Department Heads Meeting
Sept 16, 2010

David B. MacFarlane
Topics

• News
  – DOE moving forward on LSST
  – Non-Accelerator research review (Sept 28)
  – Detector R&D Workshop at Fermilab (Oct 7-9)
    • Web site http://indico.fnal.gov/conferenceDisplay.py?confId=3356
  – PPA-Advisory Committee (Dec 9-10)
• Output from Electron-based research review (June 22-23)
• Impressions from DOE site visit (Sep 13-14)
• Update on scientific computing cost recovery model
• Update on research plan development
  – Operations Directorate business plan
PPA Advisory Committee

- Dual report to SLAC Director and PPA ALD
- Membership
  - Dan Akerib
  - Sergio Bertolucci
  - Sally Dawson
  - Werner Hoffman
  - Joe Incandella
  - Ann Nelson
  - Steve Ritz
  - David Spergel
  - Paul Tipton
  - Harry Weerts
- First meeting: December 9-10, meets annually
Feedback from electron-research review

- Favorably impressed
  - Quality of ongoing BABAR analysis and archiving
    • Unique role of supporting BABAR analysis through completion
  - Proposed involvement in the Italian SuperB project
    • Reviewers concurred with SLAC’s focus on participation, capitalizing on BABAR expertise and allowing major US contributions
  - ILC detector R&D research activities
    • Reviewers agree that deployment of technical capability to develop new technologies (PFA) and generic software/simulation tools (LCSim) was especially worthy of support
  - Newly proposed Dark Photon Search experiment
    • Small but timely effort for opportunistic science worthy of support
  - White paper viewed favorably but requiring further development
Feedback from electron-research review

• Recommendations
  – Maintain BABAR-related funding at a level to allow SLAC to support services and contribute to physics output
  – Continue support for LC detector programs proposed, only expanding LCSim effort if there is clear demand from the HEP community
  – Support small HPS effort

• Request
  – Address reviewers comments on the Lepton-Collider white paper and begin the process of converting the initial concept into a more detailed comprehensive proposal
Summary of site visit issues

- **Theory**
  - Renewal planning and continuing vibrancy

- **Electron**
  - Future of flavor physics effort
  - Next steps for Lepton-Collider white paper
  - Next steps for Heavy Photon Search experiment

- **Proton**
  - Next steps for IBL project
  - Long-term generic R&D and the Detector R&D program
  - Future of Tier 2 center
Summary of site visit issues

• Non-Accelerator: Cosmic Frontier
  – Next steps for LSST: JOG, R&D, project planning
  – Next steps for JDEM/WFIRST
  – Evolution of BigBOSS
  – Next steps for SuperCDMS: R&D and project planning
  – Evolution of CTA
  – Evolution of CMB

• Non-Accelerator: Intensity Frontier
  – Operations for EXO-200
  – Support for full EXO R&D; implications for ONP stewardship
Summary of site visit issues

• Accelerator R&D
  – Future of SciDAC
  – Buildup of PWFA effort
  – Timeline & operations costs for Sector 0-20 & FACET experimental area
  – Support for HG program and X-band facilities
  – Development of a coherent X-band strategy
  – Support for test facility operations (NLCTA, ASTA)
  – Planning for ILC in FY2012 and beyond
  – HEP stewardship of generic accelerator R&D
Summary of site visit issues

• Detector R&D
  – Incorporating long-term LHC R&D effort
  – Opportunity to partner with Stanford and Photon Science
  – Operations costs for End Station Test Beam (ESTB)
  – Transitions: generic R&D, pre-project R&D, post CD-0 R&D and maintaining core capabilities

• HEP computing
  – Next steps for Computational Cosmology proposal
  – Future of SPIRES funding
  – Future of Scientific Computing Applications (SCA) group
  – Future of SciDB
Summary of issues

• General
  – Impacts of a CR
  – Priority for additional funding
  – Impacts of multiprogram financial model
  – Movement of funding between programs and managing SLAC HEP from an institutional perspective
  – Demographics and staff renewal
  – SLAC PPA role at the national level
  – PPA Advisory Committee
Operations costs for scientific computing

- Completed exercise of bottoms up re-evaluation of services and costs based on FY2010 services
  - Catalog of services and required labor used to build complete model
  - Validated against LBL and BNL operations
- Need ~22 FTEs minimum to operate the current installation
  - 7 FTEs ($1.1M) charged to Scientific Computing in FY10 more appropriately assigned to indirects
  - ~4 FTEs to maintain shared services (including Head of SciComp)
  - 11 FTEs to operate current size of facility (2200 compute servers; 230 file servers)
    - ~5 needed minimally to maintain expertise, 6 set by scale of facility
    - M&S ($840k) for licenses, maintenance
- Planned model
  - Only 5.5 FTEs shared in cost recovery, remainder built into indirects
Examples of Costs

LCLS Lustre Storage Cluster
Silver/Gold level, 500 drives, 8 servers, 10TB backup up per week, 4 racks: 16 hours/week = $137K/year

Fermi xrootd Storage Cluster
Silver level, 1180 drives, 27 servers, 4 racks: 10.3 hours/week = $88K/year
$3k/ “cluster” & $2000/server

Does not include share of M&S and shared services

Fermi Compute Cluster
Silver level, 172 servers:
9.2 hours/week = $80K
$34k/cluster & $260/additional server
New model for cost sharing per Project/Directorate

<table>
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<tr>
<th>Groups</th>
<th>Total cost To Pay After Subsidy (K$)</th>
<th>Indirect by Lab budget</th>
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<tr>
<td>ACCLR/Various</td>
<td>2.61</td>
<td>16.37</td>
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<tr>
<td>ACCLR/MCC</td>
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<td>161.00</td>
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<td>ACCLR/ARD</td>
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<td>PPA/ATLAS</td>
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<td>PPA/SuperB</td>
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Note: ARD will be HEP/LCLS shared
Science goals and creating new opportunities

• Opportunities are framed by outstanding science
  – Fermi will produce definitive results in searches for (or even discovery of) dark matter, cosmic accelerators, relativistic outflows
    • Expect NASA will extend mission to full 10 years driven by these and other exciting science opportunities
  – ATLAS is poised to make discoveries at the energy frontier and we are in the thick of engaging in this science
  – We are already learning how to attack the dark energy problem with DES, gearing up for science leadership when LSST comes online
  – BABAR is literally write the book on heavy flavor physics, CP violation, rare decays and spectroscopy
  – We are poised to begin the search for neutrinoless double beta decay and direct dark matter searches
PPA plans for enabling science: 5-10 years

- Targeted programs in particle physics, particle astrophysics & cosmology
  - Establish a leading dark energy science program
  - Establish SLAC as major partner in next generation direct dark matter search
  - Retain SLAC as a world leader intensity frontier quark flavor physics
  - Engage in LHC upgrade program
  - Play a leading US role in initiating next generation particle astrophysics experiments, such as CTA and EXO, through CD-0
- Premier electron accelerator laboratory
  - Establish fundamental electron and positron acceleration properties for PWFA and secure CD-0 for demonstration phase for PWFA collider
  - Establish warm x-band technology for warm energy frontier collider and other science applications
PPA plans for enabling science: 2-5 years

**PPA**
- Execute the construction of the LSST camera and develop the data management system
- Execute the fabrication of SuperCDMS sensors and construct germanium towers for SNOLab
- Execute the design and construction of collider and detector systems for a high-luminosity next generation B-factory project
- Support the optimal performance of the Fermi LAT instrument and the delivery of high quality data to the scientific collaboration
- Steward a device development program that supports ultrafast x-ray detector and PPA science programs at SLAC (Joint with LCLS & SSRL)

**HEP accelerator R&D**
- Execute PWFA research program to demonstrate electron/positron acceleration properties with FACET; advance proposals for PWFA demonstration phase following FACET
- Secure funding from non HEP sources to execute coherent research, development, and industrialization projects for X-band technology
PPA plans for enabling science: 0-2 years

PPA

- Execute CD-2 on LSST and define and propose dark energy science center
- Execute CD-2 on Super CDMS project
- Secure a 5-year extended mission (2013-2018) from NASA and DOE for the Fermi GST
- Perform critical R&D and develop high-luminosity next generation B-factory project through CD-2
- With LCLS & SSRL identify leader of detector R&D program by Q2 FY11
- Identify and recruit key leaders: EPP Division Head, Detector R&D Head

HEP accelerator R&D

- Identify and recruit key leadership, a wider research community and a concrete initial research program for PWFA at FACET; concept development for FACET II
- Identify and consolidate core competencies in high gradient and RF source technology
- Develop international partnerships and a proposal for a coherent research, development and industrialization proposal for x-band program
Dark Energy Survey research plan

• Critical Outcomes
  – Enable precision exploration of dark energy

• Strategic
  – Participate in 5-year observing and data analysis with the DETF Stage III experiment Dark Energy Survey (DES)

• Tactical
  – Deploy and commission RASICAM all sky camera in FY11 (Schindler)
  – Develop, deploy, and commission DECam focus and alignment code in FY11-12 (Roodman)
  – Carry out DES “PreCAM” observing and deliver photometric calibration grid in FY11-12 (Burke)
  – Generate mock galaxy catalogs for DESDM DC6/7 and science analyses in FY11-12 (Wechsler)
  – Deliver WL cluster finding code in FY11 and carry out science analyses with subsequent data releases (Burke, Roodman, Schindler, Wechsler)
Operations plans for enabling science: 5-10 years

- Strategic objectives
  - Facilitate the attraction, motivation and retention of SLAC-wide Human Capital
  - Underpin the delivery of SLAC Facilities and Infrastructure that are mission ready
  - The provision of useful, timely and accurate institutional Information and Procedures
- Management systems
  - Operations will have fully operational Management Systems that underpin and coordinate these functions effectively and efficiently, rendering our support costs as among the most competitive of the National Laboratories, demonstrated via DOE-wide benchmarks
PPA plans for enabling science: 2-5 years

**Human capital**
- Staffing plans for L1s, L2s & critical human assets exist, including succession, development and recruiting plans  *ALDs, LarryY FY12*
- A suite of effective mandatory and supplemental leadership and management training; L1s thru L3s will be trained  *EricS FY12; ALDs FY13*

**Facilities and infrastructure**
- RSB *FY14*, SUSB *FY16*, PSLB *FY18*; Computer Facility *FY14* are constructed and occupied  *Mark R, SandyM, JoS, KeithH; DonL, BillM*
- Conventional facilities and infrastructure will be mission ready consistent with the Fy’10 SLAC Ten Year Plan  *MattW FY15*

**Information and procedures**
- An integrated business system exists that is the backbone for procedures and information  *DonL, LindaR, LarryY FY12*
- An integrated program of government affairs, public outreach, education and communication goals exists  *CommsDir, FY12*

**Management systems**
- Mission and mission-support functions are organized to optimize service delivery (i.e., Centrally-Managed and Field-Deployed)  *MarkR, ALDs, FY14*
PPA plans for enabling science: 2-5 years

**Human capital**
- Improved performance evaluation system exists including goal setting, evaluating performance to goals, and motivating supervisor/staff communication that satisfies 75% of supervisors; with 100% of lab staff evaluated. *EricS, DonL, ALDs, 3rdQ*
- Incentive–based compensation, directly associated with achievement of performance objectives, exists for ALDs and Ops Directors. *KarenL 2ndQ*

**Facilities and infrastructure**
- CD-0 for SUSB and PSLB & CD-2/3A for RSB are achieved. *MarkR, JoS, KeithH, SandyM 1stQ*
- A Mission Readiness approach, including Sustainability and Legacy Waste, is defined and successfully reviewed. *MattW, CraigF 4thQ*

**Information and procedures**
- Business systems strategic sourcing is determined. *YuhuaL, TanaH, LarryY, BusMgrs 3rdQ*
- Interim improvements exist for budget 2ndQ, travel 1stQ, time-effort 2ndQ, finance controls 2ndQ, eMarketPlace 3rdQ. *TanaH, DonL, LarryY, LarryD*
- Scientific Computing recharge/support model is implemented. *RandyM, ALDs 1stQ*
- For Communications, a clear definition of audience and needed messages is created. *CommsDir, PatK, MelindaL 2ndQ*
PPA plans for enabling science: 2-5 years

**Management systems**

- CFO, Communications Director, and Planning and Assurance Director are in place  *SandyM, MarkR 1stQ*
- Operations staffing is mission-ready capable, 100% at L3 & 75% at L4, as measured both by satisfaction with service delivery  *MarkR 4thQ*
- Needed quantity and quality of project managers are on staff, trained to standards, and utilized measured by satisfaction with service delivery  *LizD, MattW, DonL 3rdQ*
- Management systems exist for planning, assessment (inc. annual survey of SLAC), and continuous improvement  *SteveW, CraigF 4thQ*
- Specific IT and OCFO functions are delivered through Centrally-Managed, Field-Deployed personnel  *MarkR, DonL, TanaH, ALDs 3rdQ*