U.S. Department of Energy
Office of Science (SC)
Stanford Site Office (SSO)
Stanford Linear Accelerator Center (SLAC)
2575 Sand Hill Road, MS-8A
Menlo Park, CA 94025

Department of Energy
Office of Science

May 21, 2004

Dr. Jonathan Dorfan, Director
Stanford Linear Accelerator Center
2575 Sand Hill Road
Menlo Park, CA 94025

RE: FY 2003 Annual Performance Assessment; Stanford Linear Accelerator Center

Dear Dr. Dorfan:

In accordance with the requirements of the Department of Energy (DOE) contract with the Board of Trustees for the Leland Stanford Jr. University for the management and operation of the Stanford Linear Accelerator Center (SLAC), enclosed is the DOE FY 2003 Annual Performance Assessment of the Laboratory.

The FY 2003 overall rating for SLAC is "OUTSTANDING." You and your staff are recognized for earning the highest overall rating of "*Outstanding*" for the sixth consecutive years. We would like to commend SLAC for your continued Outstanding performance in Science and Technology (S&T) Programs (High Energy Physics, Particle Astrophysics, Synchrotron Radiation, and Biological and Environmental Research). Of special note this year were the successful completion of the SPEAR3 Project and the start of design of the Linac Coherent Light Source (LCLS) Project which will lead to construction completion in FY 2008. Also of special note was the completion of the SLAC/Stanford University Guest House in June 2003. We appreciate Stanford's donation and their outstanding contribution to SLAC's user community. Business Management (including ES&H) was rated Excellent this year. The Excellent Business Management rating would have been "Outstanding" had it not been the seriousness of the ES&H Type B Ladder Accident which occurred in January 2003. Of the eleven Business Management areas evaluated, five had no change in rating from FY 2002. Equal Opportunity & Affirmative Action, Communications & Public Affairs, and Information Management all had increased rating from FY 2002. Environmental Safety & Health, Human Resources Management, and Procurement had decreased ratings from FY 2002.

The FY 2003 scores continue to demonstrate the effectiveness of SLAC's leadership in High Energy Physics and Synchrotron Radiation. The spirit of cooperation and teamwork that exists between SLAC and DOE serves as a strong foundation for continued success in support of DOE's missions and national goals, especially as the Office of Science begins implementation of its One SC Restructuring Project. Please extend our congratulations to the Laboratory for this sustained level of performance. Should you have any questions regarding this report, please contact me at 650-926-3208.

Sincerely,

John S. Muhlestein
Site Manager
Stanford Site Office

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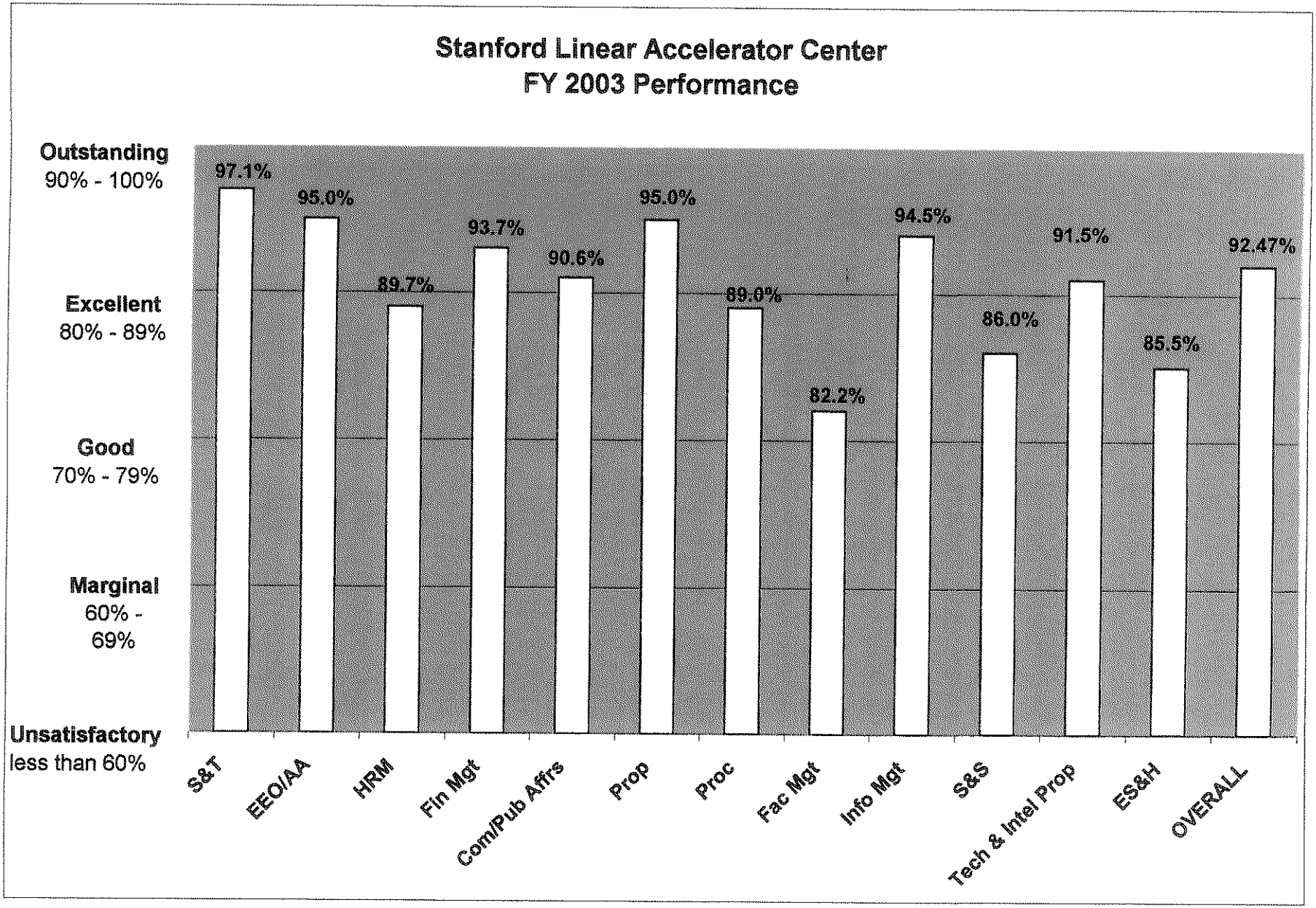
Stanford Linear Accelerator Center
FY 2003 Performance
Outstanding
90% - 100%
Excellent
80% - 89%
Good
70% - 79%
Marginal
60% - 69%
Unsatisfactory
less than 60%
97.1%
95.0%
89.7%
93.7%
90.6%
95.0%
89.0%
82.2%
94.5%
86.0%
91.5%
85.5%
92.47%
S&T
EEO/AA
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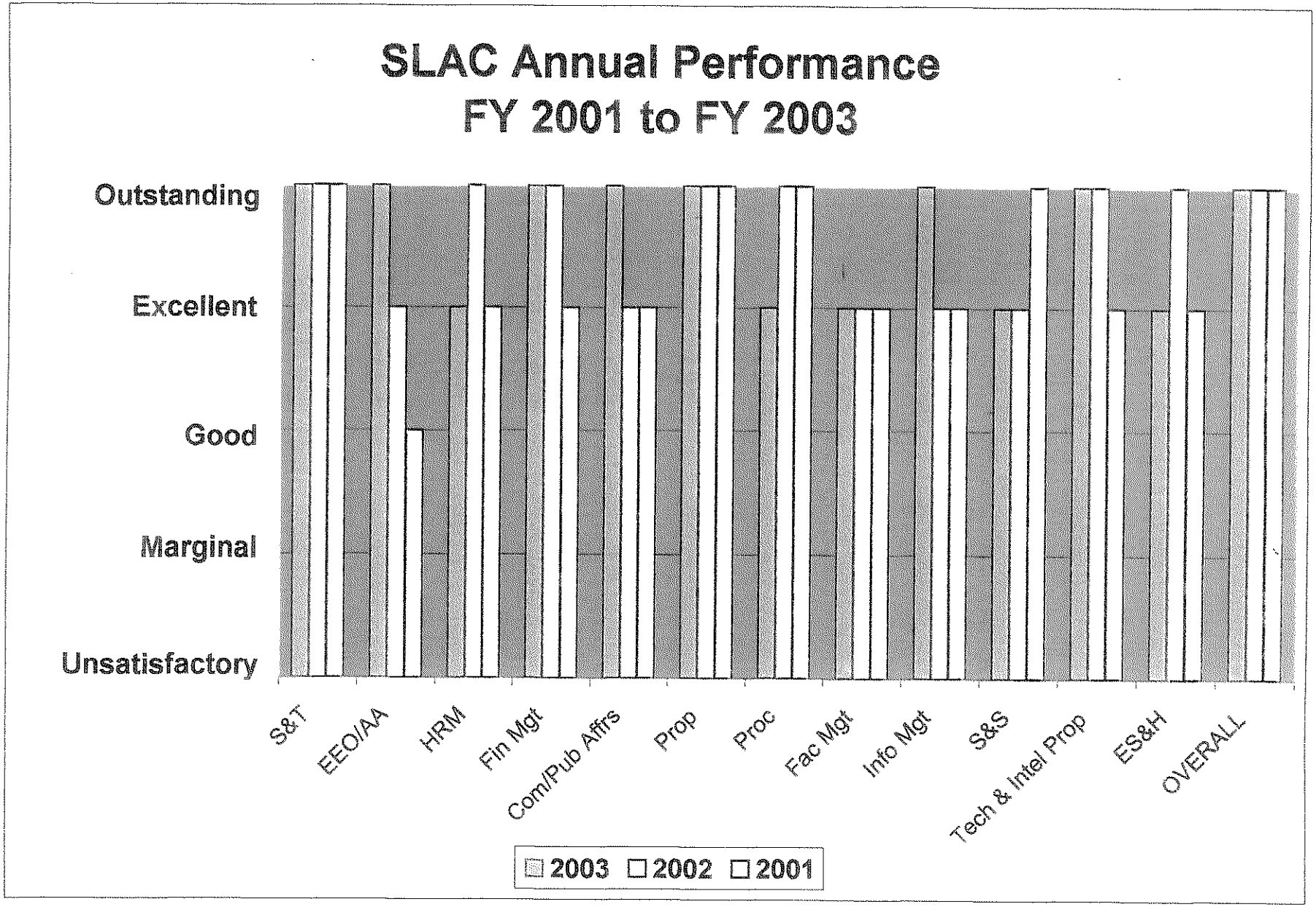
OVERALL


SLAC Annual Performance
FY 2001 to FY 2003
Outstanding
Excellent
Good
Marginal
Unsatisfactory
S&T
EEO/AA
HRM
Fin Mgt
Com/Pub Affrs
Prop
Proc
Fac Mgt
Info Mgt
S&S
Tech & Intel Prop
ES&H
OVERALL
2003
2002
2001

EXECUTIVE SUMMARY

I. PERFORMANCE-BASED ASSESSMENT PROCESS

This report is produced by the US Department of Energy (DOE), Office of Science, [High Energy & Nuclear Physics (HENP), Basic Energy Science (BES), Basic Energy Research (BER)], the Stanford Site Office (SSO), and Oakland Service Center (OAK/NNSA), to evaluate the Stanford Linear Accelerator Center's (SLAC) overall performance for FY2003. The evaluation areas are: 1) Scientific Research Programs and Technology Development; and, 2) Business Management (including ES&H). This evaluation is based upon an objective performance measurement system, validation of the Laboratory's self-assessments, scientific peer reviews, and ongoing operational awareness.

The period of performance for this Fiscal Year 2003 Annual Performance Assessment Report is October 1, 2002 through September 30, 2003. The rating is based upon a system evaluation, which provides for previously agreed-to measures with ratings expressed as percentage. The rating characterization is five tier, (Outstanding, Excellent, Good, Marginal, and Unsatisfactory). The scientific Research Programs and Technology Development section is weighted 60%, while the Business Management section (including ES&H) is weighted 40%. **Appendix A** of this report provides the methodology for the rating. **Appendix B** of this report provides detailed scores and ratings for each functional area.

The overall SLAC performance rating for FY2003 is OUTSTANDING. The Science and Technology Program summary rating of **Outstanding** is based upon input provided by Raymond L. Orbach, PhD, Director, Office of Science (SC). The Summary Rating combines performance evaluations from the Office of HENP, BES, and BER. The Business Management summary rating of **Excellent** covers: Communications & Public Affairs, Environmental Safety & Health, Equal Opportunity & Affirmative Action, Facilities Management, Financial Management, Human Resource Management, Information Management, Personal Property, Procurement, Safeguards & Security, and Technology & Intellectual Property Management. Business Management was "Outstanding" in FY2002 and would have remained so for FY2003 had it not been for ES&H rating. The reduction of ES&H from Outstanding in FY2002 to Excellent in FY2003 was the significant contributor to the Business Operations FY2003 rating of "Excellent". The seriousness of the Type B accident caused the ES&H and Business Operations rating degradation. A summary chart of the scoring and rating in each area is provided on pages 5 and 6 of this Executive Summary. Full text of the FY2003 Performance Assessment is provided under the Detailed Assessment Result.

II. SUMMARY OF SIGNIFICANT ACCOMPLISHMENTS

This Executive Summary highlights SLAC FY 2003 performance achievements. The scoring and adjectival ratings for each of the functional areas are contained in the body of this report. There were no Science and Technology areas for improvement in FY2003. Only ES&H, HR, and Procurement had areas which warranted recommendations for improvement in FY2003.

A. SCIENCE AND TECHNOLOGY

Stanford University operates and maintains the Stanford Linear Accelerator Center (SLAC) as a National User Facility, and manages the research, design, construction, engineering, testing, training, education, technology transfer, and other activities conducted on behalf of the Department of Energy (DOE), in a manner that will maintain a vigorous, forward-looking program. The mission is the generation of new, and expansion of existing, scientific and technical knowledge in: high energy physics (HEP), particle astrophysics and cosmology, including theoretical, experimental, and accelerator physics; basic energy sciences (BES), including but not limited to the utilization of synchrotron radiation in biology, chemistry, materials science, medical sciences, physics and other disciplines; biological and environmental research (BER); and, all appropriate areas of natural sciences, engineering, and related disciplines. SLAC has been established as a National User Facility for the conduct of unclassified research, providing a unique resource for the DOE Office of Science program and related User communities.

The very nature of scientific inquiry, its complexity, duration, and examination of the unknown, mitigate against the establishment of purely quantitative criteria for evaluating the results of this research. In recognition of this difficulty, a system utilizing the review by scientific peers has proven its worth in influencing the direction of, and establishing standards for scientific research. In keeping with this tradition, the peer review process is used to evaluate the science and technology programs at SLAC.

For Fiscal Year 2003, the overall performance rating for Office of Science (SC) science and technology programs at the Stanford Linear Accelerator Center (SLAC) is Outstanding. This rating relates to a scale that includes Unsatisfactory, Marginal, Good, Excellent, and Outstanding. It is a weighted average of performance evaluations provided by SC Program Offices, with the budget for SLAC from each office as the weighting factor. This summary rating combines overall performance evaluations by the SC offices of High Energy Physics (HEP), Basic Energy Sciences (BES), and Biological and Environmental Research (BER).

The Stanford Linear Accelerator Center currently operates a cutting edge program in high energy physics. The research and user programs at the Stanford Synchrotron Radiation Laboratory (SSRL) provide outstanding service to a large community of researchers in structural molecular biology in government, academic and private sector organizations. Finally, the addition of the Geballe Laboratory for Advanced Materials (G-LAM) is a very important development for SSRL, in that it provides a broad science base, including the capability to fabricate new materials and crystals that can be studied at SSRL and the nearby campus of Stanford University.

Overall S& T was rated: OUTSTANDING for FY2003. The breakdown is:

High Energy Physics = Outstanding
Synchrotron Radiation = Outstanding

Last year, FY2002 Overall rating was also Outstanding.

High Energy Physics Performance Evaluation

Office of High Energy Physics (HEP)

The Stanford Linear Accelerator Center (SLAC) currently operates a cutting edge program in High

Energy Physics (HEP) based on the B Factory, small scale "Fixed Target" experiments done with the electron beam from the SLAC 2-Mile Linac, the construction of a space-based astroparticle physics experiment (GLAST), and theoretical physics. The groundwork for a long-range future program is being developed today, with accelerator research towards the design of an energy-frontier linear collider.

Quality of Fundamental and Applied Science

B Factory (PEP-II Collider and BaBar Detector): The B Factory continued its impressive performance. From May 1999 to October 2003, PEP-II delivered 141 fb^{-1} of which the BaBar detector recorded 125 fb^{-1}. BaBar promptly published the latest result of CP violation $\sin(2\beta) = 0.741 \pm 0.067 \pm 0.034$.

Analysis in other areas such as rare B decays, $B - \overline{B}$ mixing, τ decays, and charm decays is also progressing. In April 2003, an unexpected discovery of a new particle $D_s(2317)$ was announced. More than 50 papers were published in referred journals over last couple of years, with an additional 50 papers nearing completion. BaBar is a large (550 member) collaboration with members from 72 institutions in 9 countries. There are approximately 120 graduate students and 150 postdoctoral researchers receiving training on BaBar.

Fixed Target Experiments (SLAC 2-Mile Linac): The E-158 Experiment to measure parity violation in Moeller scattering completed its physics data taking. This small experiment, which measures electroweak mixing at an energy scale far below the Z boson mass, is testing for new physics. A preliminary result was presented in spring of 2003, and a final result is expected in FY2004.

Particle Astrophysics (GLAST): SLAC is the host laboratory for the Large Area Telescope of GLAST, an astroparticle physics experiment to detect gamma rays in space. This experiment utilizes HEP detector technologies, such as cesium iodide electromagnetic calorimeters and silicon-microstrip trackers, to study the physics problem of how high-energy gamma rays are produced in space.

Theory: The SLAC theory group works in a variety of areas ranging from the development of fundamental theories to detailed calculations and tests of theories directly relevant to high energy physics experiments at SLAC and elsewhere. Their work was evaluated to be outstanding with significant impact on the field at the HEP Annual Review.

Relevance to DOE Missions and National Needs

DOE Mission and Program Priority: The Laboratory's priorities are well aligned with the DOE mission and the national HEP Program.

Next Linear Collider (NLC) R&D: SLAC leads the NLC R&D program, focusing on development of critical technologies such as klystrons and solid-state modulators, design and test of high gradient structures, examination of final-focus requirements, and an aggressive R&D program in the NLC Test Accelerator (NLCTA).

The work on the physics case for the linear collider continued with emphasis on how to use the unique capabilities of the linear collider environment, such as highly efficient heavy quark tagging, beam polarization, and the possible Higgs and SUSY measurements.

Advanced Accelerator R&D: SLAC also carries out an excellent advanced accelerator research program with a wide variety of topics covering: performance enhancement of current accelerators, research and design for near-future facilities, research in fundamental aspects of accelerator and beam physics, and accelerator physics and technology on high gradient acceleration and advanced concepts.

Effective and Efficient Research Program Management

Research Program Management: The SLAC research program is well managed, and the scientific productivity is high, in spite of difficulties from the tightly constrained budget.

The effectiveness of SLAC management is well demonstrated by the luminosity records at the B Factory in FY 2003, as a result of PEP-II and the BaBar detector operating with high efficiencies. All upgrade and maintenance activities during the planned shutdown period in summer of 2003 were accomplished on schedule -- the result of effective planning and management.

SLAC has managed to deliver sufficient computing resources for BaBar by effectively managing its computing resources, as well as successfully coordinating with major European agency-funded computing centers in Europe.

Although the GLAST Large Area Telescope (LAT) Project baseline review in the summer of 2002 was successful, the LAT Project had to be re-baselined in 2003. An increase in management oversight by the directorate helped the LAT Project overcome its difficulties, and resulted in approval of the Project re-baseline. However, success of this Project will require SLAC management to provide continuing oversight.

Research Program Leadership: The SLAC Director is serving as the chair of the U.S. Linear Collider Steering Committee, as well as the chair of the International Future Accelerator Committee (ICFA). The Director is providing strong leadership for the National Linear Collider efforts in the U.S., as well as world leadership for future planning of next generation of accelerators. The SLAC Deputy Director is serving as the chair of the International Linear Collider Technical Review Committee, and is leading the effort of producing the Committee's review report.

Success in Construction and Operation of Facilities

B Factory Operations: As noted above, SLAC has continued to improve the performance of the B Factory. The peak luminosity achieved in FY 2003 was 6.58×10^{33} cm^{-2} sec^{-1}, which is over 2.3 times the design peak luminosity of 3.0×10^{33} cm^{-2} sec^{-1}. The operation of both the PEP-II and BaBar Detector has been efficient and effective, with a record luminosity of 395 pb^{-1} delivered to BaBar in one day (in June 2003). The total integrated luminosity delivered to BaBar since May 1999 is 141 fb^{-1}, and BaBar has logged about 88% of delivered data.

During the planned shutdown of the B Factory in summer of 2003, work geared toward further luminosity increase and stable operation for PEP-II was successfully completed. Maintenance and improvement activities for the BaBar detector were also carried out successfully during this shutdown period.

Fixed Target Experiments: In FY 2003, the E158 Moller Scattering Experiment successfully operated at full design luminosity, and completed the data taking phase. The accumulated data sample is expected to produce the anticipated error on the physics asymmetry measurement of 23 parts per billion.

GLAST LAT Project: Considerable progress was made toward the final instrument design and production for the construction of the LAT Detector. However, the Project had to be re-baselined in the summer of 2003 due to cost overruns and schedule delays, partially due to withdraw of support from one of the foreign funding agencies.

Construction Projects: Construction of the SLAC Guest House (User Lodging Facility) was completed, and has started to support its User community of 3,000 researchers.

Synchrotron Radiation Research Performance Evaluation

Office of Basic Energy Sciences (BES), and Office of Biological and Environmental Research (BER)

The Stanford Synchrotron Radiation Laboratory (SSRL), a division of SLAC, is a National User Facility which provides synchrotron radiation – x-rays, infrared and ultraviolet light produced by electrons circulating in a storage ring at nearly the speed of light. These extremely bright x-rays and light beams are used by researchers to investigate various forms of matter, ranging from objects of atomic and molecular size to man-made materials with unusual properties. The resulting information and knowledge is of great value to society, with impact in areas including the environment, future technologies, health, and national security. SSRL is primarily supported by the DOE Offices of Basic Energy Sciences, and Biological and Environmental Research, with additional support from the National Institutes of Health, National Center for Research Resources, Biomedical Technology Program, and the National Institute of General Medical Sciences.

Quality of Fundamental and Applied Science

SSRL and User Research: The research supported through the Stanford Synchrotron Radiation Laboratory (SSRL), a National User Facility operated by Stanford University on behalf of the Office of Basic Energy Sciences (BES), continues to grow and produce exciting new results ranging from the photoemission studies of the Z. X. Shen group, to the nanoscience-based research led by Andrew Fisher, to the theoretical results of Shoucheng Zhang on spin currents. The addition of the Geballe Laboratory for Advanced Materials (G-LAM) is a very important development for SSRL in that it provides a broad science base, including the capability to fabricate new materials and crystals that can be studied at SSRL and Stanford campus. The collection of scientists supported under the G-LAM and SSRL is outstanding.

BER Comment: SSRL experimental stations for Structural Molecular Biology (SMB) are state-of-the-art, thanks to a well-executed plan to upgrade beamlines and experimental stations to take advantage of the SPEAR3 capabilities. These upgrades, jointly funded by BER and NIH, will enable SSRL to offer full third-generation synchrotron performance to the community. Research productivity of the SMB program continues to be outstanding, with many important new structures reported during FY 2003.

Relevance to DOE Missions and National Needs

DOE Mission and Program Priority: The SSRL program includes research on important national

topics, including nanostructures, high temperature superconductors and other strongly correlated electron systems, and x-ray spectroscopy of important biological materials and environmentally important materials. Furthermore, the training of young scientists through the University of Texas at El Paso is working very well. SSRL fulfills an very important DOE mission in providing outstanding service and reliability to its synchrotron radiation User community.

BER Comment: The research and User programs at SSRL provide outstanding service to a large community of researchers in Structural Molecular Biology in government, academic and private sector organizations, thus meeting the DOE mission to provide excellent User facilities. In addition, the high quality of the program has attracted substantial funding from other public and private sources, an indication of the importance of the facility for meeting national needs.

Effective and Efficient Research Program Management

Research Program Management: The management of the science and facilities operation is outstanding. The leadership of the SSRL in their embracement of G-LAM has been creative in finding new avenues to promote outstanding science. G-LAM is now directed by Malcolm Beasley with the departure of Arthur Bienenstock to become Vice Provost for Research for Stanford University.

BER Comment: Management of the Structural Molecular Biology program is outstanding, and makes very efficient use of staff in support of the large User community.

Success in Construction and Operation of Facilities

SPEAR2 Operations: The SSRL operations are just outstanding — Users have been very pleased. The staff support for Users is a trademark of SSRL.

SPEAR3 Upgrade Project: The SPEAR3 Construction Project was finished ahead of schedule and within its budget. The Users have a significantly improved x-ray source. The team, led by Tom Elioff, did a remarkable and safe job. Richard Boyce is credited with an extremely well-planned installation part of the project. This is a model for how to do a complex job with minimal impact (interruption) to the User program.

B. BUSINESS MANAGEMENT

Introduction: Overall Business Management rating was Excellent in FY2003.

Of the eleven functional areas evaluated, 5 had no change in ratings from FY2002 to FY2003:

- Financial Management .....Outstanding
- Personal Property .....Outstanding

- Facilities Management .....Excellent
- Safeguards & Security .....Excellent
- Technology & Intellectual Property .....Outstanding

Three Functional areas increased rating from FY2002 to FY2003:

- Equal Opportunity & Affirmative Action .....Excellent to Outstanding
- Communications & Public Affairs.....Excellent to Outstanding
- Information Management.....Excellent to Outstanding

Three Functional areas decreased rating from FY2002 to FY2003:

- Environmental Safety & Health..... .....Outstanding to Excellent
- Human Resources Management .....Outstanding to Excellent
- Procurement .....Outstanding to Excellent

Rather than reiterate the scoring or adjectival ratings for each of the functional areas contained in the Detailed Assessment Results, this summary highlights the three areas of achievements at SLAC which had increased ratings from FY2002 to FY2003.

Functional Areas Increased Ratings:

EEO & Affirmative Action: The overall rating significantly increased from Excellent to Outstanding for FY2003. This improvement can be attributed to the following achievements: SLAC developed and implemented SLAC's Strategic Plan into its Affirmative Action Plan; and, significant progress was made in placement of minorities in high priority under-utilized job group, for example, officials & managers job group increased from 4.1% to 6.8%, professional minority representation increased from 21.2% to 22.2%, technician minority representation increased from 40.3% to 41.4%, and, minorities accounted for 43% of total new-hires and women 28% which exceeded their respective rates of availability within the labor force.

Communications & Public Affairs: The overall rating increased from Excellent to Outstanding for FY2003. This is the first year Communications & Public Affairs attained an Outstanding rating. The improvements are attributed to: the increased staffing (5 public affairs officers, 8 multimedia technicians, and 6 tour guides most whom are SU students); increased national, international, and local news outlet including regional television stations and radio stations; organized and set up International Collaboration where Interactions.org website is fully operational; a joint effort, SLAC and Fermi Lab to publish a new magazine covering physics in the U.S. and abroad called *Interactions* first issue publish in 2004; work closely and established meetings with DOE-SSO, field offices, and HQ; gain involvement and support of local schools; principals of local high schools were guided around the lab; new tour route was designed to allow visitors to walk through the accelerator; increased participation in SU community relations activities such as Community Day, University Walk to Cure Diabetes and, hosted tours during SU Commencement with 650 attendees; tour program accommodated over 9,700 visitors, 560 formal lab tours, 189 educational groups, and is

more than twice the number in FY02; publish twice-monthly SLAC newspaper *The Interaction Point*; and, implemented of *SLAC Today* website http://www-internal.slac.stanford.edu.today/.

Information Management: The overall rating increased from Excellent to Outstanding for FY2003. This is the first year Information Management attained an Outstanding rating. During FY2003, SLAC's Telephone Switch and Voicemail system increased to 99% compared to 90% in FY02 and the achievement was due to their performance and reliability surpassing industry standards. SLAC's Telecommunications Services reliability factor of 99.9% experienced scheduled down time of less than 6 minutes to perform system upgrades, and telephone Voicemail System availability exceeded 99.9%. In FY03 SLAC's Telecommunication cost savings was $485K and the audio conference dervice "Reservation-less" recently tested is expected to reduce cost by $30K per year. Lastly, SLAC's follow-up with Area Telecommunications Office Motivators confirmed customer satisfaction 100% of the time. Overall, SLAC's Telecommunications Services, System and Network Department's operational effectiveness is "Outstanding" and exceeds performance requirements.

III. RECOMMENDED AREAS FOR IMPROVEMENT

A. SCIENCE AND TECHNOLOGY

None.

B. BUSINESS MANAGEMENT (Functional Areas with Decreased Ratings):

1. **Environmental Safety & Health:** ES&H rating decreased from Outstanding in FY02 to Excellent in FY03. The rating downgrade was due to seriousness of Type B ladder accident that occurred in January 2003. Refer to ES&H section under subheading, ISMS, pages 128 through 136 for more details.

    - Modified DOE/Stanford contract in FY03 to: Incorporate milestones from Type B accident Corrective Action Plan (CAP).
    - CAP milestones focus on improving line management responsibility and accountability and work planning and controls (hazard analyses).
    - SSO continues to validate Laboratory completion of CAP milestones.

2. **Human Resources Management:** Continue to improve identified deficiencies in the HR systems and processes. SLAC identified positions labeled as "critical" and need to improve and meet target dates.

3. **Procurement:** Continue to monitor corrective actions in the overall procurement systems.