



Lattice QCD Computing Project
Project Management Overview

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LQCD Contractor Project Manager

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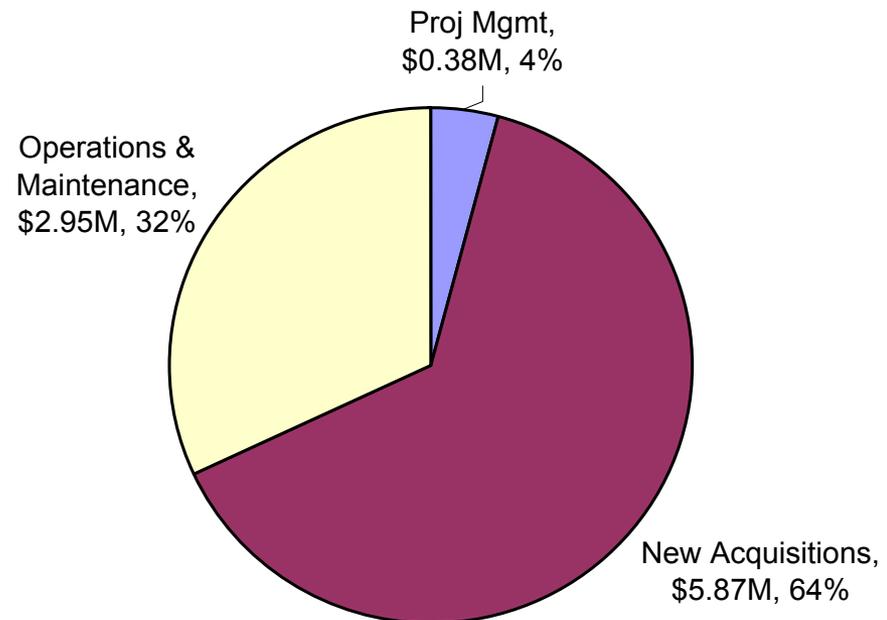
Outline

- Project Scope
- Management & Oversight Structure
- Work Organization and Planning
 - Operations
 - New Deployments
- Communications and Reporting
- Performance Measures and Metrics
 - Technical, Scientific, Cost and Schedule
- Configuration Management & Change Control

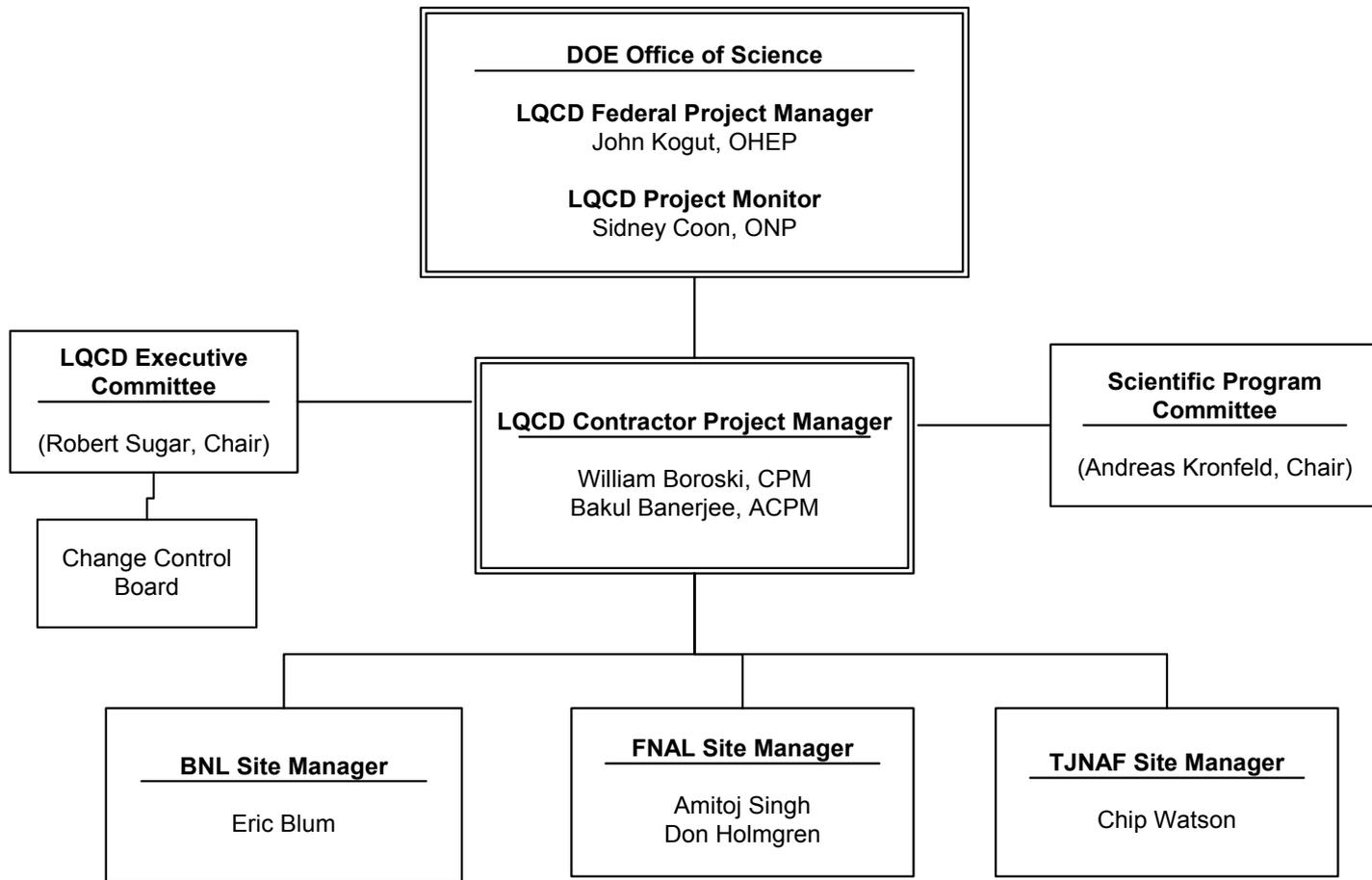
Project Scope and Budget

- Acquire and operate dedicated hardware at BNL, TJNAF, and FNAL for the study of quantum chromodynamics
 - Budget: \$9.2 million (*provided jointly by OHEP and ONP*)
 - Period of performance: FY06 through FY09

- Project funding covers:
 - Project management
 - Operations and maintenance of existing systems
 - Acquisition and deployment of new hardware



Management Organization



Management Certification

- OMB300 guidance requires Federal and Contractor IT Project Managers to be Level-1 certified.
 - Required coursework:
 - Project Management Essentials, or equivalent
 - Earned Value Mgmt Systems
 - Three years of project management experience

- Certification Status
 - John Kogut (FPM) – certified
 - Bakul Banerjee (ACPM) – certified
 - Don Holmgren (CPM thru 12/2006) – certified
 - Bill Boroski (CPM) – in process

CPM Experience and Credentials

■ Bill Boroski

- Head, Office of Project Management and QA, Fermilab Computing Division

- Project Manager, Sloan Digital Sky Survey, 1999-present
 - \$100M ground-based astronomy project

- Formal education:
 - MBA, Kellogg School of Management, Northwestern University
 - Concentrations in Finance, Strategy, and Organizations
 - BS, Computer Science

- Formal project management training:
 - Management of Large Scientific Projects (Caltech)
 - Project Planning, Analysis and Control (George Washington University)
 - Project Management Principles and Practices (UCLA)

Work Planning and Organization

- Project Execution Plan (PEP)
 - Controlled document defining project need, requirements, scope, management, cost and schedule, change control, etc.

- Work organized via WBS
 - MS Project is used to identify tasks, develop schedules, and track progress against milestones

- Work broken down into two primary areas:
 - Steady-state operations and maintenance
 - Procurement and deployment of new systems

Steady-state Operations & Maintenance

- Site Managers are responsible for day-to-day operations of their respective sites
- User allocations are determined annually by the Scientific Program Committee and provided to each site manager for implementation
- Site manager responsibilities include:
 - Establishing systems to track system performance and usage;
 - Reporting progress against goals;
 - Ensuring that host laboratory commitments are met;
 - identifying issues and concerns to the CPM.

Procurement and Deployment of New Systems

- Project plan calls for a major new acquisition each year
- Procurements treated as sub-projects
- Procurement and deployment plans, with timeline and milestones, are developed as part of the annual planning and budgeting process.
 - Planning takes into account performance requirements and goals, required facility upgrades, technical advances, etc.
 - Current procurement activities:
 - Procurement and deployment of 7n cluster at JLab
 - Planning for FY08/09 procurement/deployment at FNAL

FY07 Procurement Timeline

Activity	Baseline Goal	Current Status
Release Request for Information (RFI)	Sep/Oct 2006	Issued Nov 2
Release Request for Proposals (RFP)	As soon as budget allows	Issued Nov 21 <i>(After SC '06)</i>
Award contract	Dec '06 /Jan '07	Feb 6 <i>(Delayed by CR)</i>
System integration	Begin in March/April 2007	Systems received April 24
Release new cluster to production	June 30, 2007	On track for mid-June deployment of <u>partial</u> cluster

Full deployment behind schedule due to delayed availability of funds and AMD quad-core chips. *(Details in Chip Watson's talk)*

FY08/09 Procurement Planning

- FY08/09 planning is now underway (*Details in Don Holmgren's talk*)
- Performance goals from the OMB Exhibit 300:

FY08 Goals:	
Procure and deploy 4.2 Tflops at FNAL	06/30/08
12 Tflops-yrs aggregate computing delivered	09/30/08
FY09 Goals:	
Procure and deploy 3.0 Tflops at FNAL	06/30/09
15 Tflops-yrs aggregate computing delivered	09/30/09

- We intend to combine the FY08/09 procurements with an option clause
 - Cost savings associated with reduced labor costs
 - Action consistent with recommendations from 2006 review

FY08/09 Procurement (cont'd)

- Issues and concerns:
 - Ability to achieve future performance goals dependent upon available technology
 - Preliminary data on AMD quad-core chips is encouraging
 - Recent information on Intel “roadmap” is encouraging
 - But, performance ultimately depends on vendor delivery of new processors and chipsets
 - Ability to achieve future aggregate computing performance goals dependent upon 7n deployment results
 - Compute facility at Fermilab may not be available until late FY08
 - May be an advantage in that we are able to buy more technology later in the year
 - Timing consistent with a combined FY08/09 procurement
- Change request will be necessary once various schedule and performance issues are better understood.

Communications and Reporting

- Weekly Site Managers meeting
 - Address site-specific issues or concerns
 - Discuss procurement plans/activities
 - Exchange of other relevant information

- Monthly DOE Program Office meeting
 - Report on progress against performance goals (TFlops-yrs delivered, cost, procurement activities, etc.)
 - General exchange of information

- Quarterly Progress Reports
 - Following OMB reporting guidelines and templates
 - Performance graded using “stoplight” system

- Informal communications between federal and contractor project managers, as necessary

Performance Measures and Metrics

- Performance goals and milestones are explicitly defined in the OMB Exhibit 300 document.
 - 14 project milestones
 - External reviews of future procurement plans
 - Incremental procurements/Tflops-deployed
 - Aggregate Tflops-yrs delivered
 - 38 performance indicators
 - Science goals
 - Additional computing resource brought on-line
 - System performance (i.e., % of time system available for work)
 - Process improvements (i.e., % of tickets closed within 2 business days)
- Progress against these goals is tracked and reported periodically to the Federal Project Manager and through the OMB reporting process.

Computing Performance Measures and Metrics

- Deployment and cumulative performance milestones defined for each year:
 - “Delivered Tflops–yrs”
 - Defined as available capacity expressed as average of DWF and asqtad inverter performance
 - “1 year” = 8000 hours

 - “Deployed Tflops”
 - Defined as incremental capacity brought on-line, expressed as average of DWF and asqtad inverter performance

Milestone Performance (*Tflops deployed*)

	Tflops Deployed	
<u>Year</u>	<u>Current Baseline</u>	<u>Actual / Planned</u>
FY2006	2.0 <i>FNAL: 1.8 Tflops</i> <i>JLab: 0.2 Tflops</i>	2.6 (<i>actual</i>) <i>FNAL Kaon: 2.3</i> <i>JLab 6N: 0.3</i>
FY2007	2.9	2.2 → 2.9 (<i>planned</i>) <i>JLab 7N procurement</i> <i>in progress</i>
FY2008	4.2	tbd
FY2009	3.0	tbd

Cumulative FY06/07 milestone = 4.9 Tflops

Total FY06/07 planned = 4.8 Tflops (dual-core) or 5.5 Tflops (quad-core)

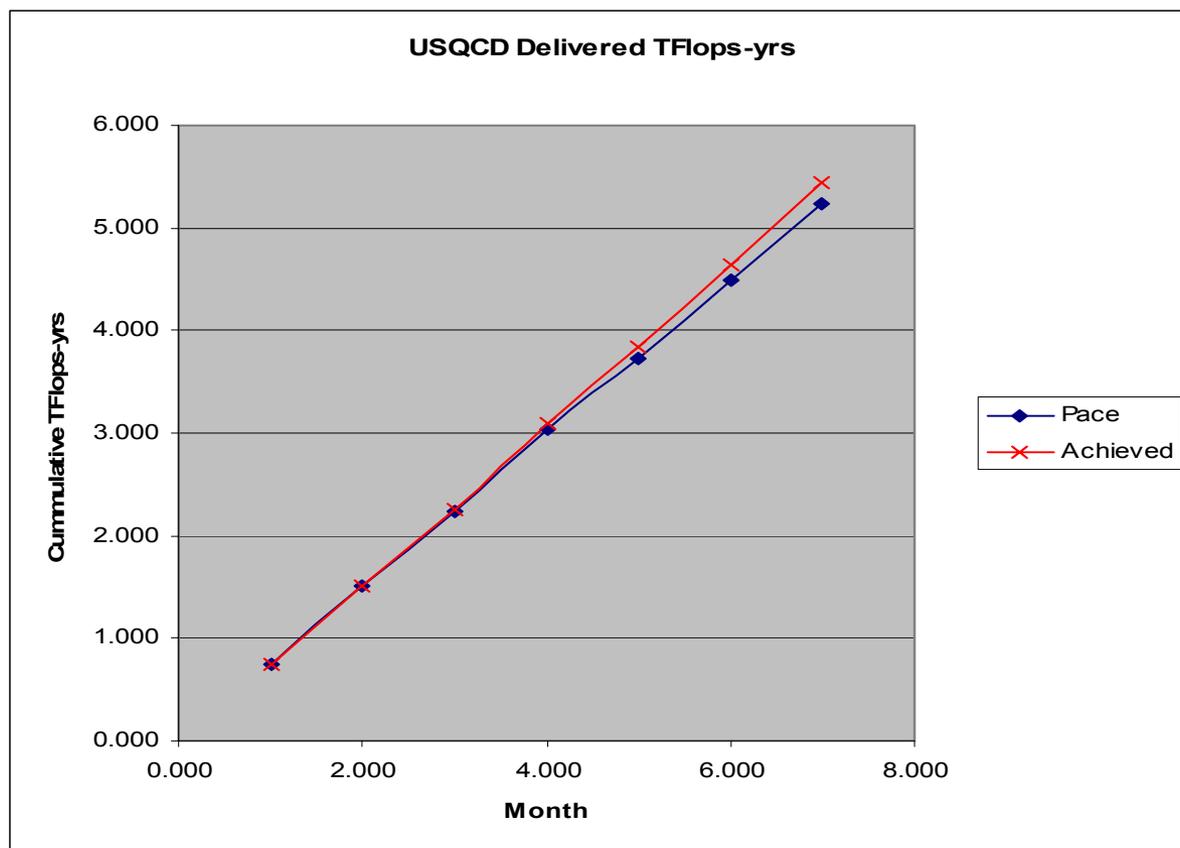
Milestone Performance (*Tflops-yrs delivered*)

- Top-level FY07 milestone is for 9.0 Tflops-yrs delivered
- Performance at the three sites is tracked and statused monthly
- Through 30-Apr-07, we have delivered 5.43 Tflops-yrs (104% of linear pace)

Running Sums	FNAL	Jlab	BNL	Total	Pace	% Pace	Deficit
Oct	0.269	0.109	0.413	0.744	0.750	99%	0.006
Nov	0.564	0.220	0.745	1.505	1.504	100%	-0.001
Dec	0.861	0.319	1.083	2.251	2.244	100%	-0.007
Jan	1.176	0.432	1.431	3.087	3.033	102%	-0.054
Feb	1.473	0.538	1.855	3.830	3.723	103%	-0.106
Mar	1.799	0.641	2.205	4.646	4.488	104%	-0.158
Apr	2.119	0.732	2.558	5.434	5.227	104%	-0.207

Milestone Performance (*Tflops-yrs delivered*)

(continued)



If we continue at current pace, extrapolated delivery is ~9.35 Tflops-yrs (without the JLab 7n cluster)

We anticipate delivering 9.8 Tflops-yrs with 7n 396-node dual-core deployment

Cost Performance

Status as of April 1, 2007

Fiscal year complete: 50%

Cost Performance - Equipment Funds

Lab	FY06 Funded	FY07 Funded	Total EQ Funds Available	Inception to Date EQ Cost	EQ %
BNL	\$20,000	\$20,000	\$40,000	\$7,908	19.8%
FNAL	\$1,548,000	\$25,000	\$1,573,000	\$1,529,424	97.2%
JLab	\$280,000	\$1,475,000	\$1,755,000	\$1,437,521	81.9%
Total	\$1,848,000	\$1,520,000	\$3,368,000	\$2,974,853	88.3%

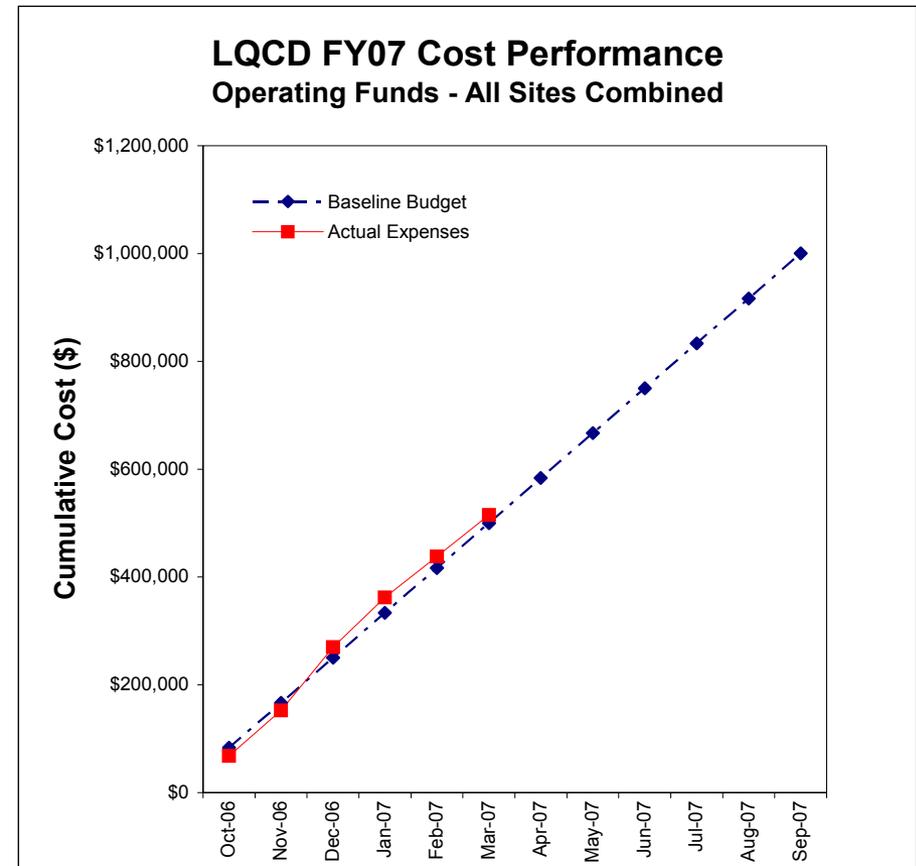
Cost Performance - Operating Funds

Lab	FY06 Carry-forward	FY07 Funded	Total Ops Funds Available	FY07 YTD Ops Cost	YTD OP %
BNL	(\$7,080)	\$234,000	\$226,920	\$50,957	22.5%
FNAL	\$7,301	\$401,000	\$408,301	\$206,207	50.5%
JLab	\$19,897	\$345,000	\$364,897	\$257,600	70.6%
Total	\$20,118	\$980,000	\$1,000,118	\$514,764	51.5%

FY07 Spend Rate

Operating Funds – All sites combined

- Operating funds are used to support salary costs associated with planning and project management, procurement and deployment of new hardware, and operation and maintenance of existing systems.
- Combined spend rate across all three sites continues to track a linear baseline forecast.
- Spend rate at the various sites is tracked through monthly reports
 - Spend rate for steady-state operations support is fairly constant
 - Spend rate increases during acquisition & deployment activities



Configuration Management and Change Control

- Change control process defined in the PEP
- CCB chaired by Bob Sugar, Executive Committee chair
- Membership includes senior management at the three labs.
- Change control thresholds:

Level	Cost	Schedule	Technical Scope
LQCD Federal Program Manager (Level 0)	Any increase in total project cost	3-month or more delay in Level-1 milestone date	Change of any WBS element that could adversely affect performance specifications
LQCD CCB (Level 1)	Cumulative increase of more than \$125K in WBS Level 2	> 1-month delay of a Level-1 milestone date or >3-month delay of Level-2 milestone.	Any deviation from technical deliverables that does not affect expected performance specifications
LQCD Contractor Project Manager (Level 2)	Any increase of >\$25K in WBS Level 2	>1-month delay of Level 2 milestone date	Technical design changes that do not impact technical deliverables.

- Associate Contractor Project Manager maintains change control log and records.

Summary

- Project management practices and tools are used to execute this project.
- Monthly status reports keep the project focused on cost and schedule performance, and on meeting milestones.
- Effective change control process in place and functional.
- Through FY06, all performance milestones were met.
- FY06 deployment is up and running reliably.
- FY07 procurement well along, but our ability to meet performance goals will depend on the performance of the new AMD quad-core chips.
- Planning for the FY08/09 procurement is underway.



Questions?