

## Goal 1 Provide Efficient and Effective Mission Accomplishment

### MAJOR ACCOMPLISHMENTS

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- Experiments conducted at LCLS have made significant progress towards the determination of structures of complex biological molecules using nano-scale crystals. SLAC staff were members of both multinational teams which published this breakthrough work in 2 *Nature* papers early in 2011.
- Photon Science and LCLS staff are co-authors on 4 additional papers or manuscripts in review in high profile journals (beyond the 2 mentioned above) which involve early science on LCLS, including one on nonlinear atomic response to intense ultrafast x-ray pulses .
- J. Stöhr received the 2011 Davison-Germer Award and Z.-X. Shen the 2011 Oliver E. Buckley Award (shared with J.C. Campuzano & P. Johnson), both given by the American Physical Society.
- To advance energy research, SSRL developed a new 3-D spectromicroscopy technique with 60nm resolution for photovoltaics, fuel cells and battery research, as well as supported 9 BES Energy Frontier Research Centers using SSRL.
- Beams have been delivered safely and effectively to support the LCLS user program during Run III - a photon beam availability of 94.8 % was achieved. Compared to Run II, the LCLS availability increased from 92.7 % , which is due to AIP Investments in machine subsystems, such as modulators and improved procedures to reduce machine tuning time.
- AD implemented new modes of LCLS operation at 40 and 150 pC, providing additional capabilities to users, in particular additional pulse lengths of ~ 150 fs and ~ 40 fs, respectively. A Full 120 Hz operation of the entire LCLS machine has recently been achieved.
- The Fermi LAT Collaboration has published 25 papers in FY2011, including an extension of the widely-cited measurement of the spectrum and tight limits on the anisotropy of cosmic-ray electrons from 7 GeV to 1 TeV, and discovery of giant gamma-ray bubbles emanating from our galaxy.
- The BABAR Collaboration has published 14 papers in FY2011, including evidence for a long-sought spin-singlet bound b-anti-b quark state  $h_b(1P)$  as a probe of the hyperfine structure of the QCD potential.
- The ATLAS group at SLAC has continued to support operation of the high level trigger and pixel systems, while resolving a difficult performance issue with data acquisition for the muon system, developing physics tools for analysis and contributing to first physics results.
- LSST continued R&D and project planning preparations for CD-1 anticipated in summer 2011.
- The EXO-200 neutrinoless beta decay experiment began initial operations with Xenon 136.

### STATUS OF NOTABLE OUTCOME(S)

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- N/A for Goal 1

### SIGNIFICANT CONCERNS AND MITIGATIONS

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- Reduced future budgets could lead to a decrease in overall availability and uptime of the accelerator complex. *Mitigation:* Review and optimize the available budget and develop strategies to operate the LCLS and SSRL under different budget scenarios.
- Reduced future budgets could significantly impact the delivery of future science due to reductions in manpower, M&S and equipment budgets. *Mitigation:* Program prioritization and potential descoping of some areas of research.

## Goal 2 Efficient and Effective Design, Fabrication, Construction and Operations of Research Facilities

### MAJOR ACCOMPLISHMENTS

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- The LCLS CXI (coherent x-ray imaging) instrument completed its early commissioning and began operation for users, several months ahead of schedule. This is the 4<sup>th</sup> LCLS instrument to come on line.
- User run 3 of LCLS was highly successful, with machine availability of greater than 96%.
- RIXS-X-ray Raman-XES Spectrometer at SSRL started commissioning in 12/10 and remains on track for scheduled completion date of March 31, 2011. This advanced spectroscopy instrument expands capabilities for energy and catalysis research.
- SSRL beam lines have been operating successfully with frequent fill at 300 mA since the beginning of the run with  $\approx$  1% current stability. Approval for 350 mA operation was secured in November 2010.
- FACET installation is progressing and commissioning planned for summer 2011. The lead experiment achieved highest rating from the SLAC Accelerator Research and Experimental Program Committee.

### STATUS OF NOTABLE OUTCOME(S)

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- BES: Develop the Conceptual Design Report (CDR) for the LCLS-II. (Objective 2.1)
  - The LCLS II CDR is being finalized in preparation for a CD-1 Lehman review by BES in April 2011.

### SIGNIFICANT CONCERNS AND MITIGATIONS

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- Operation of LCLS for users during June-Oct 2011 (LCLS user run 4) may need to be curtailed if funding falls below the minimal requirements that have been communicated to BES. *Mitigation:* Contingency plans are being prepared for several funding scenarios, which will minimize risk to the LCLS program over the long term.
- If SSRL's funding is below its normal operating needs, it will severely curtail SSRL's ability to face emergencies or upgrade its assets. In particular, SSRL will be unable to make accelerator modifications to reduce RF risk. *Mitigation:* Contingency plans are being prepared for reduced funding scenarios in order to minimize the impact on user operations.
- The Future of x-band program in AD has to be defined. *Mitigation:* Program redirection under development to be reviewed by SPC in May.
- Funding for full utilization of FACET remains a challenge. *Mitigation:* Discussions ongoing with HEP program office.
- Accelerator Machine Development (MD) time is limited. *Mitigation:* Optimize use of available time, further integrate the LCLS instrument scientist staff into MD planning.

### Goal 3 Efficient and Effective Science and Technology Program Management

#### MAJOR ACCOMPLISHMENTS

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- Successful BES Program peer reviews of the LCLS operations program and of SSRL were completed in FY11.
- Deployment of common user portal for SSRL and LCLS users as been completed.
- SSRL launched its strategic planning process, building on input from its Scientific Advisory Committee (SAC), Machine Advisory Committee (MAC) and Users' Executive Committee (UEC) meetings.
- The SLAC Energy Taskforce has developed a blueprint for future strategic portfolio development in the energy arena and the report is currently being finalized.
- In October 2010, an external Accelerator Engineering Division review focused on operational efficiency.
- Collaborations with Argonne National Laboratory and Lawrence Berkeley National Laboratory on a potential \$20M+ Injector Test Facility (ITF) and an FEL R&D Program focused on seeded radiation and polarized beams were developed.
- ALDs for SSRL and AD were successfully recruited and appointed since last summer.

#### STATUS OF NOTABLE OUTCOME(S)

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- BES: Implement strong, coordinated programs within SLAC's new division structure. (Obj. 3.2)
  - PS Materials Science Division completed strategic plan with 4 defined strategic goals and science objectives and connectivity elements, guiding strategic diversification and future investment.
  - PS Chemical Sciences Division developing coordinated future growth opportunities in areas that include catalysis research, theory and simulation and LCLS-related science.
  - Division administrative staff closely coordinating to most efficiently and effectively support research portfolio across the PS Directorate.
  - MS and CS Division scientific staff strongly engaged in the SLAC Energy Taskforce and PS coordinated workforce provides important core capabilities underpinning targeted strategic growth areas.
  - Cross PS Directorate Plan for strategic hiring and retention of critical personnel for targeted growth.
- BES: Develop a strategic vision to fully utilize LCLS and to expand the Laboratory's photon science program. (Obj. 3.2)
  - SSRL and PS staff work closely with LCLS staff in commissioning and early science of the first 4 LCLS instruments (AMO, SXR, XPP and CXI) and in planning for commissioning of the remaining two instruments (XCS and MEC).
  - PS hosts LCLS collaborators and users providing access to off-line infrastructure such as bio/chem. Labs, off-line characterization tools and setup space.
  - SLAC will develop scope, schedule and cost to build an Injector Test Facility (ITF) in collaboration with LBNL in the next few years.
- HEP: Develop and execute a plan to align the size and scope of the HEP research program with the planned resource constraints for FY 2011 and 2012. (Obj. 3.2)
  - Particle Physics, particle astrophysics and accelerator research plans for different FY2012 funding scenarios have been developed.
  - Future accelerator research plans, their alignment with the SLAC mission and funding sources are being developed.
  - SLAC is developing a framework to use Work for Others Programs to support SLAC infrastructure.

#### SIGNIFICANT CONCERNS AND MITIGATIONS

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- Budget uncertainties remain for FY11. *Mitigation:* Various scenarios have been developed to deal with possible funding level outcomes so as to minimize impact on scientific productivity.

## Goal 4 Provide Sound and Competent Leadership and Stewardship of the Laboratory

### MAJOR ACCOMPLISHMENTS

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- SLAC has three new leaders now in place during this review period:
  - ALD for Accelerator Directorate, Norbert Holtkamp; with joint appointment as faculty member at Stanford
  - CFO, Linda Rakow; Stanford Business Affairs was instrumental with the search
  - Communications Director, Farnaz Khadem; Stanford Communications was critical help in the search and recruitment
- SLAC has created a new office, Planning and Assessment, as a collaborative element of the integrated assurance model with Stanford and SSO. Craig Ferguson is the founding director of this office.
- The incoming ALD for Photon Sciences, Cynthia Friend, is being recruited with a joint faculty appointment with a Stanford Engineering Department.
- The incoming Head of Scientific Computing, Amber Boehnlein, has been hired.
- Proposed Executive Variable Pay ensuring senior management goals set, weighted, and aligned with Lab Agenda.

### STATUS OF NOTABLE OUTCOME(S)

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- Demonstrate the use of the full suite of resources at their disposal (including the expertise of laboratory scientists and engineers) to develop innovative, crosscutting strategies for meeting the Executive Order 13514 Goals. (Objectives 4.2, 4.3)
  - Developed and delivered a SLAC Site Sustainability Plan to DOE.
  - An active program is in place in collaboration with SSO to identify projects with a positive ROI as well as staff behavioral changes that will reduce generation of green house gases at SLAC.
  - Hired two energy program engineers
  - Investigated viable third-party funding for energy projects with high payback
- Fill critical management positions in mission and mission-support areas. (Objective 4.2)
  - See Major Accomplishments above
- Implement a Contractor Assurance System (CAS) in accordance with Clause H.42 of the prime contract. (Objective 4.2)
  - Published the SLAC Laboratory Management Plan and submitted revised Quality Assurance Plan, aligning to and implementing SU CAS
  - Established the Director's Assurance Council to evaluate, integrate and manage institutional risk

### SIGNIFICANT CONCERNS AND MITIGATIONS

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- SLAC management is aggressively planning for various budget scenarios for balance of FY 11 and for FY 12, including shared risk items.

## Goal 5 Sustain Excellence and Enhance Effectiveness of Integrated Safety, Health and Environmental Protection

### MAJOR ACCOMPLISHMENTS

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- Although SLAC is experiencing an increase in TRCs compared to the last couple of years, there has only been one DART case, keeping SLAC in the top 25% among the National Labs.
- In order to improve health services and ensure full integration with the Stanford environment, Occupational Medicine services were successfully transitioned to Stanford University.
- SLAC continues to play a major role in the DOE-wide Sustainability planning. More locally, SLAC hired two sustainability engineers, who in close collaboration with the Site Office, are developing plans to identify, prioritize and implement sustainability measures across the site. SSRL replaced a chiller reducing the inventory of a Class I Ozone Depleting Substance by 600 lbs.
- SLAC created mandatory online and video-based training to sustain the awareness of safety associated with low-speed driving.

### STATUS OF NOTABLE OUTCOME(S)

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- Commence disposition of excess materials using protocols formerly covered by the moratorium. (Objective 5.2)
  - SLAC is current on the action plan (D&D lead identified, excess blocks identified) but remaining FY milestones, listed below, may be delayed given current budget situation.
    - Complete disposal protocols (SLAC Material Release program)
    - Purchase and install radiation portal monitor
    - Start to release Concrete Shield Block

### SIGNIFICANT CONCERNS AND MITIGATIONS

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- Occurrence rate of low-speed vehicle accidents began to rise. SLAC upgraded its fleet, including the retirement of two wheeled motorized vehicles and upgrade electric carts that were not in compliance with ANSI standards. SLAC developed training and did a safety stand down of all SLAC/GSA vehicle drivers. Training was completed for more than 850 personnel.
- SLAC has been experiencing an increase in the number of recordable cases during the first half of the year. There have been 8 cases (TRC rate ~1.0), although only 1 case is a DART. 5 of the 8 cases are ergonomic/repetitive motion cases. Further investigation of the trend and type of cases (i.e., ergonomics) is underway. Noting this trend, we are reaffirming SLAC-wide awareness and attention to safety via the Plan of the Week meeting, line management and improved communications.
- A SLAC subcontractor doing air pressure testing and not following prescribed work planning and control procedures resulted in a potentially serious injury. SLAC issued a Stop Work and contractual Cure Letter to the contractor. SLAC also conducted a root cause analysis is incorporating the mitigation into the conduct of construction management process.
- SLAC sustainability and legacy material disposal efforts have been put on hold pending resolution of the FY11 budget. If the FY11 budget does not permit this work to be initiated, this will be a high priority for SLAC in FY12.

## **Goal 6 Deliver Efficient, Effective and Responsive Business Systems and Resources and Enable the Successful Achievement of the Laboratory Mission(s)**

### **MAJOR ACCOMPLISHMENTS**

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- Interim improvements in financial controls have been completed, including more rigorous desk procedures and policies, creation and utilization of formalized checklists, enhanced internal management review, accompanied by generation of increased awareness and provision of training.
- SLAC has reached agreement with Stanford and Booz Allen Hamilton on an approach to finalize the business systems strategic sourcing decision. Further progress is on schedule with the project plan.
- Tactical business system improvements have been made, including direct deposit of reimbursements; lab-wide budget model and budget/actual reporting.
- Travel services and systems have been improved and have received positive feedback from the Laboratory community; formal customer survey will be conducted in the last quarter of FY11.

### **STATUS OF NOTABLE OUTCOME(S)**

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- Improve financial management systems consistent with current business practices and an associated Plan of Action and Milestones (POAM). (Objective 6.1)
  - All aspects of the project are consistent with scope and on schedule.
  - Engaged feasibility analysis consultant; project underway
  - Next step: complete analysis of options and develop recommendation and plan
  - Interim improvements in progress: ARF/STARS automation to improve controls; online time and effort reporting; eMarketplace solution
  - Internal controls improved through increased awareness, training, updated desk procedures and policies, adoption of checklists, enhanced management review
- Demonstrate efficient and effective execution of all American Recovery and Reinvestment Act (ARRA) activities at the laboratory. (Objective 6.2)
  - All ARRA projects are performing well and are on-cost and on-schedule.
  - Reporting working well
  - Stanford University Internal Audit providing review and quality assurance
  - OIG audit completed with no formal recommendations

### **SIGNIFICANT CONCERNS AND MITIGATIONS**

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- Delivery of new business systems to SLAC is the highest operational priority. Potential budget reductions at SLAC could lengthen the implementation of the scope of the remaining project over an extended period of time.
- Internal controls continues to be the highest business risk and several interim measures have been put in place.

## **Goal 7 Sustain Excellence in Operating, Maintaining and Renewing the Facility and Infrastructure Portfolio to meet Laboratory Needs**

### **MAJOR ACCOMPLISHMENTS**

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- Research Support Building (RSB) project achieved CD-2/3A. The Building 28 construction contract has been awarded; contractor has mobilized; project is on cost and on schedule.
- Science and User Support Building (SUSB) project achieved CD-0 and is in FY12 SLI President's budget.
- Agreement was reached between SLAC and Stanford for the proposed site for the Stanford Research Computing Facility (SRCF), which is scheduled to go to Board of Trustees for concept and design approval in the next quarter.
- SLAC's 2010 Long Range Development Plan was completed as a joint collaborative effort between SLAC and Stanford University Architect and campus planning team; provides a conceptual plan for SLAC land use through 2025.
- Completed successful mission-readiness preliminary peer review.
- SLAC has enhanced its staffing profile, its ability to deliver projects and manage subcontractors.
  - Hired four project managers to support the RSB, SUSB and ARRA projects.
  - Launched the new building engineer program by hiring two building engineers.
  - Hired facility quality manager to help document critical processes and procedures for mission readiness; document control manager to systematize documents, drawings, etc

### **STATUS OF NOTABLE OUTCOME(S)**

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- Create and utilize a reliable, robust and consistent project management methodology, ensuring a sufficient number of quality project managers are available. (Objective 7.1)
  - Defined R2A2s for project managers
  - Formal project manager training, which includes Earned Value Management and purchasing, has been defined, implemented and continuously improved.
  - Skilled, trained project managers have been hired to support major capital projects and business systems projects.
- Achieve CD-0 for at least one facility of the Signature Buildings Project. (Objective 7.2)
  - Achieved CD-0 for SUSB
  - Significant progress to achieve CD-1 by ~9/30/12; Statement-of-work for Conceptual Design Report developed

### **SIGNIFICANT CONCERNS AND MITIGATIONS**

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- SLAC-wide funding reductions may impact project scheduling and operations.
- The availability of quality project managers for smaller projects continues to be of concern. SLAC is developing an incentive program for PMs, along with a PM development program to raise the level of competency of this key resource.
- SLAC continues to suffer from the lack of up-to-date drawings and documentation on its existing conventional facilities infrastructure. A program is in place to update SLAC's "as-built" drawings.
- While SUSB is in the FY'12 SC SLI priorities, budget challenges in DOE might threaten this prioritization. We will mitigate this by ensuring and reminding SC of the mission drivers for this facility.

## **Goal 8 Sustain and Enhance the Effectiveness of Integrated Safeguards and Security Management (ISSM) and Emergency Management Systems**

### **MAJOR ACCOMPLISHMENTS**

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- The new SLAC Badging Office has been constructed, occupied and is now in service, including a new visitor parking lot adjacent to the front gate.
- Continued active involvement with DOE HSS on design and implementation of Security Access infrastructure project.

### **STATUS OF NOTABLE OUTCOME(S)**

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- Implement the planned State-of-the-Art Security Upgrade. (Objective 8.3)
  - Working with SLAC Site Office, SLAC has continued active engagement with DOE HSS and HSS contractors (NSTech) to design and install a modern security system. System is being completed in two phases.
    - Phase 1 addresses site access, including the perimeter of the site, full automation of Alpine Gate and the implementation of a license plate reader system for Sand Hill Gate. Worked with SSO, HSS and DOE SC to secure \$400+K in funding to implement this phase.
    - Phase 2 scope was fully developed, including interior gates, fences, key buildings and Conduct of Operations documentation. Completion of Phase 2 is dependent upon DOE funding under continuing resolution and subsequent budgeting.
  - Completed installation of 17 security cameras in Building 50 and shipping and receiving area.

### **SIGNIFICANT CONCERNS AND MITIGATIONS**

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- The Phase 1 gate configuration changes are not just technical in nature but also require staff members and visitors to change their driving routines. ESH will 'red team' the technology and configuration to guarantee (as much as possible) a very smooth transition. Further, there will be mitigation and roll-back plans before implementation begins.
- DOE funding of Phase 2 is dependent upon Federal budget and continuing resolution issues. Success of this project is dependent upon DOE being able to provide at least all of the hardware for Phase 2.
- SLAC identified that some staff members and guests were accessing inappropriate websites via the SLAC network. SLAC is procuring a web proxy device that will automatically block access to malware and inappropriate websites.
- Programming of the security database will require integration of SLAC's Training Database, and current workload demands on OCIO are proving challenging to securing programmer and project manager resources. ES&H and OCIO leadership are coordinating.