

E.O. Lawrence Berkeley National Laboratory
GRETINA MONTHLY PROGRESS REPORT
November, 2004

I. DEPUTY CONTRACT PROJ. MGR. ASSESSMENT

1. TECHNICAL AND PROGRAMMATIC PROGRESS AND ACCOMPLISHMENTS

We have made the decision to use warm FETs and 4-crystal detector module. GRETINA and LBNL NS management has reviewed this document and supported the decision. Also, the GRETINA Advisory Committee reviewed the document and also supported the decision. They have sent us a letter supporting this configuration. We also sent the document to DOE for further review. All comments were positive and we decided to adopt the change (pending tests with the single crystal prototype). This represents one more L3 milestone.

A new promising concept for the support structure was envisioned and the engineering team is now reviewing the concept.

We have the draft done for the sole source justification for detector procurement from Eurisys. We progressed with the specifications for the purchase order. The geometry of the crystals of the quad detector module is under review and been checked by different teams.

Preparations for the beam test of the 3-crystal prototype detector module at the 88 Cyclotron continued. It is scheduled for December 1st. The target chamber and detector module were installed on the beam line and existing equipment was modified to hold the detector for this test. The data acquisition system and supporting computers were moved to top of shielding of the Cave 4C. The system was tested and it is ready for the December 1st beam test run.

Progress on the requirement documents and the Safety Plan continued.

MOU for Argonne National Lab was submitted for their review and we are waiting their comments.

2. ACTIONS

N/A

3. COST AND SCHEDULE STATUS

3.1 VARIANCE ANALYSIS AND PROJECT COST PERFORMANCE REPORTS

	<u>Sched</u>	<u>k\$ Act</u>	<u>Variance</u>
MIE	693.4	479.2	214.2
OPC	866.5	722.7	143.8

Variance Statement:

The MIE design effort continues to lag plan. This is due primarily to the effort being placed on answering the questions raised concerning the 4-crystal configuration. Also, without some key dimensions for the 4-crystal design the mechanical support structure will lag.

Project Impact:

N/A

Corrective Action:

To increase the scheduled expenditure we have to advance the mechanical design. We have send the purchase order for the LN system to ORNL and work will start shortly. Also, we are aggressively working on the purchase request for the detector design from Eurisys. We should be able to place the request in December. The mechanical design requires key dimensions detector module dimensions.

3.2 MILESTONE STATUS

We have achieved the L3 - Decision Review - 3 vs. 4 crystal detector milestone. DOE decided that the review we have conducted was enough.

3.3 PROJECT CRITICAL PATH ANALYSIS

N/A

II. DETAIL SUBSYSTEM STATUS

A. WBS 1.1. Mechanical

WBS 1.1.1 Requirement Document

Technical Progress/Accomplishments

Requirements Document complete and on the GRETINA Doc DB. This document will be updated as needed once the crystal specs are received from Eurisys

Significant Issues/Actions

N/A

WBS 1.1.2 Mechanical Design

Technical Progress/Accomplishments

A promising concept for the support structure was envisioned. The hemisphere comes apart in two similar parts, which allows easy movement around the beam-line. The engineering team is now reviewing the concept. For example, Tim Loew had miniature plastic (SLA) faceted caps for quad detectors made and the caps have been taped together to model GRETINA. The model proves what we expected: GRETINA will split as our paper model suggested.

Work has started on concept graphics for the yearly DOE review in January.

Significant Issues/Actions

An updated of the mechanical design schedule is continuing. This new concept of the support structure will require more engineering effort. However, it is more flexible than the original concept, which will allow for easier reconfiguration of the experiments and an advantage for GRETINA. The impact on cost is now been assessed.

WBS 1.1 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
221.7	123.3	98.4

Variance Discussion

The mechanical design is not progressing as fast as originally envisioned due to the lack of critical dimensions of the 4-crystals detector module. One of the mechanical engineers working on GRETINA was diverted to other project until we have these dimensions. However, this delay will not impact the overall schedule, since there is a gap between the end of the design and the start of the construction.

B. WBS 1.2 Detector Module

WBS 1.2.1 Procurement

Technical Progress/Accomplishments

Draft of the sole source is done and was reviewed. The requirements document for the design procurement is been reviewed. We are in contact with procurement department to ensure compliance with all appropriate regulations.

The geometry of the crystals of the quad detector module is under review and been checked by different teams. It is critical to have these dimensions correct.

The report of Sergio Zimmermann’s visit to Eurisys is done.

Significant Issues/Actions

Placing the design contract with Eurisys is high priority. Timely issuance will give the project team important information on crystal configuration for the annual technical review in January.

WBS 1.2.2 Test/Characterize Module 1

Technical Progress/Accomplishments

Dr. Enrico Farnea from Legnaro visited us and collaborated with us in the GEANT 4 simulation package. Also, work on the document that describes the Detector Test Procedures and Apparatus continued. This document represents a Level 2 milestone for Dec. 2004.

Significant Issues/Actions

N/A

WBS 1.2 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
95.2	34.4	60.8

Variance Discussion

Most of the effort on the detector module subsystem on the MIE during this period is on WBS 1.2.2 - Test/Characterize Module 1, sub-WBS Develop Test Procedures and Apparatus and Develop Database. The work on the test procedure and apparatus is mainly done with scientific or R&D effort and it is not accounted on the MIE. Costs for database development have run below estimates due to the use of public domain software. Overall work on the database is progressing slower than planned, but this will not impact the overall schedule because it is not on the critical path.

C. WBS 1.3 Electronics

WBS 1.3.1 Requirement Document

Technical Progress/Accomplishments

Progress on the requirement document continued. John Weizeorick and Sergio Zimmermann worked together generating the draft. The draft should be completed by December.

Significant Issues/Actions

N/A

WBS 1.3 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
9.2	6.0	3.2

Variance Discussion

Delay on this item does not impact the rest of the MIE.

D. WBS 1.4 Computing Systems

WBS 1.4.1 Requirement document

Technical Progress/Accomplishments

The team is keeping regular meeting and discussing points of the Computing Requirements Document. The write up is moving ahead.

Significant Issues/Actions

N/A

WBS 1.4 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
9.1	12.7	(3.6)

Variance Discussion

Delay on this item does not impact the rest of the MIE. Over spending on this WBS was caused by incorrectly charging this WBS for the R&D computing systems requirement document work. Money will be moved from the R&D account for computing systems to this account to upgrade these costs.

E. WBS 1.6 Project Management

WBS 1.6.1 Management

Technical Progress/Accomplishments

Efforts continue in preparation for the January Technical Review and CD 2a/3a.

Management is working with the Mechanical Engineering team to development of an updated mechanical design schedule.

The placement of the design contract with Eurisys is moving forward.

Significant Issues/Actions

Timely placement of the contract with Eurisys is necessary to provide data for the upcoming reviews.

WBS 1.6.2 General Project Expenses

Technical Progress/Accomplishments

N/A

Significant Issues/Actions

N/A

WBS 1.6 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
332.9	261.1	71.8

Variance Discussion

Lower than planned travel expenses and tight control of other misc. expenses contribute to the favorable variance.

E. WBS 1.7 Environment, Safety and Health

WBS 1.7.1

Technical Progress/Accomplishments

We are collecting information for the ES&H document.

Significant Issues/Actions

N/A

WBS 1.7 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
25.4	.3	25.1

Variance Discussion

Part of the variance is due to the fact that Steve's time was charged to the incorrect account. The accounts are being upgraded.

The other portion is that the scheduled safety reviews have been delayed pending the development of the full GRETINA Safety Plan and a more advanced conceptual mechanical design.

Right now we are using the LBNL and Building 88 safety procedures and the list of hazards that we have identified in the January 9, 2004 GRETINA Technical Safety Review Meeting.

III. Research and Development Status

Technical Progress/Accomplishments

Preparations for the beam test of the 3-crystal prototype detector module at the 88 Cyclotron continued. It is scheduled for December 1st. The target chamber and detector module were installed on the beam line and existing equipment was modified to hold the detector for this test. The data acquisition system and supporting computers were moved to top of shielding of the Cave 4C. The system was tested and it is ready for the December 1st beam test run.

X-Ray of the crystal will be performed to locate the actual position of the crystals.

The dimensions of the 4-crystals at LBNL and ORNL using different approaches. All approaches resulted in similar results.

We have started the test of the cables to connect the detector pre-amplifiers to the digitizer boards. Our first candidate has a big crosstalk (about 2.5%) and can not be used. We are currently testing a second candidate with twisted pairs. We also are performing more tests with the Eurisys pre-amplifier. We have identified that changing a key transistor did not change the noise performance as we were expecting. We are understanding the reasons for this effect. Work on pole-zero cancellation on the digitizer modules started with VHDL simulations.

Data acquisition upgrades: After some upgrades, the data rate is now 8 MB/sec and the controller CPU utilization improved. It went from 80% to 60% allowing more CPU for other future tasks.

Development of Run Control Software for Detector Testing is ongoing. We have switched to using wxPython for graphics purposes rather than tkInter. The latter is the de-facto old standard

A new cesium collimator, to replace the cesium collimator borrowed from LLNL, has been designed and material for its fabrication has been ordered.

Significant Issues/Actions

N/A

R&D Variance Analysis (Cumulative To-date) (\$k)

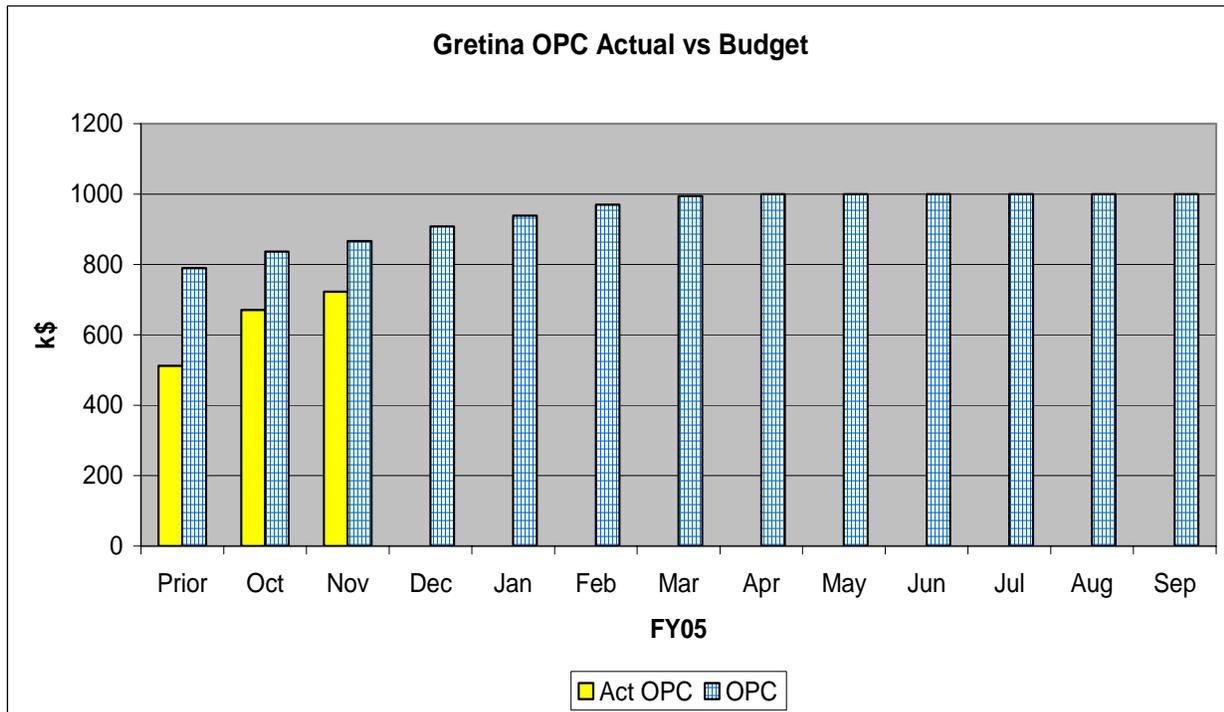
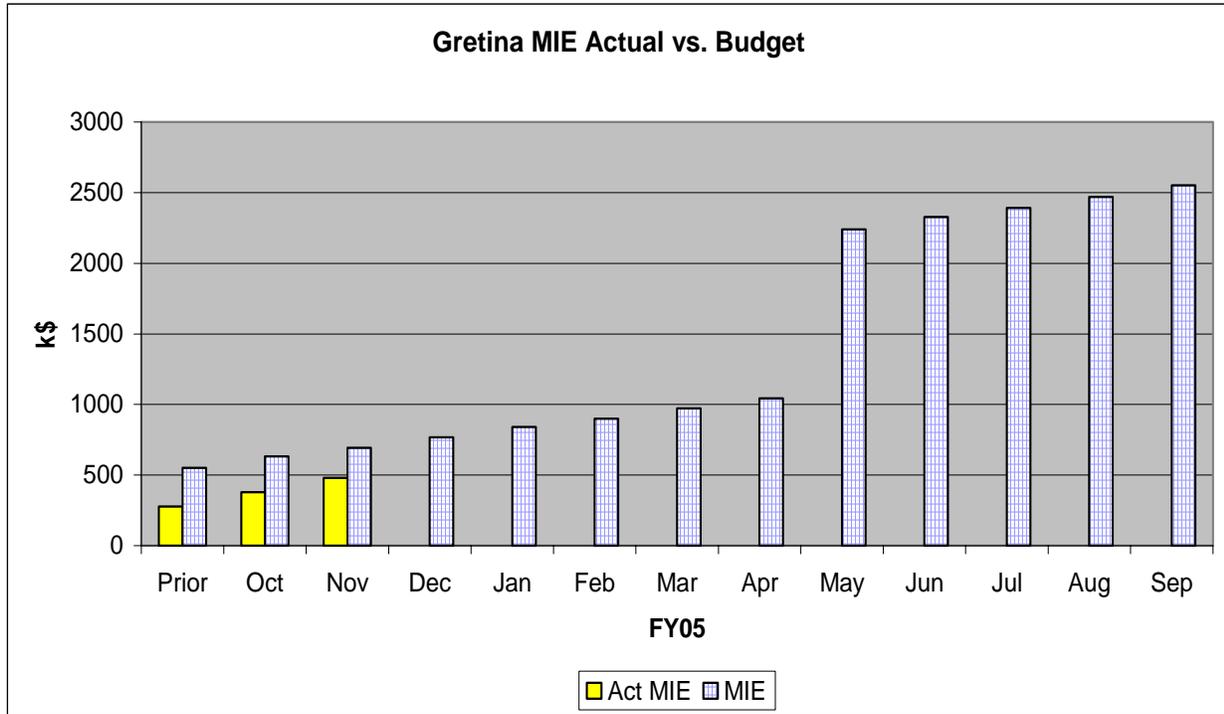
<u>Sched</u>	<u>Act</u>	<u>Variance</u>
866.5	722.7	143.8

Variance Discussion

N/A

IV. Cost Chart

The above charts compare project-to-date budgeted cost with actual for the FY05 time period.



ID	Work Breakdown	Task Name	% Comp	Start	Finish	Cost	2005															
							Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
157		Discuss test results with vendor	0%	Thu 4/13/06	Wed 4/19/06	\$0.00																
158		Decide together with vendor and purcha	0%	Thu 4/20/06	Wed 5/3/06	\$0.00																
159		Decision to accept the detector	0%	Thu 5/4/06	Wed 5/10/06	\$0.00																
160		Store test results on database	0%	Thu 5/11/06	Wed 5/17/06	\$0.00																
161		Review standard process parameters, p	0%	Thu 5/18/06	Wed 5/24/06	\$0.00																
162		Level 2: Test/Charact. of Module 1 Complete	0%	Wed 5/24/06	Wed 5/24/06	\$0.00																
163	1.2.3	Test/Characterize Modules 2 thru 9	0%	Thu 4/13/06	Tue 5/5/09	\$79,077.32																
232	1.3	Electronics	1%	Mon 3/1/04	Thu 3/12/09	\$1,517,577.14																
233	1.3.1	Requirement document	70%	Mon 3/1/04	Fri 3/26/04	\$8,824.24																
234	1.3.2	Prototype	0%	Mon 10/3/05	Wed 6/20/07	\$606,493.07																
311	1.3.3	Production	0%	Fri 8/24/07	Thu 3/12/09	\$902,259.83																
374	1.4	Computing Systems	0%	Mon 3/1/04	Thu 3/5/09	\$1,152,273.48																
375	1.4.1	Requirement document	60%	Mon 3/1/04	Fri 3/26/04	\$8,788.00																
376		Computing Req Doc Complete	0%	Fri 3/26/04	Fri 3/26/04	\$0.00																
377	1.4.2	Prototype	0%	Mon 10/3/05	Wed 6/6/07	\$289,071.60																
444	1.4.3	Production	0%	Tue 8/14/07	Thu 3/5/09	\$854,413.88																
535	1.5	System Assembly	0%	Wed 6/20/07	Thu 4/15/10	\$175,285.55																
536		Level 2: Prototype Subsystems Complete	0%	Wed 6/20/07	Wed 6/20/07	\$0.00																
537	1.5.1	Prototype	0%	Wed 6/20/07	Fri 8/24/07	\$10,765.48																
549		Level 1: CD-2B/CD-3B	0%	Fri 8/24/07	Fri 8/24/07	\$0.00																
550		Level 2: Production Subsystems Complete	0%	Tue 5/5/09	Tue 5/5/09	\$0.00																
551	1.5.2	Production	0%	Wed 5/6/09	Mon 11/30/09	\$164,520.07																
587		Level 1: CD-4: Approve Start of Operations	0%	Thu 4/15/10	Thu 4/15/10	\$0.00																
588	1.6	Project Management	7%	Mon 3/1/04	Fri 4/30/10	\$1,914,530.48																
589	1.6.1	Management	8%	Mon 3/1/04	Fri 4/30/10	\$1,710,152.65																
590	1.6.1.1	Initial phase (FY04-FY05)	43%	Mon 3/1/04	Fri 9/30/05	\$545,462.86																
591		Contractor Project Manager	43%	Mon 3/1/04	Fri 9/30/05	\$110,987.64																
592		Project Engineer	43%	Mon 3/1/04	Fri 9/30/05	\$353,356.42																
593		Project Control Analyst	43%	Mon 3/1/04	Fri 9/30/05	\$81,118.80																
594	1.6.1.6	CD2/3A (Prep)	0%	Mon 10/4/04	Wed 4/6/05	\$0.00																
611	1.6.1.7	REVIEWS	0%	Fri 1/7/05	Fri 4/15/05	\$0.00																
625	1.6.1.2	Long term	0%	Mon 10/3/05	Wed 9/30/09	\$767,034.72																
629	1.6.1.3	Final phase (~0.5 of FY10)	0%	Thu 10/1/09	Fri 4/30/10	\$100,714.46																
634	1.6.1.4	Quality Assurance Manager	0%	Tue 6/1/04	Fri 10/16/09	\$30,287.69																
635	1.6.1.5	Subsystem Managers	7%	Mon 3/1/04	Tue 9/22/09	\$266,652.92																
636		Mechanical (Design)	25%	Tue 6/1/04	Fri 3/24/06	\$35,661.60																
637		Mechanical (Production)	0%	Tue 8/14/07	Thu 8/14/08	\$20,842.22																
638		Detector	14%	Mon 3/1/04	Fri 7/3/09	\$0.00																
639		Electronics	0%	Mon 8/1/05	Thu 6/11/09	\$96,704.00																
640		Computing Systems	0%	Mon 8/1/05	Thu 6/11/09	\$105,520.29																
641		Systems assembly	0%	Wed 5/6/09	Tue 9/22/09	\$7,924.80																
642	1.6.2	General Project Expenses	6%	Mon 3/1/04	Wed 11/4/09	\$204,377.83																
657	1.7	Environment and Safety	6%	Mon 3/1/04	Wed 9/16/09	\$120,363.60																
658	1.7.1	Perform safety analysis of all subsystems	6%	Mon 3/1/04	Fri 3/6/09	\$111,641.60																
675	1.7.2	Conduct global safety review	0%	Thu 9/10/09	Wed 9/16/09	\$8,722.00																