UNM Receives Optoelectronics Grant in NSF Undergraduate Faculty Enhancement Program

The Center for High Technology Materials at the University of New Mexico has been awarded a grant by the U.S. National Science Foundation under its new Undergraduate Faculty Enhancement Program (UFEP), which is intended to revitalize the teaching of undergraduate science and engineering.

UNM will use the grant to UNM to encourage development of semiconductor optoelectronics as an undergraduate discipline through a two-week workshop at UNM June 5-16, 1989. The workshop will cover topics such as III-V semiconductor growth and processing, optoelectronic device physics, and systems engineering and applications.

Undergraduate teaching faculty interested in establishing optoelectronics programs at U.S. colleges and universities are invited to participate in the workshop, which will offer the opportunity to interact with faculty from UNM and personnel from Sandia National Laboratories. Stipends and living expenses are available under the NSF grant. The deadline for applications is **January 15, 1989.** For further details contact Professor John G. McInerney, CHTM, University of New Mexico, Albuquerque, NM 87131; telephone (505) 277-0768; fax (505) 277-6433; BITNET "mcinerny@unmb".

University of New Mexico Launches New Ceramics Center

The University of New Mexico has established a Center for Micro-Engineered Ceramics, with a research budget of approximately $1 million a year and $1 million federal grant for equipment. The center is a National Science Foundation Industry/University Collaborative Research Center. It is supported by NSF, Los Alamos and Sandia National Laboratories, the New Mexico Research and Development Institute (a state agency), and the ceramics industry.

The center, unique in that it combines the resources of two universities (UNM and New Mexico Institute of Mining and Technology) and two national laboratories, will encourage basic research on high-risk projects. It is hoped that such research will lead to significant advances in the marketplace, as well as to the education of a new generation of ceramic scientists/engineers.

R.S. Webb Named Alanx Products Business Manager

Alanx Products LP, Newark, Delaware, appointed Richard S. Webb business manager for wear resistant products. Alanx will manufacture these products using Lanxide Corporation's proprietary ceramics and metal matrix technologies. Alanx is a joint venture between Lanxide Corporation of Newark, Delaware, and Alcan Aluminum Corporation of Cambridge, Massachusetts. Webb, a member of the Materials Research Society, was previously employed by Alcan as manager of business development in its Montreal headquarters.

U.K.'s SERC Sets Up Materials Commission

The Science and Engineering Research Council (SERC), the major source of research funding at universities in the United Kingdom, has set up a Materials Commission to coordinate materials research and forge better links between basic and applied research.

Traditionally this support has been provided through the Materials Committee of the Engineering Board, and the Physics and Chemistry Committees of the Science Board. Under the new arrangement, an interdisciplinary commission supported by both boards will advise the council and the boards of priorities for materials research, education and training.

The commission, chaired by Colin Humphreys of Liverpool University, will involve industrialists and academics, and will be comprised of seven committees: Ceramics and Inorganic Materials, Polymers and Polymer Composites, Metals and Metallurgy, Semiconductors, plus three exciting SERC interdisciplinary committees for Molecular Electronics, Superconductivity, and Medical Engineering. The commission will administer a grants budget of approximately £15 million a year.

The reorganization resulted from recommendations in a 1987 study of SERC support for academic materials research. That study emphasized the increasing importance to U.K. industry of novel materials for high performance applications in areas such as communications, transportation, construction, and energy conversion.

[Editor's Note: See the May 1988 (p. 40) and August 1988 (p. 8) issues of the MRS BULLETIN for some background on SERC activities.]

National Research Council Recommends Improvements in U.S. Photonics Research

The National Research Council, responding to a study which portrays the United States as a "follower" in the development of commercial applications in the photonics industry, has called for a national photonics program to encourage greater industrial and university cooperation.

The study, conducted by the Council for the U.S. National Academy of Engineering, assesses the international prospects of the photonics industry. It concludes that the U.S. "has been a leader in research and invention, but it is already a follower—or worse, an observer—in the development of many of the commercial products of the field."

To reverse this trend, and to give the U.S. a greater share of domestic and international markets estimated at more than $400 billion each year, the NRC study recommends "stable, basic research funding with an increased emphasis on the interface of research and development." It further suggests the creation of "a national photonics project with widespread industrial and university participation." Such a project would help U.S. industry develop the expertise and capabilities to manufacture products that can compete internationally on the basis of both quality and cost.

The committee identified numerous opportunities for further applications of photonics technology in the telecommunications industry, which, worldwide, buys about $100 billion of equipment annually. Most lucrative are short-distance applications connecting computers and related equipment in offices, factories, and campuses. Eventually, such local area networks are predicted to evolve into larger networks (called BISDNS, or broadband integrated service digital networks), linking virtually all institutions, businesses, and residences in a metropolitan area.

Realizing this vision will require improvements in fiber cables, transmitting and receiving equipment, switching technologies, and the design of communication networks, the committee said. The practicality of BISDNs, however, will be determined by the cost and reliability of the necessary technologies.

Satisfying these criteria would open an enormous market. In the United States, there are more than 100 million copper-wire access lines that link to national telephone networks. Assuming that the lines were converted to optical fiber at a cost of

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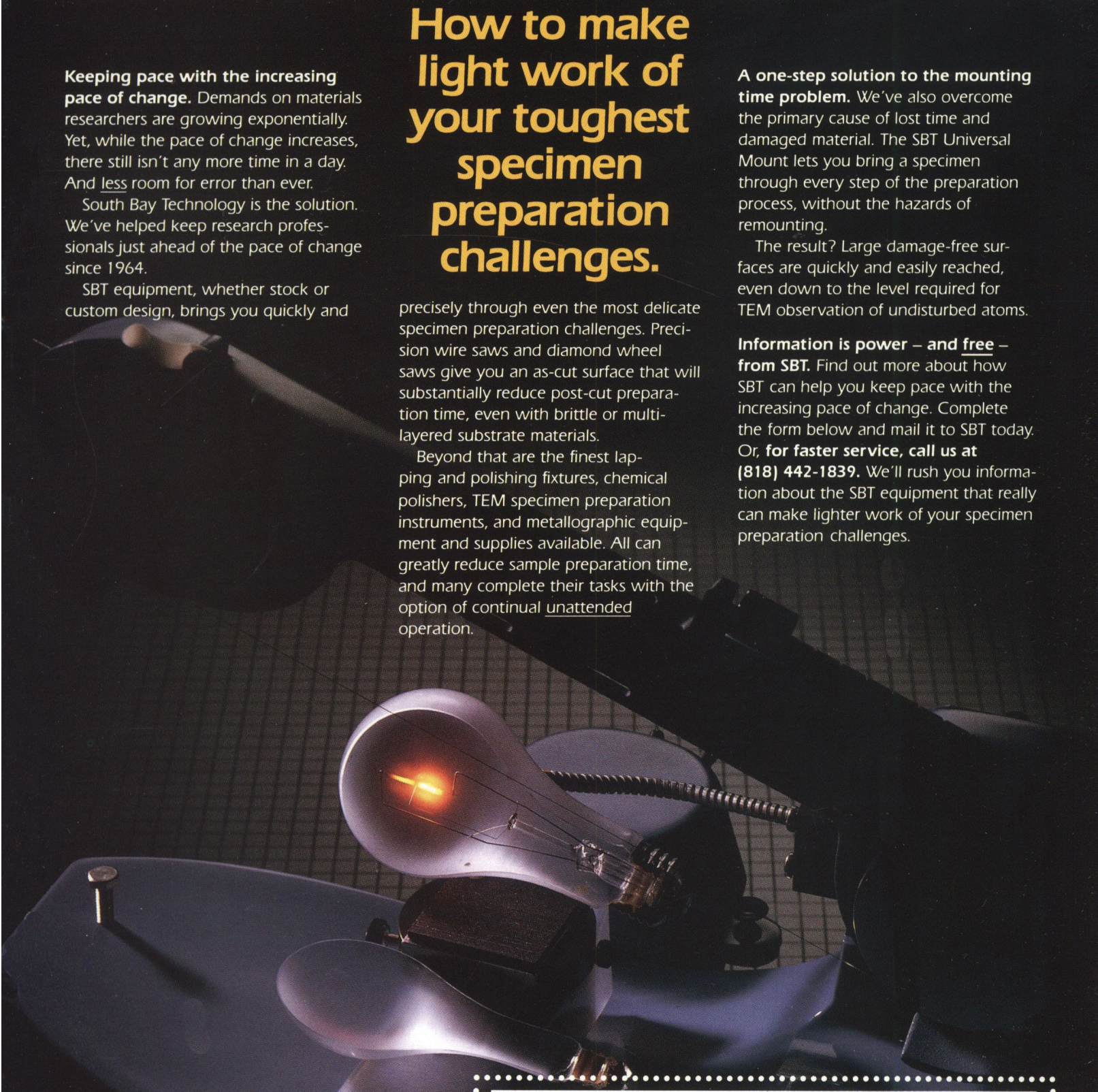

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In the long term, all-photonic computers may be developed, replacing the now-ubiquitous semiconductor chip. This technology, however, is still in the research stage. Other future uses for photonics include optical storage and retrieval methods for data now stored on magnetic tapes and disks and optical sensors for robots, automated control systems, and advance imaging equipment.

The committee's report, *Photonics: Maintaining Competitiveness in the Information Era*, is available for $11.95 prepaid from the National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; (202)334-3313.

Safety Oversight at DOE Test and Research Reactors Called "Fragmented"

In a report critical of safety standards at five low-level test and research reactors, the National Academy of Sciences and National Academy of Engineering (NAS/NAE) have called on the U.S. Department of Energy to take steps to ensure the safety of reactor operators who could currently be exposed to radiation or steam in the event of a serious accident.

Safety oversight at the reactors is conducted by a "fragmented collection of contractors, operations offices, and programmatic divisions in headquarters," the panel said. Such fragmentation "tends to disperse responsibility for safety and seems to require decisions with safety consequences by organizations that are divorced from day-to-day safety responsibility."

Secretary of Energy John S. Herrington, who requested the NAS/NAE review in May 1986, said that the committee "has again presented DOE with a very constructive analysis of the issues relating to reactor safety, and I welcome their recommendations."

The original DOE request invited review of generic and specific safety issues at 11 facilities. Four reactors were the subject of a previous NAS/NAE report in October 1987, and two were shut down during the study. Referring to these and other safety steps which DOE has taken in response to the scientific review Herrington said, "We are making significant progress, and we will continue to take the necessary steps to reinforce this department's commitment to safe operations."

In its report, the committee recommended that DOE create a central reactor operations group within the department. In addition to measures which would ensure the safety of reactor operators, it said, DOE should conduct state-of-the-art risk assessments at each reactor.

The facilities in question—all built in the 1950s and 1960s before modern safety standards were developed—are the Advanced Test Reactor and the Experimental Breeder Reactor II at the Idaho National Engineering Laboratory near Idaho Falls; the Fast Flux Test Facility on the Hanford Federal Nuclear Reservation near Richland, Washington; the High Flux Beam Reactor at Brookhaven National Laboratory on Long Island, New York; and the High Flux Isotope Reactor at Oak Ridge National Laboratory, Oak Ridge, Tennessee. All are categorized by DOE as Class A research reactors—those having over 20 MW thermal operating power. All operate at low levels of power and have lower stored energy and smaller inventories of radioactive materials than most commercial reactors, which normally operate at about 3,000 MW.

Noting that DOE safety measures have improved and that the department is striving to meet its obligations following release of the previous report, the committee nevertheless pointed out that, to date, only one sophisticated risk assessment has been completed by a DOE contractor—and it was "not persuasive." The committee emphasized the need for a "vital, continuous, and long-term commitment" to improving safety.

Ohio State University Creates New Materials Science Department

The Ohio State University Departments of Ceramic Engineering and Metallurgical Engineering have merged to create a Department of Materials Science and Engineering. The change, approved July 8, 1988 by the OSU Board of Trustees, took effect at the beginning of the current academic quarter.

The new department will continue to offer BS, MS, and PhD degrees in both ceramic engineering and metallurgical engineering. In addition, degree programs in materials science and engineering are being prepared for approval by the Ohio Board of Regents. Dr. George R. St. Pierre, Presidential Professor, has been appointed chair of the new department.

Currently 22 full-time faculty in the new department and four additional positions will be filled—including an Ohio Regents Eminent Scholar in High Temperature Materials. The Board of Regents awarded the position along with a $500,000 endowment grant. A matching endowment will be sought from industrial firms, foundations, and individuals.

Enrollment in the two undergraduate degree programs currently is about 200, and there are about 120 resident graduate students. Sponsored research projects total about $4 million per year. For more information about degree programs and research in the department, contact Dr. George R. St. Pierre, 141 Fontana Laboratories, 116 West 19th Ave., Ohio State University, Columbus, Ohio 43210; telephone (614) 292-2491.

ASTM Celebrates 90 Years of Standards Development

A 90th anniversary celebration was held June 29, 1988 during the Annual Business Meeting of the American Society for Testing and Materials (ASTM) in Baltimore, Maryland.

Noting the many advances in productivity and quality made possible through standardization during that time, ASTM Board Chairman W. DeWayne France, Jr. called ASTM "the premier developer of voluntary consensus standards."

ASTM was organized in 1898 when 20 men met in the Engineers Club in Philadelphia, Pennsylvania. Their mission was to harmonize knowledge of materials, and based on this knowledge to write standards that would ensure uniformity of product. Since then, ASTM has grown into one of the largest voluntary standards development systems in the world.

ASTM's 30,000 members are organized into 140 technical standards-writing committees. In addition to ASTM's traditional strengths in materials, standardization activities now include energy, the environment, consumer products, health care, and computerized systems. Over 8,500 ASTM standards are published each year—and sold worldwide—in the 67-volume *Annual Book of ASTM Standards*.

Alton Romig Receives Burton Medal

Alton D. Romig, Jr. was awarded the 1988 Burton Medal from the Electron Microscopy Society of America (EMSA) during its annual meeting August 8-12, 1988 in Milwaukee, Wisconsin. The award is named for Eli F. Burton, who built the first transmission electron microscope (TEM) in North America. Given annually, the award acknowledges work over the preceding five years by an outstanding scientist under the age of 35 whose research involves electron microscopy.

Romig was honored for his work at Sandia National Laboratories, Albuquerque, New Mexico, where he has been conduct-

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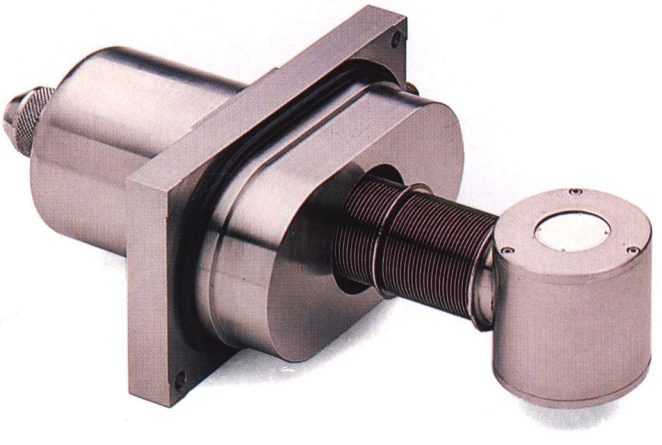

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ing research in analytical electron microscopy and its applications to the study of solid state diffusion and phase transformations. Highlights of Romig's work, with various co-workers, include the first determination of an equilibrium phase diagram (Fe-Ni, Fe-Ni-P, U-Nb) and a metastable phase diagram (Ni-Al), and the first measurement of diffusion coefficients by analytical electron microscopy (Fe-Ni, Fe-Ni-P, Ta-W, U-Nb, Ni-Nb). This work led to extensive studies of high spatial resolution microanalysis of segregation to interfaces and phase boundaries.

Romig, who has written more than 80 technical publications and recently coauthored *Principles of Analytical Electron Microscopy* (a textbook), is an active member of the Materials Research Society. He is an instructor of the MRS short course "Electron Microscopy of Thin Films" (with Dave Williams of Lehigh University), chairs the MRS Continuing Education Committee, and is a member of the MRS Long Range Planning Committee. At Sandia, he is currently Supervisor of the Physical Metallurgy Division.

A number of other active MRS members have won the Burton Medal in recent years including Michael Isaacson (University of Chicago/Cornell University, 1976), Robert Sinclair (Stanford University, 1977), David Joy (AT&T Bell Laboratories/University of Tennessee, 1978), John Spence (Arizona State University, 1980), Ronald Gronsky (University of California-Lawrence Berkeley, 1983), David Williams (Lehigh University, 1984), and J. Murray Gibson (AT&T Bell Laboratories, 1986).

Raymond Jeanloz Honored by Mineralogical Society and MacArthur Foundation

Less than four months after receiving a prestigious grant from the MacArthur Foundation, geoscientist Raymond Jeanloz will be given another professional honor—the Mineralogical Society of America (MSA) Award.

Jeanloz, a professor of geology and geophysics at University of California-Berkeley since 1985, is being recognized in an MSA ceremony November 1 for experimental research involving the use of the laser-heated diamond cell. He and his colleagues have used the cell to study materials up to P-T conditions exceeding 100 GPa (1 Megabar) and 5,000 K.

On July 19, Jeanloz, a dual citizen of the U.S. and Switzerland, was one of 31 Americans named by the John D. and Catherine T. MacArthur Foundation to share grants totaling about $9 million. Jeanloz's award of $230,000, to be distributed over the next five years, recognizes his efforts to link modern physics to geophysics.

After earning his PhD in Geology and Geophysics at the California Institute of Technology in 1979 (his thesis work concentrated on the use of shockwave techniques for studying minerals at ultrahigh pressures), Jeanloz joined the faculty at Harvard University. There he established a laboratory for high pressure mineral physics research using the diamond cell. In 1981 he was awarded an A.P. Sloan Foundation Fellowship in physics.

In 1982 he began his current position at Berkeley. Although much of his group's work is in condensed matter physics and chemistry, his dominant interests are in mineral physics and especially in the use of mineralogy to better understand the evolution of planetary interiors. Use of the tiny laser-heated anvil to compress small samples of earth minerals at enormous pressures has allowed Jeanloz and his colleagues to simulate conditions deep in the earth, thereby strengthening scientific understanding of how material properties have controlled the evolution of the earth and other planets. The research that he has carried out with his graduate students and other colleagues was the J.B. Macelwane Award of and fellowship in the American Geophysical Union (1984). He also received a Presidential Young Investigator Award and was a Fairchild Scholar at Caltech in 1988.

Jeanloz, 35, is a member of the Materials Research Society and chaired the 1987 MRS Spring Meeting Symposium, "Geological Materials: Silicate Melts and Glasses." Jeanloz is the author of more than 100 research publications and is a member of the editorial board of *Annual Reviews of Earth and Planetary Science* and the advisory board of *Physics and Chemistry of Minerals*. He has been an associate editor of *Journal of Geophysical Research* and has served on numerous committees for the National Research Council, the Department of Energy, NASA and the American Geophysical Union.

Fastest Open Computer Network Goes On Line

The fastest nonprivate computer network in the United States went on line July 27 and is now serving hundreds of researchers across the nation.

Each second, the new National Science Foundation Network (NSFNET) backbone transmits 1.5 million bits of information, the equivalent of 50 pages of single-spaced typewritten text. This is almost 30 times faster than the older NSFNET backbone it replaces.

The NSFNET backbone links six supercomputer centers and seven midlevel (or regional) academic networks across the country and is connected to other research-support networks, including ARPANET and the NASA Science Network. Using this network, researchers at over 190 U.S. campuses and governmental research centers can access state-of-the-art computing facilities throughout the nation. The new network makes possible immediate communication and collaboration between researchers even though they may work in laboratories located in different states.

The new NSFNET backbone is the result of cooperative efforts by the National Science Foundation, MERIT (a consortium of eight state-supported universities in Michigan with 15 years of experience developing and managing their own statewide network), IBM, and MCI, as well as individuals at each of the supercomputer centers and midlevel networks. IBM and MCI are providing direct services, architecture, and equipment needed to make the new network a reality.

The NSFNET backbone uses MCI's digital and fiber-optic circuit network to carry data across the continent. Hardware and software from IBM are used for routing data in packet-sized chunks over these circuits and managing data traffic to assure fast, efficient transmission. IBM's Network Management products are used to centrally manage the backbone. The combination of packet-switching and circuit-switching technologies produces one of the world's largest implementations of an Internet-protocol based network.

Future plans for the network include increasing the speed from 1.5 million bits per second to 45 million bits per second and transition to the International Standards Organization's reference model for Open Systems Interconnection (OSI) standards. □

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