DOE/ER/25029--3

DE92 016467

REPORT TO THE DEPARTMENT OF ENERGY
(March 27, 1992)

COMPUTER SCIENCE AND TELECOMMUNICATIONS BOARD

SUMMARY OF ACTIVITIES

Principal Investigator Name: MARJORY S. BLUMENTHAL
PI Institution: NATIONAL RESEARCH COUNCIL/NATIONAL ACADEMY OF SCIENCES
PI Phone Number: (202) 334-2605
PI E-mail Address: MBLUMENT @ NAS.BITNET
Grant or Contract Title: COMPUTER SCIENCE AND TELECOMMUNICATIONS BOARD

Detailed summary of technical progress.

Purpose:

The Computer Science and Telecommunications Board (CSTB) considers technical and policy issues pertaining to computer science, telecommunications, and associated technologies. The functions of the Board include: (1) monitoring and promoting the health of the computer science, computing technology, and telecommunications fields, including attention as appropriate to the issues of human resources and information infrastructure; (2) initiating studies involving computer science, computing technology, and telecommunications as critical resources and sources of national economic strength; (3) responding to requests from the government, non-profit organizations, and private industry for advice on computer science, computing technology, and telecommunications issues; and to requests from the government for advice on computer and telecommunications systems planning, utilization, and modernization; (4) fostering interaction among computer science, computing and telecommunications technologies, and other pure and applied science and technology; and (5) providing a base of expertise in the National Research Council in the areas of computer science, computing technology, and telecommunications.

CSTB actively disseminates the results of its completed projects to those in a position to help implement their recommendations or otherwise use their insights. It provides a forum for the exchange of information on computer science, computing technology, and telecommunications.

Major Accomplishments:

Keeping the U.S. Computer Industry Competitive: Systems Integration was released in early January. The second competitiveness colloquium on systems integration was held in January 1991 and provided a forum for roundtable discussion center on maintaining the competitive posture of the U.S. computer industry. Copies are currently being distributed to a number of individuals in government, industry, and academia.

A Workshop on Computing and Molecular Biology: Mapping and Interpreting Biological Information took place on April 30-May 1, 1990. It highlighted computer science problems that exist in molecular biology, notably in the human genome projects, and sought to foster greater interdisciplinary interaction, in particular by stimulating interest in such problems in the computer

science community--especially among younger researchers. A summary article published in the November 1991 issues of Communications of the Association for Computing Machinery (CACM) and Computer, published by the Institute of Electrical and Electronics Engineers (IEEE).

The report, Intellectual Property Issues in Software, was released in early May 1991. The goal was to convene government, academic, industrial, and legal experts to discuss issues surrounding an intellectual property protection system for software and to present a new perspective on issues of technical creativity. The forum catalyzed a discussion of underlying issues. Ideas for a follow-on project are being investigated.

Computers at Risk: Safe Computing in the Information Age was released in December 1991. This report assesses computer security challenges to industry, in particular, and also the public and government, including a description and categorization of information technology risks and means for abating them; an evaluation of the adequacy of existing policy; and the development of recommendations for improving relevant policy. This report has been very well received. CSTB hosted an outreach symposium on May 16-17, 1991 that provided an overview of the Systems Security Study Committee's findings and recommendations and stimulated dialogue among interested parties in industry. Several followup meetings were organized in June by a consortium of parties from industry. Marjory Blumenthal and committee chair David Clark have made several invited presentations on this report, which continues to attract interest and comment.

Current Programs:

A Workshop on Advanced Computer Simulation and Visualization took place on November 5-6, 1991 at the Beckman Center in Irvine, California. Initiated by Frank Press, President of the National Academy of Sciences, the workshop brought together individuals from industry and academia to discuss the state of the art and directions for computer simulation and visualization. Of particular interest are new insights into the value of visualization and simulation as well as possible constraints on the effective use of these techniques. A summary paper is currently being written and is expected to be released this summer.

A National Infrastructure for Computer Users. This self-initiated CSTB study, which proposes to conduct an exploratory workshop that seeks to review issues associated with implementing advanced information processing infrastructure, including computer networks and other facilities, and to explore concepts for its design and implementation, remains in the development stage. Several Board members are exploring alternate concepts that would focus on applications. A planning group comprising several Board members met in July. A steering committee drawn from the planning group will develop a specific agenda for the workshop. The results of the workshop would lead to a report illuminating issues in information infrastructure as well as directions for further action.

Rights and Responsibilities for Participants in Public Data Networks and Information Services: The rapid growth of a national information infrastructure built on computer networks and computer-based communications media such as electronic mail, bulletin boards, and conferencing systems is creating a situation in which prior legal and cultural norms for the regulation and use of

communications and information media are struggling to define their applicability. Toward that end, CSTB will convene a workshop and strategic forum to explore the rights and responsibilities of computer system users.

Third competitiveness colloquium Keeping the U.S. Computer Industry Competitive: Convergence of Processing, Communications, and Entertainment will investigate how the convergence of technology is likely to create both strategic challenges and opportunities for U.S. companies. Seeking NRC approval for steering committee nomination.

Other sponsored activities:

The following studies are conducted under the auspices of the Computer Science and Telecommunications Board and were not fully supported by core funds:

CSTB has convened a committee to examine computer technology and service sector productivity. This study was initiated to identify a set of computerization effects that must be better accounted for in measures of productivity and the economic impact of computers. The report would assist the computer science and technology community in communicating with users and others about the benefits and effects of computer use. The committee met for the third time on March 26-27, 1992 and continue to develop the draft report.

At the request of NSF, a committee, Toward A National Collaboratory: Establishing the User/Developer Partnership, will bring together both technology developers and users to form a specific research agenda necessary for the successful development of the collaboratory concept. The committee held its first meeting on December 12-13, 1991. Workshops in the three application areas have been scheduled: Molecular Biology, March 13-14, 1992; Oceanography, April 23-24; and Space Physics, July 9-10. Planning for the workshops is underway and participants are being identified and invited.

At the request of the Internal Revenue Service, the Committee to Review the Tax Systems Modernization of the IRS is reviewing the plans and projects for the modernization of IRS's information systems and providing technical and technical management advice on issues and topics related to its information systems. The committee last met on January 16-17, 1992 and intends to meet bi-monthly. An interim report was released to Commissioner Goldberg in August 1991. The final meeting, a two-day workshop, is tentatively scheduled for May 12-13, 1992 during which the committee will prepare their final report. The final report is expected to be released in September 1992.

At the request of the Social Security Administration (SSA), a committee organized by the former BOTCAP reviewed and assessed the progress and plans for SSA's modernization of its information systems and provided technical and technical management advice on issues and topics related to its information systems. Elements of Systems Modernization for the Social Security Administration was released in late January. Building on that technical foundation, this project was extended for one year to review and assess the approach, steps, and progress of SSA to define and implement a workable backup and recovery strategy should the National Computer Center suffer a catastrophic failure, and to assess other issues. These tasks are expansions to the previous work of the committee. A letter report to Commissioner King was released in mid-October. The final meeting

was held on February 19-20, 1992 and covered telecommunications, the Agency Strategic Plan, and software development. Following that meeting, the committee will write and submit the final letter report that will discuss the Agency Strategic Plan.

CSTB is examining the Scope and Directions of the Computer Science and Technology field through an assessment of its intellectual content, structure, institutional relationships, and leadership to determine how to best characterize and organize the conduct of research and teaching in the field. Since its fifth meeting on September 19-20, 1991, the committee has completed a draft report and submitted it for NRC review in late November 1991. A large number of informal reviewers will ensure that its argument, finding, and recommendations are thoroughly vetted. The report is expected to be released in mid-1992.

Academic Careers of Experimental Computer Scientists. At the request of NSF, CSTB proposes to form a committee to investigate the academic environment for experimental computer scientists. It will address the scope and scale of the difficulties facing the country's doctorate-granting computer science departments in evaluating the work of faculty whose work is predominantly focused on building functional systems for external users. Building on the evidence that it collects, the committee would assess the problem and, as appropriate, develop recommendations for nurturing the subdiscipline as well as identify successful models that might be emulated. A committee has been established; the first meeting is scheduled for April 30-May 1, 1992 in Washington, D.C.

Information Technology Hardware Standing Committee: A standing committee, or a preliminary project, may address research, development, and manufacturing issues in information technology involving devices, processes, and tools (hardware and design), and their commercial and defense applications.

Information Technology in Europe: Prospects for Cooperation and Competition: CSTB found that United States leadership in computing is being challenged by developing capabilities abroad, notably in Japan but increasingly in Europe. Based on these findings, CSTB proposes to evaluate both the quality of the research (through case studies) and the effectiveness of research and development infrastructure being created. Funds are needed to support this project.

Cooperative Ventures:

CSTB and the Office of Scientific and Engineering Personnel will host a workshop as an avenue of providing information on existing and future labor supply and demand issues. As such, it will be beneficial to human resource planners in industry, government, and universities; it will provide insight to educators as to the level and composition of future training programs. The Committee on Human Resources in Computer Science and Technology conducted the workshop on October 28-29, 1991 at the Beckman Center. A summary report will be produced in the summer.

The Committee on Human Factors and the Computer Science and Telecommunications Board propose to develop a national agenda for research relating to virtual reality technologies. A planning meeting attracting 50 participants drawn primarily from agencies, was held on January 14, 1992. A formal proposal has been developed; currently seeking funds to support this project.

The Manufacturing Studies Board, in cooperation with the Computer Science and Telecommunications Board, proposed to conduct a workshop that will define the critical issues in enterprise integration software development and implementation and explore the current and future roles of public policy in resolving these issues. A steering committee met on September 12, 1991 in Boston to identify issues, and to suggest names of participants and potential funding prospects.

At the request of NASA, the Aeronautics and Space Engineering Board along with CSTB and other units of the NRC will identify and review important space station technical issues. A standing committee has been formed, funding acquired, and the first meeting took place in mid-February. CSTB may be responsible for a subcommittee concerned with computing and software.

At the request of NASA, the Aeronautics and Space Engineering Board in cooperation with CSTB will review the independent oversight mechanisms associated with validation and verification of space shuttle software in order to assist NASA in developing a policy to define the scope of continuing independent oversight. While the study will examine the role played by the independent validation and verification contractor, it will not evaluate the contractor's performance. The committee held its first meeting on January 14-15, 1992 at the Johnson Space Flight Center in Houston.

The Board on Radiation Effects Research, in conjunction with CSTB and the Institute of Medicine, may conduct a comprehensive study of the health effects of extremely low frequency electromagnetic fields emitted by video display terminals.

National Archives and Records Administration. Under the leadership of CPSMA, this project will address the growing volumes of scientific data often stored or generated on electronic media. Planning discussion is underway which may ultimately lead to a project concerned with old scientific data.

Review of the Earth Observing System (DOS) Data and Information System (EOSDIS). Under the leadership of CPSMA, NASA requested that the Academy evaluate the NASA Request for Proposal (RFP) for EOSDIS to determine whether the RFP adequately address the technical requirements of the Data and Information System given the recent restructuring of the Earth Observing Satellite program. The primary objective of the review is to ensure that the planning and design for the EOSDIS development effort would optimally serve those who will use EOS Data. Drawing from the outcome of the meetings, a preliminary report is expected to be released in early April and a final report due in the fall.

Integrating Information Technology into the Future of Clinical Medicine: A planning workshop was held in cooperation with the Institute of Medicine to explore the need for a large-scale study of the potential uses and integration of various types of user-friendly information technology in the practice of clinical medicine. It was determined that a larger scale study was needed to focus on various related issues.

Plans and Prospects:

Computer and Communications Technology in Pre-College Education: Developing a Strategic Plan will address issues related to K-12 networking, specifically with respect to "scaling up" current educational networking efforts to national scope.

Software Development and New Perspectives Workshop: An electronic workshop to explore new models in software development based on novel ideas and options for producing reliable, functional, cost-effective software is under development.

Software Safety will address the safety of software for medical devices.

Lists of reports:

- Keeping the U.S. Computer Industry Competitive: Systems Integration. January 1992.
- Computing and Molecular Biology: Mapping and Interpreting Biological Information, Damian Saccocio, CSTB; Eric Lander, Whitehead Institute for Biomedical Research; and Robert Langridge, University of California, San Francisco, CACM and IEEE Computer, November 1991.
- IRS letter report to Commissioner Goldberg, August 1991
- Intellectual Property Issues in Software, March 1991.
- Elements of Systems Modernization for the Social Security Administration, January 1991.
- Computers at Risk: Safe Computing in the Information Age, National Academy Press, December 1990.

END

DATE FILMED 9/02/92