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Technology Services FY1999 Technical Activities Report



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Technology Services FY1999 Technical Activities Report

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Editor

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Technology Services FY1999 Technical Activities Report

Table of Contents

Technology Services (TS) at a Glance.....	1
Director's Foreword.....	1
Overview.....	2
Office of Measurement Services.....	9
Office of Standards Services.....	33
Office of Technology Partnerships	45
Office of Information Services	51
Metric Program	54
Glossary	60
Appendices – outputs and interactions	63
Office of Measurement Services.....	63
Office of Standards Services.....	74
Office of Technology Partnerships	80
Office of Information Services	82
Metric Program	83
TS Organization Chart	84

Technology Services (TS) at a Glance

- **What TS is and does:** an organization of the National Institute of Standards and Technology that provides a wide range of technical products and services supporting scientific research and development, domestic commerce, and international trade.
- **How to work with TS:** visit <http://ts.nist.gov/ts> for a detailed description of TS products, services, and contacts.
- **TS vision:** Excellence in transferring technology, measurements, standards, and knowledge for the benefit of the economy and society.
- **TS mission:** To provide measurements, standards, and knowledge services to strengthen the U.S. economy and improve the quality of life.

Director's Foreword

This report describes the major technical activities of NIST Technology Services (TS) during Fiscal Year (FY) 1999. TS provides a wide variety of goods and services to U.S. industry in collaboration with other NIST operating units, other federal agencies, other national measurement institutes, state and local governments, and the private sector. These services include measurement traceability and reference data, coordination of documentary standards activities, laboratory accreditation, partnerships between NIST researchers and U.S. industry, management of the NIST knowledge base, and promotion of the use of the metric system by U.S. industry and federal agencies.

TS comprises 13 programs organized into four offices, plus TS Headquarters. The information presented herein reflects this organization. Following a brief overview of TS as a whole are individual descriptions of each TS Office and the Metric Program covering mission, scope, outputs, customers and markets served, opportunities, and FY 1999 highlights. Appendices enumerate staff recognition and awards, publications, presentations, committee participation and leadership, sponsored workshops, conferences, and symposia.

We are always looking to improve our products and services and to better serve our customers. We welcome your feedback and suggestions for our improvement.

Dr. Richard F. Kayser
Director
NIST Technology Services

Overview

Basic description

Technology Services (TS) is one of eight Measurement and Standards Laboratories (MSL) of the National Institute of Standards and Technology (NIST), which in turn is an agency of the U.S. Department of Commerce (DoC). Developed both with and for the seven other NIST MSL, TS provides a wide variety of goods and services, such as:

- (1) high quality measurement traceability and evaluated data;
- (2) coordination of national and international standards-related activities, and recognition and accreditation of calibration and testing laboratories or certifiers;
- (3) effective research relationships with U.S. industry; and
- (4) a comprehensive program of knowledge management.

In support of (1), TS presides over the ICSU Committee on Data for Science and Technology; ensures the quality of measurement traceability and evaluated data; serves as NIST point of contact for direct calibration of instruments and equipment; produces reference materials and artifacts for self-calibration; promotes and disseminates NIST evaluated data; and supports state and local governments for their weights and measures programs.

In support of (2), TS chairs the federal Interagency Committee on Standards Policy; reports on governmental use of voluntary consensus standards; coordinates standards and conformity assessment issues; coordinates U.S. input to international standards developed under the Voluntary Product Standards Program and for the International Organization for Legal Metrology (OIML); operates the National Voluntary Laboratory Accreditation Program (NVLAP); provides technical support for U.S. trade negotiators; supports U.S. standards experts overseas; assesses the competence of U.S. conformity assessment bodies under the National Voluntary Conformity Assessment Systems Evaluation (NVCASE) program; operates the U.S. Inquiry Point for non-agricultural products for the World Trade Organization; and maintains the national repository of standards and conformity assessment information.

In support of (3), TS provides support services to and representation in the Federal Laboratory Consortium; manages NIST's relationship processes through agreements for Cooperative Research and Development, Domestic Guest Researchers, Facility Use, License, Non-disclosure, and Industrial Fellows; manages NIST invention disclosure, commercial assessment, and patenting processes; manages NIST's participation in the government-wide Small Business Innovation Research Program; and provides "effective practice" advice and trains NIST staff on R&D relationship issues.

In support of (4), TS preserves the history and heritage of NIST and the National Bureau of Standards; offers a host of services to support the publishing and dissemination needs of the NIST research community; and maintains the NIST Research Library.

TS also promotes the use of the metric system by U.S. industry and federal agencies. The importance of TS activities is widely recognized in the U.S Constitution and federal legislation, which include general and specific mandates for these goods and services.

In FY1999 TS had annual expenditures of \$35.2 million, and 172 FTEs as of October 1, 1999; each of these figures represents about 9% of the totals for the MSL. TS has few of its own laboratory facilities, maintains the vast majority of NIST information facilities, and operates numerous minicomputers and local area networks serving TS staff, customers, and partners from the other MSL. TS staff members possess a wide variety of academic degrees, from AA to PhD, as well as considerable skill and knowledge in metrology, normative standards, laboratory accreditation, international trade, reference data and materials, information technology, electronic publishing, marketing, scientific and engineering research and development, and program management.

Customer and market requirements

TS has customers external and internal to NIST. The external customers represent a broad clientele, including U.S. industry, U.S. Department of Defense (DoD), other federal agencies, educational institutions, scientific societies, standards-developing organizations, international organizations of which the U.S. is a member, governments of friendly foreign countries, state and local governments in the U.S., and individuals. Many customers, are, in fact, collaborating partners.

Several classes of NIST measurement services administered by TS – calibrations, reference materials, and PC databases – are available on a fee basis. As measured by revenue, the primary industrial customers of TS are manufacturers of scientific instrumentation and equipment, including not only large diversified companies such as Hewlett Packard and General Electric, but also smaller specialty companies such as Leco Corporation, Shimadzu Scientific, Mettler-Toledo, and Instron Corporation. Other industries served by TS include aerospace and defense, as represented by Lockheed Martin, Hughes Aircraft, and TRW, and the chemical industry, as represented by Tennessee Eastman and Dow Chemical. State and local governments served by TS consist primarily of the 750+ U.S. Weights and Measures jurisdictions at the city, county, and state levels.

Key market requirements for NIST measurement services are accuracy and traceability, wherever possible, to the national and international standards. Scientific investigators calibrate their equipment based on Standard Reference Materials, or arrange through the Calibration Program to have their equipment calibrated at NIST. Other investigators need accurate, reliable scientific data to model natural phenomena, test scientific theories, or design engineered artifacts or systems. Officials at state and local testing laboratories need to make accurate measurements to ensure fairness in domestic commerce. Prompt delivery of NIST measurement services is also a significant market requirement, because very often the acquisition and use of a NIST measurement service is a prerequisite to subsequent modeling, testing, processing, or production.

The OIML standardization activities rely on public and private sector participation in working groups to promote the inclusion of U.S. technology and interests in OIML's international recommendations. Individuals, small and large companies, and trade associations obtain information on foreign standards and conformity assessment through the National Center for Standards and Certification Information, which TS maintains. NVLAP's accreditation process helps laboratories improve and document their measurement and test capabilities and offers recognition of competence that is often demanded by their customers. Technical assistance to other countries helps them to build the infrastructure needed to comply with international treaty obligations while promoting free trade and compatibility with the U.S. standards and conformity assessment systems.

With respect to technology partnerships, TS serves both external and internal customers. The external customers are U.S. firms that wish to work with NIST's researchers and/or license NIST inventions. The internal customers are members of the NIST research community who are working with industry under a formal agreement. Common requirements of both groups are prompt execution of relationships with a minimum of delay and problems; and access to timely, high quality advice/information on their relationship questions.

TS has many other customers internal to NIST. NIST measurement services result from a partnership between the technical MSL and TS. NIST technical staff from the other MSL perform the measurement science research, development, and critical evaluation underlying NIST measurement traceability and data services. TS provides needs assessment, NIST policy implementation, program management, administrative support, metrology instructor training, product evaluation, processing, packaging, market research, sales, distribution, and information services. TS also manages NIST information resources and services that are used primarily by NIST internal customers, who require real time response to routine and complex reference questions, fast turnaround time to literature requests, and on-time delivery, editing, and publication of documents.

Supplier and partnering relationships

In the area of standards services, TS partners with other Federal agencies, standards-developing organizations, and conformity assessment bodies. TS works closely with the International Trade Administration (ITA), for example, in implementing the U.S.-EU Mutual Recognition Agreement (MRA) as a means of providing U.S. companies readier access to the European market. TS was instrumental in the creation of the National Cooperation for Laboratory Accreditation (NACLA), a partnership with U.S. accreditation bodies and other Federal agencies. TS also cooperates with DoC's Special American Business Internship Training (SABIT) program to give technical assistance to government and business leaders from Russia and the Newly Independent States, exposing them to U.S. technology and standards-related practices in periodically scheduled workshops. These SABIT and companion Standards in Trade workshops capitalize on the participation of cognizant federal agencies and private sector

organizations. TS also provides information and assistance to NIST staff who serve on many hundreds of standards committees.

In the area of technology partnerships, TS partners with the NIST research laboratories and the NIST legal office to secure legally sufficient agreements that satisfy the research objectives. With respect to information services, TS procures a large number of scientific and technical information products and services from a wide variety of suppliers. TS also partners with other research organizations for the purpose of competitive acquisitions, benchmarking and information exchange.

All of the TS programs in measurement services are highly leveraged through partnerships.

The Standard Reference Data Program (SRDP) supports data evaluation efforts throughout the other NIST MSL. This support takes the form of funding for data evaluation work conducted by subject matter experts in the other MSL, or SRDP staff assistance with a variety of tasks required for the production of NIST Standard Reference Data, including: long-term planning of data activities, mentoring and program management of fledgling data evaluation efforts, negotiating cooperative agreements with non-NIST partners, data product design and development, data product review, marketing, sales, and distribution. SRDP also collaborates extensively with non-NIST partners, including major national data centers in the U.S. and abroad. In addition to these partnerships, SRDP also retains a number of non-NIST data evaluators in subject areas for which there is a demand for evaluated data, but where no suitable experts currently at NIST are available to conduct the evaluations. SRDP also maintains several dozen distributor agreements with outside partners for the broadest possible dissemination of SRD products.

The Calibration Program (CP) cooperates extensively with partners from the other MSL, principally from CSTL, EEEL, MEL and PL, to deliver high-quality calibration services to NIST customers and to develop associated fees. NIST MSL and CP staffs also provide general technical assistance and guidance on traceability, quality systems, and measurement reciprocity across national borders. The CP staff provides quality assurance, administrative functions, customer service, and broad-based NIST representation to large and diverse customer groups such as DoD, DOE, NASA, and the National Conference of Standards Laboratories. The CP staff serves as NIST's "corporate face" for most non-NIST customers seeking to have their equipment calibrated at NIST. In this role the CP staff disseminates catalogues and fee schedules, resolves complaints, optimizes work processes, monitors billing data, assists legal actions and financial audits, and answers email and telephone inquiries.

The Standard Reference Materials Program (SRMP) cooperates extensively with the other MSL to provide SRMs of the highest metrological value. SRMP staff duties include: program administration, NIST SRM policy implementation, scientific assessment and technical review of SRM data and related documents, market research and needs assessment, reference materials processing and production, marketing, sales,

and information services. In the areas of marketing and needs assessment, SRMP partners with other federal agencies, ASTM, other professional organizations, other SRM distributors, other NMIs and certified reference material producers, materials suppliers, and round robin participants. SRMs and their assigned values define the bases for the validation and calibration of measurements in the U.S. and are accepted and used in many countries of the world, thereby ensuring traceability and compatibility across the entire national/international standards community.

The Weights and Measures Program (WMP) collaborates with the National Conference on Weights and Measures to promote national and international uniformity in weights and measures laws, regulations, standards, and practices. WMP also works closely with the States in the areas of accreditation, calibration, training, packaging and labeling, and statistical sampling to strengthen the metrology system within the U.S. To facilitate international trade, WMP develops test data exchange agreements with trading partners for certificates of compliance for devices. WMP and NIST's Manufacturing Engineering Laboratory are co-developing MEASUREnet, a network linking 11 pivotal state metrology labs to facilitate interlaboratory comparisons and training. WMP also collaborates with the NIST MEL Force Group to evaluate prototypes of commercial weighing and measuring devices against national and/or international standards.

Competitive situation

Most industrialized nations have a national measurement institute to fulfill national standards and measurement needs and maintain measurement infrastructure, but none provide anywhere the range and quality of products and services provided by NIST via TS. TS does not compete directly with other public organizations or the private sector, but instead provides services of an infrastructural nature in such a way as to maximize the leverage of the investment of Congressional appropriations and income that support TS programs. For example, recently the Weights and Measures Program conducted a weights and measures instructor training pilot program. Four NIST instructors trained 205 State instructors, who in turn trained over 6,300 other individuals, including nearly 2,400 industry representatives, for a net leveraging effect of 1:1580. A consequence of improved instructor training was reflected in a recent study of the net content of milk packaging, which showed that the number of milk containers underfilled had been reduced from 46% to 19% of samples tested, resulting in a \$17 million savings to consumers.

As a part of NIST, TS is in an ideal position to promote U.S. Government trade objectives on standards-related activities domestically and internationally. Capitalizing on NIST's reputation as an objective scientific institution, TS influences the policies of Federal agencies, private standards and conformity assessment organizations, and even regional and international standards and conformity assessment activities. TS facilitates, coordinates, and promotes private-sector activities in standards by providing requested information, training, and guidance; and reinforces and supports activities of the American National Standards Institute (ANSI) in promoting an effective U.S. standards

community. NIST has strengthened its working relationship with and support for ANSI to encourage broader U.S. industry participation in international standards development.

TS has located five standards experts abroad to assist U.S. businesses, to provide feedback on standards-related activities within the surrounding regions, and to work with standards and conformity assessment bodies in those countries. To promote the acceptance of U.S. test data and product certification activities, NVCASE plays a vital role in implementing the U.S.-EU MRA. NVLAP is pursuing recognition by regional accreditation bodies to facilitate the acceptance by other countries of U.S. calibrations, test data, and conformity assessment results. Globalization is changing the nature and importance of standards and conformity assessment, and TS must continue to be flexible, efficient, and outward looking to deal with these new challenges.

Business directions / other factors

The demands of TS's customers are changing rapidly. In recent years science and technology have become increasingly interdisciplinary, while at the same time product development life cycles have accelerated dramatically. Industries accustomed to product development duration on the order of years from original idea to marketable product are now delivering products in a matter of months, or even weeks in the fastest moving technology markets, such as the Internet. Many advanced technologies function as complex systems with multiple integrated component technologies, which require complex organization to implement and manage successfully. By virtue of its multidisciplinary suite of products and services, TS is poised to serve customers operating in the increasingly complex, accelerating technical marketplace. To remain effective, TS must strengthen its relationships with the other MSL so as to identify opportunities for coordinated, interdisciplinary effort and to respond promptly and flexibly to the demands of fast-paced technology markets.

TS must meet the new challenges posed by its responsibilities under the National Technology Transfer and Advancement Act in a changing world scene. In particular, TS must spot critical trends, conduct economic analyses of the role of standards and conformity assessment for various sectors, use newly available electronic tools, and facilitate/coordinate policy decisions related to the U.S. position in the global standards and conformity assessment arena. Development of long-term strategic alliances with key foreign partners may be a fruitful avenue to enhance U.S. influence in the global marketplace; TS will pursue this aggressively. Success over the next three to five years will be determined by TS effectiveness in its coordination functions, development and promotion of an agreed upon National Standards Strategy, assistance in bringing NACLA to self-sustaining effectiveness, and improving internal operations, especially through greater use of electronic tools.

Key business directions include:

1. Increased measurement services in such important areas as information technology, biotechnology, wireless communications, advanced materials, nanotechnology, and

microelectromechanical systems. In more technologically mature industries, NIST needs to respond to demands for more measurements with increasingly high accuracy, selectivity, and traceability to national standards. TS needs to work closely with the other MSL to see that these demands are served. For maximum impact, TS needs to focus its resources on key products and services while reducing those in low impact areas.

2. International standards for products and services. U.S. standards-setting organizations often are ineffective in international standards-setting processes. TS needs to continue its efforts to effect a National Standards Strategy for application in the international standards arena. This objective would include steps to evaluate sources of change, to articulate alternative responses, and to recommend and develop collaborative effective strategies to, and with, U.S. standards-setting organizations.
3. The development and implementation of alternative, 'semiformal' research relationship vehicles that allow for tracking collaborative agreements with a minimum of administrative interference. TS needs to increase its training of NIST scientific staff and laboratory management on invention disclosures, patent protection, formal agreement and technology transfer mechanisms, etc., in order to facilitate smooth partnerships between NIST and non-NIST parties.
4. Increased automation and on-line availability of NIST information sources and services.
5. Promoting performance excellence and improvement in all TS programs. Establishing and monitoring measures of customer satisfaction will strengthen customer relations by making TS more responsive to customer needs. Engaging the other MSL and other TS partners to participate in joint planning of NIST outputs will foster an esprit de corps among TS and its primary partners, and sustain TS's commitment to its tireless pursuit of continually improving customer service.

Office of Measurement Services

Introduction

The NIST Office of Measurement Services (OMS) facilitates access to measurement and standards activities of NIST Laboratories and Programs through the dissemination of NIST products, data and services. Many national and international institutions perceive NIST's major outputs as reference materials, databases, accreditation and calibrations. The Office of Measurement Services has successfully placed these traditional and discrete services within the context of the critical regulatory, market and trade issues of today. This coordinating effort has served to heighten the importance, effectiveness and relevance of the technological assistance that NIST provides.

The Office of Measurement Services is the central contact point for NIST technology transfer services that include not only traditional measurement transfer standards and services, but also services that assist customers in overcoming technical barriers to global trade markets. The Office of Measurement Services is in the unique position of representing industry's interests to the NIST Measurement and Standards Laboratories (MSL) by explaining the economic driving forces behind industrial demands and then disseminating NIST products and services. The demand for NIST products and services continues to escalate out of proportion to available resources. Thus, the Office of Measurement Services' interface between industry and NIST is crucial as it allows NIST to articulate and assimilate the most effective and economical technical services and products to meet customers' needs.

The linking of industry's measurements to NIST via the outreach and technology transfer programs under the Office of Measurement Services umbrella is the best possible assurance that the United States receives the superior services synonymous with NIST's international reputation for technological excellence.

OMS is composed of four programs: Calibration, Standard Reference Materials, Weights and Measures and Standard Reference Data. The first three make up the largest and most successful measurement traceability program in the world.

- The **Calibration Program (CP)** administers and provides quality assurance for NIST calibrations. The Program provides policy guidance for NIST staff and acts as an information broker, bringing together NIST customers, customer groups and service providers in support of the national measurement system. The Calibration Program is the first point of contact for potential customers who need instruments and standards calibrated to the highest accuracy available in the United States. Over 800 customers receive traceability to the SI units through the more than 500 high-accuracy calibrations and special tests available from 30 technical groups throughout NIST.
- The **Standard Reference Materials Program (SRMP)** oversees the development, certification and distribution of over 1300 Standard Reference Materials® (SRMs®). The number of SRMs available illustrates the breadth of measurements supported by

NIST. Certified for their specific chemical and physical properties, SRMs are the definitive source of measurement traceability in the United States. All measurements using SRMs can be traced to a common and recognized set of basic standards or stated references, which provide the basis for comparability of measurements among different laboratories. These SRMs are used to assure the long-term adequacy and integrity of industrial quality assurance programs, to self-calibrate instruments and measurement systems and to help users in industry and government develop accurate methods of analysis. In addition, as economic activity becomes even more globalized, customers are using SRMs to achieve measurement quality and conformance to process requirements that address both national and international needs for commerce and trade.

- **The Weights and Measures Program**, known outside NIST since 1836 as the Office of Weights and Measures (OWM), cooperates with the 50 States, the Virgin Islands, Puerto Rico and the District of Columbia as well as other Federal agencies to achieve national uniformity in weights and measures standards, laws and practices. Working with the National Conference of Weights and Measures, OWM operates a multi-faceted program consisting of training, development of model laws and practices, testing and quality assurance.

These three NIST measurement traceability services work closely together to ensure that American industry requirements are met with a robust and flexible program that adjusts to new measurement and traceability needs. In recent years, the globalization of the U.S. economy has required vigorous efforts to ensure that our national measurement traceability program is recognized and harmonized internationally. The OMS programs have worked with the TS Office of Standards Services to ensure U.S. measurement traceability technology and policy are accepted throughout the world.

The fourth OMS program, the Standard Reference Data Program (SRDP), is designed to ensure that scientists, engineers and the general public have access to the critically evaluated data necessary to perform state-of-the-art research and development and product and process development.

- **The Standard Reference Data Program (SRDP)** coordinates the activity of 30 data evaluation centers located both at NIST (25) and in external organizations (5). These centers collect and evaluate data in over 40 disciplines and make the resulting high quality data compilations available via the World Wide Web, PC databases and published journals. NIST critical evaluation work allows scientists and engineers to use data with more confidence.

FY 1999 OMS Highlights

OMS and its four programs serve American industry and others through a wide variety of programs and services. The past year has seen the following highlights. More complete write ups are included under each program as indicated:

National and International Leadership

- *NIST Sponsorship of National Accreditation of State Metrology Laboratories (OWM)*
- *Prioritization of Federal Needs In Laboratory Metrology And Accreditation (CP)*
- *Partnership with NCSL for Improved Measurement Services and Establishment of Chemical Metrology Committee (CP)*
- *SRMP-Hosted Workshop at Pittcon Trade Show (SRMP)*
- *ASTM-NIST Conference on Computerized Materials Data (SRDP)*

NIST Leadership

- *Calibration Quality Forums (CP)*
- *Coordination of New NIST Calibration (CP)*
- *Internet Data Dissemination Policies (SRDP)*
- *FY 2000 SRMP Project Plans (SRMP)*

Strategic Planning

- *Review and Restructuring of the National Type Evaluation Program (OWM)*
- *Calibration Program Strategic Planning and Implementation Meetings (CP)*

Customer Service

- *Internet Access to the National Type Evaluation Program Certificates of Conformance (OWM)*
- *The Information System to Support Calibrations (ISSC) and Calibration Services Virtual Library (CSVL) (CP)*
- *Reaching SRMP Customers through Information Technology (SRMP)*
- *New SRM Manufacturing Facilities Made Operational (SRMP)*
- *Record Dissemination for NIST Standard Reference Data (SRDP)*

New Products and Services

- *Draft Revision of Handbook 133, Checking the Net Contents of Packaged Goods (OWM)*
- *Important New Standard Reference Materials Released (SRMP)*
- *Modernization of the Protein Data Bank (SRDP)*
- *Growth of NIST Online Data Systems (SRDP)*

Technical Training and Technology Transfer

- *Development of a Mass Workshop and Tutorials in Conjunction with the 1999 Measurement Science Conference (OWM)*
- *Training for State and Industry Metrologists and U.S. Weights and Measures Officials (OWM)*
- *NIST Sponsorship of the Establishment of MEASUREnet (OWM)*
- *Education on U.S. Measurement Technology Policy (CP)*

Calibration Program

The NIST Calibration Program links the makers and users of precision instruments and artifact standards to national and international measurement standards. The core CP measurement services are instrument and standard calibrations, special tests and measurement assurance programs (MAPs). Customers from private and public organizations send transfer standards to NIST laboratories in Gaithersburg, Maryland and Boulder, Colorado. NIST technical staff members characterize the measurement parameters of these instruments and standards using transfer processes that have been demonstrated to be stable, predictable and directly traceable to SI units as realized at NIST. When returned to the customer, the instrument or standard is used as the reference in a quality control system or quality assurance program, the purpose of which is to achieve reliable and accurate measurements for a variety of process or production specifications.

To provide the measurement tools and reference points that allow industry as well as government agencies to establish traceability directly to international measurement standards, NIST utilizes the talents and expertise of its technical divisions. Approximately 30 different technical groups from 13 technical divisions are involved in the delivery of calibration services, as well as the research and development to support these services. The Calibration Program is the first point of contact with potential customers and provides essential quality assurance and reporting services to internal stakeholders, including the Director's Office, the other MSL, the Chief Financial Officer and the Program Office.

As the interface between the NIST technical staff and the user, CP also provides policy analysis and assessment of trends in measurement science to all levels of NIST management. To keep pace with U.S. technological developments and to ensure that NIST calibration services are meeting the needs of the user, CP acts as a point of contact for both information dissemination and technology transfer. This work includes user-group liaison and other support activities to strengthen ties to professional and standards organizations as well as to federal agencies.

Currently, more than 500 different calibrations, special tests and MAP services are available in seven major measurement areas. Benchmark parameters for assessing the health and vitality of the Program are (a) type of requested measurement services, (b) income from these services and (c) the number of instruments and transfer standards calibrated during the course of a year. Other important measures of program impact are the number of calibration customers, exhibits at professions meetings or trade shows, and Web site hits.

Future Opportunities - Business Process Streamlining with New IT Tools

Business processes and information technology systems of OMS, TS and NIST programs have developed, matured and evolved independently of each other, in accord with the perceived needs of each individual activity. Developments in software engineering,

electronic data interchange, electronic commerce, enterprise systems management and information technology create compelling reasons to reengineer the business and information technology systems of OMS and its individual programs. Not only must the reengineering address currently perceived needs, but also it must anticipate the future needs of all NIST calibration activities.

To expand the Information System to Support Calibrations (ISSC) database developed by the NIST Electricity Division, the Calibration Program has formed a Joint Planning Group to integrate the ISSC tools into current NIST business practices. Some business processes have been eliminated entirely; others added. CP plans for the future are to work with other OMS programs to develop a master plan to move OMS into electronic commerce and a state-of-the-art information technology system. Project goals include:

- Reviewing, evaluating, characterizing and documenting current processes and systems as a baseline;
- Identifying processes to determine the needs of the OMS customer base;
- Assessing what, if anything, should or could be improved immediately;
- Identifying and documenting opportunities and requirements for electronic commerce; and
- Identifying and documenting opportunities and requirements to reengineer information technology systems.

Future Opportunities - Calibration Program Virtual Library

NIST calibration service providers invest considerable resources in documenting their measurement standards and calibration services for the benefit of their customers and peers. While these publications are referenced in the NIST Calibration Services Users Guide, NIST SP 250, the Calibration Program encourages an even wider distribution, for example, making the publications available at exhibits. The Internet is an even broader and more efficient distribution mechanism. Today NIST provides some of these publications electronically, and more will be added in the near future. Immediate savings to NIST include the costs of storing and mailing publications. More importantly, the concept of a virtual library opens exciting possibilities for having the entire publication process, from writing to editorial review to dissemination, take place electronically.

Calibration Program FY 1999 Highlights

Prioritization of Federal Needs in Laboratory Metrology and Accreditation – Many government and corporate metrology laboratories routinely undergo multiple audits and assessments, usually with multiple criteria. With availability of internationally-accepted quality and accreditation criteria and with OMB policy on using public standards as a driver, government agencies are discussing the use of ANSI/NCSL Z540-1 and ISO/IEC Guide 25 (soon to be replaced with ISO/IEC 17025) as their sole quality and performance criteria for both their own laboratories and their contractors' facilities. This change will lead to reduced costs by reducing the number of audits and assessments and by establishing a single national standard for quality systems in metrology laboratories.

In partnership with the National Voluntary Laboratory Accreditation Program, the Calibration Program has been facilitating the Department of Energy, NASA and Air Force efforts to aggregate and prioritize their needs for laboratory metrology and accreditation. As an example, the Calibration Program staff worked with the Department of Energy Metrology and Accreditation Committees to bring harmony to multiple DOE national laboratory programs and their multiple contractors, both defense and civilian. Committee members from a broad spectrum of DOE programs have prioritized their needs for NIST research, measurement services and laboratory accreditation. The Chief of the Calibration Program serves on the Steering Committee for the Metrology Committee, and the Deputy Chief serves on the Steering Committee for the Accreditation Committee. CP was instrumental in providing NIST technical divisions enough lead time and discussions with decision-makers to make proposals for about \$7M of DoD research money to be awarded in FY 2000.

Partnership with NCSL for Improved Measurement Services and Establishment of Chemical Metrology Committee - The Calibration Program has a long history of participation in committees and standards development activities with the National Conference of Standards Laboratories (NCSL), most recently in the formulation of the NCSL U.S. National Measurement Requirements Survey. NCSL is an organization of over 1500 calibration and testing laboratories, equipment manufacturers, consumers of measurements and other interested parties. The survey is directed to NCSL members and NIST calibration customers and over the years has covered both technical needs and customer service. It provides effective feedback to NIST technical groups from an important customer base. The last survey highlighted the need for NIST to improve calibration turnaround time. NIST has improved its turnaround time and now enables its customers to check on calibration status via the Web.

During FY 1999, the Calibration Program has collaborated with the National Conference of Standards Laboratories in establishing a Chemical Metrology Committee to focus on chemical traceability and measurement issues, ISO accreditation needs and worldwide improvement of accuracy using intercomparisons. NCSL has a number of industry-sector-specific technical committees including healthcare, electric utilities, airline metrology and automotive metrology. Extension of NCSL interests to chemical metrology is a natural progression and provides the chemical metrology community with a unique forum and an opportunity to work with their colleagues in the physical metrology community. A member of the analytical technology division of a major U.S. chemical manufacturer will chair the committee.

Calibration Quality Forums – NIST calibration services, administrative support, business functions and logistical support are located throughout the NIST campuses. Each group works with its customers according to technical needs and customer expectations. In order to bring these groups together to discuss common

issues and share best practices, the Calibration Program instituted a series of Calibration Forums several years ago. This past year, the Calibration Program sponsored a series of five "Forums on Quality," beginning with an introduction of the series by Ray Kammer and followed by separate descriptions of varied approaches and successes by the Ionizing Radiation, Optical Radiation and Process Measurements Divisions. The series concluded with a presentation comparing NIST calibration services with those of Australia's national laboratory. This series will be continued with more internal and external speakers on quality and with speakers on other topics of interest.

Coordination of New NIST Calibration Services - Based on dialogues with customers and industry groups, NIST technical divisions establish the need for new or expanded calibration services. The initial research, construction, verification and documentation costs are borne by the technical division. Once a service is approved, the costs of providing and maintaining it are funded by a surcharge on customer fees. The Calibration Program administers the planning, prioritization and disbursement of Calibration Service Development Surcharge funds, which are used for improvement of existing services and near-term development of new services. In FY 1999, projects such as the following were funded:

- Establishment of a Measurement Assurance Program for Zener references at the 10 V level;
- Development of measurement capabilities for calibrating reference radio-frequency emitters;
- Development of an instrument to measure the coefficient of thermal expansion for simple and complex geometrical standards;
- Construction of low-range gas flow meter with higher throughput and reduced uncertainties for vacuum gage and leak calibration services; and
- Demonstration of the feasibility and benefits of remote, user-initiated transfer dosimetry calibrations of alanine dosimeters in high-dose absorbed-dose measurements.

Calibration Program Strategic Planning and Implementation Meetings – NIST calibration service providers have considerable latitude in designing and implementing their calibration services. In order that there be a NIST-wide picture of the various services and to facilitate sharing information and best practices, each year the Calibration Program Management Team meets with the 13 Division Chiefs that oversee NIST calibrations. These meetings serve to coordinate and familiarize the individual divisions with the status and future of each of their small businesses within the context of NIST's overall priorities. Areas of discussion include staffing, workload, funding, quality systems, new and modified services and services to be terminated.

In addition, the Calibration Program acts as an interface between NIST service providers and NIST external customers to implement improvement plans. CP is uniquely suited to address problems that affect multiple divisions, especially

when the divisions are in different Laboratories. To enhance service quality while maintaining high technical quality, the Calibration Program assists in specific issue resolutions that clarified roles and streamlined calibration hand-off processes between groups within NIST and between external customers and NIST service providers. The Calibration Program is available to help technical groups with disseminating the results of their research efforts. This help ranges from ensuring that documentation meets NIST calibration quality guidelines to determining the best dissemination mechanism. During the past year, the Calibration Program Management Team held strategic planning meetings to assist NIST staff developing new capabilities in appearance measurements.

The Information System to Support Calibrations and Calibration Services Virtual Library (CSVL) – The ISSC is a Web-based management and tracking database that went on-line linking 13 NIST divisions, the Calibration Program and the Comptroller’s office; 500 calibration services; and 200+ calibration providers in Gaithersburg and Boulder. This system was initially developed by the NIST Electricity Division and has been adopted by CP as the basis for a larger service. The ISSC replaces hard copy handoffs among administrative centers, technical groups and financial staff. It improves workflow tracking, notifying staff of new work and notifying management when promised delivery dates are nearing. The NIST Comptroller’s Office is provided with a summary of customer data ready for billing and uses the ISSC to feed into its invoice software. In addition, external calibration customers are given passwords to access a Web page that provides status reports for their calibration only. The ISSC also automates computation of fees that are calculated based on actual time, materials and other custom work. It can also be used to store raw data, produce final reports and access other historical and trend data. The Calibration Program has re-engineered its administrative support activities to take full advantage of the database and to meet new needs that it has introduced. CP is also facilitating a merger of business processes for shipping artifacts with the ISSC capability to display information that tracks shipping company progress.

The CSVL is a Web-based search engine for full text retrieval of articles of importance to calibration and measurement specialists. It has been populated with a sample of publications from the SP 250 series and other recent publications.

Education on U.S. Measurement Technology Policy - Many calibration laboratories look to NIST to provide high-level training in measurement processes and techniques. In response to this need, various NIST divisions hold classes at NIST. In FY 1999, the Calibration Program also organized short courses by NIST experts to be held in conjunction with the Measurement Science Conference and National Conference of Standards Laboratories. These two meetings serve over 2000 metrologists each year and make it easy for interested students to attend. Through these classes, NIST improves the measurements that U.S. metrologists make and brings NIST customers in direct contact with NIST service providers and researchers.

International trade has assumed increasing importance in activities throughout NIST. Whereas once tariffs dominated trade concerns and measurement issues were confined to technology issues, we now see measurement barriers (so-called non-tariff trade barriers) playing a major part in trade. Programs throughout NIST have been affected by this change. In support of the U.S. international trade position, the Calibration Program provides educational presentations and documentation to clarify the U.S. practices surrounding traceability, calibration, Standard Reference Materials and laboratory accreditation, within the overall context of quality systems and best business practices. In FY 1999, CP provided several key presentations on traceability and measurement services to overseas experts in several industries, provided comments on the CIPM MRA on measurement and dissemination capabilities and met with domestic and foreign guests concerned with technology transfer and measurement services.

Standard Reference Materials Program

The Standard Reference Materials Program provides reference materials that are the definitive physical sources of measurement traceability in the United States. The Program promotes and supports the development and certification of NIST SRMs essential to industry, academia and government in order to facilitate commerce and trade and to advance science and technology. This work is in support of the NIST mission to strengthen the U.S. economy and improve the quality of life by working with industry to develop and apply technology, measurements and standards.

SRMP maintains and offers for sale over 1300 different Standard Reference Materials certified for their chemical composition, physical properties, or engineering properties. SRMs are used for three primary purposes: to help develop accurate methods of analysis; to calibrate measurement systems; and to assure the long-term adequacy and integrity of measurement quality assurance programs.

Historically, SRMs have been used as vehicles for transferring measurement science and technology through channels of industry and commerce to the nation at large. As such, SRMs are crucial reference points in the establishment of a comprehensive measurement system for the entire nation. This system has met the needs of U.S. industry and commerce for nearly one hundred years and continues to evolve to satisfy more demanding measurement requirements. The current fast pace of technological change, coupled with increasing demands on high quality, traceability pathways involving SRMs and SRM types, is mandating that new strategies for delivering technology transfer via SRMs be explored and developed.

Each new SRM is the fruit of collaboration between SRMP, the NIST technical divisions and the NIST Statistical Engineering Division, as well as representatives of science and industry. SRMP is the central point at NIST for the coordination and support of all reference material services and related activities. The program provides support to the NIST Laboratory programs in the following areas:

- SRM program administration,
- NIST policy implementation related to SRM products and services,
- Scientific assessment and technical review of SRM certification data and related documents,
- Market research and SRM needs assessment,
- Reference materials processing and production,
- Business services (SRM marketing and sales), and
- Information services.

SRMP is organized into three main groups: Production and Certification; Packaging and Distribution; and Sales and Marketing.

- The **Production and Certification Group** is responsible for maintaining official records supporting SRM certification, collecting draft certificates from the technical divisions and the preparation and review of draft certificates for NIST-wide uniformity and format. The SRM Coordinators provide independent technical and financial oversight over the SRM process and share responsibility with the NIST technical divisions on identifying customer needs, projecting SRM markets, acquiring raw materials and providing customer support.
- The **Packaging and Distribution Group** works with the SRM Coordinators and the NIST technical divisions to process and provide candidate materials for certification as Standard Reference Materials. This group has facilities and trained personnel for achieving this goal by using mixing, cutting, blending, bottling, ampouling and other special processing techniques as required. These facilities and personnel complete the final packaging and physical preparation of SRMs for sale. This group is also responsible for physical inventory control and worldwide distribution of the SRMs.
- The **Sales and Marketing Group** is responsible for customer support, service and satisfaction. They respond to customer needs in many ways including conducting market research, providing technical and hazardous materials information, issuing invoices, processing orders, booking international shipments with freight forwarders and providing proper shipping documentation and tracking numbers. The sales office offers customer support in selection and purchasing of SRMs, as well as conducting exhibits at tradeshows, maintaining the SRMP Web site and issuing the SRMP Quarterly Newsletter, annual price list and various technical brochures and publicity.

Standard Reference Materials Program FY 1999 Highlights

Reaching SRMP Customers through Information Technology - The SRMP Web site became fully operational at the beginning of FY 1999 and has grown in popularity to become one of the most visited sites at NIST. A recent tally indicated that the site collected in excess of 76,000 hits/month. The Web site

provides customers with information concerning all aspects of the SRM Program including policies, ordering information and staff contacts. Information on all 1300 SRMs in stock is provided, including price, availability, certificate of analysis and Materials Safety Data Sheets. Future plans for the site include electronic commerce, digital images of the products offered and a revamped internal page offering sales information.

SRMP is also initiating a complete upgrade of integrated order entry, shipping, inventory and customer database software to take advantage of the advances made in technology since the legacy system was put in place in 1990. The new system will include improvements in order entry and inventory control. The implementation of bar coding of stock as well as documents will streamline the processing of customer orders. The use of automatic fax and e-mail capabilities will allow better communication with customers regarding the status of NIST SRM products and customer orders. This upgrade effort will also help to maximize the output of existing staff operations. In addition, implementation of communication between the Web site and the legacy data will pave the way for fully integrated e-commerce and real-time information to internal and external customers. In addition, all SRMP information technology systems were made year 2000 compliant.

SRMP Hosted Workshop at Pittcon - In 1999, the Standard Reference Materials Program sponsored a major workshop at the largest analytical chemistry meeting in the United States, the Pittsburgh Conference. The workshop was a continuation of an ongoing dialogue with reference materials users, analysts and accreditors regarding the use of NIST SRMs and their relationship to the performance of analytical methods and calibration laboratories. Each SRM coordinator presented technical data, impact, applications and developments on new and recently reissued SRMs certified in their area of responsibility. Presentations on SRMs in the following technical categories were given: Industrial; Environmental; Health, Clinical and Food; Physical Properties; and Radioactivity. Workshop attendees obtained first hand knowledge of recent issues regarding SRM certification, SRM applications and new SRMs under development. An important part of the workshop was a panel discussion that provided a public forum for the exchange of ideas and needs between the presenters and the audience.

FY 2000 SRMP Project Plans - Some 89 SRMP production projects (40 for new SRMs and 49 for renewal SRMs) and 44 development projects were submitted to the NIST Budget Office for FY 2000 funding. SRMP requested that the other MSL consider 17 additional renewal SRM projects, mostly under the aegis of the NIST-ASTM Collaborative Agreement for Metals. In accordance with new NIST Laboratory Council policy, approved projects are funded in the Working Capital Fund (WCF) and Service Development (SD) categories in the priority order established by the MSL. The funding levels are determined by the amount of WCF and SDS recovered by each Laboratory through FY 1999 sales of SRMs. The SRM Program has prepared a summary report, which lists all projects, their impact, technical work objectives and

duration. The summary report has been issued as a NIST Internal Report (IR) and can be accessed at <http://ts.nist.gov/srm>.

New Manufacturing SRM Facilities Made Operational - In FY 1999, SRMP added new ampoule manufacturing capabilities to meet the growing demand by the NIST technical divisions and customers for ampouled solution SRMs. The new ampoule equipment ends the tedious hand filling for standard reference solutions as was previously done by the technical divisions. The new machine was manufactured to NIST specifications in Germany by ROTA GmbH. This machine automatically fills, adds an inert atmosphere and flame seals 10-ml ampoules containing acids and other corrosive materials. To date, it has been used to package SRM 1641d Mercury in Water and several standard solution SRMs with high efficiency and low scrap rate.

New and Renewal SRMs Completed and Made Available to Industry - *SRMs 2553-2555 Optical Fiber Coating Diameter Standards (EEEL and MEL)* - Fiber diameter is a critical parameter to the proper function of fiber optic ribbon connectors. Errors of a few micrometers can severely impair the performance of these connectors. Members of the Telecommunications Industry Association (TIA) identified this need and requested an optical fiber coating diameter standard be developed by NIST.

In response to this need, NIST produced SRMs 2553 through 2555 for use in calibrating instruments that measure the diameter of coated optical fibers. Each SRM consists of a 100-mm long uncoated glass fiber marked with a flag to assist in proper orientation during measurement. The SRMs are individually certified for diameter and index of refraction. The fibers are nominally 250 μm in diameter. The average diameter and the diameter at specific 45° increments is reported to $\pm 1.2 \mu\text{m}$ or better. The index of refraction was chosen to match that of certain commercial fiber coatings.

SRMs 1358a-1364b Coating Thickness (MSEL)- Major improvements were made in the production, certification and packaging of the electrodeposited Coating Thickness SRMs produced by the NIST Metallurgy Division. These SRMs are used for the calibration of gages used to measure the thickness of organic or nonmagnetic metallic coatings over magnetic materials, with steel being the most common substrate. The improved processes for production of these SRMs resulted from industry's demand for reference standards that could take advantage of the capabilities of modern magnetic induction thickness gages. The paint, electronics, aerospace, automotive, steel and other industries need thickness standards with more uniformity and smaller uncertainty.

The new SRMs were produced by an upgraded process, which includes increased thickness substrate and a redesigned production electrochemical cell to increase deposit uniformity. These changes significantly increase the area available for measurements.

Significant changes were also made to the certification process of these standards. A new series of internal calibration standards was produced, and the empirical mathematical models used to correlate thickness with magnetic induction intensity were revised. Automating the measurement process has reduced the overall uncertainty of the standard. Total uncertainties for certified average thickness are reported as an expanded uncertainty at 95 % confidence about the mean. The thickness variability is reported separately on the certificate based directly on the measurements made on it. As a result of these improvements, the combined uncertainty of the mean thickness value for each standard has been reduced from 5 % to less than 2 % of the certified value. The thickness standards now are marked with a bar code that allows tracking their complete history when they are returned for routine verification.

SRM 2135c Ni/Cr Depth Profile (CSTL)- Sputter erosion by ion bombardment is a widely used method for atom-layer removal in surface analysis. Use of sputter erosion in conjunction with Auger electron spectroscopy, x-ray photoelectron spectroscopy or secondary ion mass spectrometry allows one to probe the in-depth elemental composition near surfaces and at interfaces within a solid. A reference material capable of allowing precise determination of erosion rates and sputtered depth at a variety of depths is a useful tool for this application.

SRM 2135c was produced for this purpose. Its periodic structure, consisting of eight well-defined metal/metal interfaces, can be used to obtain accurate calibration at a number of depths. SRM 2135c is certified for total Cr and Ni thickness, single element layer-to-layer uniformity, Ni and Cr bi-layer uniformity (periodicity) and single-layer thickness. A unit of SRM 2135c consists of nine alternating metal thin-film layers, five layers of pure chromium and four of pure nickel, on a polished silicon substrate. The individual layers have thickness that is nominally 57 nm for Cr and 56 nm for Ni.

SRMs 1563, 1974a and RMs 8415, 8418, 8432, 8433, 8435 and 8436 Proximates, Individual Fatty Acids, Calories and Total Dietary Fiber in Food Matrix Reference Materials (CSTL) - A number of food matrix reference materials made by Agriculture Canada are now available from NIST. Most of these materials were originally value-assigned for their elemental composition (major, minor and trace elements), but no additional nutritional information was previously provided. The addition of proximate (solids, fats, proteins, etc.) information to these existing reference materials was provided in response to industry and customer need for materials with assigned values for proximates in six of the nine sectors of the AOAC fat-protein-carbohydrate triangle, a nine-sectored triangle in which foods can be placed based on the proportions of fat, protein and carbohydrate that they contain. Five of these materials have values assigned for total dietary fiber, the first such information provided for materials available from NIST.

Two of the materials were certified for selected organic constituents. Eight of these materials, SRM 1563 Cholesterol and Fat-Soluble Vitamins in Coconut Oil (Natural and Fortified), SRM 1974a Organics in Mussel Tissue (*Mytilus edulis*), RM 8415 Whole Egg Powder, RM 8418 Wheat Gluten, RM 8432 Corn Starch, RM 8433 Corn Bran, RM 8435 Whole Milk Powder and RM 8436 Durum Wheat Flour, were recently distributed by NIST to four laboratories with expertise in food analysis for the measurement of proximates, individual fatty acids, calories and total dietary fiber, as appropriate. SRM 1846 Infant Formula was distributed as a quality control sample for the proximates and for analysis of individual fatty acids. Two of the materials (Whole Egg Powder and Whole Milk Powder) were distributed in an earlier inter-laboratory comparison exercise in which they were analyzed for several vitamins. Value assignment of the above analyte concentrations in these nine SRMs and RMs is based on analyses by the collaborating laboratories.

The above materials are intended primarily for validation of analytical methods for the measurement of nutrients in foods of similar composition. The materials may also be used as primary control materials in the value-assignment of in-house control materials of similar composition.

SRM 1878a and 1879a α -Quartz and Cristobalite (MSEL)- Nearly two million U.S. workers are potentially exposed to crystalline silica, which causes the lung disease silicosis. These renewal SRMs are designed to ensure the accuracy of industrial hygiene analysis related to the detection of crystalline silica. They are intended for use in the preparation of calibration standards for quantitative analyses of crystalline-quartz and crystalline cristobalite by x-ray powder diffraction (XRD). Each unit consists of approximately 5 g of powder bottled under argon.

The certified purity of SRM 1878a, expressed as a mass fraction in %, is 100.00% \pm 0.21 % crystalline- α -quartz, while the certified purity of SRM 1879a, expressed as a mass fraction in %, is 95.6 % \pm 0.4 % crystalline cristobalite. The homogeneity of this material was tested by four independent techniques: particle size distribution measurements, lattice parameter measurements, x-ray diffraction relative intensity measurements, and XRD intensity ratio measurements.

SRM 1944 NY/NJ Waterway Sediment (CSTL)- SRM 1944, New York/New Jersey Waterway Sediment, provides certified and reference values for over 150 organic and inorganic constituents of environmental concern. This SRM is used in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, chlorinated pesticides and trace elements in marine sediment and similar matrices. SRM 1944 is the first NIST material characterized for selected dibenzo-*p*-dioxin and dibenzofuran congeners. Reference values are also provided for total organic carbon, total extractable material and particle-size characteristics.

SRM 1944 is a mixture of marine sediment collected near urban areas in New York and New Jersey. All of the constituents for which certified, reference and information values are provided in SRM 1944 were present in the sediment material before it was processed. A unit of SRM 1944 consists of 50 g of radiation-sterilized, freeze-dried sediment contained in an amber glass bottle.

SRM 1006d Smoke Density (BFRL)- Industry typically employs smoke density chambers to measure and describe the response of materials, products or assemblies to heat and flame under controlled conditions. Standard test methods which are used when operating smoke density chambers include ASTM E 662-95 "Specific Optical Density of Smoke Generated by Solid Materials," and ANSI/NFPA 258-1998 "Test Method for Determining Smoke Generation of Solid Materials."

The latest renewal, SRM 1006d Smoke Density Chamber Standard for Non-Flaming Exposure Condition, was developed for use with these standards. This SRM is certified for maximum specific optical density and is used in performing calibration and operational checks of smoke density chambers.

A unit of SRM 1006d consists of nine sheets of 172 mm x 254 mm x 1.65-mm thick cellulose paper, to be tested in single thickness. Users may cut the paper to fit their apparatus. A typical apparatus may get as many as 54 tests from a unit. Each set of nine sheets is enclosed in packaging that minimizes degradation caused by ultraviolet radiation, enzymatic/bacterial actions and moisture.

SRM 772a Magnetic Moment (MSEL)- Magnetic properties of materials are critical to diverse applications such as computer disk drives and vacuum systems. This SRM is intended for use in the calibration of magnetometers including vibrating sample magnetometers. The magnetic moment of SRM 772a was determined by a sampling technique using an absolute magnetometer developed and built at NIST based on the Faraday method. The NIST magnetometer was calibrated by using three different methods to determine the value of the field gradient. The value of the specific magnetization, Φ , was determined to be $54.94 \text{ Am}^2/\text{kg}$ at 298 K in a field of 398 kA/m.

SRM 772a consists of a nickel sphere 2.383 mm in diameter with a mass of 63.16 mg. The SRM 772a lot was produced from annealed nickel wire, with a purity of 99.999 %, ground into spheres. The microstructure is equiaxial with an average grain size of about 100 μm . The certified value at a 95 % level of confidence for magnetic moment, m , at 298 K in an applied field of 398 kA/m is $3.47 \text{ mAm}^2 \pm 0.01 \text{ mAm}^2$.

SRM 2232 Indium DSC Calibration Standard Temperature and Enthalpy of Fusion (CSTL)- Differential thermal analyzers (DTA) and differential scanning calorimeters (DSC) are widely used in the characterization of materials in the chemical, polymer, food and pharmaceutical industries. For example, DSCs can detect, monitor and characterize the melting, gelatinization and retrogradation of

starches under a wide variety of conditions. High-sensitivity DSCs are being used to study the energetics of ligand binding and protein folding in biomedical research.

These are newer areas of application for DTAs and DSCs, beyond the traditional chemical and metal industries that have historically used these instruments for purity analysis of their manufactured products. It is essential, therefore, that high purity and traceable standards be available to calibrate these instruments. To meet these needs, NIST has developed SRM 2232, Indium DSC Calibration Standard (Temperature and Enthalpy of Fusion). A unit of this SRM consists of a 1 g piece of indium metal sealed in an argon atmosphere in a Mylar bag.

SRMs 2718 and 2719 Green and Calcined Petroleum Cokes (CSTL)- SRM 2718, Green Petroleum Coke and SRM 2719, Calcined Petroleum Coke, are intended primarily for use in the calibration of apparatus and the evaluation of techniques employed in the analysis of petroleum coke and other materials of a similar matrix. Both SRMs have certified values for Al, Ca, Fe, Ni, S and V and provide reference values for Co and Na. Information values are provided for Si, C, H, N, ash, volatile matter and calorific content.

NIST Petroleum Coke SRMs are provided to enhance trade and utilization of petroleum cokes. Green petroleum coke is used as a fuel in the power production industry, as an alternative to metallurgical coke in the steel industry, and as the feedstock in the production of calcined petroleum coke. Calcined petroleum coke is used as anodes for the aluminum industry, as electrodes for the electric arch steel industry, and as a catalyst in the pigment industry in the production of TiO₂. Each unit of SRM 2718 and SRM 2719 consists of 50 g of petroleum coke ground to pass a 250 µm (60 mesh) sieve, homogenized and bottled under an argon atmosphere.

Weights and Measures Program

The Weights and Measures Program, known outside of NIST as the Office of Weights and Measures (OWM), promotes uniformity among the States in weights and measures standards, laws and practices to facilitate trade and protect U.S. businesses and citizens. It has been estimated that these weights and measures activities ensure equity in commercial transactions worth more than \$4.5 trillion of the \$8.51 trillion U.S. Gross Domestic Product (based on 1998 figures). To help it carry out its mission, OWM partners with the National Conference on Weights and Measures (NCWM), an organization of State and local weights and measures officials and representatives of industry, consumers and Federal agencies. NCWM develops uniform laws, regulations and methods of practice that are published by NIST. When these standards are adopted by government regulatory agencies, they become mandatory. OWM is organized into four program areas:

- The **State Laboratory Program**, which provides the basis for ensuring traceability of State weights and measures standards to NIST and provides basic, intermediate and advanced training to metrologists from the States, industry and other countries;
- The **Device Technology Program**, which develops procedures for testing weighing and measuring devices, conducts training on device testing for weights and measures officials, administers the NCWM's National Type Evaluation Program (NTEP) and provides technical and administrative support to the NCWM Specifications and Tolerances Committee, the NTEP Committee and the various Sectors of the National Type Evaluation Technical Committee;
- The **Laws and Regulations Program**, which provides technical and administrative support to the NCWM Laws and Regulations Committee and guidance and training to the States, Federal regulatory agencies and industry on the model weights and measures laws and regulations adopted by the NCWM; and
- The **Administration and Publications Program**, which provides support to the NCWM Board of Directors and various annual committees, plans the technical agendas of meetings of the NCWM, coordinates the development and publication of key NIST and NCWM publications, maintains OWM's information services and operates the NCWM National Training Program.

Weights and Measures FY 1999 Highlights

NIST Sponsorship of National Accreditation of State Metrology Laboratories – A 1999 National Conference on Weights and Measures survey found that 46 State metrology laboratories disseminated NIST measurements to 14,700 companies for more than 320,000 standards of mass, volume, length and temperature throughout the United States. NIST has worked with the State laboratories for many years to ensure traceability of their measurements to national standards. Today, however, because of national and international pressures, it is increasingly important for laboratories to attain accreditation by a recognized accrediting body. In response to requests from the States, the Office of Weights and Measures requested and disbursed NIST funds to pay the costs of State metrology laboratories seeking national accreditation. OWM manages the distribution of the funds and assists the laboratories applying for accreditation, for example, by reviewing laboratory quality manuals and providing data to the accrediting agency on proficiency testing. In FY 1999, seven States applied for NIST-funded accreditation from the National Voluntary Laboratory Accreditation Program: Arizona, Connecticut, Indiana, Maine, Michigan, Ohio and Oklahoma. Two other States are already accredited (Minnesota and Virginia), and several more are planning to apply by the end of 1999.

Review and Restructuring of the National Type Evaluation Program – In FY 1999, as part of a strategic planning process, the Office of Weights and Measures and the National Conference on Weights and Measures reviewed the

administration and certain legal aspects of the National Type Evaluation Program, which they jointly sponsor. OWM has administered the program since its establishment and NCWM has provided the mechanism for developing the policies and procedures for the program. After assessing comments received from a number of sources at meetings and workshops, NIST and NCWM agreed that NCWM would assume responsibility for the administration of the program. As a result, the program is being restructured, and the roles of NIST and NCWM are being redefined. OWM will continue to provide technical support to the National Type Evaluation Technical Committee Sectors that develop recommendations for NTEP test procedures. The NIST Force Group will continue to assist NTEP by testing load cells that are submitted to the Program. Transfer of the administration of NTEP to NCWM will make it possible for OWM to put more of its resources into training and other high priority technical areas.

Internet Access to National Type Evaluation Program Certificates of Conformance – Under a Memorandum of Understanding with the National Conference on Weights and Measures, OWM led a project to make NTEP Certificates of Conformance accessible on the Internet, searchable by key parameters and key words. Most States require that new commercial weighing and measuring equipment installed in the State have an NTEP Certificate of Conformance. Consequently, Weights and Measures officials and device manufacturers throughout the country need quick access to the Certificates as soon as they are issued. In the past, the Certificates were published in a series of indexes that were bulky and quickly outdated. The new system allows users to access the Certificates soon after they are approved and to search the Certificate database at any time. Users can search the database by device manufacturer, model number, certificate number and device type. They can also select specific key words (e.g., “tare,” “multi-range,” or “security seal”) to find Certificates that contain the selected terms. Copies of the Certificates found can be printed and downloaded to a user’s computer.

Draft Revision of Handbook 133, Checking the Net Contents of Packaged Goods – OWM has developed a draft Fourth Edition of Handbook 133 in an effort to simplify the handbook and consolidate information that had been published in the Third Edition and four supplements. Handbook 133 is used by 41 States as the basis for checking the net contents of packaged goods to determine if quantity declarations marked on the packages are correct. The handbook includes procedures for testing packages labeled by weight, volume, measure and count. Following new “plain language” guidelines for the Government, OWM drafted a shorter, more up-to-date handbook and circulated it for comments. A copy of the latest draft is available on the OWM Internet home page. The revised handbook is currently under review by the National Conference on Weights and Measures.

Development of a Mass Workshop and Tutorials in Conjunction with the 1999 Measurement Science Conference – OWM helped coordinate a week-long training event in conjunction with the Measurement Science Conference in

January 1999, including a 2-day mass workshop presented by OWM and the NIST Mass Group. Three sessions included international guest speakers on the subject of mass. OWM staff presented a talk on the History of Weights and Measures in the United States during one of the sessions. Over 160 people participated in the workshops and tutorials.

Training for State and Industry Metrologists and U.S. Weights and Measures Officials – OWM planned and participated in 16 training sessions for over 200 State and industry metrologists in FY 1999. Courses taught at NIST in OWM's special training facility included

- Basic Mass for States and for Industry,
- Intermediate Metrology,
- Advanced Mass Hands-On Workshop, and
- Advanced Mass Measurements Seminar.

OWM also prepared materials and presented training for six regional Measurement Assurance Programs, specifically:

- Northeastern Measurement Assurance Program (NEMAP),
- MidAmerica Measurement Assurance Program (MidMAP),
- Southeastern Measurement Assurance Program (SEMAP),
- Southwest Assurance Program (SWAP),
- Western Regional Assurance Program (WRAP), and
- Caribbean Measurement Assurance Program (CAMAP).

In addition, OWM presented training at a Key Intercomparisons Workshop attended by representatives of 11 pivotal State laboratories. The training was in anticipation of a national level mass round robin using the international model of key comparisons for establishing measurement equivalence. This project should provide published data that will enable State laboratories to be a part of the international measurement equivalence system for trade and will assist in formalizing proficiency testing that is critical for laboratory accreditation. This project will provide the first comprehensive documentation of the abilities of our National Measurement System in mass.

OWM staff also planned and conducted three instructor-training classes for over 70 weights and measures officials from 32 States in FY 1999. In exchange for the training, States commit to adopting the procedures taught in the class and to having their trainers present the same training to weights and measures officials and industry representatives in their jurisdictions. This past year, OWM presented courses on the testing of Retail Computing Scales and Retail Motor-Fuel Dispensers and the administration of the National Type Evaluation Program. The Instructor Training Program leverages OWM's resources by requiring the student trainers to teach others. Data from past classes indicated that OWM's training of 205 instructors resulted in 6,321 State officials and industry representatives being trained. The Training Program also promotes uniformity in the administration of weights and measures laws and regulations. In addition to the Instructor Training,

OWM presented training on Price Verification to 20 weights and measures officials in the State of Louisiana.

NIST Sponsorship of the Establishment of MEASUREnet – NIST paid for the purchase of Netmeeting software for 11 Regional Pivot Laboratories to establish a pilot Internet-based network that can be used to provide training and make possible other collaborative efforts between NIST and State weights and measures laboratories. The new MEASUREnet is modeled after SIMnet, an Internet collaboration on voltage calibration among NIST and 10 other Western Hemisphere national measurement institutes. The Pivot Laboratories are located in the following States: California, Minnesota, Oklahoma, Maine, North Carolina, Puerto Rico, Idaho, Michigan, Arizona, Connecticut and Georgia. MEASUREnet is expected to facilitate mass calibrations, round robin intercomparisons and key comparisons for State weights and measures standards and balances. OWM staff will be able to use the system to observe calibrations via computer and offer immediate technical assistance. In addition, staff will be able to view and edit documents and even run applications on a PC in participating State laboratories. The system is expected to increase efficiency, promote uniformity and enhance the skills of State metrologists.

Standard Reference Data Program

The NIST Standard Reference Data Program is designed to ensure that scientists and engineers have access to reliable scientific and technical data. Using experts in specific subject areas, NIST SRDP generates sets of critically evaluated data and makes them available in computerized and published form. The program evaluates data in chemistry, physics, materials science, building materials, fire research, software recognition and electronics. NIST databases contain the results of past data evaluations and are widely used in industry, academia and government.

The NIST data programs are a partnership between the NIST Measurement and Standard Laboratories and the Standard Reference Data Program. Most of the data evaluation centers are located at NIST, though some are in universities and other research centers throughout the world. The other MSL and SRDP work together to identify and fund high priority projects. Many databases are jointly supported by NIST and outside organizations, such as technical societies and other government agencies. The SRD Program is organized into three groups:

- The **Management and Administration Group** is responsible for overall administration of the program, as well as for program management of individual data evaluation projects. Working with other NIST management organizations, the group develops policies for NIST data programs for issues such as intellectual property rights, pricing and dissemination. The group also works with managers in the other MSL in negotiating and concluding agreements with U.S. and international data groups.

- The **Data Systems Development Group** is a staff of database programmers that build individual PC databases and online data systems for a number of NIST data centers. These projects are fairly short term (two to three years), and the programming support rotates among data centers as needed. This centralized programming support allows data centers to concentrate their resources on data evaluation.
- The **Data Product Review and Dissemination Group** is responsible for quality reviews of all databases and online data systems, as well as their marketing and distribution. Each database is carefully reviewed before release to ensure the highest quality. Once released, this group oversees all aspects of its dissemination. This group is responsible for direct sales of PC databases to customers. It also administers and maintains licenses with third party distributors throughout the world.

Staff of SRDP and the other MSL work together to provide online access to NIST data. The NIST Standard Reference Data catalog is provided and receives many thousands of accesses per month. Today, most NIST standard reference data are disseminated as computerized databases in various formats. NIST operates 12 World Wide Web systems containing large amounts of its evaluated data. In addition, thousands of copies of 70+ titles in the NIST Standard Reference Database series have been distributed. Most databases are updated on an annual or biannual basis and provide comprehensive sets of reliable data accessible through easy-to-use interfaces. NIST SRDP also publishes the Journal of Physical and Chemical Reference Data in partnership with the American Chemical Society and the American Institute of Physics. The Journal is the major source of published evaluated physical science data in the world. Electronic access to the Journal is planned in the next two years.

During the past few years, the Internet and World Wide Web have revolutionized database dissemination. SRDP has worked closely with NIST's High Performance Computing and Communications initiative through the Systems Integration for Manufacturing Applications (SIMA) management on a number of projects to allow NIST data dissemination to take advantage of new technology. Over the past six years, SIMA projects have supported development of online systems as well as standards for data exchange. Notable projects include the NIST Chemistry WebBook, the NIST Physical Reference Data System, the NIST Ceramics WebBook and MatML, an emerging mark-up language for materials data. Other ongoing projects include the International Comparisons Database, a multi-OU project that aims to improve access to results of international round robin and other measurements comparisons by use of the Internet.

Standard Reference Data Program FY 1999 Highlights

ASTM-NIST Conference on Computerized Materials Data

For more than 15 years, NIST has collaborated with the American Society for Testing and Materials on developing standard guidelines and practices for computerizing materials data. Numerous normative standards have been

developed that facilitate building and disseminating materials databases. In May 1999, SRDP and ASTM organized a workshop to assess the needs for continued standards development, given the advent of the Internet and World Wide Web. Over 150 experts, representing U.S. and international database builders, evaluators, users and information industry, attended the two-day meeting. Abstracts and presentation viewgraphs are now available over the Web.

The meeting concluded that development of new standards for materials data must be advanced by a greater variety of organizations. This conclusion was based on several facts brought out at the workshop. First, the growth of Web-based online data systems has changed the dynamics of building and disseminating materials data. Web sites can be released very quickly in comparison with printed publications and PC databases. At the same time, user expectations of the cost of Web access are very different from those of traditional media. Consequently, the future economics of materials information is very unclear.

Other factors are equally important, namely the experience of present standards committees and the complexity of existing materials data standards. The wide range of engineering materials and diversity of properties has made it difficult to develop comprehensive standards. The NIST-ASTM workshop identified the need for a standard that is easier to use, and development has started based on existing mark-up languages. Special steps are being taken to ensure broad participation.

Internet Data Dissemination Policies

As NIST continues to make the bulk of its standard reference data collections available on the Web, several major policy issues have arisen, including mirror sites, access charges and in-house Intranets. SRDP, working with the NIST Budget and Program Offices and the other MSL have established new policies designed to meet user needs as well as reflect today's dynamism. In FY 1999, following extensive review by interested NIST groups, two important policies were put in place. First, NIST has reaffirmed its policy of free access to NIST online data systems. While reducing income for the data programs, this policy enables users of all types – from high school students to the most advanced researcher – ready and easy access.

NIST has instituted a clear policy for mirror sites of its online data systems. The policy ensures that mirror sites enhance NIST dissemination efforts and are of the highest quality. The relevant MSL director and the Chief of SRDP must approve in advance all mirror sites. The policy also covers use of NIST online systems to create Intranets, which are online networks available only for the internal use of a specific group. The policy on mirror sites and Intranet services also controls demands on NIST resources and personnel.

Record Dissemination for NIST Standard Reference Data

1999 saw several significant records for the sales and dissemination of NIST standard reference databases and online data systems. Total income reached a new high of \$2.67 million, fueled primarily by increased demand for NIST '98 Mass Spectral Library, the new and highest quality mass spectral library available. In addition, SRDP disseminated a record number of CD-ROMs, led by the July release of the Protein Data Bank. Finally, with 12 online data systems up and running, NIST recorded a record number of users, with many thousands of users each week.

Modernization of the Protein Data Bank

NIST, in partnership with Rutgers University and the University of California, San Diego as the Research Collaboratory for Structural Biology (RCSB), now operates the Protein Data Bank (PDB) with support from the National Science Foundation, the National Institutes of Health and the Department of Energy. The Protein Data Bank is the world's depository of data on the structure of biomacromolecules.

Over the past 18 months, the RCSB partners have totally transformed the operation and dissemination of the Protein Data Bank. The primary focus of initial work has been to use modern database management technology for the PDB and to integrate this new database other resources maintained by RCSB. The RCSB began disseminating the PDB in July 1999. NIST has lead responsibility for data clean up and evaluation. NIST is also placing special emphasis on developing guidelines for reporting NMR data. One major event in 1999 was the physical move of the PDB archives and computer files to NIST from Brookhaven National Laboratory. SRDP personnel are leading the work that enables NIST to begin its role as master archivist for the PDB.

With the high interest in mapping the human and other genomes, the role of the Protein Dank Bank is difficult to overestimate. Biomacromolecules are used to transform gene functions in biological activities. The PDB, as the repository of biomacromolecular structure, enables researchers to determine how these molecules function.

Growth of NIST Online Data Systems

NIST continued to provide more and more evaluated data to users worldwide through the Web. With a diversity of systems reflecting the needs of different disciplines, many thousands of users access NIST data each week. Industrial scientists, university researchers, students and the general public have found that NIST online systems in chemistry, physics and ceramics have a broad spectrum of data on many substances, similar to printed handbooks. In addition, several specialized Web sites provide detailed data of importance in plasma modeling and

composites processing. Another site provides reliable test data for statistics packages. During FY 1999, SRDP released the first online data system built by its programming staff. The data system contains data on composites processing.

The growth of online accessibility of NIST standard reference data is significant. In spite of considerable marketing efforts, many scientists and engineers did not have easy access to printed compilations and PC databases of NIST evaluated data. Major factors in this lack of awareness included cost, time-constraints, poor searching of the literature and company and university procurement policy. Today virtually everyone who needs evaluated data can easily find NIST online systems, which are registered with all major search engines, well-indexed and easy to use. The increased use greatly improves the return on investment made by NIST in data evaluation.

Office of Standards Services

The Office of Standards Services (OSS) is the focal point for standards and conformity assessment in the United States. The Office cooperates with federal agencies, state and local governments, the private sector, and with domestic, foreign, and international organizations in matters related to standards and conformity assessment. OSS also formulates and implements policy regarding standards and conformity assessment, including laboratory accreditation, to promote U.S. technology and support international competitiveness. Much of this is accomplished through the Interagency Committee on Standards Policy (ICSP), which OSS chairs; the ICSP guides federal participation in voluntary standards activities and, through OSS, provides an annual report to the Office of Management and Budget on federal standards related activities. OSS also provides support for the National Cooperation for Laboratory Accreditation (NACLA) and is responsible for outreach and development of strategic linkages with foreign counterparts on standards and conformity assessment practices. OSS activities are carried out centrally and in four related program areas:

Laboratory Accreditation Program

The National Voluntary Laboratory Accreditation Program (NVLAP) provides third-party accreditation to testing and calibration laboratories. Accreditation programs are established in response to mandates from Congress and administrative actions by other federal government agencies, or in response to requests from the private sector that require a governmental program. Accredited laboratories are identified in a published directory and on the Internet. NVLAP is in full conformance with the standards of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), including ISO/IEC Guides 25 (to be replaced by Guide 17025) and 58. NVLAP has entered into Mutual Recognition Arrangements with the Asia Pacific Laboratory Accreditation Cooperation (APLAC) and the European Cooperation for Accreditation (EA). NVLAP accredits laboratories in the following fields of testing: acoustics, asbestos fiber, carpet, commercial products, construction materials, electromagnetic compatibility and telecommunications, efficiency of electric motors, energy efficient lighting products, fasteners and metals, information technology security, ionizing radiation dosimetry, thermal insulation and wood based products; and accredits laboratories in the following fields of calibration: chemical, dimensional, electromagnetic-DC/low frequency, electromagnetic-RF/microwave, ionizing radiation, mechanical, optical radiation, thermodynamics, and time and frequency.

Technical Standards Activities Program

The Technical Standards Activities Program (TSAP) coordinates assigned technical activities related to domestic and international standards development in the interest of the public and private sectors. TSAP manages assigned responsibilities under the National Technology Transfer and Advancement Act of 1995 (P.L.104-113), which includes coordinating, federal, state and local, and private sector technical standards and conformity assessment activities, with the goal of eliminating unnecessary duplication

and complexity in the development and promulgation of conformity assessment requirements and measures. TSAP also manages U.S. representation and participation in the International Organization of Legal Metrology (OIML), a treaty organization, on behalf of the U.S. State Department. OIML promotes global trade through harmonization of performance requirements for measuring instruments that are subject to laws or regulations. These instruments are used for equity in commerce, assure public and worker health and safety, and monitor environmental pollutants.

TSAP provides the contact point under the Agreement on Technical Barriers to Trade (TBT) of the World Trade Organization (WTO) for investigating complaints of non-tariff trade barriers to non-agricultural products that may be related to differences in normative standards, test methods and conformity assessment regulations and provides support on technical inquiries related to domestic and international standardization for U.S. interested parties and for standards experts posted abroad in conjunction with the Global Standards Program. The Program also manages NIST's residual responsibilities under the Fastener Quality Act of 1990 (P.L.101-592) as revised in 1999; administers the DoC Voluntary Standards Program, providing a mechanism for private-sector sponsors to develop standards in the public interest with significant domestic and international impact that currently include construction and industrial plywood, wood-based structural-use panels, and softwood lumber; and provides the Executive Secretariat for the Interagency Committee on Standards Policy (ICSP). TSAP also coordinates NIST participation in the annual U.S. observance of World Standards Day.

Global Standards Program

The acceptability of U.S. products in the global marketplace is significantly enhanced when industry's standards and conformity assessment practices are compatible with those of trading partners. To achieve this goal for the United States, the Global Standards Program (GSP) provides technical assistance to other countries as one mechanism to reduce, eliminate, and prevent technical barriers to trade that are standards-related. GSP supplies technical information related to standards and support to Federal agencies and industry to assist them in resolving trade issues related to standards and conformity assessment. It develops policy and plans and implements NIST normative standards and conformity assessment activities supporting trade in the Free Trade Area of the Americas, Russia and the CIS, the European Union, the Middle East and the Asia-Pacific region, including the Asia Pacific Economic Cooperation (APEC). It also supports the implementation of the standards-related provisions of the North American Free Trade Agreement (NAFTA). On behalf of the American National Standards Institute (ANSI), GSP manages U.S. participation in the ISO Committee for Developing Country Matters (DEVCO). GSP also participates in UN Economic Commission for Europe standards policy activities.

The Program conducts economic analyses of likely impact of standards and conformity assessment programs on commerce and trade; develops operational and policy framework for the National Voluntary Conformity Assessment Systems Evaluation (NVCASE); and develops and publishes reports, directories, and other standards-related documents. Five

GSP standards experts are assigned abroad to furnish technical assistance to other countries, participate in regional organizations, and assist U.S. businesses, particularly small- and medium-sized enterprises on standards-related issues and to gain access to foreign markets. Therefore GSP plans, organizes and manages the placement of technical experts from NIST, or selected by NIST, in key U.S. embassies, missions, or standards organizations to provide technical advice and support to commercial and economic staff in the identification and resolution of issues involving technical barriers to trade. GSP provides operational support for these experts; receives and distributes reports from NIST representatives.

The NVCASE activity within GSP is the framework for supporting the implementation of the Mutual Recognition Agreement (MRA) that has been negotiated with the European Union (EU), the Asia Pacific Economic Cooperation (APEC) telecommunications MRA, and the U.S.-Interamerican (CITEL) MRA. Under the U.S.-EU MRA, NIST supports the U.S. Food and Drug Administration (FDA) in its role as the designating authority; and is the designating authority for Conformity Assessment Bodies (CABs) under the Telecommunications, Electromagnetic Compatibility (EMC), and Recreational Craft sectors. NIST is also the designating authority under the APEC Telecommunications MRA and the CITEL MRA, each of which requires use of the NVCASE program.

GSP plans, organizes, and conducts two standards-related training programs for technical experts from Russia and the NIS, the Americas, the Middle-East, and other areas important for U.S. trade, often in cooperation with the private sector and other government agencies. It supports the Office of the U.S. Trade Representative and the ITA in negotiations with trading partners.

Standards Information Program

The Standards Information Program (SIP) operates the National Center for Standards and Certification Information (NCSCI), a central repository for standards-related information in the United States that provides access to standards, technical regulations, and related documents published by U.S., foreign, and international private-sector standards organizations. As required by law, SIP also operates the U.S. Inquiry Point, a contact point for standards-related inquiries, for non-agricultural products in support of the World Trade Organization (WTO) and NAFTA. It responds to requests for information about foreign standards and technical regulations through its access to the network of information centers (ISONET) of the International Organization for Standardization and WTO Inquiry Points. Domestic and foreign individuals and organizations frequently request information on U.S. standards, technical regulations and conformity assessment procedures.

SIP maintains a database of DoC participants in standards development activities; coordinates a translation service for technical documentation, regulations and standards; and disseminates information on trade-related proposed technical regulations issued by WTO members to U.S. industry, government agencies and other interested parties.

FY 1999 OSS Highlights

- Dr. Belinda Collins took office as the Chair of the International Laboratory Accreditation Cooperation (ILAC). She also played a major role in the development of the National Cooperation for Laboratory Accreditation (NACLA), which was incorporated by the private sector this year, and chaired its Governmental Liaison Committee.
- Dr. Collins continues to chair the Interagency Committee on Standards Policy (ICSP), providing leadership to federal agencies in harmonizing standards and conformity assessment programs and in responding to the mandates of the National Technology Transfer and Advancement Act (NTTAA) and the revised OMB Circular A-119. She also joined with NIST Director Ray Kammer in close cooperation with the private sector in the development of a National Standards Strategy.
- Staff of the Global Standards Program played instrumental roles in implementing the U.S.-EU Mutual Recognition Agreement in several product areas. Under the National Voluntary Conformity Assessment System Evaluation (NVCASE) program, conformity assessment bodies were selected for participation in a confidence-building program that will lead to more efficient access to European markets.
- Krista Johnsen-Leuteritz developed a NIST policy on Strategic Standards Management which was implemented by the NIST Director. She also submitted a winning proposal to the 1999 Pioneer Fund competition. She and JoAnne Overman, SIP Chief, have been funded to prosecute a project entitled *SAMI 2000 – Standards Position Coordination*.
- JoAnne Overman was elected Vice President of the Standards Engineering Society (SES); Ellen Trager, SIP, was elected Chair of the SES Education Council.
- Dr. Charles Ehrlich received the 1999 Andrew J. Woodington Award at the Measurement Science Conference in recognition of his contributions to the profession of metrology. Mary Saunders, GSP Chief, shared a Department of Commerce Silver Medal for her work with the ITA Commercial Law and Development program. Krista Johnsen Leuteritz received an Award of Appreciation from the National Pollution Prevention Roundtable for her outstanding work as Chair of the ISO 14000 Work Group.
- OSS issued a number of important publications concerning standards and conformity assessment. These included: (a) The 1998 Edition of SP 739, *Directory of Federal Government Certification and Related Programs*, May 1999 and (revised) August 1999; along with other OSS publications, it is available at

<http://ts.nist.gov/oss>. (b) Cooke, P.W., Collins, B.L, and Johnsen-Leuteritz, K.J. 1997 Annual Report to the Office of Management and Budget on the Implementation of OMB Circular A-119, April 1999. (c) Faison, D. NVLAP Chemical Calibration; Providers of Proficiency Testing, NIST Handbook 150-19, June 1999. (d) Johnsen-Leuteritz, K. Towards Strategic Management of Standards Activities at NIST, NISTIR 6292, May 1999. (e) Leight, W.G. and J. Johnsen-Leuteritz. Towards a National Strategy Conference Report, NISTIR 6290, February 1999.

NVLAP Highlights

- NVLAP Celebrated its 20th anniversary, having first accredited 30 laboratories and issued certificates of accreditation on October 12, 1979 for specified test methods on thermal insulation materials. The evaluations were based on criteria published in the Federal Register on January 18, 1979. At that time there were programs only for Thermal Insulation Materials, Freshly Mixed Field Concrete, and Carpet. NVLAP currently offers 17 different LAPs for testing and calibration laboratories, more than 800 of which are NVLAP-accredited.
- A team from the European Cooperation for Accreditation (EA) spent two days at NVLAP during the week of September 13-17 discussing responses to a previous team's visit, then two days observing on-site assessments at a calibration and a testing laboratory. Their evaluation report was favorable, and in November of 1999, the EA General Assembly voted to admit NVLAP as a signatory to a bilateral agreement. NVLAP, as a future signatory with EA and a member of APLAC, will facilitate acceptance of data across borders from laboratories accredited by NVLAP.
- At the request of the U.S. Environmental Protection Agency (EPA) and the NIST Analytical Chemistry Division, the Chemical Calibration, Providers of Proficiency Testing Program, called PPT, was developed to replace EPA's proficiency test program. Organizations that now wish to be recognized by the EPA to provide proficiency testing services to water analysis laboratories must be accredited by NVLAP and must also participate in proficiency testing through NIST Analytical Chemistry Division. NIST Handbook 150-19, *Chemical Calibration, Providers of Proficiency Testing*, has been published in draft form to supplement the basic requirements of NIST Handbook 150, and contains the necessary technical requirements for accreditation. Eleven PPT laboratories have so far been accredited.
- A laboratory accreditation program (LAP) for Information Technology Security (IT) Testing was established at the request of the National Information Assurance Partnership (NIAP), a partnership between NIST and the National Security Agency. The IT Security LAP includes testing to the Common Criteria (ISO/IEC DIS 15408) and the already-established Cryptographic Modules Testing program (FIPS PUB 140-1).

- NVLAP expanded the scope of accreditation in the Electromagnetic Compatibility and Telecommunications (EMC) program to include CNS 13438 and CISPR 22 with amendments 1 and 2 in order to eliminate separate accreditations to allow market access in Taiwan, a key export target for U.S. industry. Several immunity standards were added to allow NVLAP-accredited laboratories to be designated as Conformity Assessment Bodies under the terms of the U.S.-European (EU) Mutual Recognition Agreement.

Technical Standards Activities Program Highlights

- New or revised OIML Recommendations, on "Load cells" (revision of OIML R60) and "Force measuring system of uniaxial material testing machines" (revision of OIML R65), were completed and subsequently approved by OIML. Significant input was provided for two other approved Recommendations, on "Multi-dimensional measuring instruments" and "Water meters for cold potable water - including both mechanical and electronic meters" (revision of OIML R49). Two international working group meetings, on "Metrological Control" and "Water Meters," and two international task group meetings, on "Net content in prepackages" and the "Expression of measurement uncertainty in legal metrology activities," were hosted.
- In support of the Chairman of the Standing Committee and APA, the Engineered Wood Association, two controversial and substantive issues on "linear expansion" were resolved during the 5-year review of DOC Voluntary Product Standard (PS) 2-92, "Performance Standard for Wood-Based Structural-Use Panels." It was decided that the APA would initiate a project on laboratory testing of panels in order to clarify needed requirements for the revision of PS2. The revision of DOC PS 20-99 "American Softwood Lumber" was completed, approved, and published.
- Sixty-nine Saudi Arabia Standardization Organization (SASO) draft standards and 5 Gulf Coast Country draft standards were reviewed in concert with U.S. experts representing the interests of trade associations, major industries and manufacturers, standards bodies, consultants, and governmental agencies.
- TSAP provided support for and participated in several Standards-in-Trade Workshops: NIST/ITA Workshop for U.S. Commercial Officers in the Association of South East Asian Nations (ASEAN) region Jakarta, Indonesia, March 1999; Sino-U.S. Workshop on Standards and Conformity Assessment, Beijing, China, March, 1999; and U.S.-China SIT Workshop - Building and Construction Sector; September, 1999.
- As Secretariat for the Interagency Committee on Standards Policy (ICSP), TSAP prepared and submitted the Annual Report for FY98 to the Office of Management

and Budget on “Implementation of OMB Circular A-119 (Federal Participation in the Development and use of Voluntary Consensus Standards and in Conformity Assessment Activities),” based on input from members of the ICSP.

- TSAP co-chaired with the American National Standards Institute (ANSI) a committee to plan for the 1999 World Standards Day Celebration held in Washington, D.C., and prepared the NIST exhibit.
- TSAP prepared proposed implementing regulations for the amended Fastener Quality Act of 1990 for comment in the December 15, 1999 Federal Register. In June 1999, the Act was amended to limit coverage to high-strength fasteners only; encourage the use of recognized industry quality assurance systems; and streamline paperwork reporting by allowing companies to transmit and store reports electronically. The Act no longer requires NIST to implement the Accreditation Body Evaluation Program for recognizing organizations that accredit testing laboratories for fasteners, but the NVLAP fastener laboratory accreditation program will be continued.

Global Standards Program Highlights

The primary goals of the Global Standards Program (GSP) are to increase industry access to foreign markets, facilitate trade, and promote regulatory reform that eliminates, reduces, or prevents technical barriers to trade.

In Fiscal Year 1999, GSP’s activities included:

- the conduct of technical training workshops;
- coordinating and supporting other agencies in their standards-related measures involvement throughout the world;
- helping to conclude and implement the U.S. – EU Mutual Recognition Agreement;
- supporting “on-site” standards experts in selected major U.S. markets;
- participation in regional and international standards and conformity assessment organizations;
- providing technical support to the Office of the U.S. Trade Representative in the negotiation of trade agreements; and
- outreach to the U.S. business community.

Technical Assistance

As part of a six-week Department of Commerce Special American Business Internship Training (SABIT) Program, GSP hosted a two-week workshop focused on the oil and gas equipment industry. Twenty-four participants from nine countries (Russia and the Newly Independent States) discussed public and private sector issues in standards, including programs of the American Petroleum Institute, and conformity assessment. They addressed safety issues and laws in the petroleum industry, visited equipment manufacturers to observe how standards affect design and production and the use of

standard reference materials by the industry. GSP also hosted a two-week workshop for the construction and building supplies sector for 24 participants from eight countries (Russia, Ukraine, Georgia, Kyrgyzstan, Turkmenistan, Tajikistan, Azerbaijan, and Uzbekistan). The participants received lectures on U.S. standards and conformity assessment, energy efficiency requirements, building codes, safety issues, building code development and maintenance, building technology, materials research, building plan design and review, and many other topics.

Another workshop focused on the food processing and packaging industry with 23 participants from Russia and the Newly Independent States. U.S. Government and private sector speakers addressed U.S. regulations for food processing, product and worker safety, packaging equipment and technology, standards development and conformity assessment, enforcement practices, and standard reference materials relevant to the industry, among other topics.

In support of WTO activities, two GSP staff members traveled to Moldova for the DoC Commercial Law and Development Program to audit and assess Moldova's standards and certification systems in consideration of possible WTO accession.

A one-week Laboratory Quality Management seminar, taught by an expert from the University of Wisconsin, was conducted for 18 representatives from five of the Gulf Cooperation Council (GCC) countries. Subsequent site visits in the Washington, DC area permitted additional presentations by U.S. Government and private sector representatives. The seminar focused on the ISO/IEC Guide 25 criteria and how to relate the criteria to the laboratories in which the participants worked. This seminar was part of an ongoing series of seminars covering technical topics of interest for the GCC countries.

A two-week Standards-in-Trade workshop on standards and conformity assessment was held for 21 participants from the Caribbean, Guyana, and Suriname. Objectives were: (1) familiarize participants with U.S. technology and practices in metrology, standardization, and conformity assessment, (2) describe the roles of the U.S. Government and the private sector in developing and implementing standards, and (3) develop professional contacts as a basis for strengthening technical ties and enhancing trade among the U.S. and our Caribbean trading partners.

GSP and five private sector organizations co-sponsored a one-week workshop on "Electrical Safety Systems for the Americas." Twenty participants from standards organizations, government agencies and industry associations in Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela exchanged ideas with 25 representatives from counterpart U.S. organizations regarding existing systems in the hemisphere. Participants resolved to: 1) create a virtual community for continuing discussions; 2) conduct additional training and reviews of the National Electrical Code (NEC) and the IEC 60364; and 3) perform advocacy within trade blocks, such as Mercosur, the Andean Pact, NAFTA, and the Free Trade Area of the Americas (FTAA), of issues pertaining to the electrical sector.

A two-week workshop for representatives of the Chinese building and construction sector promoted understanding of and confidence in the U.S. approach to relevant standardization and conformity assessment issues. The workshop, coordinated with the Building and Fire Research Laboratory (BFRL), supported the Presidential U.S.-China Housing Initiative, which is jointly administered by the ITA and the Department of Housing and Urban Development. Participants resolved to advance discussions on building and residential codes, explore collaborative research projects between Chinese research institutes and NIST, and conduct future exchanges and workshops in specific areas of the sector, including fire safety and building materials.

A first out-of-country workshop was conducted by GSP in Jakarta, Indonesia, for U.S. Commercial Officers and Foreign Service Nationals working in the DoC offices in U.S. Embassies in the ASEAN region. This will enable U.S. representatives to be more responsive to inquiries and problems encountered by U.S. companies doing business in the region.

Two seminars were given in Argentina and Venezuela (165 participants) to explain the requirements of ISO Guide 25 for evaluating laboratories for accreditation purposes. The seminar provides an introduction to Guide 25 and incorporates many concepts incorporated in the OSS NVLAP activities. The course is taught under contract by a NVLAP assessor whose vast experience provides participants with practical, real-life examples of situations that arise in the process of evaluating laboratories and applying the ISO/IEC criteria.

The NIST standards representative in Mexico City sponsored the travel of three FDA representatives to meet with officials of Mexico's Ministry of Health to discuss confidentiality requirements for medical test data. These meetings were the initial step to share information and "fast track" Mexican approval of medicines subject to the FDA approval process. The meetings were particularly beneficial to both parties since they were able to learn what the actual practices are of each country to evaluate medical test data and understand which information is considered confidential and publicly available in each country.

Twenty-one U.S. representatives of public and private sector standards and certification organizations participated in a standards workshop hosted by Brazil. The workshop provided the U.S. participants with a better understanding of the technical infrastructure in Brazil and provided a forum to discuss opportunities for future collaboration.

Regional Participation

GSP staff members participated in 15 regional and international meetings of eight organizations to promote U.S. principles and trade objectives. The sessions covered the Western Hemisphere, the European Union, Russia, the Newly Independent States (NIS), the International Standards Organization and the International Accreditation Forum. GSP regularly participates in the Pan-American Technical Standards Commission (COPANT) and the Interamerican Accreditation Cooperation (IAAC); Dr. Carmiña Londoño, who

serves as an ANSI representative, chairs the IAAC Working Group III for document development and resources. IAAC is a critical information, training, and coordinating body that helps developing countries establish a technical infrastructure consistent with the criteria of international bodies and supports the negotiation and implementation of free trade agreements. For the United Nations and the European Union, GSP representatives participate in activities to promote the harmonization of standards and business facilitation measures. GSP supports several presidential initiatives for Russia and the NIS on trade and investment. These latter activities supplement the technical assistance provided through the SABIT workshops.

Trade Support

GSP staff members support a number of agencies in developing technical positions for trade negotiations and for implementing the MRAs. Technical support is provided to the Transatlantic Business Dialog and the Transatlantic Economic Partnership, and to negotiations on the World Trade Organization Agreement on Technical Barriers to Trade, for the Asia-Pacific region, and for the Free Trade Area of the Americas. Close cooperation is maintained with the Office of the U.S. Trade Representative, the Federal Communications Commission, the FDA and the ITA. Standards and conformity assessment activities are a critical element of MRAs and free trade agreements, for which the implementation generally requires NIST technical support.

Activity or Organization	# Meetings
US-EU MRA	13
NVCASE workshops for MRA	4
TEP & TABD	5
WTO	3
APEC & SCSC	4
FTAA	9

National Outreach and Support

GSP drafted conformity assessment guidance documents and met with the FDA, EPA, CPSC, HUD and GSA several times to address their concerns and establish government positions on a wide range of issues in support of the NTTAA. This guidance outlines Federal agencies' responsibility for evaluating the efficacy and efficiency of their conformity assessment activities. Each agency is responsible for coordinating its conformity assessment activities with those of other appropriate government agencies and with those of the private sector to make more productive use of the increasingly limited Federal resources available for the conduct of conformity assessment activities and to reduce unnecessary duplication. The guidance supports the role of the U.S. Government in pursuing international trade and other related negotiations and agreements with foreign countries and U.S. industry in pursuing agreements with foreign national and international private sector organizations.

Several articles and publications were issued on quality systems management, conformity assessment, ISO Guides 25 and 68, and the NIST web site has been updated and expanded to disseminate information on these subjects. Six major publications were updated or issued in FY1999.

Eight presentations were given at national meetings for various organizations and export promotion with respect to standards.

NIST Standards Representatives

NIST supports five standards representatives, three of whom are members of the U.S. and Foreign Commercial Service posted in Belgium, Brazil, and Mexico, and two of whom are in contract positions in India and Saudi Arabia. All except the India representative have regional responsibilities. They provide technical support to the Embassies, Missions, and Consulates within their regions and to U.S. Government agencies in Washington, DC., working to reduce, overcome, and prevent technical barriers to trade, meeting regularly with government officials within their region (particularly within the host country to which they are assigned). They produce reports (International Market Insights, IMIs) on current issues and regional activities regarding standards and conformity assessment, approximately 35 IMIs in FY1999.

Several years of effort by NIST standards attachés led Mexico to publish proposed changes to its conformity assessment policies and procedures that will give foreign companies the same access to options for product certification that are available to Mexican manufacturers; this is consistent with the NAFTA agreement. Previously, each importer of U.S. products had to obtain product certification on an annual basis, even if the products were identical and from the same manufacturer. Under the proposed policies, foreign manufacturers will be able to submit the product for test and obtain the product certification. Multiple importers of the products covered by the certificate for the product certification will be able to obtain the appropriate documentation to allow them to import the product without further testing. This modification to the product certification procedures will benefit all U.S. exporters to Mexico. The final rule is expected to be published in early 2000.

Standards Information Program Highlights

SIP staff disseminated 589 notifications of proposed foreign technical regulations to U.S. industry, government agencies and other interested parties that market products in foreign markets to call attention to changes and/or new regulations under development by U.S. trading partners. The notifications are issued as a requirement of the WTO Agreement on Technical Barriers to trade and provide an opportunity for WTO members to review and comment on the proposed regulations to avoid the development of standards-related technical barriers to trade.

SIP published *TBT Agreement Activities of the National Institute of Standards and Technology 1998* (NISTIR 6363) and *Directory of DOC Staff Memberships on Outside Standards Committees*.

JoAnne Overman provided an overview of program activities to: Johnson & Johnson Council of Research Directors/Scientific Information Subcommittee; participants in the Standards-in-Trade workshop (Caribbean); and staff members from NIST's Office of Information Services. A. Diane Lay briefed new employees at the ITA.

JoAnne Overman participated in two annual conferences of the Standards Engineering Society, chairing the November 16-19, 1998 conference in Orlando, FL, and presenting an overview of standards information that is available on the Internet and serving as moderator at the August 16-19, 1999 conference in Toronto, Canada.

JoAnne Overman provided an overview of the TS website to members of the ISO Consumer Information Policy Committee during a Workshop at NIST on May 13, 1999, and participated in the Standards Roundtable at the annual Special Libraries Association conference held in Minneapolis, MN, June 7-10, 1999.

JoAnne Overman chaired the Interagency Committee on Standards Policy working group on directory database, providing Federal agencies with guidelines on developing databases for collecting, monitoring and retrieving information on staff participation on standards developing committees.

SIP staff responded to 3,356 inquiries for standards-related information: 87% from U.S. companies and/or organizations and 13% from foreign; 50% from the private sector and the other half from government agencies, academia, WTO inquiry points, ISONET members, etc.; and 71% via telephone and 29% via fax, letter, or e-mail.

Office of Technology Partnerships

Mission

The Office of Technology Partnerships' (OTP) mission is to build and sustain effective research relationships between NIST and U.S. industry. OTP also fulfills NIST's statutorily mandated role to provide support services to and representation in the Federal Laboratory Consortium (FLC).

Scope

Managing and implementing NIST's relationship processes (e.g., Cooperative Research and Development, Domestic Guest Researchers, Facility Use, License, Non-disclosure (outgoing for inventions), and Industrial Fellows Agreements) with the goal of making the processes effective and transparent to the users;

Managing and implementing the NIST invention disclosure, commercial assessment, and patenting process;

Providing industry and the NIST research community with "effective practice" advice, useful up-to-date information, and prompt professional service on R&D relationship issues;

Training NIST staff on R&D relationship issues through formal training sessions, web-based tutorials and individual situation analysis;

Identifying generic R&D relationship issues and working with the other MSL to resolve or, at least, mitigate them;

Sustaining good working relationships with the NIST research community; and

Representing NIST on formal technology transfer and R&D relationship issues with the FLC and the Interagency Working Group on Technology Transfer chaired by the Department of Commerce Technology Administration.

Outputs

OTP is organized to provide relationship services in two ways. First, each of the three OTP case officers (CRADA/Licensing Officers, or CLOs), who handle Cooperative Research and Development Agreements (CRADAs), licenses and various relationship questions, work with specific OUs – typically two to three each. This laboratory focus allows the CLOs to develop relationships with their clients and to learn the technical programs of their assigned laboratories. The typical annual caseload of the CLO is: 1) 20-30 CRADA negotiations; 2) a market and assessment caseload of 100 patents, 20 pending applications, 12 provisional applications, 10 maintenance reviews, and 10 invention disclosure reviews; 3) 4 –8 license negotiations; 4) 80 Domestic Guest

Researcher reviews; and 5) 200 guidance queries from technical staff or external customers. Further, the CLOs contribute to the creation and content of OTP's internal and external web sites, participate in FLC and interagency activities. A specific CLO is assigned to serve as the FLC Laboratory Representative for the Gaithersburg and Boulder facilities.

Secondly, OTP staff administer specific relationship processes (e.g., patents, licensing, Domestic Guest Researcher, Industry Fellow), OTP web sites, or provide support services to the CLOs. For example, OTP's patent coordinator works with several groups (the OTP case officers, the inventors, procured patent attorneys, NIST procurement, and NIST legal) to ensure that NIST's patent applications and patents meet deadlines and requirements of the U.S. Patent and Trademark Office. Similarly, the administrator of the licensing and Domestic Guest Researcher activities and the CRADA administrator ensures that those processes are running smoothly providing timely execution.

Customers and Markets Served

OTP's primary customers are (1) the NIST research community, particularly those researchers who are active in working with industry under a formal agreement, and (2) U.S. firms that wish to work with NIST's researchers and/or license NIST inventions.

Common requirements of both groups are prompt execution of relationships with a minimum of delay and problems; and access to timely, high quality advice/information on their relationship questions.

Future Opportunities

- Provide the NIST scientific staff and laboratory management with alternative, 'semiformal' formal research relationship vehicles that allow for tracking collaborative achievements with a minimum of administrative interference (the Research Relationship Agreement, CRADA Letter of Intent).
- Relationship process improvements such as improved tracking of agreements, improved tracking of non-employee researchers.
- Continued emphasis on increasing the quantity and quality of communications with OTP's customers at numerous stages of the CRADA, invention, patent, etc., process.
- Deployment and continuous improvement of the revised internal OTP web site.
- Initiation of external web site with access to licensable NIST technologies.
- Deployment of a modified Baldrige approach: 1) gathering more detailed customer feedback data, 2) involving the customers in interpreting these data and refining the OTP operating plan, 3) using these data to drive formulation of the operating plan, and 4) benchmarking office activities.

- Continued emphasis on patent portfolio triage and commercialization.
- Increased training of NIST scientific and laboratory management on invention disclosures, patent protection, formal agreement and technology transfer mechanisms, procedures, etc., expanded training of new employees, updated web sites, frequent e-mail notices.

FY 1999 OTP Highlights

Of the 62 new CRADAs signed in FY 1999:

- 37 (60%) were multiparty consortia CRADAs
- 5 (8%) were with universities
- 4 (6%) were with trade associations
- 31 (50%) were with small businesses
- 2 (3%) were with foreign entities

Of the 91 CRADAs expiring in FY 1999:

- 48 (52%) renewals/extensions were processed

Of the 288 Domestic Guest Researcher Agreements reviewed and processed in FY 1999:

- 7 (2%) were from industry
- 130 (45%) were from universities
- 41 (14%) were contractors
- 91 (32%) were self-employed

Of 39 Invention Disclosures Received in FY 1999

- 25 commercial assessments with OU concurrence completed
- 8 assessments issued & awaiting OU concurrence
- 6 assessments in process at the end of FY 1999

18 were filed as Provisional Patent applications

Of the 33 Assessments completed:

- 17 non-Provisional patent application filings were recommended
- 6 were CRADA inventions
- 2 were joint inventions resulting from informal collaborations

Of 23 Provisional Patent applications filed in FY 1999:

- 10 non-Provisional patent applications will be filed
- 3 will be placed in the public domain through publishing, etc.
- 9 assessments are in process or awaiting OU concurrence

Of 18 U.S. patent Applications Filed in FY 1999:

- 5 were CRADA inventions
- 3 were joint inventions from informal collaborations
- 2 have already been licensed
- 1 resulted in an Interagency Transfer Agreement with the National Institutes of Health

Of 28 Patents Issued in FY 1999:

- 8 Commercialization licenses are in place
- 2 Research licenses have been granted
- 2 Commercialization licenses are in negotiation
- 5 were CRADA inventions or resulted from informal collaborations

Of the 18 inventions licensed in FY 1999:

- 10 were exclusive or co-exclusive commercialization licenses
- 4 were non-exclusive commercialization licenses
- 1 was a research license
- 2 were Interagency Transfer agreements (NIH, Air Force)

Other

170 Facility Use (Primarily the NIST Research Reactor & CNFR Facility) Agreements were processed.

Work was initiated on streamlining and clarifying the workflow for NIST Non-employees.

Drafts of a proposed Research Relationship Agreement and the accompanying Admin subchapter were prepared and provided to TS management. The proposed Agreement would provide an expedited vehicle for use in collaborative relationships wherein preferential treatment of Intellectual Property was not required.

OTP's internal R&D Research Relationship Web site was completely revised and provided to NIST Counsel for final review. The revision contained a new section, the Inventor's Handbook, designed to provide "how to" to help NIST inventors.

Advanced Encryption Standard Infringement Study

The NIST Information Technology Laboratory was charged with selecting an Advanced Encryption Standard (AES) from a large field of candidate standards submitted by U.S. and international teams. Five finalists were selected and OTP was asked to assist in an analysis of the potential patent infringement liability of each of the finalists. OTP's Terry Lynch and Dale Berkley met with ITL representatives and the Office of NIST Counsel to formulate a cost-effective strategy for determining whether any of the AES finalists infringe U.S. or foreign patents. Outside patent counsel was selected and hired by OTP to conduct a patent search in the U.S. and in the European Patent Office. Patent counsel

recently provided a report (rather than a formal opinion) that indicates which patents may be infringed. OTP is currently working with the technical experts at ITL to generate a short list of patents that may require a formal infringement opinion or could be eliminated as a cause for concern through negotiation with the patent owner. By employing OTP's in-house intellectual property know how with ITL's technical expertise, a high quality, timely determination of the risk of infringement of AES finalists will be made with a minimum commitment of resources to expensive formal infringement opinions.

Atlantic Marine CRADA

The NIST Office of Manufacturing Programs required an agreement to formalize NIST's membership as a partner with Atlantic Marine Holding Company in the Maritech administered initiative on shipyard technologies. This highly visible initiative focuses on the overhaul, repair and conversion of naval and commercial ships. The agreement first proposed by Atlantic Marine was inappropriate for use with a government agency because it attempted to pass through a number of provisions (from a master contract) pertaining only to industrial partners. NIST's standard CRADA agreement was proposed as the vehicle for formalizing this important relationship with Atlantic Marine. OTP, in conjunction with the Office of the Deputy Chief Counsel, worked to customize a statement of work that satisfied both parties and quickly put the agreement in place. The agreement became effective in September 1999. In this way OTP, by virtue of its experience in selecting and crafting the appropriate formal instrument for the occasion, was able to facilitate the NIST/Atlantic Marine collaboration.

Lucent Material Transfer Agreement

A Material Transfer Agreement (MTA) between NIST and Lucent Technologies became effective November 1999 and permits a NIST scientist at the Boulder JILA laboratory to research the properties of an important new optical fiber recently developed at Lucent. Lucent was very interested in preventing unauthorized dissemination of proprietary information concerning the material, and in preserving its intellectual property rights. Through an extensive series of discussions with Lucent legal counsel, the language for an MTA was agreed upon and the NIST investigator was able to quickly receive and begin work on the fiber.

Exclusive License to Digiray, Inc. of the NIST Diffraction Measurement Accessory to the Scanning X-Ray Source

An exclusive license agreement between NIST and Digiray, Inc. for the commercialization of a NIST invention allowing the Digiray Scanning X-Ray Source to be used in a diffractometer mode became effective in August 1999. The NIST invention permits the Digiray machine to obtain diffraction information and, thus, quantitative chemical analyses of materials passed through the Digiray scanner. The invention provides the scanner with the potential for detecting, for example, hazardous materials in airline baggage. The NIST technology has the potential for improving public safety.

NIST Non-Employee Project

OTP, the Office of International and Academic Affairs, the Information Technology Laboratory, and the Program Office of the Office of the Director are working together to implement a streamlined workflow for non-NIST personnel. This project will improve the user interface, reduce data input for the OUs, improve agreement and non-NIST personnel tracking, reduce filling out forms, improve non-employee database quality, and speed agreement approvals and updates. NIST has more than 1500 non-NIST personnel – a number almost the size of its scientific employee base - on its Gaithersburg and Boulder campuses that it must track.

Revised R&D Relationship Guide, New “Inventor’s Handbook” Section

The R&D Relationship Guide is an internal NIST web site that provides the NIST research community with information on “how to work with others”. It provides one-stop convenience where the NIST researcher may obtain answers to frequently asked questions, procedural information, Dos and Don’ts, downloads of sample agreements, sample memos. Further, OTP added new content to aid the NIST inventors in each of the major invention stages – disclosing the invention, preparing the application, working with the U.S. Patent and Trademark Office, and licensing/commercializing inventions. The popularity of this site has grown from 16,000 hits during its first fiscal year of operation to an annual level of 46,000 hits.

Office of Information Services

Mission

The Office of Information Services (OIS) provides a host of research, information, editorial, and historical services to support the scientific and technical staff of NIST. Within OIS are some of the best research consultants, librarians, writers, editors, printing specialists, and online publishing experts in the government.

Scope

The purpose of OIS is to support and enhance the research activities of the NIST scientific and engineering community through a comprehensive program of knowledge management. OIS also seeks to constantly improve and increase information collection, organization, and dissemination to meet the needs of the broadest possible audience and to deliver superior and timely service through a trained, responsive, and professional staff. OIS contributions serve to increase the productivity of the NIST research, technical, and administrative staff through resources and services that contribute to the creation, publication, and dissemination of knowledge products for the NIST and national scientific and technical communities.

Output

OIS seeks to improve our customers' (predominantly NIST research and technical staff) awareness and use of existing, proposed, and planned OIS services and resources. In so doing OIS ensures that NIST employees have access to adequate information about OIS resources, programs, and policies. OIS actively pursues internal projects and activities to increase and improve NIST communications. To ensure that OIS proposed and planned activities have the full support of NIST management and staff, OIS proactively seeks networking and partnering opportunities for communications and information exchange.

Customers

OIS customers include NIST employees, guest researchers, students, and visitors to NIST. OIS has established a mechanism for closer and regular involvement of customers in the planning and development of new OIS services and resources and has established a mechanism for continuing feedback from clientele to improve existing services. This process ensures that NIST managers and employees have direct input into the planning and development of new OIS services and resources.

Future opportunities

Future opportunities for OIS involvement include contributing to the research activity through a program offering both Research Library consultants and editorial services during research and manuscript development. In addition to improved editorial services, OIS services can be expanded to include document design assistance. OIS can also add

value to the results of the research activity through a program that facilitates the dissemination of products and publications in both print and electronic formats. OIS will continue to design, develop, and implement electronic, digital, and network-based products and services in support of NIST research and publication activities. Additional plans include the continuous improvement of the NIST Virtual Library, which benefits all of OIS's client communities. Also, OIS will continue to facilitate the design, development, implementation, and maintenance of web-based networked knowledge resources and services from Technology Services.

The Research Library and Information Program intends to modernize and expand the services available through the NIST Virtual Library (NVL).

Through the NIST Museum and History Program OIS expects to publish third volume of the NIST technical history covering 1970-1993. Additionally, OIS plans to enlarge the scope of the NIST Virtual Museum by completing its online pictorial database of artifacts available for public viewing.

FY 1999 OIS Highlights

Technicalendar 2000

The Technicalendar 2000 Project will launch a vastly improved electronic TCal with the first issue for January 2000. This is the culmination of a series of improvements made to the delivery of the Technicalendar Suite (Technicalendar, NIST Administrative Calendar, and NIST Vacancy Announcements). Through another new product called CIAO (Current Information and Awareness Online) TCal readers can customized the electronic version to meet their individual needs. Employees may select which sections of TCal to receive, filter that information by use of keywords, organization, NIST division, etc. Vacancy announcements can be delivered daily or weekly. Employees can also determine how to have TCal delivered, print, e-mail full text or the web version.

This project which was funded jointly through a NIST overhead initiative and a DoC Pioneer Grant, has significant fiscal impact. TCal will not only save paper but also drastically reduce the effort required to print and distribute the Technicalendar weekly. The TCal team looks at this joint venture between TS and Admin/CFO as first steps toward a paperless organization.

Personal TCal web pages

Personal TCal web pages will enable individual NIST staff members to control precisely what information from the Technicalendar suite (including AdminCal and Vacancies) they choose to receive. Since user profiles are integrated with the Physical Security Database and the Phone Directory Database, the foundation of personal web pages is in place to produce products and services that can go well beyond the information from the Technicalendar suite. For example, with the TCal profiling system as a foundation, NIST scientists can be offered "that precise piece of information" from the premium databases

in the NIST Virtual Library right on their personal web page without having to browse or search. In the future, we are hopeful that this project will evolve into a "NIST Web Portal" with infinite possibilities for content that are critical, timely, and appropriate for each and every NIST staff.

30 Second Evaluation

In FY1999 OIS instituted a mechanism for instant feedback: the 30 Second Evaluation, to accompany all OIS online products. Customers are asked to take 30 seconds or less to provide input as to their likes, dislikes, suggestions for improvements, problems encountered, etc. The impact of this system is that it gives the customer the opportunity to provide immediate feedback. It allows OIS to respond just as quickly. It means problems can be resolved quickly, suggestions can be examined and improvements made. In many cases minor adjustments to products can be made that improve ease of use or content.

Publication of NBS history

The Office of Information Services released the publication *of A Unique Institution: The National Bureau of Standards 1950-1969* by Elio Passaglia. Although Passaglia wrote the draft text he died before completing the work. The history is a showcase for the NIST technical work of the period and preserves NBS contributions in a critical period in our nation's history and creating a vehicle to continue to foster an appreciation of NBS and NIST. Although OIS publishes many manuscripts annually, this was the first time that OIS produced a project of this size and scope.

Publication of this 800 page tome called on and combined skills of every part of OIS including the History, Research and Publishing programs. Expert staff provided legislative reference, research, bibliographic references, writing, editing, redacting, composition, and printing services. Photos were carefully selected, scaled and placed within the text. No detail was overlooked from the design and layout to selection of the paper, and the color, texture, and quality of the binding.

A limited number of copies were distributed to NIST staff. Copies may also be purchased from the Government Printing Office (GPO).

Agreement with the American Physical Society

A collaborative agreement has been created with the American Physical Society to initiate a Full Text Program with NIST publications. The Full Text Program will be 100% Web based and will include the abilities to search full text, print full text, and create virtual documents from NIST publications. This program will provide NIST and the public the ability to search and immediately obtain NIST research information through full text NIST publications. We believe this program will greatly improve the dissemination of NIST research information and eliminate the need to rely on GPO or the National Technical Information Service.

Metric Program

Introduction

The Metric Program seeks to accelerate the Nation's transition to the metric system, the preferred system of weights and measures for United States trade and commerce.

Implementing the 1988 amendments to the metric Conversion Act of 1975, the Metric Program helps foster the metric transition activities of all Federal agencies.

The Program provides leadership and assistance on adoption and use of the metric language of measurement by businesses, state and local governments, standards organizations, trade associations, and the educational community.

Under the banner "Toward a Metric America", the Program conducts outreach among educational, professional, business, and media audiences to:

- (1) Accelerate adoption of the metric system in trade and commerce;
- (2) Encourage use of the metric system in all facets of education, including honing of worker skills; and
- (3) Develop positive and enjoyable programs of public awareness.

Current Metric Program initiatives focus on education and public awareness to gain broad-based support for national metrication from industry and the general public.

Vision: The Program has as its longer range vision "An American public receptive to moving 'Toward a Metric America' in trade, in education, and ultimately in culturally sensitive areas of daily life".

Mission: The Program's mission has been articulated as seeking "To provide leadership, example, and model initiatives for building awareness -- among all measurement stakeholders -- of the metric system's widespread presence, its relative ease to learn and use as a language of measurement, and its vital role in an increasingly global marketplace".

Customers and target audiences are widespread, including government agencies (federal, state, and local), businesses (with particular focus on small and medium sized enterprises), and educators, the media, and ultimately the general public.

With its "Toward a Metric America" theme, the Metric Program has initiated a variety of information and public awareness campaigns, many of which are seen as models for future sustained and national efforts. It has sought also to build partnerships to support its efforts to create a more favorable environment for national metrication.

The Metric Program and its outreach efforts support the commitments of the U.S. Department of Commerce and of the National Institute of Standards and Technology to increasing access to foreign markets for America's business community; to increasing their competitiveness in global markets; to facilitating trade expansion; and to building partnerships, notably among education and business communities.

The Program makes an ongoing effort, through the media, to educate the public in the benefits of using the metric system of measurement. It has launched several campaigns to raise the visibility of the metric system among our nation's news media, businesses, and educators. In the first six months of these efforts, over half of U.S. households (some 65 million impressions) were exposed to key messages about the benefits of the metric system. Media results included: 3 national news service stories with photos (including Associated Press), 56 national and local television talk shows and newscasts (including CNN and MSNBC), 55 radio talk shows and newscasts, and over 700 newspaper articles. The media coverage continues to this day.

The Program envisions several key opportunities in the relatively near term. These include, within the next two to three years:

- (1) Revamping the focus of federal metrication efforts to encourage all relevant federal agencies to move:
 - From primary reliance on federal procurement as the driving force for national metrication,
 - Toward using federal agencies' outreach resources (such as education, public affairs, and media relations) to foster greater awareness, understanding, and acceptance of the metric system among businesses, educators, and the public.
- (2) Expanding the recently launched nucleus of volunteer metric support/change agents by forming partnerships involving:
 - Government metric coordinators, starting at the federal level,
 - Educators in all curriculum areas, ranging from subjects focused on measurement skills to the study of languages, and
 - Business community proponents of metric use, whether found in corporations, trade associations, technical societies, or professional associations.
- (3) Submitting and supporting timely legislative initiatives to advance metric oriented change in America's laws and regulations, ranging:

- From an initiative by The National Institute of Standards and Technology to introduce amendments to the Fair Packaging and Labeling Act to permit metric-only labeling on consumer products,
 - To initiative(s) to "test the waters" for broader metric legislation, including the setting of relevant target dates for completion of future metric transition steps, and
- (4) Laying the groundwork for a "Measurement Literacy Alliance":
- To address the documented weakness of our nation's students in measurement skills, relative to other countries (the Third International Mathematics and Science Study - TIMSS),
 - To do so with a strong focus on the benefits of the metric language and on the involvement of parents, and
 - To proceed through an alliance/partnership involving leaders from industry, technology, and education.

FY 1999 Metric Program Highlights

The Metric Program's highlights during the past fiscal year have included a variety of new projects and pilot efforts, several new or updated publications, and a broad range of participation in meetings, conventions, exhibitions, and press interviews across the country.

In summary, the Program has:

- Alerted the Nation's businesses to the European Union's "Metric-Only" labeling plans and progress,
- Developed presentations and materials to portray the metric transition's background and prospects to targeted audiences,
- Launched initiatives and pilot projects focused on smaller businesses and on the education community,
- Developed an initial nucleus of private sector partners in the Nation's Western, Midwestern, and Eastern regions,
- Brought the Program's "Toward a Metric America" educational exhibits to some four dozen selected conventions, and
- Continued to deliver key metric messages to a wide variety of media.

New Projects

(1) Support to the Business Community

Focused pilot efforts have sought to assist smaller businesses in their use of the metric language, and in their realization of export potentials.

The program has pursued this initiative by building partnerships with local and regional arms of bodies such as:

- District Export Councils
- Export Assistance Centers
- Manufacturing Extension Centers
- Minority Business Development Administration Offices
- Small Business Administration Centers
- Service Corps of Retired Executives

(2) Support to the Educational Community

Model projects have been developed to target all levels of the educational community, notably:

- Supporting the work of a college level drama troop in its development and delivery of a "Metric Can Be Fun" play to elementary school audiences,
- Encouraging the development of "Across the Curriculum" programs aimed at the secondary school level, programs in which the metric system is studied and discussed in classes of all subjects in, say, an eighth grade curriculum,
- Exploring the combination of "language, culture, and world trade" in curriculum design and presentations at the university and "VoTech" levels, and
- Stimulating creative approaches to facilitating the use of metric units in the workplace, using a successful case history pioneered for the automotive industry.

(3) Building of Private Sector Partnerships

The Program successfully launched a nucleus of private sector partnerships (from both the business and educational sectors), capitalizing on the interest and skills of supportive individuals. Targeted in the East, Midwest, and West, these partners already have provided significant assistance in exhibition coverage and in joint presentation of metric seminars.

Quantified Outputs

Although much of the Program's output is more readily measured qualitatively (e.g., the progression of media coverage from earlier brief and "neutral" press items to the increasingly earned receipt of pro-metric-transition editorials in major newspapers), the past year has seen:

- (1) The handling of nearly 5,000 inquiries and requests for assistance in metric usage, received by letter, FAX, phone, and e-mail,
- (2) The delivery to customers of over 12,500 metric information kits, many of them customized for the recipient. Thanks to the Program's outreach at major conventions, the number of kits requested has increased by approximately 4,000 in each of the past two years, and
- (3) The exposure of the Program's educational displays at conventions enjoying an estimated gross attendance of nearly 140,000.

Publications

During the past fiscal year, the Metric Program has:

- (1) Issued a contractor-prepared report entitled "U.S. Manufacturers with Products Conforming to Metric Standards: An Analysis" (GCR 99-783). The report provides insights into the current extent of compliance with metric standards among U.S. industrial product manufacturers. In addition to providing trends over recent years, the publication can serve as a useful benchmark for the future.
- (2) Reissued an updated version of "The Chart of the Modern Metric System (SI)" (SP304) popular in classrooms and in offices as a wall chart reference, and of "A Brief History of Measurement Systems with a Chart of the Metric System" (SP304A). Both publications' usefulness in helping students and adults learn and understand the metric system has been cited by educators and workforce trainers.
- (3) Updated and reissued the Program's "Metric Style Guide for the News Media" (LC1137). Originally prepared to help the media set an example of correct use of the metric language, this publication has proven to be among the most popular at seminars and conventions of all audiences, including businesses and educators.

Meetings

The Metric Program has taken part in an increasingly large and varied number of meetings, ranging from conduct of sessions of the Interagency Council on Metric Policy to participation in conventions enjoying attendance of as many as 40,000.

Most noteworthy in the past year, however, have been the pilot projects involving support for smaller businesses in their efforts to export their products and services, and in their need to understand and use the world's metric language of measurement. Examples include new partnerships launched:

- (1) With the Chicago Small Business Administration, and with Chicago's Service Corps of Retired Executives, to introduce a metric module in their international trade training seminars aimed at new and prospective small business exporters,
- (2) With the Rhode Island Export Assistance Center, to include a presentation on the metric language of measurement in their "World Trade Day" program,
- (3) With the Oklahoma Manufacturing Extension Program affiliate to provide a half-day long metric system orientation for the Center's state-wide technical field staff, and
- (4) With the Oklahoma Export Assistance Center to provide a two-hour metric training session during a full day seminar for smaller businesses seeking to increase their participation and success in export markets.
- (5) With Minority Business Development agencies, providing a metric presence and resources at annual celebrations of Minority Enterprise Development Week: nationally in Washington, D.C., and regionally in Boston and Atlanta.

Glossary

AES	Advanced Encryption Standard
ANSI	American National Standards Institute
APA	Engineered Wood Association
APEC	Asia Pacific Economic Cooperation
APLAC	Asia Pacific Laboratory Accreditation Cooperation
ASEAN	Association of South East Asian Nations
ASTM	American Society for Testing and Materials
BFRL	Building and Fire Research Laboratory
CAB	Conformity Assessment Body
CIPM MRA	International Committee of Weights and Measures Mutual Recognition Arrangement
CITEL MRA	U.S.-Interamerican Mutual Recognition Agreement
CLO	CRADA Licensing Officers
COPANT	Pan American Standards Commission
CP	Calibration Program
CPSC	Consumer Product Safety Commission
CRADA	Cooperative Research and Development Agreement
CSTL	Chemical Science and Technology Laboratory
DoC	Department of Commerce
DoD	Department of Defense
DOE	Department of Energy
EA	European Cooperation for Accreditation
EEEL	Electronics and Electrical Engineering Laboratory
EIPP	Electronic Information and Publications Program
EMC	Electromagnetic Compatibility
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
FLC	Federal Laboratory Consortium
FTAA	Free Trade Area of the Americas
GCC	Gulf Cooperation Council
GSA	General Services Administration
GSP	Global Standards Program
HUD	Department of Housing and Urban Development
IAAC	Interamerican Accreditation Cooperation
ICSP	Interagency Committee on Standards Policy
ICSU	International Council of Scientific Unions
IEC	International Electrotechnical Commission
ILAC	International Laboratory Accreditation Cooperation
IMI	International Market Insights
ISO	International Organization for Standardization
ISSC	Information System to Support Calibrations
ITA	International Trade Administration
ITL	Information Technology Laboratory
MAP	Measurement Assurance Program
MEL	Manufacturing Engineering Laboratory
MRA	U.S.-EU Mutual Recognition Agreement
MSL	Measurement and Standards Laboratories

MTA	Material Transfer Agreement
NACLA	National Cooperation for Laboratory Accreditation
NAFTA	North American Free Trade Agreement
NASA	National Aeronautics and Space Administration
NCSCI	National Center for Standards and Certification Information
NCSL	National Conference of Standards Laboratories
NCWM	National Conference on Weights and Measures
NIAP	National Information Assurance Partnership
NIH	National Institutes of Health
NIS	Newly Independent States
NIST	National Institute of Standards and Technology
NMI	National Measurement Institute
NTEP	National Type Evaluation Program
NVCASE	National Voluntary Conformity Assessment Systems Evaluation
NVL	NIST Virtual Library
NVLAP	National Voluntary Laboratory Accreditation Program
OIML	International Organization for Legal Metrology
OIS	Office of Information Services
OMB	Office of Management and Budget
OMS	Office of Measurement Services
OSS	Office of Standards Services
OTP	Office of Technology Partnerships
OWM	Office of Weights and Measures
PDB	Protein Data Bank
PL	Physics Laboratory
PPT	Providers of Proficiency Testing
PS	Product Standard
RCSB	Research Collaboratory for Structural Biology
RLIP	Research Library and Information Program
SABIT	Special American Business Internship Training
SASO	Saudi Arabia Standardization Organization
SBIR	Small Business Innovation Research
SCSC	Sub-Committee on Standards and Conformance
SD	Service Development
SES	Standards Engineering Society
SIP	Standards Information Program
SIMA	Systems Integration for Manufacturing Applications
SRDP	Standard Reference Data Program
SRMP	Standard Reference Materials Program
TABD	Transatlantic Business Dialog
TBT	Technical Barriers to Trade
TEP	Transatlantic Economic Partnership
TIA	Telecommunications Industry Association
TS	Technology Services
TSAP	Technical Standards Activities Program
U.S.-EU MRA	United States – European Union Mutual Recognition Agreement
WCF	Working Capital Fund
WMP	Weights and Measures Program
WTO	World Trade Organization

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Technology Services FY1999 Technical Activities Report

Appendices – outputs and interactions

Office of Measurement Services

Staff recognition and awards

Dinis Camara
Geraldine Dalton
Charles Sturrock

DOC/NIST Bronze Medal Award (team award with M.F. McCurley (OD), R.L. Watters, Jr. (CSTL), and J.L. Springmann (ITL)) – for developing the NIST International Comparison Database, recognized by national metrology institutes worldwide as the authoritative source for qualified international comparison data, and serving as the technical basis for establishing mutual recognition agreements between trading nations.

Nancy Trahey

DOC/NIST Bronze Medal Award – for outstanding efforts in forging a stronger partnership between NIST and ASTM Committee on Analytical Chemistry for Metals, Ores, and Related Materials; and U.S. industry. NIST/ASTM partnership for metals represents more than 90 years of cooperative support to the development of ferrous and nonferrous metal.

Publications

(Note: for citations that include non-TS authors, TS authors are shown underlined>)

Bruce, S., and Trefzger, W., The NIST Calibration Services Virtual Library, NCSL Workshop and Proceedings, 1999.

Bruce, S., Measurement Services for Optoelectronics at NIST, Electrochemical Society Proceedings, Volume 99-17, 1999.

Butcher, T., Grimes, T., and Williams, J., (Eds.), Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, NIST Handbook 44, 1999 Edition.

Coleman, T., Grimes, T., (Eds.), Uniform Laws and Regulations, NIST Handbook 130, 1999 Edition.

Heller, S., The History of the NIST-EPA-NIH Mass Spectral Database, Today's Chemist at Work, 8(2), 45-50 (1999).

Kelleher, D.E., Martin, W.C., Wiese, W.L., Sugar, J., Fuhr, J.R., Olsen, K., Musgrove, A., Mohr, P.J., Reader, J., and Dalton, G.R., The New NIST Atomic Spectra Database, Physica Scripta. Vol. T83, 158-161, 1999.

Low, S., Liggett, W., Song, J., and Gettings, R., Rockwell Hardness – A Method-Dependent Standard Reference Material, NCSL Proceedings, July 1999.

MacDonald, B., Industrial Sludge Reference Materials for the Analysis of Acid-Extractable Metals, 1999.

Mindte, J., (Ed.), NCWM Publication 2, Directory of Weights and Measures Officials in the U.S. and All Members of the NCWM, 1999 Edition.

Powell, C.J., Rumble, Jr., J.R., Blakeslee, D.M., Dal-Favero, M.E., Jablonski, A., and Tougaard, S., The NIST Surface Analysis Data Center, in Characterization and Metrology for ULSI Technology: 1998 International Conference.

Quinn, G., Xu, K., and Gettings, R., Standard Reference Material 2100: Ceramic Fracture Toughness, Ceramic Engineering and Science Proceedings, January 1999.

Quinn, G., Xu, K., and Gettings, R., Standard Reference Material for Fracture Toughness, in the Proceedings of the 7th International Symposium on Fracture Mechanics of Ceramics, July 1999.

Rumble, J., and Sturrock, C., “Computerizing Complex Data: Data Quality Issues and the Development of Standard Formats for Representing Materials Properties”, in Service Life Prediction of Organic Coatings (American Chemical Society, Washington DC, 1999).

Sturrock, C., Proceedings of May 1999 ASTM-NIST Workshop on Materials Data in the Internet Era, available at <http://www.nist.gov/srd/astm-sum.htm>.

Williams, J., NCWM Interim Meeting Agenda NCWM. Publication 15, December 1998.

Williams, J., Program and Committee Reports for the NCWM 84th Annual Meeting NCWM. Publication 16, 1999.

Williams, J., Report of the 83rd National Conference on Weights and Measures, NIST Special Publication 932, 1998.

Williams, J., Quarterly issues of the W&M Today newsletter of the NCWM.

Zarr, R.R., Dalton, G.R., and Fioravante, S.M., “Development of a NIST Standard Reference Database for Thermal Conductivity of Building Materials,” 25th International Thermal Conductivity Conference and 13th International Thermal Expansion Symposium, 1999.

Talks and Presentations

Brickenkamp, C.

"Metrology: From International Definitions to the Shop Floor", Butler Community College Students and Faculty, NIST, Gaithersburg, MD March 19, 1999.

"Traceability and the Implications of the Proposed ISO 17025 Standard", Las Vegas, NV March 24, 1999.

"An Overview of NIST Calibration Services" Delegation from Sri Lanka, June 8, 1999.

"Alternative Pathways to Traceability in the U.S.A." Delegation from China, September 27, 1999.

"Further Implementation of NAFTA" Delegation from CENAM (Mexico), September 20, 1999.

Bruce, S.

"Quality Systems: What's in it for Everybody?" Calibration Program Quality Forum, NIST, Gaithersburg, MD, April 9, 1999.

"The NIST Calibration Services Virtual Library: An On-Line Electronic Publishing System", National Conference of Standards Laboratories Workshop and Symposium, Charlotte, NC, July 13, 1999.

"The Quality System for Optical Technology Calibration Services" Short Course on Photometry, NIST, Gaithersburg, MD, September 15, 1999.

"Measurement Services for Optoelectronics at NIST", [Invited Talk], 196th Meeting of the Electrochemical Society and the 1999 Fall Meeting of the Electrochemical Society of Japan, Honolulu, HI, October 18, 1999.

Butcher, K.

NIST Handbook 133, "Checking the Net Contents of Packaged Goods," to the Standards in Trade Workshop for Latin America held at NIST on September 21 to October 2, 1998.

Butcher, T.

"The National Type Evaluation Program," to the Scale Manufacturers Association meeting, Fall 1998.

Served on a panel of technical experts at Dirreccion General De Normas Weights and Measures Seminar, Mexico City, Mexico. Chaired session on Scale Verification and Retail Motor-Fuel Inspection in the United States.

Coleman, T.

3-day class on the NCWM Price Verification Procedure for the State of Louisiana in March 1999.

Dalton, G.

NIST Microsoft Access Users' Group Meeting, August 5, 1999, *"Access and SQL Server"*, part of a presentation of work with Access in developing a Web site for the International Comparisons Database.

Fagan, P.

“Data Uniformity and the New Protein Data Bank”, 218th ACS National Meeting, August 22-26, 1999; New Orleans, Louisiana.

“NMR and the New Protein Data Bank”, Keystone Symposium.

“Frontiers of NMR in Molecular Biology VI January 9-15, 1999; Breckenridge, Colorado.

“The new Protein Database”, Chemistry and the Internet, September 25-27, 1999; Georgetown University, Washington DC.

Garner, E.

“*An Overview of the National Voluntary Laboratory Accreditation Program*”, DOE Laboratory Accreditation Committee Meeting, Idaho Falls, ID, September 22, 1999.

Gettings, R.

An Introduction to the NIST Standard Reference Materials Program. Measurement Science Conference, January 1999.

Standard Reference Materials for Physical Properties. Pittcon Conference, Orlando, FL, March, 1999.

Certification and Use of NIST Rockwell Hardness SRMs. NCSL, July, 1999.

Harris, G.

OWM overview to the Standards in Trade – Caribbean Group, November 1998.

“History of Weights and Measures in the United States,” 1999 Measurement Science Conference.

Heller, S.

Invited Plenary lecture, Noordwijkerhout Chemical Information Conference, June 1999.

Lee, D.

“Grain Moisture Measurement System in the United States,” to Butler College metrology students .

MacDonald, B.

NIST Modes of Certification for Chemical Analysis, ASTM 2.94 Task Group on Statistical Practices, December 1999 meeting of ASTM D2, New Orleans.

NIST Environmental SRMs: Issues and Impact, NIST Workshop at Pittcon '99, Orlando FL.

Co-author of Poster Presentation given by Dr. John Sieber, 48th Annual Denver XRF Conference.

Rumble, J.

“*Databases in Modern Analytical Sciences*,” 16th International CODATA Conference, New Delhi, India, November 1998.

“*Derived Data – Or More Investments in Data Leads to More Science*,” 16th International CODATA Conference, New Delhi, India, November 1998.

"NIST and OMG Work on Life Sciences Data Formats," Object Management Group (OMG) Semiannual Meeting, Philadelphia, PA, March 1999.

"Materials Data and the Internet: Materials Data as the Driving Force, or Are Standards Needed Now?," NIST-ASTM E49 Workshop on Materials Data in the Internet Era, Gaithersburg, MD, May 1999.

"Scientific Data in the Internet Era" at the World Conference on Science, Budapest, Hungary, June 1999.

"Shaping the Information Revolution for 21st Century Science," Japan National Committee for CODATA, Tokyo, Japan, July 1999.

"Standards in Scientific and Technical Data," at the CODATA Species 2000 Workshop, Tsukuba, Japan, July 1999.

Sturrock, C.

"Four Motivating Questions for the Materials Data Community," Chairman's Welcome, May 1999 ASTM-NIST Workshop on Materials Data in the Internet Era.

"Perspectives on Materials Informatics: from Expert Systems to Data Mining," Materials Informatics Conference, June 1999, Boston, MA.

Suiter, R.

NTEP and *"Assuring Successful Evaluations"* at the National Industrial Scales Association Meeting, October 1998.

NTEP Update at the International Society of Weighing and Measurement Meeting, June 1999.

NIST Handbook 44 training seminar at the International Society of Weighing and Measurement Meeting, June 1999.

Thomas, J.

Radioactivity SRMs (part of the NIST/SRMP Workshop "NIST SRMs for Chemical Measurements - Recent Issues and Applications). Pittcon '99, March 7-12, 1999, Orlando, FL.

Overview and tour of SRMP to visiting participants of SIM (The Inter-America System for Metrology), April 14, 1999.

The NIST Standard Reference Materials Program (SRMP) - Measurement Linkage through the Use of SRMs, Workshop on Luminescence Standards in Chemical Analysis, NIST, Gaithersburg, MD, September 8-9, 1999.

Trahey, N.

A National Certified Reference Materials (CRM) Program, NIST Standards in Trade Workshop, 24 September 1998, Gaithersburg, MD.

NIST Standard Reference Materials (SRMs) Storage and Packaging, NIST Standards in Trade Workshop, 24 September 1998, Gaithersburg, MD.

Status of NIST Metal SRMs, American Iron and Steel Institute Technical Committee on Chemical Analysis. 20 October 1998, Pittsburgh, PA.

Status of SRM Activities for Metals, ASTM November Committee Week, 4 November 1998, Norfolk, VA.

“Interlaboratory Analysis Program for Metals and Metal alloys – a Model Approach,” (published). Workshop on Needs Assessment of the Egyptian Metals Industry: A model for Government- Industry Interaction,” 11 November 1998, Sharm El-Sheik, Egypt.
Industrial SRMs, Pittcon 99, 7 March 1999, Orlando, FL.
SRMP Goals and Objectives, Presentation to the NIST Deputy Director, 18 March 1999, Gaithersburg, MD.
NIST Standard Reference Materials for Measurement Assurance – Practices, Issues and Perspectives, Workshop on Proper Use of Environmental Matrix Reference Materials, 22 April 1999, Berlin, Germany.
Status of SRM Activities for Metals, ASTM November Committee Week, 19 May 1999, Seattle, WA. (Published with meeting minutes.)
Status of NIST Metal SRMs, American Iron and Steel Institute Technical Committee on Chemical Analysis, 10-11 June 1999, NIST, Gaithersburg, PA.
Status of NIST Metal SRMs, Annual Meeting of Analytical Reference Materials International, 22 July 1999, Snowmass, CO. (Published with meeting minutes.)

Ugiansky, G.

OWM Update to the NCWM Board of Directors at the 1999 NCWM Interim and Annual Meetings.

OWM Update at four Regional Weights and Measures Association Meetings.

OWM Update at the fall (November 1998) and spring (April 1999) meetings of the Scale Manufacturers Association.

“Structure of the National Conference on Weights and Measures,” Interim Working Group on Legal Metrology (Americas).

“Weights and Measures System in the United States,” Parcel Shipping Scales Workshop, June 1999.

Committee Participation and Leadership

Ahrens, T.

Technical Advisor to the NTETC Measuring Sector; Technical Advisor to the NTETC Belt Conveyor Scales Sector.

Arnold, T.

System to Support Calibrations (ISSCOC)

Blakeslee, D.

NIST representative on the Organizing Committee for Year 2000 U.S. National CODATA Conference on Scientific and Technical Data, Data for Science and Society.

Brickenkamp, C.S.

NIST Leadership Management Development, Communications and Awareness Committee; NIST Baldrige Information Gathering Team on Business Process chaired by Jorge Urrutia; Oversight Committee of the Information System to Support Calibrations (ISSCOC); Joint Software Planning Group to support ISSC.

Butcher, K.

Technical Advisor to the NCWM Administration and Public Affairs Committee; Co-Technical Advisor to the NCWM Handbook 133 Working Group; Technical Advisor to the NCWM Voluntary Program Assessment Working Group; Co-Technical Advisor to the NCWM Laws and Regulations Committee for the 1999 Interim Meeting.

Butcher, K. and Coleman, T.

Coordinated a NIST/FTC survey on price verification that was released in December 1998.

Butcher, T.

Public Member of the National Type Evaluation Program Technical Committee (NTETC) Weighing Sector Public Member of the NTETC Measuring Sector; Public Member of the NTETC Belt Conveyor Scales Sector; Member of the U.S./Canada Mutual Recognition Work Group - Weighing Devices; Technical Advisor to the NCWM National Type Evaluation Program Committee.

Coleman, T.

Technical Advisor to NCWM Laws and Regulations Committee; Co-Technical Advisor to the NCWM Handbook 133 Working Group; Served as a technical expert on net contents testing and package fill requirements for the U.S. Department of Agriculture's School Lunch Program to assist them in determining if vendors give full measure on milk contracts.

Dalton, G.

Member, Washington Baltimore HP Regional Users Group.

Dittmann, S.

Liaison Delegate, National Conference of Standards Laboratories; Secretary, ISO TC/112, Vacuum Technology Committee; Laboratory Metrology Committee, Department of Energy

Fagan, P.

Treasurer, COMSCI Council Board.

Garner, E.

Government Advisory Group and the Metrology Committee, Government Industry Data Exchange Program, Department of Defense; Laboratory Accreditation Committee, Department of Energy; Laboratory Evaluation Resources Committee, National Conference of Standards Laboratories.

Geraci, D.

Vice Chair, TS Diversity Committee

Gettings, R.

Member, American Society for Testing and Materials; C14 Glass Main Committee;

C14.91 Glass Standard Reference Materials; C28 Advanced Ceramics Main Committee; C28.01 Ceramic Properties and Performance; E4 Metallography; E28 Mechanical Testing Main Committee; E28.02 Ductility and Flexure Testing; E28.06 Indentation and Hardness Testing; E28.07 Impact Testing.

Harris, G.

ASTM Committee 41.06, Laboratory Equipment; Mass Standards and Balances; NCWM Liaison to the NCSL Board of Directors; Technical Advisor, NCWM Metrology Subcommittee.

Heller, S.

Chairman, Working Party on Electronic Publishing; IUPAC Committee on Printed and Electronic Publications; Chairman, Working Party on Electronic Access to PAC; IUPAC Committee on Printed and Electronic Publications; Titular Member, International Union of Pure and Applied Chemistry (IUPAC), committee on Printed and Electronic Publications; Member of the Editorial Board of the Journal of Agricultural Genomics (JAG); Co-Founder and Member of the Editorial Board of the Internet Journal of Chemistry (IJC); Hong Kong Research Grants Council Reviewer.

Koenig, J.

Technical Advisor to the NCWM Board of Directors.

Lee, D.

Co-Technical Advisor to the NTETC Grain Moisture Meter and Near Infrared Protein Analyzer Sectors.

Levey, C.

Committee on Data for Science and Technology (CODATA).

MacDonald, B.

Member, American Society for Testing and Materials; D2 Petroleum Products; E11 Statistical Methods; D5 Coal & Coke - Chair 3 task groups in ASTM D5: Residual Moisture in Nitrogen Atmosphere, NIST Standard Reference Materials; and Titer Correction Gross Calorific Value of Coal and Coke; Washington Area Chapter of American Society of Quality Control(ASQC).

Marshall, J.

Oversight Committee of the Information System to Support Calibrations (ISSCOC); Joint Software Planning Group to support ISSC; TS Webmasters; CP Web Development; PC Applications Committee; PC Liaison Committee.

Mindte, J.

Coordinator of the NCWM Nominating, Auditing, Credentials, and Resolutions Committees.

Rumble, J.

CODATA (ICSU Committee on Data for Science and Technology), President; ASTM E49 on Computerized Systems and Chemical and Material Information, Vice Chair; ASTM E2 on Terminology, Member; On Site Meetings Subcommittee, NIST Centennial Committee, Member; Communications and Awareness Committee, NIST Leadership and Management Development, Member.

Sauerwein, J.

Customer Services Group for Measurement Services Reorganization; Baldrige Committee; Diversity Committee/Technology Services (Secretary); Leadership & Management Development Pilot Project - Performance Management.

Sturrock, C.

Chairman, CODATA Task Group on Materials Database Management; Member, VAMAS Technical Working Area 10 on Material Databanks; Member, ASTM Committee E-49 on Computerized Systems and Chemical and Material Information.

Suiter, R.

Technical Advisor to the NTETC Weighing Sector
Technical Advisor to the Multiple Dimension Measuring Devices Working Group.

Trahey, N.

Member of the ANSI Board of Standards Review (BSR). Will become vice chairman of the committee on January 1, 2000 (a two-year term, renewable twice); Alternate Delegate of the U.S. TAG to the ISO Committee on Reference Materials (REMCO); Member of the following ASTM Technical Committees: C26 on Nuclear Fuel Cycle; E01 on Analytical Chemistry for Metals, Ores, and Related Materials; (official ASTM/NIST Representative to E01.94 Subcommittee on Reference Materials); E04 on Metallography; E28 on Mechanical Testing; E29 on Particle and Spray Characterization; E43 on SI Practice.

Ugiansky, G.

NCWM Executive Secretary; Member of ASTM Committee G001, Corrosion of Metals, SC.05, Laboratory Corrosion Tests, and SC.06, Stress Corrosion Cracking and Corrosion Fatigue.

Williams, J.

Technical Advisor to NCWM Specifications and Tolerances Committee.

Sponsored Workshops, Conferences, Symposia, and Training Sessions

Dittmann, S.

Organized Five Calibration Forums featuring the following NIST speakers from outside TS:

- Ray Kammer "*Quality Series Kickoff*" January 19, 1999

- Al Parr “*Optical Technology Division’s Quality System: 5 + Years of Experience*” April 9, 1999
- Greg Rosasco “*Process Measurement Division Study of Turn-Around Time*” June 18, 1999
- Barry Inglis, NML Australia “*Quality Systems at Australia’s National Measurement Laboratory*” July 20, 1999
- Bert Coursey “*Leveraging NIST Calibration Services thru Secondary Labs*” September 30, 1999

NCSL/MSL Short Courses

Sponsored 3 short courses (statistics, dimensional measurements, and time & frequency) at Measurement Science Conference (January 1999)

Sponsored 2 short courses (dimensional measurements and mass) at the National Conference of Standards Laboratories (NCSL) (July 1999)

Fagan, P.

NMR Task Force Workshop, April 23, 1999, Center for Advanced Research in Biotechnology Rockville, MD

Gettings, R.

NCSL, July, 1999. Hosted a session on NIST Standard Reference Materials.

Harris, G.

Presented an Advanced Mass Measurements Seminar March 8 to 12, 1999, in cooperation with MEL and ITL staff.

Presented training to the following Regional Measurement Assurance Programs: SWAP (October 12-16, 1998), MidMAP (October 19-23, 1998), CaMAP (February 8-12, 1999), SEMAP (March 22-26, 1999), WRAP (May 17-21, 1999), NEMAP (September 15-19, 1999).

Presented training at two Basic Mass for Industry classes, one Basic Mass for States class, two Intermediate Metrology classes, and two Advanced Mass Hands-On Workshops.

Presented training at a Key Intercomparisons Workshop on November 9 and 10, 1998.

Presented training to metrologists at the NCWM Annual Meeting in July 1999.

Heller, S.

Co-chairman, ChemInt’99

Member of the organizing committee – international Chemical Inform.

Rumble, J.

Keynote speaker at NIST-ASTM E49 Workshop on Materials Data in the Internet Era, Gaithersburg, MD, May 1999. An international meeting attended by over 150 experts that discussed the need for materials data standards in the Internet era.

Sturrock, C.

Organized and chaired May 1999 ASTM-NIST Workshop on Materials Data in the Internet Era. An international meeting attended by over 150 experts that discussed the need for materials data standards in the Internet era.

Suiter, R.

Prepared and presented an Instructor Training School for Retail Computing Scales in March 1999

Prepared and presented an Instructor Training School for Retail Motor-Fuel Dispensers in May 1999

Prepared and presented an Instructor Training School on NTEP in August 1999

Coordinated a week-long mass training event at the Measurement Science Conference, January 25 to 29, 1999

Planned and conducted the technical program for the Interim Meeting of the 84th National Conference on Weights and Measures, January 31 to February 4, 1999

Co-sponsored a workshop on the Inspection of Parcel Shipping Scales, June 3, 1999

Co-sponsored a workshop on the National Type Evaluation Program, June 4, 1999

Planned and conducted the technical program for the Annual Meeting of the 84th National Conference on Weights and Measures, July 25 to 29, 1999

Trahey, N.

Participated with NIST in a needs assessment workshop on for the Egyptian metals industry. Contacted some representatives from the U.S. commercial metals industry and asked for their participation as well. Made arrangements for ASTM to provide technical information about its metals interlaboratory program. Gave a presentation describing the metals interlaboratory program of a commercial U.S. company.

Worked with ASTM Committee E01 on the Analytical Chemistry for Metals, Ores, and Related Materials to finalize the new procedures for prioritizing requests for new SRMs.

Reviewed the new bylaws to determine if they are in concert with the ASTM-NIST Memorandum of Understanding and sent a concurrence letter to the ASTM E01 Executive Subcommittee.

Served as secretary for the Fourth NORAMET Chemical Metrology Committee meeting held 2 June 1999, NIST, Gaithersburg, MD. Issued the minutes of the meeting.

Converted/revised and issued the traceability document developed by Team #6 into a white paper that the SRMP Chief (now OMS Director) then distributed to the OU directors for comment.

Prepared a NIST SRM status report for the April 1999 ISO REMCO meeting. (Published with meeting minutes.)

Attended the ISO REMCO meeting, Berlin, Germany, and conducted the Task Group 3 meeting on behalf of the convener.

Office of Standards Services

Staff recognition and awards

Charles Ehrlich: 1999 Andrew J. Woodington Award at the Measurement Science Conference in recognition of his contributions to the profession of metrology.

Krista Johnsen-Leuteritz: Award of Appreciation from the National Pollution Prevention Roundtable for her outstanding work as Chair of the ISO 14000 Work Group.

Mary Saunders: Department of Commerce Silver Medal Award (team award with L.A. Wells, C.A. Delfino, S.D. Gardner, M.L. Owen, J.A. Walz, S.J. Powell, E.R. Lewis, all from Office of the General Counsel; R.L. Stoll and A.T. Zalik, Office of Legislative and International Affairs; and J.A. Burgess, ITA.) For leadership in mobilizing a network of experts from throughout the department, other federal agencies, multilateral organizations, and private firms to support economic and legal reforms around the globe.

Publications

Breitenberg, M., Directory of Federal Government Certification and Related Programs, 1998, NIST SP 739, May 1999.

Breitenberg, M., Directory of Federal Government Certification and Related Programs, 1999 Edition, NIST SP 739, (Revised) August 1999.

Collins, B.L., Standards and Government Regulations in the United States, Warnings and Risk Communications, Chapter 12. Taylor and Francis Ltd., 1999.

Collins, B.L., Federal Government Coordination on Standards - The Role of NIST and the Interagency Committee on Standards Policy. ASTM Standardization News, 27, May 1999, pp. 20-21.

Cooke, P.W., Collins, B.L., and Johnsen-Leuteritz, K.J. 1997 Annual Report to the Office of Management and Budget on the Implementation of OMB Circular A-119, April 1999.

DeVaux, C., An Overview of the Development of Technical Infrastructure in the Asia-Pacific Region. The Work of the Asia-Pacific Economic Cooperation (APEC) Subcommittee on Standards and Conformance (SCSC) and the Specialist Regional Bodies, NISTIR 6325, June 1999.

Faison, D., NVLAP Chemical Calibration; Providers of Proficiency Testing, NIST Handbook 150-19, June 1999.

Johnsen-Leuteritz, K., Standards Summit: A First Step Toward a National Standards Strategy, ASQ Journal – “Energy and Environmental Update,” Fall 1998.

Johnsen-Leuteritz, K., Guidelines for NIST Standards Committees (To be Published).

Johnsen-Leuteritz, K., Towards Strategic Management of Standards Activities at NIST, NISTIR 6292, May 1999.

Johnsen-Leuteritz, K., The New MOU, ASTM Standardization News Pp 17-18, March 1999.

Johnsen-Leuteritz, K., Towards Strategic Management of Standards Activities at NIST. ASTM Standardization News Pp 26-29, December 1999.

Johnsen-Leuteritz, K., The Church of Accreditation. ASQ Journal "Energy and Environmental Update" February 1999.

Johnsen-Leuteritz, K., Toward a National Standards Strategy to Meet Global Needs. NIST Journal of Research, pp. 104, 83 1999.

Leight, W.G. and Johnsen-Leuteritz, K., Toward a National Standards Strategy Conference Summary Report, NISTIR 6259, November 1998.

Leight, W.G. and Johnsen-Leuteritz, K., Towards a National Strategy Conference Report, NISTIR 6290, February 1999.

Londono, C., Free Trade Area of the Americas (FTAA) Conformity Assessment Infrastructure, NIST SP 941, August 1999.

Overman, J. and Lay, A.D., TBT Agreement Activities of the National Institute of Standards and Technology 1998, NISTIR 6363, July 1999.

Rasberry, S.D. (retired from TS) and Ehrlich, C.D., Traceability – General Principles, Proceedings of the 1999 Workshop and Symposium of the National Conference of Standards Laboratories, Charlotte, NC, July 1999.

Rountree, J., Directory of DOC Staff Memberships on Outside Standards Committees. January 1999.

Stiefel, S.W. and Gladhill, R., Program Handbook – Procedures for Obtaining NIST Recognition as an Accreditor of Quality System Registrars Under the Fastener Quality Act, NISTIR 6263, December 1998.

Stiefel, S.W. and Gladhill, R., Program Handbook – Accreditation Requirements for Quality System Registrars Under Provisions of the Fastener Quality Act. NISTIR 6262, December 1998.

Stiefel, S.W. and Gladhill, R., Program Handbook – Quality Assurance System Registration Requirements for Facilities Under Provisions of the Fastener Quality Act, NISTIR 6263, December 1998.

White, V.R., National Voluntary Laboratory Accreditation Program, 1999 Edition, NIST SP 810, March 1999.

Talks/presentations

Collins, B.L.

“NIST Role in Standards: Technical, Policy & Outreach.” NRC Board of Assessment, Gaithersburg, MD, December 9, 1999.

“NIST Role in Standards.” Materials Science and Engineering Laboratory Offsite, Gettysburg, PA, November 15, 1999.

“Conformity Assessment in North America.” Transatlantic Regulatory Harmonization and Global Standards: 21st Century Challenges and Opportunities for Regulatory Policy Cooperation, Cross-Border Competition and Global Market Governance in North America and Europe, George Washington University Seminar, Washington, DC, October 12, 1999.

“Overview of the Office of Standards Services.” The NIST Office of Standards Services (OSS): What Does It Do? What Can it Do for You? Gaithersburg, MD, September 1, 1999.

“Issues for a U.S. National Standards Strategy.” Catholic University School of Engineering, Washington, DC; August 30, 1999.

“Framework for a U.S. National Standards Strategy.” Session 1, National Standards Strategies, Standards Engineering Society Conference, Toronto, Canada, August 16, 1999.

“U.S.-EU Mutual Recognition Agreement - NIST’s Role in Implementation.” JTC MET CAL Meeting with Department of Defense staff, Gaithersburg, MD, July 20, 1999.

“Existing International and Regional Systems for Accreditation of Testing and Calibration Laboratories.” World Trade Organization Symposium on Conformity Assessment Procedures, Session IV, Geneva, Switzerland, June 9, 1999.

“Perspective from the International Laboratory Accreditation Cooperation.” World Trade Organization Symposium on Conformity Assessment Procedures, Session I, Geneva, Switzerland, June 8, 1999.

“North American Perspective on Laboratory Accreditation.” Canadian Association for Environmental Analytical Laboratories (CAEAL) Annual General Meeting, Toronto, Canada, June 1, 1999.

“The Role of the U.S. Government in Standards.” ISO Consumer Policy Committee (COPLCO) Post Meeting Seminar, Gaithersburg, MD, May 13, 1999.

“Activities in Laboratory Accreditation.” International Symposium on Setting Quality Standards for the Forensic Science Community, San Antonio, TX, May 3, 1999.

“NIST Activities to Implement National Technology Transfer and Advancement Act.” American Association for Laboratory Accreditation Annual Meeting, Ellicott City, MD, April 26, 1999.

“Standards for the 21st Century - Toward a national standards strategy.” National Electrical Manufacturers Association 6th Annual Spring Conference, Sanibel Island, FL, April 19, 1999.

“What is the Office of Standards Services?” International Trade Administration Briefing, Washington, DC, March 29, 1999.

“Federal Interactions with NACLA.” NACLA Annual General Meeting, Gaithersburg, MD, March 25, 1999.

“Standards for the 21st Century - A U.S. View.” Global Trade Breakout Session from Standardization for the 21st Century Conference, Berlin, Germany, March 16, 1999.

“Report from Breakout Session on Issues in Conformity Assessment.” ACIL/ANSI/NIST Workshop on Conformity Assessment, Washington, DC, February 9, 1999.

Leight, W.G.

“Coordination of U.S. Government Standards Activities.” Seminar for HHS employees, Rockville, MD, November 5, 1999.

Breitenberg, M.

“Conformity Assessment.” Seminar for HHS employees, Rockville, MD, November 5, 1999.

Johnsen-Leuteritz, K.

“Strategic Management of Standards Activities/A-119 Reporting Requirements.” Seminar for HHS employees, Rockville, MD, November 5, 1999.

Overman, J.

“Standards Information & Resources and Databases.” Seminar for HHS employees, Rockville, MD, November 5, 1999.

Committee participation and leadership

Breitenberg, M.

ANSI-C093, U.S. TAG for ISO/TC196. ASQ-C002, Standards Group Leadership Council. ASQ ASCZ-1, Quality Assurance.

Chappell, S.

ANSI-C096, Appeals Board. ASTM E010, Nuclear Technology and Applications; SC.01, Dosimetry Radiation Processing; SC.07, Ionizing Radiation Dosimetry and Radiation Effects on Materials and Devices. ASTM E020, Temperature Measurement; SC.02 Radiation Thermometry; SC.03, Resistance Thermometers; SC.05, Liquid-in-Glass Thermometers and Hydrometers; SC.08, Medical Thermometry. ASTM E028, Mechanical Testing; SC.01, Calibration of Mechanical Testing Machines and Apparatus; SC.06, Indentation Hardness Testing; SC.14, Strain Gauges. ASTM E041, Laboratory Apparatus. DOC PS020, American Lumber Standards Committee. ISO/IEC JTAG4, Metrology. OIML-C002, Vice President CIML and Presidential Council of CIML; - C006 International Committee of Legal Metrology; TC03, Metrological Control; TC06, Prepackaged Products; TC10, Instruments for Measuring Force, Pressure, and Related

Quantities; SC.04, Material Testing Machines; SC.05, Hardness Standardized Blocks and Hardness Testing Machines' SC.06, Strain Gauges; TC11, Instruments for Measuring Temperature; SC.02, Contact Thermometers; TC15, Instruments for Measuring Ionizing Radiation; SC.01, Ionizing Radiation Dosimetry for Processing Industrial Products; TC16, Instruments for measuring Pollutants; SC.02, Water Pollutants; SC.03, Pesticides and Other Toxic Substances Pollutants; SC.04 Field Measurements of Hazardous (Toxic) Pollutants.

Cigler, J. (now retired)

ANSI Z540, Standardization of Calibration Systems Requirements. ASTM E036, Conformity Assessment; SC.60, Accreditation Systems.

Collins, B.L.

ANSI-C012, Board of Directors; SC.01, Conformity Assessment; SC.02 International Committee; SC.03, National Issues Committee. ASME Council on Codes and Standards. DOC-C004 Chair, Interagency Committee on Standards Policy; PS020, American Lumber Standards Committee. ILAC-001 Chair, International Laboratory Accreditation Cooperation. NACLA-C005 Board.

Ehrlich, C.D.

OIML TC8; SC.05 Water Meters; ISO TC30; SC.07 Water Meters; OIML TC10, Instruments for Measuring Force, Pressure, and Related Quantities; SC.05 Hardness Standardized Blocks and Hardness Testing Machines; SC.06, Strain Gauges; ASTM E07, Nondestructive Testing; SC.08 Leak Testing; ASTM E28, Mechanical Testing; SC.06, Indentation Hardness Testing; ANSI Executive Standards Council; ISO/IEC JTAG4 (Metrology); Joint Committee on Guides for Metrology (JCGM) WG2, International Vocabulary of Metrology (VIM). OIML TC18; SC01 Sphygmomanometers.

Faison, C.D.

ASTM E036, Conformity Assessment; SC,10, Laboratory/Inspection Bodies; SC.60, Accreditation Systems.

Gladhill, R.

ASTM E036, Chair, Conformity Assessment; -C.90, Executive Committee; SC,50, Support Operations.

Johnsen-Leuteritz, K.

ANSI-C094, US TAG for ISO/TC207, Environmental Management; SC.01, Environmental Management System; SC.04, Performance Evaluation; SC.06, Terms and Definitions.

Leight, W.G.

ANSI-C142, Government Member Council; Z021, Performance & Installation of Gas-Burning Appliances/Related Accessories.

Meigs, B.

DOC PS001, Construction and Industrial Plywood; PS22002, Performance Standard for Wood-based Structural; PS020, American Lumber Standards Committee.
USNWG/OIML TC16, Instruments for measuring Pollutants.

Overman, J.

Standards Engineering Society, Vice President.

Ripley, D.M.

ISO TC028, Petroleum Measurement; SC.02 Dynamic Petroleum Measurement; SC.03, Static Petroleum Measurement; SC.04, Classifications and Specifications; SC.05, Measurement of Light Hydrocarbon Fluids. OIML TC08, Measurement of Quantities of Fluids; SC.04, Dynamic Mass Measurement; SC.06, Measurement of Cryogenic Liquids; TC.09, Instruments for Measuring Mass and Density; SC.03, Weights. USNWG/OIML PS05D, Measurement of Volumes of Liquids; RS01, Meters with Measuring Chambers or Turbines; TC07, Measuring Instruments for Length and Associated Quantities; SC.05, Dimensional Measuring Instruments; TC08, Measurement of Quantities of Fluids; SC.03, Dynamic Volume Measurement (Liquids Other Than Water); -WG.02, USNWG for OIML/TC08/SC.03, Dynamic Volume Measurement; SC.04, Dynamic Mass Measurement (Liquids Other Than Water); WG.02, USNWG for OIML/TC08/SC.04, Dynamic Mass Measurement; SC.07, Gas Metering; WG.01, Measuring Systems for Gaseous Fuel; WG.02, Compressed Natural Gas for Vehicles; TC.09, Instruments for Measuring Mass; -WG.01, USNWG for OIML/TC09, Load Cells.

Saunders, M.H.

ANSI-C094, US TAG for ISO/TC207, Environmental Management; SC.01, Environmental Management System; SC.03, Labeling.

Stiefel, S.W.

ASTM F016, Fasteners; SC.01, Test Methods; SC.92, Government Specifications; SC.93, Quality Assurance Provisions for Fasteners.

Trager, E.Y.

Standards Engineering Society Education Council, Chair.

Other

Ehrlich, C.D.

Session Host for Session 7C on Traceability at the National Conference of Standards Laboratories, Charlotte, NC, July 1999.

Office of Technology Partnerships

Publications

Germer, T. and Asmail, C., Microroughness-Blind Hemispherical Optical Scatter Instrument, U.S. Patent Application Allowed September 13, 1999.

Germer, T. and C. Asmail, "Polarization of Light Scattered by Microrough Surfaces and Subsurface Defects," J. Opt. Soc. Am. A, 16, 1326-1332, June 1999.

Talks/presentations

Berkley, D.D.

"Government-Industry Partnerships at the National Institute of Standards and Technology," presented at the U.S.-Egypt Technology Commercialization Workshop, Cairo, Egypt, May 17-20, 1999.

"Government-Industry Partnerships and CRADAs," presented to visiting Ministry of Science guests from Kazakhstan, October 1, 1999.

"NIST CRADA Overview," presented to Maritech Consortium members (for MEL), October 1, 1999.

"Government-Industry Partnerships and CRADAs," presented to visiting Japan Research and Development Center for Metals guests, November 23, 1999.

Lynch, J.T.

"Licensing Government Technology," International Dental Association Annual Meeting, Vancouver, BC, October 1998.

"Licensing Government Technology" – Japanese Patent Office Delegation – NIST, September 1999.

"CRADA Consortia" Primer – Polymer Characterization Consortium; Nanocomposite Consortia.

"CRADA Consortia Policies and Procedures," NIH/NCI Invited Panel, June, 1999.
Full-Day Licensing Negotiations Training Session – Federal Laboratory Consortium Annual Meeting, May 1999.

Mattson, B.E.

"Licensing Government Technology," Japanese MITI delegation, August 1999.

"Licensing Government Technology," Japanese University Delegation, June 1999.
Full-Day Licensing Negotiations Training Session – Federal Laboratory Consortium Annual Meeting, May 1999.

Committee participation and leadership

Lynch, J.T.

Interagency Working Group on Technology Transfer; Licensing Executives Society Committees on Government Licensing and Role of Standards in Licensing; TS Customer Service Working Group; TS SEBA Representative

Mattson, B.E.

Interagency Working Group on Technology Transfer; Federal Laboratory Council Executive Committee; Leading TS IT Group; Co-Chair, TS Customer Service Working Group.

Other

Tanaga Boozer initiated and lead action on facilitating technology transfer/licensing planning conference for Historically Black Colleges and Universities (HBCUs). OTP and AUTM co-sponsored this conference at Howard University during July 1999.

SBIR

In February 1999, 31 of the 33 companies that received a FY1998 Phase I award submitted Phase II proposals for evaluation. Ten proposals were selected to receive awards not to exceed \$300,000 each.

The SBIR Program Manager participated/presented at the following conferences:

- Regional SBIR Conference for NC, SC, TN, GA, AL, KY and FL, Research Triangle Park, NC
- 1999 Ohio SBIR Conference, Columbus, OH
- The Society of Research Administrators Annual Meeting, Columbus, OH
- SBIR Conference Roundtable Forum, Billings, Montana
- SBIR Conference at the State University of NY
- SBIR Conference at the North Carolina Small Business & Technology Center, Winston-Salem, NC

Office of Information Services

Publications

Cunningham, D., Abstract and Index Collection in the National Institute of Standards and Technology Research Library, NIST SP 936, 1999.

Greenhouse, L., "Measures of Hassler at NIST", Rittenhouse, Vol.12, No. 4, 1998, pp 120-124. (Released in 1999)

Passaglia, E. (with K.A. Beal), A Unique Institution: The National Bureau of Standards 1950-1969, U.S. Government Printing Office, Washington, DC, 1999.

Sanders, S., NIST Serial Holdings 1999, NIST SP777 99 ED, 1999.

Vassallo, P., "The knowledge continuum - organizing for research and scholarly communication", Internet Research, Vol. 9, No. 3, 1999, pp. 232-242.

Talks/presentations

Trefzger, W.

"The NIST Calibration Services Virtual Library: An On-Line Electronic Publishing System", National Conference of Standards Laboratories Workshop and Symposium, Charlotte, NC, July 13, 1999. (Presented by Sally Bruce)

Vassallo, P. "El Continuo Del Conocimiento", November 12, 1999, Lima, Peru.

Metric Program

Staff Recognition and Awards

Linda Crown

Elected to the National Honor Society "Phi Theta Kappa" for her performance in studies at Montgomery College.

Gerard Iannelli

Joined the faculty at Georgetown University as an Adjunct Professor of Liberal Studies, teaching in the curricular field of Ethics and the Professions.

Publications

McCracken, J.B. (Ed.) and Lobrano, B.D., "U.S. Manufacturers With Products Conforming to Metric Standards: An Analysis," NIST GCR 99-783.

"Metric Style Guide for the News Media," (LC1137) – updated and reissued.

"The Chart of the Modern Metric System (SI)" (SP304) – updated and reissued.

"A Brief History of Measurement Systems with a Chart of the Metric System" (SP304A) – updated and reissued.

Committee Participation and Leadership

Iannelli, G.

Transportation Research Board, as advisor to the metrication outreach committee; National Conference of Weights and Measures, attending and briefing sessions of the Associate Members Committee and of the Industry Committee on Packaging and Labeling; Society of Automotive Engineers' Metric Committee.

McCracken, J.

Society of Automotive Engineers' Metric Committee; American Society of Mechanical Engineers' Board on Metrication.

TS Organization Chart
(as of July 2000)



