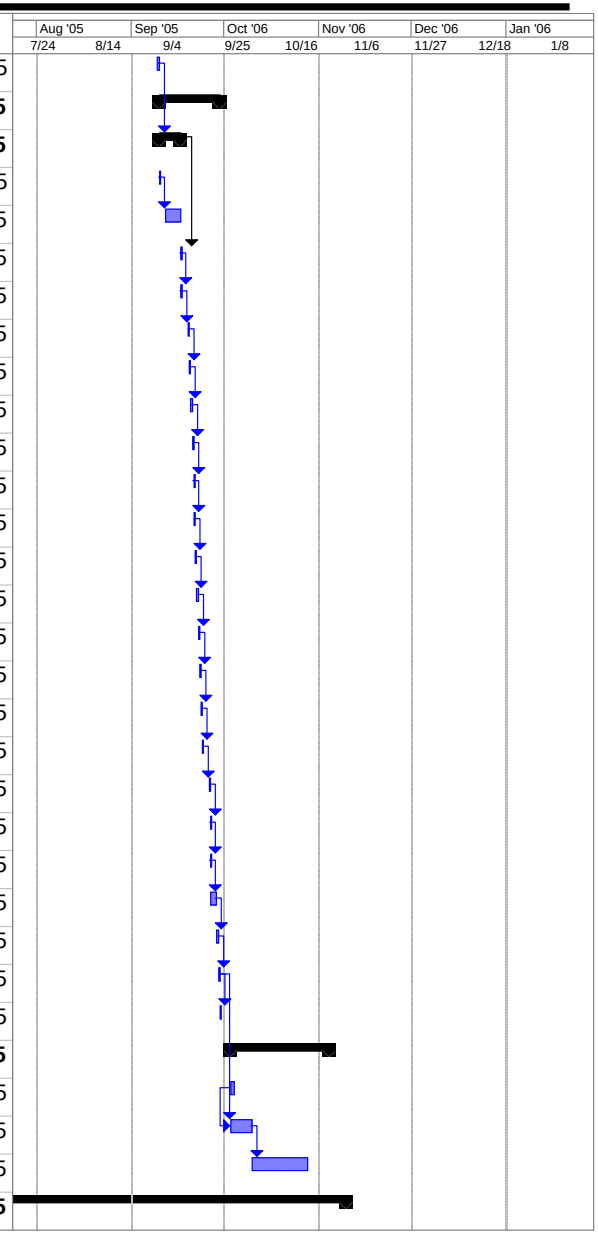
I&T Detail Schedule (1 of 3)

ID	Task Name	Start	% Complete	Finish
282	**MGSE**	**7/19/05**	**49%**	**10/3/05**
283	5 Ton Crane Repair	9/7/05	0%	9/7/05
284	15 Ton Crane Repair	8/29/05	20%	9/6/05
285	Building Shutdown for substation/AC upgrade (4:00 pm 9/9 - 7:00 am 9/12)	9/9/05	0%	9/12/05
287	**Grid 2**	**7/19/05**	**54%**	**10/3/05**
289	TIP (Test Interface Plate) Assembly	8/29/05	10%	8/31/05
290	Assembly of Grid 2 to TIP	9/1/05	0%	9/2/05
291	Grid 2 Flexure Testing	9/6/05	0%	10/3/05
977	**NCR status**	**8/1/05**	**0%**	**8/15/05**
1121	**Post TPS Replacement Retest (NCR 562)**	**8/30/05**	**9%**	**9/2/05**
1122	**Post TPS Replacement Retest (NCR 562) INTEGRATION**	**8/30/05**	**9%**	**9/2/05**
1135	Shear Plate Installation	9/1/05	0%	9/1/05
1136	Thermistor bonding/cure on bays 0/4	8/30/05	50%	8/31/05
1137	Install Cable Trays	9/1/05	0%	9/2/05
1138	Optical Survey	9/7/05	0%	9/8/05
1139	**ACD Receiving & Testing**	**8/8/05**	**83%**	**9/7/05**
1145	Validation of test software on qual chassis w/ flight like GASU	8/26/05	90%	8/31/05
1149	ACD Receiving Test	9/1/05	0%	9/2/05
1150	ACD Receiving Post Test Review	9/6/05	0%	9/6/05
1151	**ACD Parts for Test**	**8/8/05**	**95%**	**9/7/05**
1152	**ACD Lift Fixture**	**8/8/05**	**95%**	**9/7/05**
1156	Proof Test ACD Lift Fixture	9/7/05	0%	9/7/05
1157	Bulkhead Brackets	9/1/05	0%	9/1/05
1158	EMI Shield & Connector Panels	9/1/05	0%	9/1/05
1159	Flight Cables	9/1/05	0%	9/1/05
1160	Cable savers	9/1/05	0%	9/1/05
1161	ACD Health & status telemetry	9/1/05	0%	9/1/05
1162	Release dwgs 2563 & 6721	9/1/05	0%	9/1/05
1163	Install SIU/EPU EM cables	9/1/05	0%	9/1/05
1164	8-Tower ACD pre-test review	9/8/05	0%	9/8/05



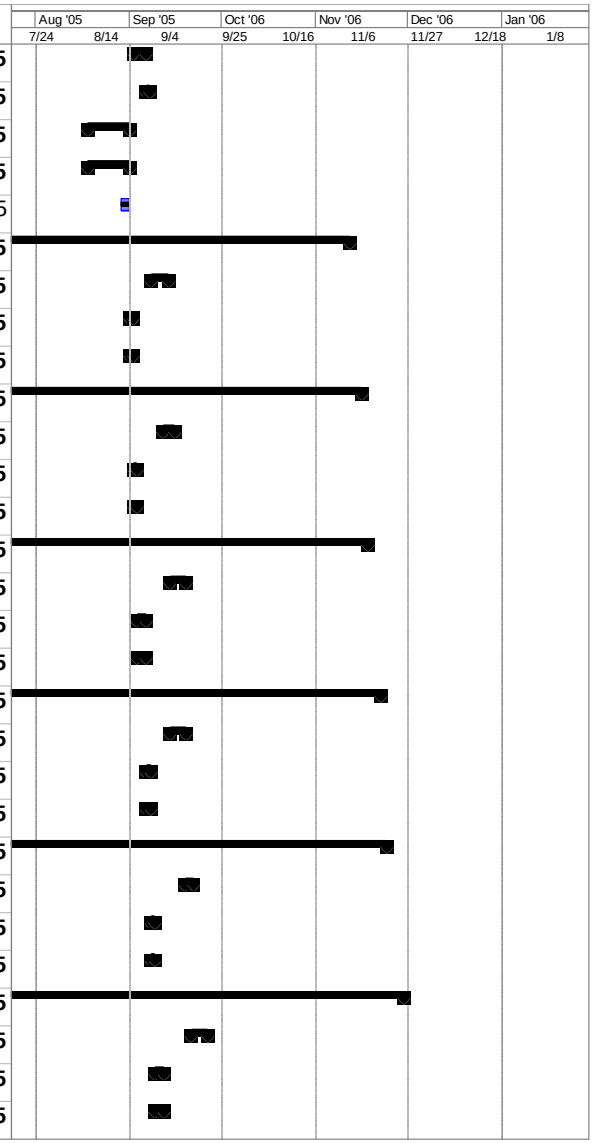
I&T Detail Schedule (2 of 3)

ID	Task Name	Start	% Complete	Finish
1165	ACD Integration Readiness Review	9/9/05	0%	9/9/05
1166	**ACD Installation & Test with 8 Towers**	**9/9/05**	**0%**	**9/29/05**
1167	**ACD Mech & Elec Integration**	**9/9/05**	**0%**	**9/16/05**
1168	AEM/ACD Clock Phase Bit Set/Timing Characterization (STR 19)	9/9/05	0%	9/9/05
1169	ACD Integration (STR 17)	9/12/05	0%	9/16/05
1170	ACD Integration Health Checks (STR 18)	9/16/05	0%	9/16/05
1171	Dataflow (AEM/ACD) Tests	9/16/05	0%	9/16/05
1172	ACD Full Functional (with CAL & TKR Off)	9/19/05	0%	9/19/05
1173	ACD TREQ Full Time-in	9/19/05	0%	9/19/05
1174	ACD TACK Full Time-in	9/19/05	0%	9/20/05
1175	TkrSimOcc	9/20/05	0%	9/20/05
1176	LAT Parallel CPT - ACD Section (All Detectors On)	9/20/05	0%	9/20/05
1177	LAT Parallel CPT - TKR Section (All Detectors On)	9/20/05	0%	9/21/05
1178	LAT Parallel CPT - CAL Section (All Detectors On)	9/21/05	0%	9/21/05
1179	ACD Trigger Efficiency	9/21/05	0%	9/22/05
1180	GEM ROI and TKR Test	9/22/05	0%	9/22/05
1181	ACD as a Muon Telescope	9/22/05	0%	9/23/05
1182	ACD Performance amd TKR Readout Redundancy	9/23/05	0%	9/23/05
1183	Multiple Trigger Engine Test	9/23/05	0%	9/23/05
1184	Full Mode HE Muon Gain (Bxx)	9/26/05	0%	9/26/05
1185	Full Flight Mode Gain (Short Run) (Bxx)	9/26/05	0%	9/26/05
1186	Full Flight Mode Gain (Long Run) (Bxx)	9/26/05	0%	9/26/05
1187	Muon Calibration Auto Range (Bxx)	9/26/05	0%	9/28/05
1188	TKR Trigger Study with ACD & CAL	9/28/05	0%	9/28/05
1189	ACD Threshold Calibration Data Collection	9/28/05	0%	9/29/05
1190	ACD Threshold Calibration Verification	9/29/05	0%	9/29/05
1191	**Flight Software Installation & Test**	**10/3/05**	**0%**	**11/3/05**
1192	Flight Software Delivery w/EM SIU	10/3/05	0%	10/3/05
1193	Flight software installation	10/3/05	0%	10/10/05
1194	Flight software testing	10/10/05	0%	10/27/05
1197	**Tower 7 -Grid Bay 10**	**6/7/05**	**48%**	**11/9/05**

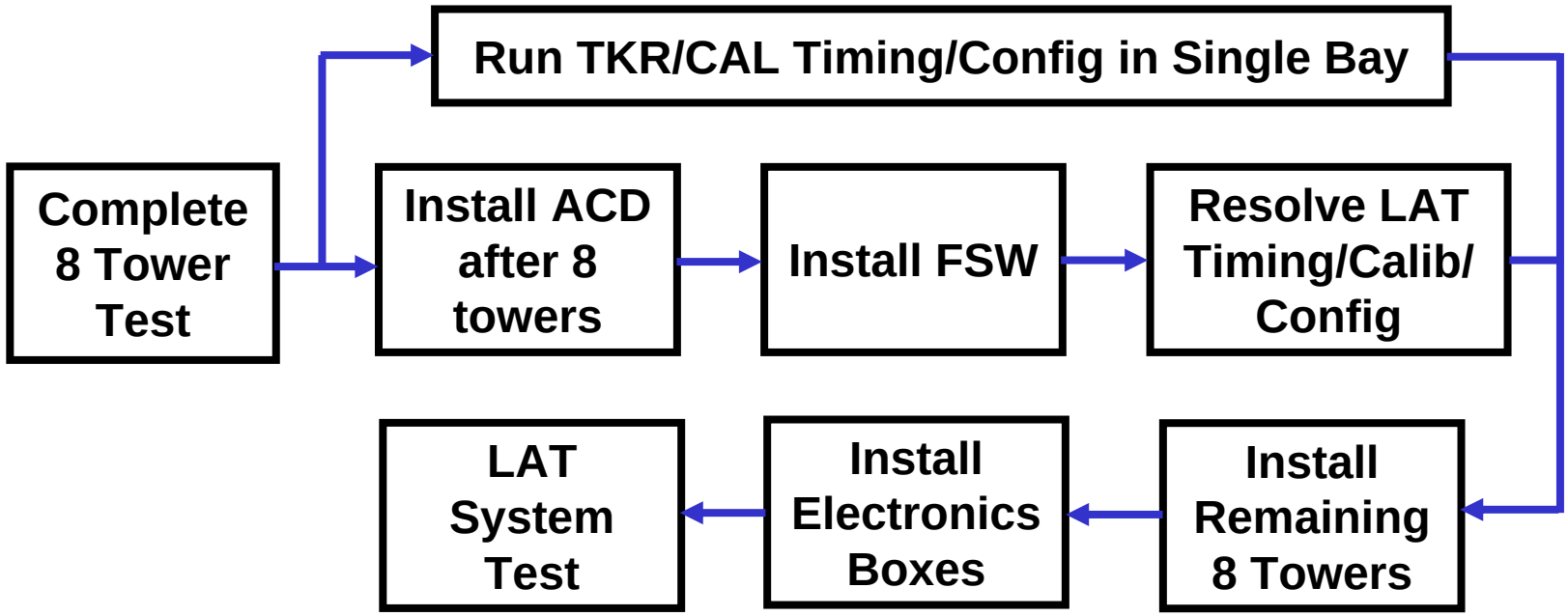


I&T Detail Schedule (3 of 3)

ID	Task Name	Start	% Complete	Finish
1203	Tracker 7 post ship test & receiving test	9/2/05	0%	9/6/05
1211	Sell TKR-7 to I&T	9/6/05	0%	9/7/05
1214	TEM/TPS 7 Flight Readiness	8/18/05	93%	8/31/05
1215	TEM/TPS-7 I&T	8/18/05	93%	8/31/05
1220	FM111 Post-Integration CAL CPT	8/29/05	90%	8/31/05
1229	Tower 8, Grid Bay 11	6/13/05	20%	11/11/05
1236	Tracker 8 post ship test & receiving test	9/8/05	0%	9/13/05
1247	TEM/TPS 8 Flight Readiness	8/31/05	0%	9/1/05
1248	TEM/TPS-8 I&T	8/31/05	0%	9/1/05
1262	Tower 9, Grid Bay 14	6/13/05	20%	11/15/05
1269	Tracker 9 post ship test & receiving test	9/12/05	0%	9/15/05
1280	TEM/TPS 9 Flight Readiness	9/1/05	0%	9/3/05
1281	TEM/TPS-9 I&T	9/1/05	0%	9/3/05
1295	Tower 10, Grid Bay 15	6/13/05	14%	11/17/05
1302	Tracker 10 post ship test & receiving test	9/14/05	0%	9/19/05
1313	TEM/TPS 10 Flight Readiness	9/3/05	0%	9/6/05
1314	TEM/TPS-10 I&T	9/3/05	0%	9/6/05
1328	Tower 11, Grid Bay 6	6/27/05	21%	11/21/05
1336	Tracker 11 post ship test & receiving test	9/14/05	0%	9/19/05
1347	TEM/TPS 11 Flight Readiness	9/6/05	0%	9/7/05
1348	TEM/TPS-11 I&T	9/6/05	0%	9/7/05
1362	Tower 12, Grid Bay 7	6/27/05	22%	11/23/05
1370	Tracker 12 post ship test & receiving test	9/19/05	0%	9/21/05
1381	TEM/TPS 12 Flight Readiness	9/7/05	0%	9/8/05
1382	TEM/TPS-12 I&T	9/7/05	0%	9/8/05
1396	Tower 13, Grid Bay 2	6/27/05	21%	11/29/05
1404	Tracker 13 post ship test & receiving test	9/21/05	0%	9/26/05
1415	TEM/TPS 13 Flight Readiness	9/8/05	0%	9/12/05
1416	TEM/TPS-13 I&T	9/8/05	0%	9/12/05

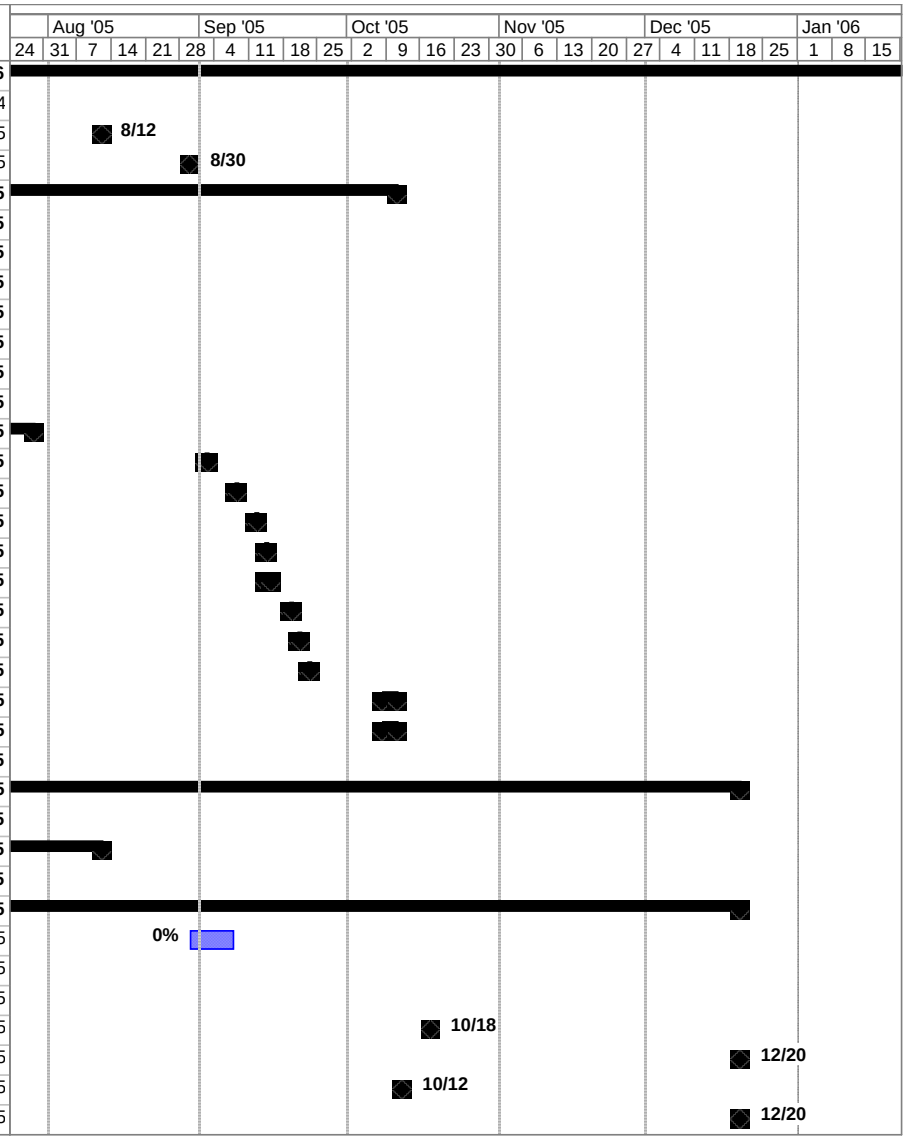


I&T Flow w/ Early ACD Integration



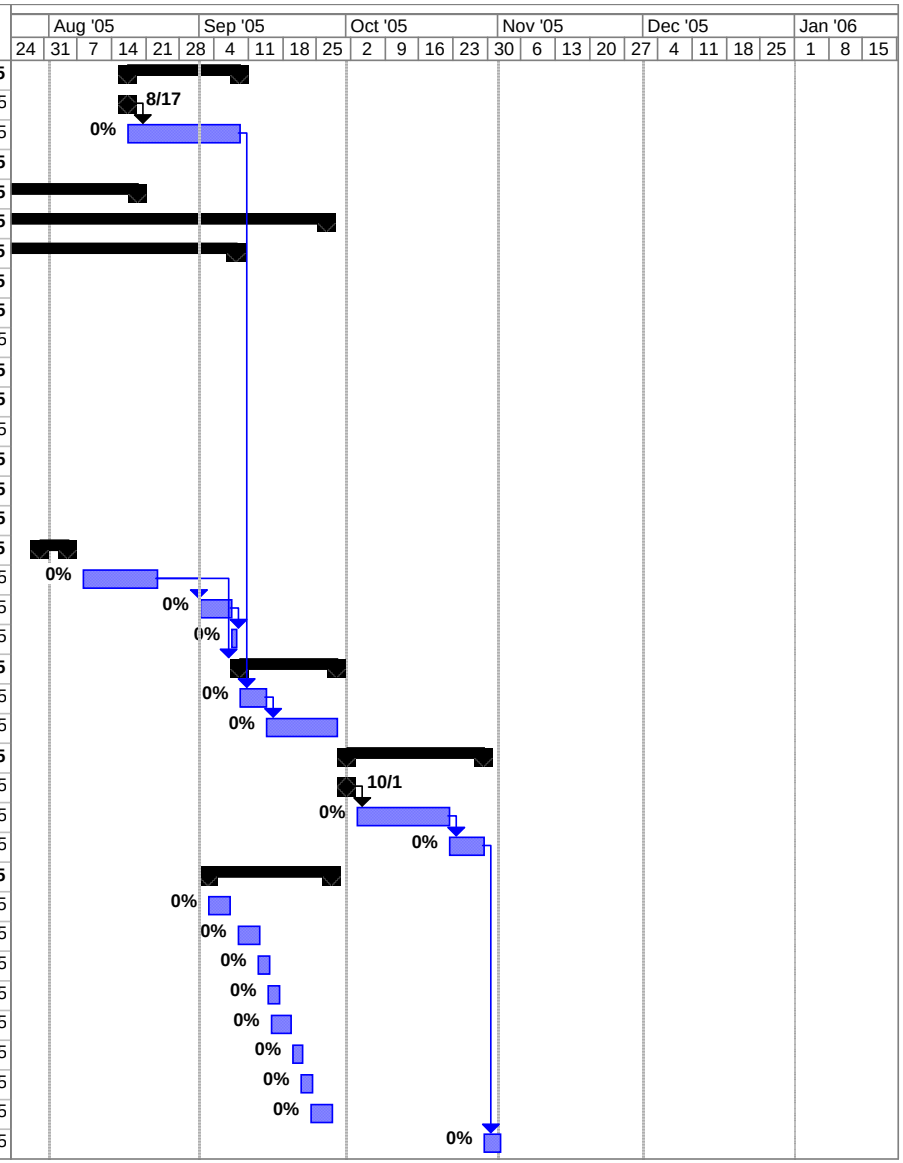
I&T Plan w/ Early ACD Integration (1 of 3)

ID	Task Name	Duration	Start	Finish
1	**LAT Accelerated Integration Plan**	**305.47 days**	**10/22/04**	**1/24/06**
2	Grid RFI	0 days	10/22/04	10/22/04
3	X-LAT Thermal Plate RFI	0 days	8/12/05	8/12/05
4	Radiators RFI	0 days	8/30/05	8/30/05
5	**Tracker Receiving**	**178.81 days**	**1/14/05**	**10/11/05**
6	**Tower A**	**7 days**	**1/14/05**	**1/26/05**
11	**Tower B**	**8 days**	**2/14/05**	**2/24/05**
17	**Tower 1**	**3 days**	**5/10/05**	**5/13/05**
21	**Tower 2**	**6 days**	**5/10/05**	**5/18/05**
25	**Tower 3**	**8 days**	**5/10/05**	**5/20/05**
29	**Tower 4**	**2 days**	**6/9/05**	**6/13/05**
33	**Tower 5**	**3.06 days**	**6/10/05**	**6/15/05**
37	**Tower 6**	**4 days**	**7/23/05**	**7/28/05**
41	**Tower 7**	**0.5 days**	**9/2/05**	**9/2/05**
45	**Tower 8**	**0.5 days**	**9/8/05**	**9/8/05**
49	**Tower 9**	**0.5 days**	**9/12/05**	**9/12/05**
53	**Tower 10**	**0.5 days**	**9/14/05**	**9/14/05**
57	**Tower 11**	**1 day**	**9/14/05**	**9/15/05**
61	**Tower 12**	**0.5 days**	**9/19/05**	**9/19/05**
65	**Tower 13**	**0.5 days**	**9/21/05**	**9/21/05**
69	**Tower 14**	**0.5 days**	**9/23/05**	**9/23/05**
73	**Tower 15**	**1.5 days**	**10/8/05**	**10/11/05**
79	**Tower 16**	**1.5 days**	**10/8/05**	**10/11/05**
85	**Calorimeter Receiving**	**138 days**	**12/1/04**	**6/29/05**
176	**Electronics Receiving**	**210.88 days**	**2/10/05**	**12/20/05**
177	**Cables**	**81.63 days**	**2/10/05**	**6/14/05**
196	**TEM Assemblies**	**116.31 days**	**2/18/05**	**8/12/05**
215	**TEM PS Assemblies**	**86.75 days**	**2/18/05**	**6/29/05**
234	**Electronic Boxes**	**186.06 days**	**3/19/05**	**12/20/05**
235	Flight Harness - Remaining Cables	6.16 days	8/30/05	9/7/05
236	EM PDU	0 days	4/26/05	4/26/05
237	EM GASU	0 days	3/19/05	3/19/05
238	Flight PDU	0 days	10/18/05	10/18/05
239	Flight SIU	0 days	12/20/05	12/20/05
240	Flight GASU	0 days	10/12/05	10/12/05
241	Flight Event Processor Units	0 days	12/20/05	12/20/05



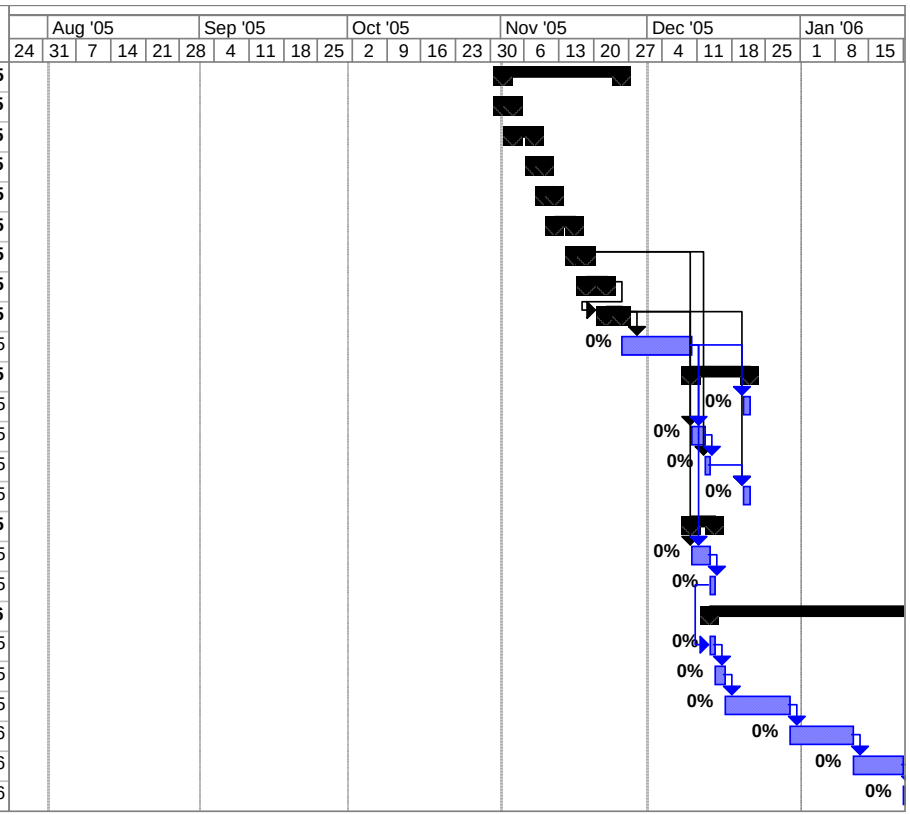
Alternate I&T Integration Plan with ACD (2 of 3)

ID	Task Name	Duration	Start	Finish
242	**ACD Receiving**	**16 days**	**8/17/05**	**9/9/05**
243	Receive ACD	0 days	8/17/05	8/17/05
244	ACD Receiving Tests	16 days	8/17/05	9/9/05
245	**Grid Assemby in I&T**	**76.19 days**	**11/1/04**	**2/25/05**
276	**TEM to Calorimeter**	**128.81 days**	**2/7/05**	**8/18/05**
331	**Calorimeter/Tracker/TEM/TEM-PS Test**	**145 days**	**2/21/05**	**9/26/05**
380	**Tower Installation**	**114.31 days**	**3/21/05**	**9/8/05**
381	**Install Bay 0 (Tower A)**	**10 days**	**3/21/05**	**4/5/05**
389	**Install Bay 4 (Tower B)**	**10 days**	**4/8/05**	**4/22/05**
397	2 Tower CPT	11 days	4/26/05	5/11/05
398	**Install Bay 5 (Tower 1)**	**2.5 days**	**5/20/05**	**5/25/05**
405	**Install Bay 1 (Tower 2)**	**2.5 days**	**5/23/05**	**5/26/05**
412	4 Tower CPT	8 days	5/26/05	6/8/05
413	**Install Bay 9 (Tower 3)**	**2.5 days**	**6/8/05**	**6/13/05**
420	**Install Bay 8 (Tower 4)**	**2.5 days**	**6/14/05**	**6/16/05**
427	**Install Bay 13 (Tower 5)**	**2.5 days**	**6/16/05**	**6/21/05**
434	**Install Bay 12 (Tower 6)**	**4 days**	**7/29/05**	**8/5/05**
441	8 Tower Tests	10 days	8/8/05	8/22/05
442	Install shear plates & cable trays	4 days	9/1/05	9/7/05
443	Optical survey	14 hrs	9/7/05	9/8/05
444	**ACD Install and Test**	**13 days**	**9/9/05**	**9/28/05**
445	Install ACD	3 days	9/9/05	9/14/05
446	Test ACD	10 days	9/14/05	9/28/05
447	**FSW Testing**	**20.56 days**	**10/1/05**	**10/28/05**
448	FSW Delivery w/ EM SIU	0 days	10/1/05	10/1/05
449	FSW Install and Checkout	15 days	10/3/05	10/21/05
450	FSW/LICOS Validation	5 days	10/22/05	10/28/05
451	**Single Tower Tests**	**16.13 days**	**9/2/05**	**9/27/05**
452	Time Tower 7 in Single Bay	2 days	9/2/05	9/6/05
453	Time Tower 8 in Single Bay	2 days	9/8/05	9/12/05
454	Time Tower 9 in Single Bay	2 days	9/12/05	9/14/05
455	Time Tower 10 in Single Bay	2 days	9/14/05	9/16/05
456	Time Tower 11 in Single Bay	2 days	9/15/05	9/19/05
457	Time Tower 12 in Single Bay	2 days	9/19/05	9/21/05
458	Time Tower 13 in Single Bay	2 days	9/21/05	9/23/05
459	Time Tower 14 in Single Bay	2 days	9/23/05	9/27/05
460	Remove ACD	2 days	10/28/05	11/1/05

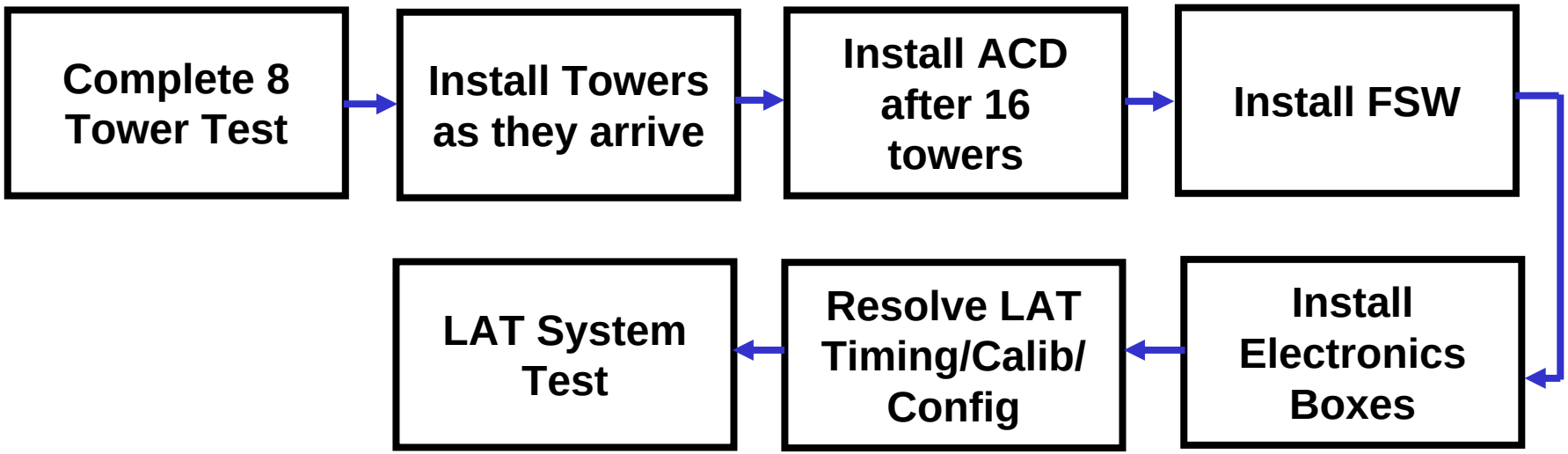


Alternate I&T Integration Plan with ACD (3 of 3)

ID	Task Name	Duration	Start	Finish
461	**Install Last 8 Towers**	**16 days**	**11/1/05**	**11/25/05**
462	**Install Bay 10 (Tower 7)**	**2 days**	**11/1/05**	**11/3/05**
469	**Install Bay 11 (Tower 8)**	**2 days**	**11/3/05**	**11/7/05**
476	**Install Bay 14 (Tower 9)**	**2 days**	**11/7/05**	**11/9/05**
483	**Install Bay 15 (Tower 10)**	**2 days**	**11/9/05**	**11/11/05**
490	**Install Bay 6 (Tower 11)**	**2 days**	**11/11/05**	**11/16/05**
497	**Install Bay 7 (Tower 12)**	**2 days**	**11/16/05**	**11/18/05**
504	**Install Bay 2 (Tower 13)**	**2 days**	**11/18/05**	**11/22/05**
511	**Install Bay 3 (Tower 14)**	**2 days**	**11/22/05**	**11/25/05**
517	16 Tower Tests	10 days	11/25/05	12/9/05
518	**Install Electronics and Cables**	**8.06 days**	**12/9/05**	**12/21/05**
519	Install SIU	1 day	12/20/05	12/21/05
520	Install GASU	1 day	12/9/05	12/12/05
521	Install PDU	1 day	12/12/05	12/13/05
522	Install Event Processors	1 day	12/20/05	12/21/05
523	**ACD Install and Test**	**3 days**	**12/9/05**	**12/14/05**
524	Install ACD	2 days	12/9/05	12/13/05
525	Test ACD	1 day	12/13/05	12/14/05
526	**LAT Level System Test**	**26.56 days**	**12/13/05**	**1/21/06**
527	Flight Radiator Fit check	1 day	12/13/05	12/14/05
528	Flight Software Validation	2 days	12/14/05	12/16/05
529	LAT Functional Test	15 days	12/16/05	12/29/05
530	E2E Tests	15 days	12/29/05	1/11/06
531	Low Level Characterization/MC Verfication/Fir	15 days	1/11/06	1/21/06
532	Pack & Ship to NRL	5 days	1/21/06	1/24/06

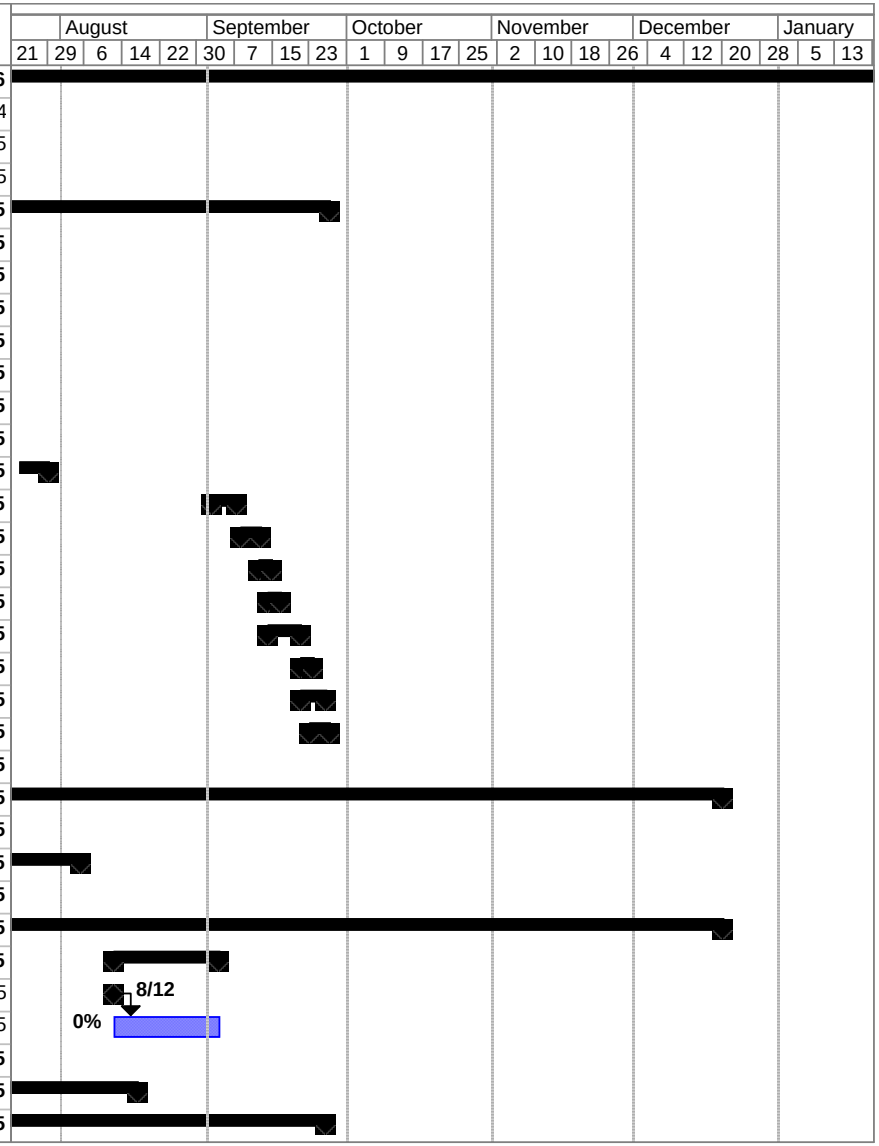


I&T Flow w/ ACD Integration at 16 Towers



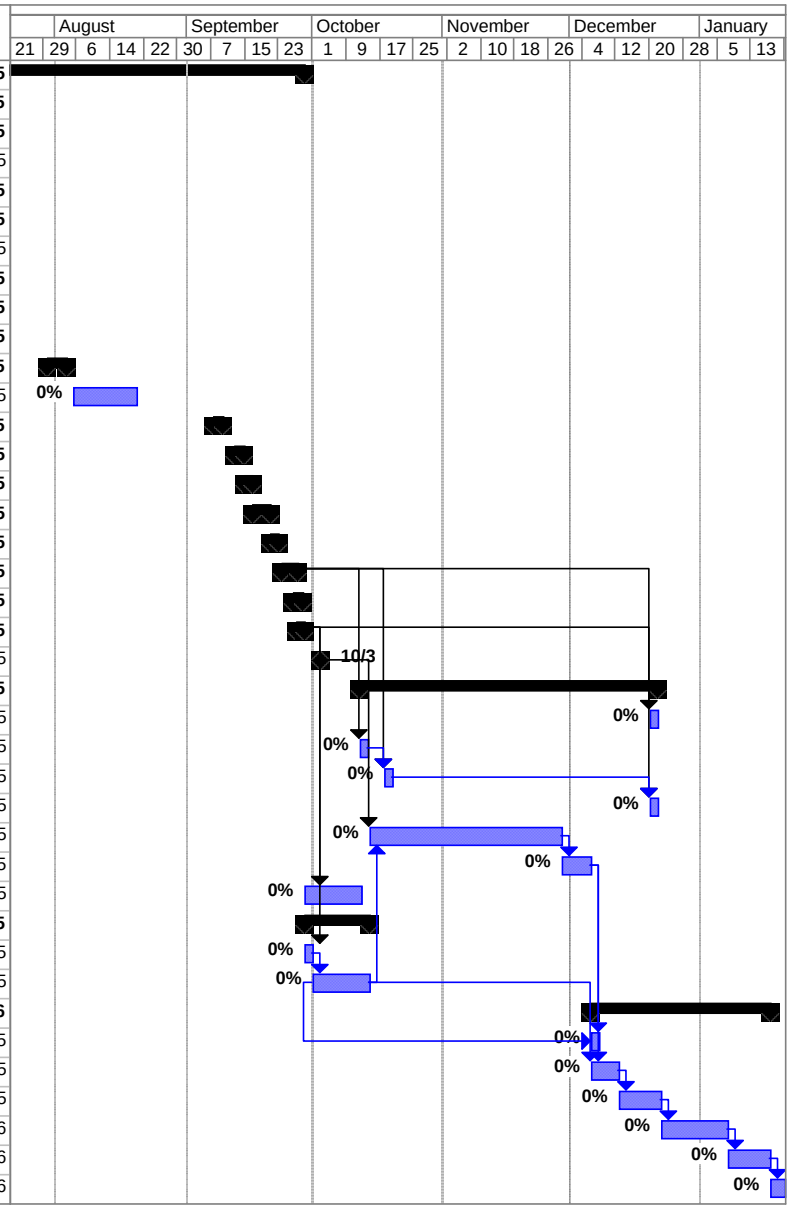
I&T Plan w/o Early ACD Integration (1 of 2)

ID	Task Name	Duration	Start	Finish
1	**LAT Integration Plan**	**305.44 days**	**10/22/04**	**1/24/06**
2	Grid RFI	0 days	10/22/04	10/22/04
3	X-LAT Thermal Plate RFI	0 days	2/9/05	2/9/05
4	Radiators RFI	0 days	5/31/05	5/31/05
5	**Tracker Receiving**	**168.06 days**	**1/14/05**	**9/26/05**
6	**Tower A**	**7 days**	**1/14/05**	**1/26/05**
11	**Tower B**	**8 days**	**2/14/05**	**2/24/05**
17	**Tower 1**	**3 days**	**5/10/05**	**5/13/05**
21	**Tower 2**	**6 days**	**5/10/05**	**5/18/05**
25	**Tower 3**	**8 days**	**5/10/05**	**5/20/05**
29	**Tower 4**	**2 days**	**6/9/05**	**6/13/05**
33	**Tower 5**	**3.06 days**	**6/10/05**	**6/15/05**
37	**Tower 6**	**4 days**	**7/23/05**	**7/28/05**
41	**Tower 7**	**3 days**	**9/2/05**	**9/7/05**
45	**Tower 8**	**2 days**	**9/8/05**	**9/12/05**
49	**Tower 9**	**2.13 days**	**9/12/05**	**9/14/05**
53	**Tower 10**	**2.25 days**	**9/14/05**	**9/16/05**
57	**Tower 11**	**4.25 days**	**9/14/05**	**9/20/05**
61	**Tower 12**	**2 days**	**9/21/05**	**9/23/05**
65	**Tower 13**	**3 days**	**9/21/05**	**9/26/05**
71	**Tower 14**	**1.5 days**	**9/23/05**	**9/26/05**
77	**Calorimeter Receiving**	**138 days**	**12/1/04**	**6/29/05**
168	**Electronics Receiving**	**210.88 days**	**2/10/05**	**12/20/05**
169	**Cables**	**81.63 days**	**2/10/05**	**6/14/05**
188	**TEM Assemblies**	**111.63 days**	**2/18/05**	**8/5/05**
207	**TEM PS Assemblies**	**86.75 days**	**2/18/05**	**6/29/05**
226	**Electronic Boxes**	**186.06 days**	**3/19/05**	**12/20/05**
234	**ACD Receiving**	**15 days**	**8/12/05**	**9/3/05**
235	Receive ACD	0 days	8/12/05	8/12/05
236	ACD Receiving Tests	15 days	8/12/05	9/3/05
237	**Grid Assemby in I&T**	**76.19 days**	**11/1/04**	**2/25/05**
268	**TEM to Calorimeter**	**127.13 days**	**2/7/05**	**8/17/05**
323	**Calorimeter/Tracker/TEM/TEM-PS Test**	**144.63 days**	**2/21/05**	**9/26/05**



I&T Plan w/o Early ACD Integration (1 of 2)

ID	Task Name	Duration	Start	Finish
372	**Tower Installation**	**128 days**	**3/21/05**	**9/28/05**
373	**Install Bay 0 (Tower A)**	**10 days**	**3/21/05**	**4/5/05**
381	**Install Bay 4 (Tower B)**	**10 days**	**4/8/05**	**4/22/05**
389	2 Tower CPT	11 days	4/26/05	5/11/05
390	**Install Bay 5 (Tower 1)**	**2.5 days**	**5/20/05**	**5/25/05**
397	**Install Bay 1 (Tower 2)**	**2.5 days**	**5/23/05**	**5/26/05**
404	4 Tower CPT	8 days	5/26/05	6/8/05
405	**Install Bay 9 (Tower 3)**	**2.5 days**	**6/8/05**	**6/13/05**
412	**Install Bay 8 (Tower 4)**	**2.5 days**	**6/14/05**	**6/16/05**
419	**Install Bay 13 (Tower 5)**	**2.5 days**	**6/16/05**	**6/21/05**
426	**Install Bay 12 (Tower 6)**	**2.5 days**	**7/29/05**	**8/3/05**
433	8 Tower Tests	10 days	8/5/05	8/19/05
434	**Install Bay 10 (Tower 7)**	**2 days**	**9/7/05**	**9/9/05**
439	**Install Bay 11 (Tower 8)**	**2 days**	**9/12/05**	**9/14/05**
444	**Install Bay 14 (Tower 9)**	**2 days**	**9/14/05**	**9/16/05**
449	**Install Bay 15 (Tower 10)**	**2 days**	**9/16/05**	**9/20/05**
454	**Install Bay 6 (Tower 11)**	**2 days**	**9/20/05**	**9/22/05**
459	**Install Bay 7 (Tower 12)**	**2 days**	**9/23/05**	**9/27/05**
464	**Install Bay 2 (Tower 13)**	**2 days**	**9/26/05**	**9/28/05**
469	**Install Bay 3 (Tower 14)**	**2 days**	**9/26/05**	**9/28/05**
474	FSW Delivery w/ EM SIU	0 days	10/3/05	10/3/05
475	**Install Electronics and Cables**	**49.5 days**	**10/12/05**	**12/21/05**
476	Install SIU	1.5 days	12/20/05	12/21/05
477	Install GASU	1.5 days	10/12/05	10/13/05
478	Install PDU	1.5 days	10/18/05	10/19/05
479	Install Event Processors	1.5 days	12/20/05	12/21/05
480	FSW Install and Checkout	30 days	10/14/05	11/28/05
481	LATTE 5 Validation	5 days	11/28/05	12/5/05
482	16 Tower Tests	10 days	9/28/05	10/12/05
483	**ACD Install and Test**	**12 days**	**9/28/05**	**10/14/05**
484	Install ACD	2 days	9/28/05	9/30/05
485	Test ACD	10 days	9/30/05	10/14/05
486	**LAT Level System Test**	**28.94 days**	**12/5/05**	**1/17/06**
487	Flight Radiator Fit check	2 days	12/5/05	12/7/05
488	Flight Software Validation	5 days	12/5/05	12/12/05
489	LAT Functional Test	15 days	12/12/05	12/22/05
490	E2E Tests	15 days	12/22/05	1/7/06
491	Low Level Characterization/MC Verfication/Fir	15 days	1/7/06	1/17/06
492	Pack & Ship to NRL	5 days	1/17/06	1/24/06



Issues & Concerns

ISSUES

- **Availability of flight hardware.**
  - **SIU & EPU Deliveries**
  - **TKR Deliveries**

CONCERNS

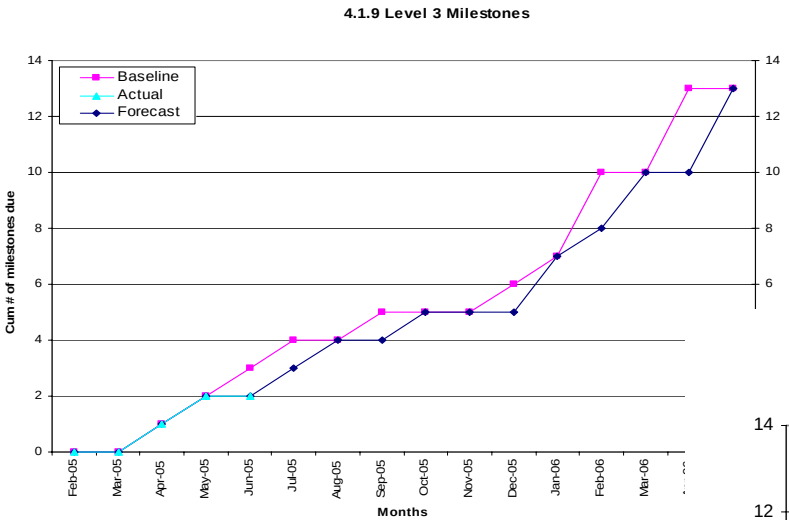
FSW availability for Early ACD Integration tests

I&T Resources for ACD and TKR tower tests in parallel

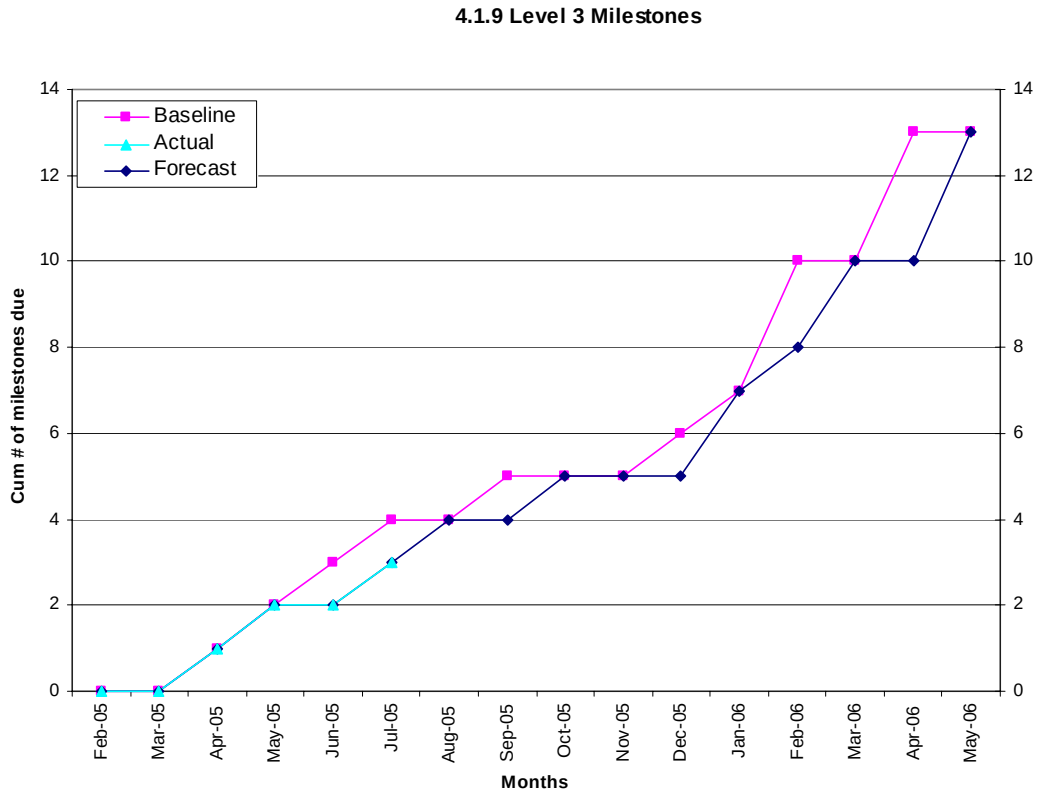
Cost/Schedule Reports for Presentation
June 2005 Month End
4.1.9 Integration & Test

Level 3 Milestone Count

June 05

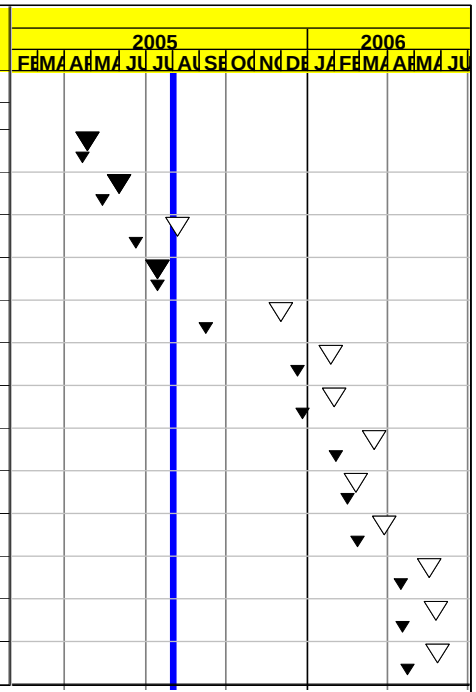


Jul 05



Level 3 Milestone List

Activity Description	Baseline Finish	-2m Var	-1m Var	Bsln Var	Early Finish
4.1.9 I&T					
Start 2 Tower Comprehensive	04/20/05	-3	-3	-3	04/25/05A
Start 4 Tower Comprehensive	05/12/05	-12	-12	-12	05/31/05A
Start 8 Tower Comprehensive	06/20/05	-16	-31	-33	08/05/05
Online FU S/W Final Release-I&T to	07/14/05	0	0	0	07/14/05A
Start 16 Tower Comprehensive	09/07/05	-8	-21	-59	12/01/05
LAT Ready to Ship to NRL for Env	12/20/05	-27	-10	-20	01/26/06
Ship LAT to NRL for Env Test	12/26/05	-40	-12	-35	01/30/06
LAT EMI/EMC Test	02/01/06	-58	-30	-44	03/17/06
LAT Sine Vibe	02/14/06	-24	5	-10	02/24/06
LAT Acoustic Test	02/26/06	-46	-18	-30	03/28/06
LAT TVAC	04/15/06	-20	-19	-32	05/17/06
LAT Weight & CG	04/17/06	-25	-25	-39	05/26/06
Ship LAT to Spectrum Astro	04/23/06	-23	-23	-35	05/28/06



Run Date 08/19/05 08:47 Data Date 08/01/05 © Primavera Systems, Inc.	**GLAST LAT PROJECT** **Level 3 Milestones** **Baseline Variance (Organized by Subsystem)**	LT-DZ: Baseline Variance FL-D4: AV: Level 3 Milestones Report #10 Sheet 11

Milestone Variance Explanation

- **Schedule Impact**
  - **LAT shipment to NRL delayed until the end of January 06**
- **Cost Impact**
  - **Additional labor costs for weekend work to minimize impact of late hardware deliveries.**
- **Corrective Action**
  - **Schedule weekend work for integration and test as appropriate.**

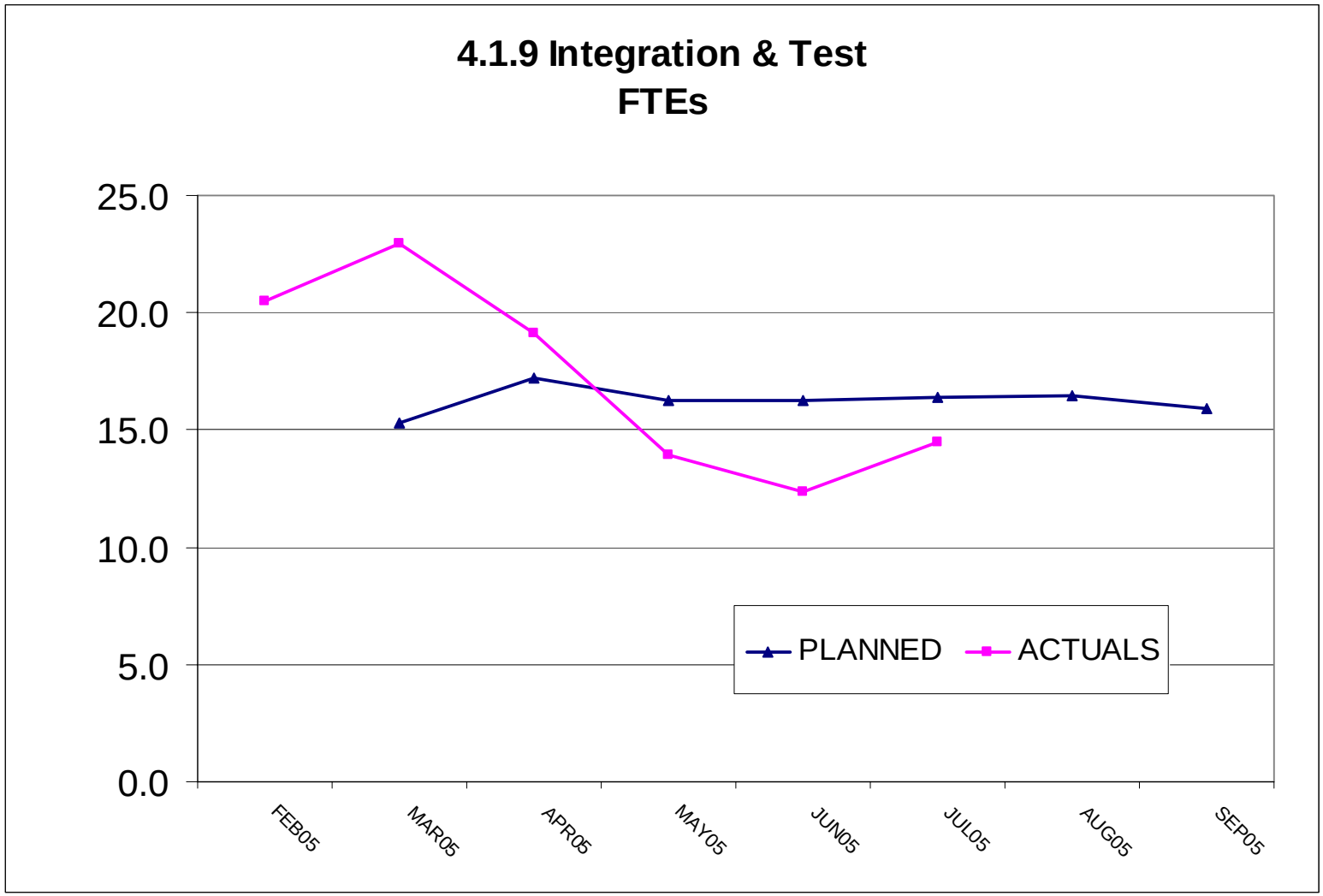
Cost Report

Monthly Contractor Financial Management Report 31-Jul-05								NASA form 533M Approved OMB # 2700-0	Report for Month Ending: 7/31/2005	
Reporting Category	Cost Incurred				Estimated Cost			Estimated Final Cost		Unfilled Orders Outstanding
	During Month		Cum. to Date		Detail		Balance of Contract	Contractor Estimate	Contract Value	
	Actual	Planned	Actual	Planned	AUG05	SEP05				
4.1.9 INTEGRATION & TEST										
4.1.9.1 I&T MANAGEMENT	41	44	1,205	1,256	51	46	52	1,354	1,354	0
4.1.9.3 INSTR OPS COORDINATOR	0	0	31	31	0	0	0	31	31	0
4.1.9.4 MECH GROUND SUPT EQUIP	-7	39	2,074	1,931	12	155	-143	2,098	2,098	3
4.1.9.5 ONLINE SOFTWARE	0	0	654	654	0	0	0	654	654	0
4.1.9.6 INTEG, FACILITIES, CONFIG & TEST	139	170	3,187	3,584	147	488	397	4,219	4,219	56
4.1.9.7 PARTICLE TEST	0	0	44	48	0	0	4	48	48	4
4.1.9.8 ENVIRONMENTAL TEST	66	128	458	606	82	60	148	747	747	1
4.1.9.9 SCIENCE VERIFICATION, ANALYSIS & CALIBRATION	0	0	300	300	0	0	0	300	300	0
CAPW[3]Totals:	238	382	7,953	8,411	291	749	458	9,451	9,451	63

Cost Variance Explanation

- Why overrun/underrun?
  - Underrun caused by operating under planned headcount.
  - Minimized impact of late hardware deliveries.
- What will be done to correct?
  - Adding staff as required.

FTE Report (DOE/NASA-funded only)



FTE Variance Explanation

- **Why overrun/underrun?**
  - **Staffing is below plan due to employee voluntary terminations.**
- **What is the impact?**
  - **None**
- **What will be done to correct?**
  - **Adding staff as required.**