

News Briefs

Developments

PRESIDENT SIGNS COMPUTER SECURITY ACT

On January 8, President Reagan signed the Computer Security Act of 1987 (P.L. 100–235) giving NBS the primary responsibility for developing standards and guidelines needed to secure sensitive, unclassified information in Federal computer systems. In addition, the act amends the basic charter of NBS and mandates a computer standards program within NBS. (Since 1966, under the Brooks Act and policy directives from the Office of Management and Budget, the NBS Institute for Computer Sciences and Technology has conducted a computer standards program for the Federal Government which included computer security activities.)

The Computer Security Act leaves unchanged the National Security Agency's (NSA) authority over computer systems containing classified, national security-related information. NBS will continue to work closely with NSA and to draw upon the agency's technical advice and assistance where appropriate.

NEW PATENT COVERS 3-D LASER MEASUREMENT SYSTEM

NBS researchers have received a patent for an automated laser tracking system that greatly simplifies the task of accurately measuring the dimensions of large shapes, such as aircraft wings or fuel tanks.

The five-axis laser tracking system invented by Kam Lau and Robert Hocken of the NBS Center for Manufacturing Engineering includes a laser in-

terferometer, a servo-controlled tracking mirror, a similar target mirror, and a computer to control the system. Once the laser is "locked" on the target mirror, the control system keeps the beam centered on the target as it is moved about the space to be measured. The interferometer constantly returns displacement measurements to the controller, and angle-sensitive transducers on the tracking and target mirrors send the data necessary for the computer to keep a running account of the three-dimensional position, pitch, and roll of the target mirror. A simpler 3-axis system, also covered by this patent, measures the position of the target without pitch and roll.

The system is portable, fully automated, uses only one station, and can measure positions over a sizeable volume (a radius of 20 meters or greater over 360° in the horizontal and $\pm 40^\circ$ in the vertical) to an accuracy of about one part in 100,000. This is about 3 times better than a close competitor: a multi-station, computer-assisted theodolite system (also invented at NBS).

Other applications include assessing the static and dynamic performance of robot arms and the accuracy of machine tools and coordinate measuring machines. The system is being marketed by Automated Precision, Inc., 7901-C Cessna Avenue, Gaithersburg, MD 20879.

MILLION-FOLD IMPROVEMENT IN SUPERCONDUCTOR RESISTANCE

In further developments on the high-temperature superconductor front, NBS and Westinghouse have lowered contact resistivity to a million times less than indium-solder contacts. This a hundred- to a thousand-fold improvement over the earlier reported results of Ekin (NBS), Panson and Blankenship (both of Westinghouse) who devel-

oped the basic technique. The newest results are obtained by annealing the sputter-deposited silver contact pads on the superconductor in oxygen at temperatures up to 500 °C for an hour. (The previously reported technique involved temperatures up to 150 °C, but no oxygen annealing.) Where the intermediate (500 °C) temperatures can be tolerated, the annealing technique yields resistivities of about 10^{-8} ohm-cm² at 76 K for bulk sintered samples of YBa₂Cu₃O₇. This resistivity was measured for current densities of up to 100 A/cm². The voltage-current characteristic was non-linear, having the character of a superconducting proximity effect; at lower current densities, below 30 A/cm², the resistivity was unmeasurably low.

For technical details, contact Jack Ekin, Division 724.05, National Bureau of Standards, 325 Broadway, Boulder, CO 80303, 303/497-5448.

NBS SEEKS HELP TO AUTOMATE PLASTIC PROCESSES

Polymer scientists at NBS are seeking cooperation from researchers in industry, universities, and other organizations to help develop the measurement tools manufacturers need to automate the processing of high-performance plastics, polymer blends, and advanced composite materials.

The NBS researchers have identified three areas that need to be developed: sensors to monitor polymer production processes, processing models for producers, and a database on the properties of polymer materials. To meet the measurement goal, researchers are invited to collaborate in the development of technology to monitor the quality of the mix of product ingredients, the viscosity of polymers in a molten state, the flow and velocity of polymeric materials, the orientation of molecules during processing, and the interlocking of molecules in two-phase materials such as block copolymers. Several NBS facilities for polymer research are available to industry for joint projects. Under the NBS Research Associate Program guest scientists and engineers are able to conduct research at the Bureau on projects of mutual interest with salaries paid by their employers.

For information on the plastic processes cooperative program, contact Drs. Anthony J. Bur or Francis W. Wang, B320 Polymer Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-6748.

BULLETIN BOARD STARTED ON FIRE RESEARCH PROGRAMS

Many of the computer programs developed by the NBS Center for Fire Research (CFR) now can be

obtained 24 hours a day, 7 days a week through a computerized bulletin board called CFRBBS. Included are computer programs which simulate the movement of smoke and toxic gases and the decisions and actions of occupants during a fire as well as a program which can help analyze smoke control systems. Information on upcoming CFR activities, such as conferences; a list of recent CFR reports; and information on accessing FIREDOC (a computerized fire research database) also is available on the bulletin board. It is designed to operate with IBM personal computers or compatible computers. The modem telephone number is 301/921-6302. The bulletin board operates at 300, 1200, or 2400 BAUD with most PC communications packages. The package should be set for 8 data bits, 1 stop bit, and no parity. Xmodem, Ymodem, Crxmodem, or Kermit protocol is required to download most of the files. No password is needed and there is no fee other than telephone costs paid by the user.

For additional information, contact system operator Doug Walton, B345 Polymer Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-6872.

COMPUTER SECURITY STANDARD REAFFIRMED FOR FIVE MORE YEARS

NBS has reaffirmed use of the Data Encryption Standard (DES) for another 5 years, saying it continues to be a sound method for protecting computerized data. Based on a technique developed by IBM, the standard was adopted by NBS and approved by the Secretary of Commerce as a Federal Information Processing Standard in 1977. (These standards are developed by NBS for use by the Federal Government.) The DES is reviewed by the Bureau and the Secretary of Commerce every 5 years to determine its adequacy to protect computerized data.

"The DES continues to be a sound and economical method for protecting unclassified, but valuable or sensitive data, and we support it," said Dr. Dennis Branstad of the Bureau's Institute for Computer Sciences and Technology.

The DES provides a publicly available set of equations, or "algorithm," to encode a message and a 56-bit electronic "key," held by the sender and receiver, to decode it. In 1977, NBS set up a laboratory to validate commercial devices to help ensure that products properly implement the standard and are compatible with other equipment using the DES. More than 100,000 devices that conform to the standard are currently being used to protect computer information.

Among other uses, the DES has been adopted by the American National Standards Institute and the American Bankers Association for protecting transfers of funds and securities over communications lines, a process known as electronic funds transfer. NBS also is helping the Department of the Treasury to use the DES to help protect the billions of dollars in federal funds that are transferred electronically each year.

Contact Dr. Dennis Branstad, A225 Technology Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-2913.

ENVIRONMENTAL "FROZEN ASSETS" DESCRIBED IN VIDEOTAPE

A project that is using frozen environmental samples to monitor pollution trends across the country is described in an 8.5-minute videotape available from NBS. The tape examines the National Biomonitoring Specimen Bank, which is a storage facility and clean laboratory for samples such as human livers and marine specimens as well as food products. These kinds of samples are banked because they are excellent indicators of pollution contamination at a particular time and location. Human livers, for example, are collected because they act as "sponges" in which toxic chemicals accumulate. Project researchers store samples at liquid nitrogen temperatures and can withdraw these materials at any time for reliable analysis. By periodically analyzing banked specimens, scientists can examine pollution trends.

For details on obtaining the videotape, contact Dr. Stephen Wise, A113 Chemistry Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-312.

Standard Reference Materials

NEW SRMS FOR CHOLESTEROL IN SERUM

In cooperation with the College of American Pathologists (CAP) and the Centers for Disease Control (CDC), NBS has recently completed measurements for certification of cholesterol in new serum-based materials to be issued as Standard Reference Materials (SRMs). The measurements are made using a "definitive method," i.e., a method shown to provide highly precise results with no known sources of bias. The technique employed in this method is isotope dilution mass spectrometry. This highly specialized technique is beyond the capabilities of most clinical laboratories and would be

too costly and time consuming to be used directly on patients' samples. However, the laboratories can use the SRMs certified by this technique to evaluate the accuracy of their routine methods. The new SRMs are in two forms: SRM 1951 consists of three vials of frozen serum supplied by CDC at 210, 242, and 282 mg/dL; SRM 1952, supplied by CAP, consists of three vials of lyophilized serum which when reconstituted have levels of 207, 262, and 357 mg/dL. These new materials cover the range in which most medical decisions concerning cholesterol risk factors are being made and should provide clinical laboratories with a much needed accuracy base.

Each of these SRMs costs \$150, plus the cost of our shipment in insulated boxes. These SRMs can be ordered from the Office of Standard Reference Materials, B311 Chemistry Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-6776.

DRUGS-OF-ABUSE-IN-URINE SRM

In an effort to provide reference materials for the drug testing community, NBS has prepared and certified the first of a series of urine-based SRMs. SRM 1507 is a freeze-dried urine fortified with 11-nor- Δ^9 -tetrahydrocannabinol-9-carboxylic acid (THC-9-COOH), the major urinary metabolite of marijuana. Each unit of SRM 1507 consists of three bottles of freeze-dried urine: two bottles containing, after reconstitution, THC-9-COOH at the certified concentration of 20 ± 1 ng/mL and one bottle of a urine blank. The certified value for the analyte was obtained from the concordant results of two independent NBS analytical methods: 1) solid phase extraction followed by gas chromatography/mass spectrometry (GC/MS); and 2) liquid-liquid extraction followed by high-performance liquid chromatography (HPLC) with electro-chemical detection.

A limited round robin exercise using SRM 1507 as an unknown was conducted among five Department of Defense laboratories engaged in drug testing. The reported results ranged from 17.7 to 21.0 ng/mL, with an average concentration of 20.8 ng/mL and the standard deviation of a single measurement among the laboratories being 1.0 ng/mL.

SRM 1507, which costs \$159, is intended primarily for verifying the accuracy of methods used for the determination of THC-9-COOH in human urine. The concentration of the reconstituted SRM is near the decision level for THC-9-COOH in urine that is used by the DOD and many government and private institutions. This SRM should be useful in addressing some of the legal and scientific issues surrounding substance abuse and its detec-

tion and treatment. A cocaine-in-urine SRM is being developed currently and urine-based SRMs for other drugs of abuse are planned.

This SRM can be ordered from the Office of Standard Reference Materials, B311 Chemistry Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-6776.

SRM CATALOG AVAILABLE

A new catalog lists nearly 1000 SRMs available from NBS. The SRMs, certified by NBS for specific chemical and physical properties, help scientific, industrial, and commercial users to achieve quality assurance of materials and goods. These materials include cements, ores, metals, glasses, plastics, food, environmental, and clinical items. The new catalog contains an improved alphabetical index and a complete numerical listing of the latest renewal SRMs and their certificate dates. It includes a description of the reference material, its certified characterization, and unit size.

Ordering and shipping information is also included; prices for the SRMs are published separately in annual supplements. Copies of the new catalog are available free-of-charge from the Office of Standard Reference Materials, B311 Chemistry Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-6776.

Calendar

April 10–15, 1988

RESONANCE IONIZATION SPECTROSCOPY AND ITS APPLICATIONS (RIS '88)

Location: National Bureau of Standards
Gaithersburg, MD

The RIS '88 Symposium is a major focal point for presenting the results of multidisciplinary research involving resonance ionization phenomena and related laser applications. The program will consist of posters, contributed and invited papers, and plenary lectures on the following topics: (1) Photo-physics and Spectroscopy, (2) Resonance Ionization Mass Spectrometry (RIMS), (3) Molecular Resonance Ionization Spectroscopy, (4) Noble Gas Atom Counting, (5) Analysis of Materials and

Surfaces, (6) Medical and Environmental Application, (7) Optical Sources, (8) Atom Reservoirs and Sampling, (9) Physics Applications—including Elementary Particles and Nuclear Processes, (10) Chemical Applications—including Diffusion, Reaction Rates, and Clustering.

This symposium is organized by an International Advisory Group through an appointed Program Committee and is sponsored by the Department of Energy, the University of Tennessee, the National Bureau of Standards, the International Union of Pure and Applied Physics, EG&G, and Battelle Northwest Laboratories.

Contact: Thomas B. Lucatoro, A243 Physics Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-3734.

April 13–15, 1988

4th INTERNATIONAL CONFERENCE ON METROLOGY AND PROPERTIES OF ENGINEERING SURFACES

Location: National Bureau of Standards
Gaithersburg, MD

Metrology and properties of engineering surfaces have continued to assume great importance to both the practicing engineer and the researcher. In recent years, industry has gained increased awareness of the importance of surface preparation techniques. This international conference is the 4th in a series of meetings on the subject of metrology and properties of engineering surfaces which have been held every 3 years since 1976. The main topics to be discussed at this meeting will be: the application of new surface techniques in industry, the development of new tactile instruments, the development of new techniques for the optical measurement of engineering surfaces, the compilation and analysis of data for specific manufacturing processes, and the relationships between surface generation and practical performance. This conference is sponsored by the National Bureau of Standards, Coventry Polytechnic, and Whitestone Business Communications.

Contact: Professor K. J. Stout, Coventry Polytechnic, Department of Manufacturing Systems, Priory Street, Coventry CV1 5FB, England, 0203 24166, ext. 278; or Dr. T. V. Vorburger, A117 Metrology Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-3493.

April 21–22, 1988

**WORKSHOP ON MICROSTRUCTURE AND
MACROMOLECULAR RESEARCH
WITH COLD NEUTRONS**

Location: National Bureau of Standards
Gaithersburg, MD

In order to inform and involve the community of scientific researchers at an early stage in the development of the Cold Neutron Research Facility (CNRF), NBS is hosting a series of workshops which will each focus on a major area of cold neutron research. This workshop on "Microstructure and Macromolecular Research with Cold Neutrons" will focus on scientific opportunities in the study of submicron structures in materials, including macromolecular structures in polymers and biomaterials, which arise from experimental techniques which take special advantage of cold neutron.

Technical talks by invited speakers will review current work in a variety of disciplines and discuss future extensions utilizing cold neutrons. Specific instruments and techniques related to characterizing submicron structures in materials will also be discussed. An important part of the workshop will be the active participation of the attendees in assessing the capabilities of and the need for various types of instrumentation for the CNRF. The workshop will thus afford potential users a unique opportunity to explore the capabilities of the CNRF and to guide its development.

The meeting is sponsored by the National Bureau of Standards.

Contact: Charles J. Glinka, B106 Reactor Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-6242.

May 10–11, 1988

**CONFERENCE ON UNCERTAINTY
IN ENGINEERING DESIGN**

Location: National Bureau of Standards
Gaithersburg, MD

Designing for Quality and Reliability is the focus of this conference. The aim is to provide an opportunity for engineers and statisticians to explore approaches to handling uncertainty in design and manufacturing. The conference will facilitate the interaction of these disciplines in the context of both product and process design. The program will include invited talks and open discussion led by se-

lected participants. Attendees will also have an opportunity to tour the NBS Advanced Manufacturing Research Facility (AMRF). Sponsored by the George Washington University, the National Science Foundation, the Army Research Office, the Office of Naval Research, the Air Force Office of Scientific Research, and the National Bureau of Standards, with the cooperation of the American Statistical Association.

Contact: Shirley Bremer, A337 Administration Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-2845.

June 9, 1988

**TWENTY-SEVENTH ANNUAL TECHNICAL
SYMPOSIUM OF THE WASHINGTON, DC,
CHAPTER OF THE ASSOCIATION FOR
COMPUTING MACHINERY**

Productivity: Progress, Prospects, and Payoff

Location: National Bureau of Standards
Gaithersburg, MD

Productivity is a key issue in the information industry. Information technology must provide the means to maintain and enhance productivity. This symposium will explore the theoretical and practical issues in developing and applying technology in an information-based society. "How productive are we?"—"How productive can we become?"—"What are the inhibitors and facilitators?" Topics to be discussed include: software; hardware system considerations; economic considerations; labor and the workplace; capture and use of expertise; artificial intelligence and knowledge-based systems; and building, testing, and maintaining systems. Sponsored by the Washington, DC, Chapter of ACM and the National Bureau of Standards.

Contact: Wilma Osborne, B266 Technology Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-3339.

June 20–23, 1988

**10th SYMPOSIUM ON
THERMOPHYSICAL PROPERTIES**

Location: National Bureau of Standards
Gaithersburg, MD

This Symposium is the 10th in a well-established series of conferences on thermophysical properties. It will address theoretical, experimental, and

applied aspects of thermophysical properties for gases, liquids, and solids. Appropriate topics to be included in the symposium include Thermodynamic Properties, Transport Properties, Optical and Thermal Radiative Properties, Interface Properties, and Data Correlation. Special topics to be included in the symposium are Properties of New Materials, Properties of Gaseous and Liquid Mixtures, New Developments in Experimental Techniques, and Interpretation of Experimental Data in Terms of New Theoretical Developments. Also included in the symposium is the “First Workshop on Subsecond Thermophysics.”

Contact: Dr. A. Cezairliyan, Room 124 Hazards Building, National Bureau of Standards, Gaithersburg, MD 20899, 301/975-5931; or Dr. J. V. Sengers, Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742, 301/454-4117.