PRESIDENT'S MESSAGE

The NCSL Conference this year, while focusing on measurements and the standards laboratory, will expand our horizons as we consider metrology from an international perspective. And with this perspective we will see that we share many common interests, many common concerns, and many common problems. This commonality of interests, concerns and problems is not much different than the commonality we Americans share — whether we are competitors in the same industry or have only our involvement in measurement in common. We have come to understand that in spite of our diversity — or perhaps because of it — we can each learn something from others and through this learning improve ourselves and the organizations of which we are each a part.

As managers, each of us is interested in improving our organization's performance. What we learn from colleagues in the NCSL — technologically, managerially or behaviorally — is probably the single most direct means I know of contributing to improving our performance. And this, after all, is what is meant by productivity improvement.

The Conference, scheduled for October 1-4 at the Gaithersburg facilities of the National Bureau of Standards, will feature mixes of workshops and formal presentations, and of national and international participants. Among the many interesting topics planned for presentation is one that we in metrology seldom feature: a report on the model robotics shop at the NBS. Its inclusion emphasizes the importance of metrology in the development of manufacturing technologies. And these new technologies are providing new ways to not only improve productivity directly but also to improve it indirectly by eliminating what has been referred to as the "hidden factory." The term "hidden factory" usually refers to the extra resources (people, material, etc.) which a manufacturing firm must devote to its production in order to make up for product which is lost due to defects requiring scrap or rework. The message in the term is that the size of this "hidden factory" can be reduced if our factory operations would make the product right the first time.

I think the message is broader than just applying to manufacturing. I think each of us — as individuals and as managers — have "hidden factories" which prevent us from realizing the full potential of the resources at our disposal. We in metrology — perhaps more than any other group — know full well the importance of identifying, quantifying and compensating for errors in measurement. It is our concern for meticulous performance of measurement which allows us to continually push the state-of-the-art, to get a few p.p.m. more accurate.

We can take advantage of this characteristic of meticulousness in measurement and apply it to our management style and to the results we expect as managers. Elimination or reduction in errors — in measuring, in recording, in reporting, in every aspect of our jobs — would greatly reduce the size of the "hidden factory" within our area of responsibility.

I'm convinced that when you attend the Conference you will not complain "Where's the beef?" In fact, I think you will find there's too much to consume and have need for a "doggie bag."

Hope to see you there in October.

George O. Rice, President
EDITOR'S MESSAGE

Is There Anyone Out There?

You must get tired of me asking that in my editor's message about once a year? But to most editors, it's important to know how readers like the product. After all, every issue contains several dozen judgment calls and decisions on what news items to run, how much to edit out of the board minutes (administrative trivia), what's important from the committees, and so forth.

I try to put myself in your place in making those editing decisions. But most of you know I'm not a metrology person, although I try to talk with as many of you as I can to keep up with your particular issues. But based on actual feedback, I might draw two conclusions:

1. Everything is fine the way you're going.
2. No-one cares much.

I tend to go with #1 because most of us in our busy jobs don't take time to give critical feedback as much as we could or should. And probably most of us adhere to "if it ain't broke, don't fix it."

But one area I feel the newsletter is deficient is the "one metrologist visiting another" sort of material. If you were visiting a friend's lab, you'd most often come away with more than one good idea to help you out. It always happens.

Maybe it's a new way to handle or rack or label inbound workload. Or purchasing or stocking spares. Or automation in many forms. Or motivation. Or writing and promulgating test procedures. Well, you get the idea. The fact that we have member companies with such diverse products and markets means we can learn from each other.

But how to do this? Well, I have three ready-made mastheads to cover these stories, both big and small.

1. Touring Our Member Labs (big and small stories)
2. Metrology Mini-Systems (lab automation)
3. NCSL Newsnotes (general news)

And I'm ready to create another if I would have a lot of short stories: Metrology Memos (or handy hints).

What say you?

John Minck, Editor
MARK YOUR CALENDARS!!
RESERVE SOME TRAVEL BUDGET!!
AND PLAN NOW TO ATTEND THIS YEAR'S CONFERENCE!!

KEYNOTE SPEAKERS

Donald Abelson
Office of the U.S. Trade Representative
"Technical Barriers to International Trade"

John Simpson
Chief, Center for Manufacturing Engineering
National Bureau of Standards
"Metrology of the Future"

SPEAKERS ON CRITICAL CURRENT TOPICS

- "Nine years of Activity of the WECC"
- "Design of Measurement Standards Laboratories (Draft of a new RP)"
- "The French Calibration System-Approval Procedures"
- "Metrology: A Discipline at Butler College"
- "Twenty-First Century Leaders: A New Breed"
- "The Effect of Accuracy Ratios on Product Quality & Productivity"
- "Productivity Measurements in Metrology"
- "Mass - Lab Determination, Uncertainty and Accreditation"
- "NASA's Metrology/Calibration Program"
- "Practices of Vacuum Gauge Calibration in the United States"
- "A New Look at the Effect of Measurement on Decision-making"
- "Getting Calibrated in 1984"
- "ASTM in the International Arena"
- "Underwirter's Laboratory and Its Role in the IECQ System"
- "NBS Calibration Services - A Status Report"
- "Progress of the National Measurement System in Korea"
- "Staten Provningsanstalt (SP) The Nat. Lab for Elect. DC & LF Quantities in Sweden"
- "Current Status of QC Education in Taiwan"
- "Strategy of Designing Our Standards Laboratory"
- "Practice of Vacuum Gauge Calibration in Western Europe"
- "Acceptability of Measurement Standards and Calibrations from Foreign Countries"
- "Laboratory Accreditation in the UK"
- "The International Recognition of Calibration Certificates"
- "The Mutual Traceability Between the European Calibration Services Coordinated by WECC"
- "The Italian Calibration Service (SIT)"
- "The World Radiation Reference: An Example of International Science"
- "Progress in International Agreements Amongst National Labs"
- "Laboratory Accreditation System in the United States, 1984"
- "Metrology Laboratory Facility in the Pharmaceutical Industry"
- "Conceptual Design of the New Department of Energy (DOE) Primary Standards Lab. - Sandia"

WORKSHOPS FOR ON-THE-SPOT DISCUSSIONS WITH OTHER ORGANIZATIONS

- Automatic Test - Calibration System
- Education and Training
- Error Analysis
- Lab Evaluation
- Ask the Experts

FOR MORE INFORMATION CONTACT:
Keith Kirby
National Bureau of Standards
Washington, DC
301/921-2805
PRESIDENT'S REPORT - George Rice

George reported that he, Pete England, and Hartwell Keith attended the annual meeting with the NBS Director, Dr. Ernest Ambler, his key directors, and others. Some of the most noteworthy of the topics discussed were:

(a) The MAP Handbook—in two volumes will be published this year. The volume covering statistics will appear first with the volume on MAPs and their application coming later.

(b) The NBS response to the NCSL's National Measurement Requirements Survey Report will be published by June.

(c) Dr. Ambler approved an increase in support for the Secretariat but coupled with the decision to terminate that support in two years.

(d) A wide range of NBS measurement service topics to determine more effective means for communicating needs and assigning priorities.

George, Pete and Hartwell also attended the Senate Subcommittee on Science, Technology and Space hearings concerning the NBS FY85 Budget. Written testimony prepared by George, Pete and Hartwell as representatives of the industrial segment of NCSL was submitted to the Subcommittee.

George reported that Selden McKnight had planned to be at the meeting to discuss the DOD's Calibration Coordinating Group and NCSL's board working more closely. The present point of contact would be Keith Kirby's office at NBS measurement Services.

EXECUTIVE VICE PRESIDENT'S REPORT - Pete England.

Pete presented an updated copy of the NCSL organizational structure previously approved at the Board Meeting in January. Pete noted that several committee charters and Guidelines will need to be developed soon to cover the new committees and the restructured committees.

Hartwell requested that people be considering possible candidates for recommendation to serve on NBS review committees. These should be people who are highly qualified in the measurements area since he feels that the present make up of most of these committees are heavily weighted with people from the academic or the R&D areas.
SECRETARY'S REPORT - Chet Cran e

Chet reported that 22 new members were processed during the first quarter.

Art McCoubrey presented a proposed new volume of the Precision Measurement and Calibration series which would cover new publications in DC and Low Frequency. These were passed around for review and comment. Art asked for suggestions for added material or material of little value which should be removed.

TREASURER'S REPORT - Gary Davidson

Gary presented the NCSL financial statements for 1983 which showed a total income of $132,646.76 with a total expense of $111,910.12. This resulted in a net increase of funds of $20,736.64. The total present assets of the organization stands $73,155.08.

Gary reported that he had raised the surety bond for the treasurer and the president to $80,000.00. This was to cover the greater assets.

Gary reported that NCSL's IBM XT system was delivered to Roland Vavken for use in getting programs operational.

Gary moved that the treasurer's budget be increased by $1000.00 from $1900.00 to $2900.00. Seconded by Bryan Werner. Motion passed.

SPONSOR'S DELEGATE'S REPORT - Ken Armstrong for Bob Kamper

The NBS response to the National Measurements Requirements Study has been completed and copies have been mailed to all NCSL members. Bob attended two meetings of the Committee to Promote National Microwave Standards. This is an official committee of the IEEE-MTT Society with Doug Ryting of Hewlett-Packard as chairman. The committee's objective is to raise the level of microwave metrology at NBS.

Bob also attended a two-day seminar on millimeter wave measurement requirements in the Department of Defense. This was a first attempt to get representatives from all the big millimeter wave development programs in DOD together with CGS and the NBS to define metrological needs and develop a plan to meet those needs.

Volume 2 of the NBS Measurement Assurance Program Handbook is at the printer and volume 1 should be there by the end of April.

A comprehensive report on the NBS calibration services being prepared by the Office of Measurement Services will be available in the summer of 1984. The editors are Keith Kirby and Lottie McClendon and it will cover current scope, documentation, technical capabilities, and plans for the future.

George Uriano is preparing a report to the Congress on the impact of price increases on users of NBS calibration services. This will be a more formal version of the presentation made to the NCSL Board at the January meeting.

SECRETARIAT'S REPORT - Ken Armstrong

Ken received a schedule from Ralph Bertermann for producing the 1985-86 Directory of Standards Laboratories and has scheduled the appropriate Secretariat Actions.

Ken reports that all copies of the RMRC Survey have been distributed, the inventory is zero.

Tapes of the 1983 NCSL Workshop and Symposium presentation by Grace Hopper, Jack Jackson, and Fred Hume have been added to the training aids library.

Ed Nemeroff is updating the NCSL slide presentation and this will be completed by summer. Graham Cameron has provided copies of slides that cover the Canadian Sector.

LABORATORY ACCREDITATION - Stanley Warshaw

It was reported that the Laboratory Accreditation program is progressing steadily but not rapidly with about one hundred laboratories already accredited all in five or six areas. The microwave power and attenuation LAP only had five applicants and the required $400,000.00 for funding was excessive for such a small group to bear. This microwave program had therefore been suspended for the present.

There has been effort initiated to get a pressure calibration accreditation in place. On May 16 a workshop will be held at the bureau to discuss criteria. The impetus being products being shipped to Australia. NVLAP has agreements with NATA in Australia, also with the accrediting agency in New Zealand and the United Kingdom with similar agreements in process with Canada and two countries of Western Europe. There will be an International Laboratory Accreditation Conference held in London in October 1984.

There are meetings being held with ASTM (American Society for Testing Materials) to get them to assume a major role in future
efforts toward accreditation. A set of guidelines were published for certification which are being adopted by several federal agencies.

We presently have Statements of equivalence with the United Kingdom National Physical Laboratories and several are being worked out with Canada. These allow acceptance of tests performed at source without retesting at the destination.

ADMINISTRATION VICE PRESIDENT'S REPORT - Bob Lady

Meetings and Programs Committee - M.J. Corrigan Jr. Moe states that there is a problem getting information from Region Coordinators and Directors regarding planned meetings. It is not always necessary to publish the exact location of the meeting, if the date is published in advance then plans and travel can be scheduled.

Moe would like some inputs for new topics for discussion. Some of those presently listed have been overused.

Honors and Awards Committee Chairman's Report - Jay Varvel. Jay reported that new NCSL pins must be purchased since the stock is almost depleted. Several changes are being contemplated such as longer pins and locking devices to keep them from losing them. Bob Lady accepted an action item to develop a guideline for what to use for awards and also what to use for sale to members.

Education and Training Committee - John Martin

A supplement to the Training Information Directory containing training course announcements and the latest NCSL Training Aids Form was published in the NCSL newsletter.

John suggests that an item on the agenda for regional meetings be to collect inputs from the meeting attendees on any measurements related courses they are aware of and have the Regional Training Coordinator forward the information to Dave Lorenzen.

There were 34 people at the Dallas Seminar on MAPs, the attendance was pretty well scattered from the entire country. The next Map Seminar will be held in the northwest sector of the country sometime in October, then to the Baltimore/Washington area then back to the midwest possibly Denver/Boulder area.

Art McCoubrey stated that although the ratio of degreed people was high at the Dallas Seminar there was still a problem with getting the concepts of statistics across to the uninitiated.

There have been some organizational changes at Butler County Community College with John Bacon assuming total responsibility for the metrology program including curriculum and faculty. He is planning to hire an additional full time instructor for the program. It is expected that eleven students will graduate from the Metrology program in August, 1984. They are presently seeking internships for these students in the private sector and government laboratories. If there is an interest in sponsoring one of these students for the summer contact Lynn Thompson by calling (412) 287-8711.

Mr. Herb O'Neil and Mr. Warren Macemon from the Hutchinson Area Vocational Technical Institute gave a presentation on the program at the Institute. The goal of their program is to train entry level calibration technicians.

MEASUREMENTS REQUIREMENTS VICE PRESIDENT'S REPORT - Bob Weber

National Measurements Requirements - Del Caldwell by Bob Weber. Bob read a letter written by Klaus Yeager and also added his own voice to state that the NBS is doing and has been doing a good job. The number of respondents to the survey was not great enough and a percentage figure of those with a particular requirement versus total respondents would be valuable information.

Laboratory Evaluation Committee Chairman's Report - Carl Quinn by Bob Weber. Carl reported that he had received inputs from five nations, Australia, Denmark, Finland, Sweden, and the United Kingdom in response to his request for information regarding methodology used in accreditation laboratories. Carl will compile the information to include all descriptions of the common criteria involved in the assessment or evaluation of Calibration Laboratories in the nations who responded.

A survey of the NCSL membership is under development to sample member interest in Lab Accreditation. If it can be completed in time the results can be presented in October.

Biomedical and Pharmaceutical Metrology Report - Bill Fitzgerald by Bob Weber. Bill reports that he took part in two training sessions for FDA Field Investigators on "Computer's In Process Control In The Pharmaceutical Industry." During each session the NCSL "Medical Products and Pharmaceutical Industry Calibration Control System Guideline" was discussed with the FDA Field...
Investigators. Feedback from both the Health Care Industry and the FDA has been positive.

LABORATORY MANAGEMENT AND OPERATIONS VICE PRESIDENT'S REPORT - Bryan Werner

Calibration Systems Management Committee - Phil May by Bryan Werner. Phil reports that Phil McRury, Woody Trammell and Jack George expect to have the wage and salary survey ready to mail to the Secretariat for distribution by 30 April. The committee still needs volunteers to serve on the Interval Analysis Sub Committee with Dr. Castrup.

Phil's committee would like to expand the Lab Manager's Handbook into a text for existing and new lab managers. They will be looking for editing help. Phil reports that he needs two sub-committee chairpersons.

Measurement Assurance Committee - Arno Ehman by Dean Brungart. Arno reports that all participants in the Region 8 Gage Block Round Robin have completed their readings. Data are presently being reduced at Lockheed Sunnyvale.

The Phase IV (long-term maintenance) started in mid-February for the Region 8 Reverse Resistance May Experiment.

The latest Region 8 Volt MAP has been delayed due to the NBS Transport Standard arriving too hot. Another Standard is being shipped and should arrive during April.

Bryan reports that the Measurement Assurance Committee is ready to assist regions that are contemplating or starting MAPs. The Committee has delayed the purchase of any solid state reference volts until some history and background has been accumulated.

Product Design and Specifications Committee - Warren Collier by Bryan Werner. Bryan reports that Warren's committee could use additional members to express/explore different opinions as they take a fresh look at RPs related to their charter.

Automatic Test and Calibration Systems Committee - Jerry Niedrauer by Bryan Werner. Jerry reports that there was one new release added to the Tape Exchange Program and a request for two programs according to Bob Smith, Subcommittee Chairman.

The planning and scheduling of the AT & CS Workshop at the Conference is well along with the time allotted already 2/3 gone. The committee is seeking people to discuss software control, and other topics pertaining to automatic calibration or calibration of automatic Systems.

Persons interested in participating in the workshop are invited to call Jerry Niedrauer.

COMMUNICATION AND MARKETING VICE PRESIDENT'S REPORT - Ed Nemeroff

Newsletter Committee - John Minck by Ed Nemeroff. John reported that the March issue was brought in under budget approximately 20%. This was mainly due to fewer than projected number of pages.

John requests material for "member organization laboratories tour" section of the Newsletter. Needed are a write-up with photographs for use in the newsletters.

Information and Directory Committee - Ralph Bertermann. Ralph has prepared a schedule for getting out the 1985-86 Directory. He will be sending a Laboratory Capabilities questionnaire first. His schedule is:

June 1, 1984 Secretariat sends out the Laboratory Capabilities Questionnaire.

June 1, 1984 Letter to the Board requesting inputs on Directory changes.

July 15, 1984 Deadline for return of Laboratory Capabilities Questionnaire.

July 15, 1984 BCD revisions due.

July 15, 1984 Send out request for bids.

Sept. 15, 1984 Select printer.


Nov. 1, 1984 Printing complete.

Nov. 10, 1984 Directory mailed to members.

Nov. 15, 1984 Bulk shipment sent to NCSL Secretariat.

Recommended Practice - Al Kohler by Ed Nemeroff. Ed reports that the Recommended Practice Committee needs a new chairman.
Board Meeting

since Al Kohler has decided to retire and move to San Diego.

Membership Committee Chairperson's Report - K. Hurley by Ed Nemeroff. Ed reported that Ken had resigned due to taking a job out of the measurements field. A new chairman will be appointed this quarter.

REGIONAL REPORTS - Directors/Coordinators

Regions 1 and 2 - H.B. Haymes. A letter has been sent to each member in the state of Connecticut explaining the change from Region #2 on Region #1. They were still given the option of attending either or both of the Region meetings.

Region 1 - Harry Haymes for Bill Robinson. Plans are currently underway to have the first Regional meeting in early June.

The Region 1 Voltage MAP is scheduled to start in June. Draft copies of the January 1984 M.B.S. Volt Transfer Program Instructions have been distributed to the participation laboratories.

Region 2 - Harry Haymes for Bill Brenant. Bill attended the Science Fair at Butler College where he had an opportunity to talk with past graduates and J. Tesza regarding the program. There is a Region 2 meeting planned for July at Loral, the exact date is not set yet.

Region 3 - Hillary Taff for Marlin Johnson. Hillary reports that Marlin is exploring the section concept with one section at Newport News, Virginia and another in the Washington D.C. area. Marlin has a tentative candidate for the Newport News Section chairman.

Hillary reports that with help from Thomas Short of the Bonneville Power Administration they would like to have an NCSL committee of utility members. Hillary and Ray Lindsey of Duke Power Company, served on a panel discussion at the initial meeting of the Power Industry Laboratory Conference. Hillary distributed about 30 NCSL brochures at the conference.

There are three meetings planned for Region 4, the first had to be delayed due to a conflict in schedules but is now planned for May. A second meeting is planned for the Macon, Georgia area about mid-year and a final meeting in November. Exact dates and other details will be published as soon as they are final.

Region 5 - Cliff Koop for Doug Smith. There are plans for two meetings in Region 5 this year. The first is planned for the last week of June in the Ohio Michigan area. A possible host is Philip McRury at Battelle Memorial Institute.

Region 6 - Bill Simmons for Hank Gonzales. Bill reported that the Region has been subdivided into four Sections with Chairmen as follows:

Dallas/Ft. Worth
Bob Willet, Rockwell Collins

Denver/Boulder
Dave Workman, Martin Marietta

El Paso/White Sands
Billy Simmons

For the present Hank will be covering the El Paso/White Sands Section and Bill the Houston Section.

An NBS Seminar on Electrical Measurement Assurance Programs was held in Region Six in Dallas, Texas on March 26-30. Bob Willett helped with arrangements and Bill gave talks titled "NCSL Role in Measurement Assurance" and "A User's Point of View of MAPs."

Region 7 - Hugh Starling for Jim Ingram. There are two meetings planned in Region 7 both in the San Francisco Bay area. The first was on May 16 and the second will be on November 14. Jim manned the NCSL booth at the "Test and Measurement World" expo held in San Francisco. We felt that there was a lot of interest and expects that new members will result from this effort.

The program coordinator, John Cox has resigned and a replacement is being sought. He will be missed in the Region.

Region 8 - Bill Simmons for R.D.F. Schumacher. Section meetings were held in Region 8 as follows:

Phoenix/Tucson January 26, 1984
San Diego February 8, 1984
Los Angeles February 15, 1984

Meetings are presently scheduled for the Sections at the following locations:

San Diego September 12
Phoenix/Tucson October 22
Los Angeles Sometime around October
The Section Chairmen for these Sections are Lee Walters, Phoenix/Tucson, J.L. King, San Diego, and Dean Brungart, Los Angeles originated meeting reports which were compiled by Rolf Schumacher and sent to all Board Members.

Region 9 - Cliff Koop for David Goodhead. There is a meeting tentatively planned for July 13th at the Boeing Standards Laboratory in Seattle. This will follow the BOD meeting in Victoria.

Hartwell pointed out that more workshops and participation type activities would reduce reliance on speakers and problems of this type.

Region 10 - Graham Cameron. Graham has completed the arrangements for the July BOD meeting in Victoria with all of the trimmings.

Graham has made four NCSL slide presentations and many personal contacts to encourage NCSL membership.

Graham has assisted in arranging for speakers for the Conference NCSL '84. Dr. Andy Dunn of N.R.I.C.C. has committed to participate.

The International Dinner is planned as a fun event with the program leaving more to entertainment than to technical.

Graham has supplied updated slides covering the International portion of the NCSL slide presentation.

LIAISON DELEGATES REPORTS - Pete England

Precision Measurements Association - Pete England for Glenn Rasmussen. The San Fernando Valley Section sponsored an excellent meeting on the Direct Voltage Maintenance Program.

A Measurement Science Seminar jointly sponsored by the Los Angeles Sections of PMA and ASQC was held April 14, 1984 at Rio Hondo College, Whittier, California. Main topics included in this highly successful Seminar were Measurement Uncertainty, Temperature, Automatic Testing Equipment, and Computer Product Verification.

GIDEP - Pete England for Phil Painchaud. Phil reported that Mr. Ray Williams died on April 16, 1984. Ray had been chairman of the GIDEP Metrology Committee for nearly four years.

Phil reports that at the Spring meeting of the GIDEP Metrology Committee the Operations Center is being directed to:

1. Create file of automatic test equipment, including automatic calibration equipment. This file will include a list of GIDEP participants with this type of equipment and what hardware/software they had.

2. Investigate the feasibility of creating a loan library of ATE and ACE software.

3. Investigate to determine which of the GIDEP Metrology participants are actually involved in Metrology.

4. Expand the scope of the GIDEP Metrology Software program to specifically include the software for Automatic recall and possible other Metrology Management functions.

5. Change the format of the Metrology portion of the Annual GIDEP Workshop. The new format will be a general meeting preceding each discussion session.

Measurement Science Conference - Dean Brungart. The 1984 Measurement Science Conference was one of the best ever. Twenty nine percent of the evaluation questionnaires rated the conference as great. The employment function question indicated that more than half of the attendees were managers/supervisors and more than seventy percent were affiliated with either NCSL or PMA. All indications are that the conference was a technical and financial success.

The 1985 conference will be held January 17th and 18th, 1985 at the Marriott Hotel in Santa Clara, California. The January BOD meeting for NCSL has been scheduled for the same hotel and will precede the conference.

American Society for Quality Control - Karl Speitl. George Rice reported that there will be an ASQC Congress in Chicago. Rolf Schumacher will attend and take care of the NCSL booth.

There was an ASQC annual conference held in the San Gabriel Valley. Pete England made a presentation on Metrology as related to quality. Speakers were Jerry Hayes, Rolf Schumacher, and Steve Kozich.

Bill Simmons attended an ASQC Symposium held in Dallas recently.

Graham Cameron will be giving a talk at an ASQC meeting in Canada. The title of his talk will be "World Wide Quality Systems."
Board Meeting

Instrument Society of America - Pete England for Mike Suraci. Mike reports that ISA would be interested in functioning as a Secretariat for NCSL and if NCSL would furnish the necessary information they would prepare a quote. Mike is prepared to continue the negotiations as needed. The ISA Annual Conference for '84 will be held the 22nd through the 25th of October in Houston, Texas. The '85 Conference will be October 21st through the 24th in Philadelphia.

OIML - Keith Kirby by Pete England. No report, however Pete will contact George Uriano for a report for next meeting.

NVLAP - Ron Kidd by Pete England. No report, however Ron will be attending a meeting on a new Laboratory Accreditation Plan during the same week as the BOD meeting.

ANSI - Rolf Schumacher's report by Pete England. Draft 3, Revision 0, of the proposed Standard for Calibration Systems was submitted to the ASQC Standards Review Board together with a plan for consensus development and disposition of all comments received from the Intermediate approval Group. The draft will be made available for public comments which must all be in by August 21, 1984. A press release has been sent to the NCSL Newsletter Editor as to the planned availability of the draft and the invitation for comments.

Invitations are also being issued for interested persons or organizations to join the Writin Group in an effort to draft the next standard which will concern itself with the application and maintenance of measuring instruments.

CPEM - Bob Kamper by Pete England. The CPEM conference will be held during August in the Netherlands, Bob will attend.

IEEC - Tim Driver. The ECCB (Electronics Component Certification Board) has decided to proceed with the development of a U.S. product assessment system based on IECQ international systems concepts. The United Kingdom and Japan are now inputting component specifications into the IECQ-System, also Taiwan representatives have negotiated with the ECCB concerning their entry into the IECQ system.

The prognosis is that by the end of the year there will be fourteen facility qualification approvals within the United States under the IECQ-System.

The tentative schedule for the next series of International meetings is for Spring of '85 on the West Coast of the U.S.

CORM - Bill Simmons. The council for Optical Radiation Measurements (CORM) was organized in 1972 to push for improved measurement standards in the electro-optic community. Bill has been invited by William Schneider, President of CORM, to attend the CORM Board of Directors Meeting in June.

The Annual Conference for CORM will be held June 4th and 5th at the NBS Gaithersburg.

ASTM - The American Society for Testing Materials (ASTM). There is no liaison report for ASTM, Bryan Werner will act as liaison in the future.

Art McCoubrey reported that he had recent conversation with ISA personnel regarding the publishing of materials generated by the NBS that otherwise might not be printed, also in coordinating training programs with the NBS and the ISA.

1984 Conference - Moe Corrigan. The Conference is set for October 1st through 4th at the NBS in Gaithersburg. The speakers program is set, also the workshops. There are plans to get two keynote speakers, one for Monday and another for Tuesday, it is hoped that Monday's will be from the Department of Commerce and Tuesday's from the National Bureau of Standards.

Business System Initiation - Roland Vavken. There are two full time people working on the system presently and a third standing by to assist in transforming from one file to the new files. A program for Training Aids file is in work.

The system will include codes for the officers and dues invoices should come out of the new system, each member will be known by his computerized number and all transactions will be tracked by that number. We have a target date of some time in June to start running system.

Other Business. George Rice discussed the points both good and bad of not being sponsored by the NBS. George also read a statement which came from the NBS stating that financial sponsorship will be stopped after the end of FY 85.

Pete England accepted an action item to chair an ad-Hoc Committee to:

1. Begin the process of determining the total budget for operation of the Secretariat to include mailing, office space, telephone, travel, etc.

2. Investigate ramifications should it be necessary to sever NBS sponsorship at some time in the future, e.g., charter, tax
status, position with various state and federal agencies, etc.

Organization Change Proposal - Pete England. Pete presented his proposal for the new expanded organization.

A motion was made by Bryan Werner and seconded by Gary Davidson that Article V paragraph A of the NCSL by-laws be revised to read:

The officers of the NCSL shall be the President, Executive Vice-President, five Vice-Presidents, Treasurer and Secretary and immediate Past President.

And that Article 7 paragraph B3 by revised to read:

3. The Vice-Presidents, the Secretary and the Treasurer shall serve two year terms. The terms of three of the Vice-Presidents and the Secretary shall expire in even-numbered years; the terms of the other two Vice-Presidents and the Treasurer in odd-numbered years.

And that Article 7 paragraph B4 shall be revised to read:

4. All Board members shall be eligible for re-election except the President and Executive Vice-President. Appointments to fill vacancies on the Board shall be made by the President and be ratified by a majority of the Executive Committee. If the Presidency shall become vacant the Executive Vice-President shall complete the term prior to serving his normal term as President. Should the Executive Vice-Presidency become vacant, the Nominating Committee will conduct a special election to fill the vacancy. If both the Presidency and Executive Vice-Presidency should become vacant, the Secretary, Treasurer, and five Vice-Presidents will choose a temporary President and the Nominating Committee will conduct a special election to fill the vacancies.

And that these changes shall become effective on 1 January 1985.

In-favor - 14 Opposed - 0 Motion carried.

ATTENDEES:

George Rice Hartwell Keith Pete England Bryan Werner Edward Nemoroff Bob Weber


NCSL ORGANIZATIONAL CHART – PROPOSED

VICE PRESIDENT
OPERATIONS

VICE PRESIDENT
MARKETING

VICE PRESIDENT
LAB MANAGEMENT

VICE PRESIDENT
INDUSTRIAL
TECHNOLOGY

VICE PRESIDENT
EDUCATION

1A BUSINESS
SYSTEMS

1B MEETINGS &
PROGRAMS

1C PUBLICATIONS

1D ADMINISTRATION
GUIDELINES &
BYLAWS

2A NEWSLETTER

2B MEMBERSHIP

2C PUBLICITY

2D HONORS &
AWARDS

3A CAL SYSTEMS
MANAGEMENT

3B MEASUREMENT
ASSURANCE

3C NATIONAL
MEASUREMENT
REQUIREMENTS

3D LABORATORY
EVALUATION

4A BIOMEDICAL &
PHARM. METROL

4B AUTOMATIC TEST
& CAL SYSTEMS

4C PRODUCT DESIGN
AND SPEC'S

4D TRAINING AID

5A TRAINING
AIDS

5B TRAINING INFO
DIRECTORY

5C ADJUNCT
TRAINING

5D EDUCATION
LIASON

+ SECRETARIAT
OVERSIGHT

+ ARCHIVES &
HISTORIAN

+ METROLOGY
COMPENDIUM

+ ELECTRICAL
UTILITIES

+ INDUSTRY
ADVISORY
COMMITTEES

+ OTHER
FUNCTIONS
COMMITTEE NEWS

NATIONAL MEASUREMENT REQUIREMENTS COMMITTEE

Dr. Bruno O. Weinschel
Vice Chairman, IEEE Committee to
Promote National Microwave Standards
One Weinschel Lane
Gaithersburg, MD 20877

Dear Dr. Weinschel:

I received a copy of your January 30th letter to Bob Kamper at NBS regarding the need for improved microwave standards to support worldwide trade from Del Caldwell. I was encouraged to hear that IEEE has a task force to promote national microwave standards. As a subcommittee chairman for the NCSL National Measurement Requirements in the RF and Microwave area, I would be interested in the status of your committee.

I have enclosed the copy of my report that was presented at the last NCSL symposium in Boulder on the Measurement Requirements for DoD Microwave and Millimeterwave Programs.

I agree that more accurate calibration capabilities are required, but I believe the most pressing needs are NBS calibration services that are not available to meet current and future DoD program requirements. I have recommended that NCSL in coordination with NBS sponsor workshops with DoD to identify the microwave parameter where traceability does not exist at the NBS. Perhaps, in this manner a productive agreement or programs can be established to meet current and upcoming DoD program requirements.

I have also presented the NCSL RF & Microwave Measurement Requirements Report to the IEEE Instrumentation and Measurement Society ADCOM meeting. Since Dr. Kamper is a NCSL Sponsor Delegate, he has been elected as IEEE I&M Liaison to NCSL.

Currently, I am in the process of updating the NCSL RF & Microwave National Measurement Requirements for this year.

I hope the information is helpful toward your committee's effort. If you have any questions on this matter, please contact me.

Best regards,

Frank K. Koide
RF & Microwave Subcommittee Chairman

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IEEE TASK FORCE ON PRODUCTIVITY & INNOVATION

Dr. Robert A. Kamper, Director
Boulder Laboratories
National Bureau of Standards
U.S. Department of Commerce
Boulder, Colorado 80303

RE: Requirement for NBS Support for U.S. Microwave and Telecommunications Industry in International Competition

SUBJECT: Need for Improved Microwave Standards on Impedance, Power and Attenuation to Support Export

Dear Dr. Kamper:

It was good to see you during the January 12 meeting with the microwave instrumentation industry's representatives. The discussion was concerned with improving the services of the National Bureau of Standards microwave calibration laboratories to U.S. industry. This improved support is needed in the competitive struggle of the U.S. Microwave and Telecommunication Industry in worldwide trade where we encounter more accurate calibration capabilities in other countries.

I was surprised about the statement that only $.75 million per year are furnished from NBS funds to the Microwave Metrology Group for the development of standards and measurement techniques. This supports also $400,000 of income for calibrations per Publication #250 including the calibrations for the Department of Defense, as well as the marketing effort to obtain $1.35 million for work for other federal agencies. Of this $.75 million, over 60 percent is deducted for administrative expenses leaving less than $250,000 actual operating expenses for this important section responsible for primary standards in microwave power, impedance and attenuation.

For the O.A. funds of the Department of Defense, what portion is assigned to the furnishing of hardware and training? What portion of these O.A. funds can be used for internal R&D or development of improved capabilities to be kept at NBS which would benefit industry?

In order to better understand the services in microwave calibrations, could you please furnish me with the equivalent data for Taggart's Section (Noise Calibration) and Baird's Section (Antenna Calibration) in
Committee News

Miller's Division 723? Are there other sections involved in microwave calibration?

This information will help us in planning how to provide a better and stable support for the development of primary standards by the above sections so that their unique capabilities can be optimized in the support of improved U.S. primary standards for the U.S. Microwave Instrumentation Industry which in turn supports the total U.S. Microwave and Telecommunication Industry.

I trust that this information is readily available and I am looking forward to an early reply.

Sincerely,

Bruno O. Weirtschel
Vice Chairman
Committee to Promote National Microwave Standards

AD HOC COMMITTEES

At the present there are 7 ad hoc committees which by precedent are normally established for one year terms subject to reestablishment at the pleasure of each new president. The existing ad hoc committees and chairmen are:

1. NBS Organic Act
2. NBS Funding
3. Military Specifications
4. Business Systems Modernization
5. Research Associate
6. International Calibration Reciprocity
7. Dues and Initiation Fees

It is my recommendation that items 1, 2 and 5 be folded into the new Government Relations Committee, that item 4 be made a full-fledged committee, that item 3 be continued until the Handbook is approved, and that item 7 be discontinued. Carl Quinn is to determine whether item 6 will remain as an ad hoc task or incorporated into the Laboratory Evaluation Committee.

Based on the above the following ad hoc committees are continued for the present with chairman as noted:

Military Specifications
Dean Brungart

International Calibration Reciprocity
Carl Quinn

Business System Administration
Roland Vavken

George O. Rice
Executive Vice President

QUARTERLY REPORT: AUTOMATIC TEST AND CALIBRATION SYSTEMS COMMITTEE

Bob Smith, Tape Exchange Program subcommittee chairman, reported that there was one new release form added this quarter, bringing the total on file to 111. One request for two programs was received.

The committee met during the Measurement Science Conference at Long Beach, California on 19 January 1984 to discuss plans for the October 1984 Workshop on Automatic Test and Calibration Systems in Gaithersburg, MD.

I have been advised by Moe Corrigan that the AT&CS Workshop is scheduled to be 3 hours in duration - from 1600 hrs. to 1730 hrs. on Tuesday, 2 October and the same period on Wednesday. So far, we have commitments which fill about 2/3 of the session. Seven topics have been identified by their developers. They are:

"Turnkey v. Homebrew Systems"
Bill Robinson, Raytheon.

"Standard Cell Comparator Station"
Curtis Chan, Lockheed Missiles and Space Co.

"Automatic Thermocouple Calibrator"
John England, Grumman Aerospace Co.

"Networking Automatic Calibration Systems" and

"Automatic Generation of ATS Procedures"
Ken Carrington, Computer Science Corporation.

"Test Equipment Calibration Using PC's"
Fred Katzmann, Ballantine Laboratories.

"In-Place Calibration Philosophy:
Dave Hopping, Hewlett Packard

Jerry Niedrauer, Chairman
By now all NCSL members should have received their own copy of this NBS report which provides a comprehensive reply to an earlier NCSL Committee Report. If your copy didn't arrive, contact Keith Kirby at 301-921-2805.

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METROLOGY AUTOMATION USERS GROUP WILL MEET IN ST. LOUIS

The Automatic Test and Calibration Systems Committee was advised that the "Metrology Automation Users Group" (formerly the T-10 Users Group) which met at LMSC from 14-16 September 1983, is planning their 1984 meeting at McDonnell Douglas Corp., St. Louis, Missouri, this Fall. The meeting in 1983 consisted of demonstrations of equipment, plus discussions of techniques and common problems. It is open to anyone interested in automation of metrology functions.

Contact Mel Hoppe, P.O. Box 516, D/856B MS/042, St. Louis, MO 63166, 314-233-6154.
The March edition of the NCSL newsletter introduced the Metrology Program at Butler County Community College and its first graduating class. The first class of five students have either accepted jobs or are continuing their education. Four of the students have been placed with Lockheed Electronics, DH Instruments, National Bureau of Standards and Intec. The other student is working on a physics degree at the University of Pittsburgh.

There are 11 students graduating in the Metrology Program in August, 1984. Two of these have already accepted permanent positions. Terry Witt will be employed with Sandia National Laboratory and Paul Beck will be employed with Lockheed Electronics Corporation.

Each of the 11 graduates has prepared a qualification summary which follows. Anyone wishing to contact one of the students for employment in metrology can call the Counseling and Placement Center at (412) 287-8711, ext. 185, or write to: Lynn Thompson, Butler County Community College, College Drive, Oak Hills, Butler, PA 16001.

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**AUGUST 1984 GRADUATING METROLOGY STUDENTS**

**EILEEN AMBROSE, 22 years old**

I currently have a Q.P.A. of 4.0 in Metrology. I will be doing my summer practicum at Contraves Goerz Corporation in Pittsburgh, PA. The practicum experience will be in electrical and mechanical calibrations. I would consider working in any area of Metrology, preferably in western Pennsylvania. I am comfortable working in groups or alone.

**ROBERT GREEN, 39 years old, married, no children**

I would like to work in a primary standards laboratory on a research and development facility. My four years of practical experience as an electronics technician in the Marine Corp. Air Wing and the summer internship in the resistance laboratory of the National Bureau of Standards have helped me to develop good measurement techniques. I have maintained a 3.25 average in the
Butler Class

Metrology curriculum at BC3 by making a commitment to apply myself to the best of my ability and seeing that commitment through. I perform well on my own and work well with others. I am willing to relocate for the right job opportunity and intend to earn an engineering degree through night school courses. My goal is to become a good metrologist and a productive employee for my company.

THOMAS M. MILLER, 22 years old, single

Interested in advanced technology such as robotics, lasers, and precision calibration. I am very reliable, mechanically inclined, dedicated, and work well with others and individually. I am presently performing my research/study work with Gulf Research in Hamarville, Pennsylvania, in the Systems and Control Department—Electronics and Measurements Section. I am willing to relocate, and a West Coast location would be perfect. I am dedicated to becoming a competent, skillful metrologist, and plan to continue my education in a high tech field.

TERRY WITT, 30 years old, single

I am a very capable person, eager to learn, and strive to be on top. Currently I have a 4.0 Q.P.A. in Metrology and my strongest background is in chemistry. I am well liked by both the faculty and my fellow students. This summer, I will be completing my summer practicum in Radiation Physics at the National Bureau of Standards. I have recently accepted a full-time position for the fall at Sandia National Laboratories, Physical Standards Division, Albuquerque, New Mexico.

BRADLEY ADAMS, 20 years old, single

To begin my career, I am open to any field of Metrology. My summer practicum is at the National Bureau of Standards in the Radiometric Physics Laboratory. My Q.P.A. in Metrology is 3.3. I would be willing to relocate anywhere in the United States. I am comfortable working in a group or alone. I am excited about entering my career and growing with the employer that hires me.

DAVID KENNEDY, 21 years old, single

I will be going to NBS for my summer internship. While there I hope to learn the techniques in precision measurement which will enhance the knowledge I obtained at BC3. My strongest interests are in electrical and physical metrology. My aim is to obtain a position in a primary standards lab where I can apply techniques learned at NBS. I am willing to relocate anywhere, but would prefer a position in Pennsylvania, Ohio, and West Virginia area.

EUGENE ZDRAL, 31 years old, married, 2 children

An entry level position in R&D or systems developed, working with electrical or
dimensional assignments with an Accent on Microprocessor Programming and Interfacing. Besides the Metrology degree (3.6 Q.P.A.), I have an A.A.S. in Math (Preengineering, 3.65 Q.P.A.). Related courses include Advanced BASIC, FORTRAN and MACHINE LANGUAGE. I also learned to use an Assembler while building a slow scan storage oscilloscope. My summer practicum will be automating a capacitance bridge at the National Bureau of Standards. Prefer the Pittsburgh area or the Sunbelt, but will consider any location with the right company. Intend to continue working toward a B.S.E.E.

JEFFREY S. SCHAEFER

I would like to begin my Metrology career in a research and development or standards lab working in electronics. My summer internship will be performed at the National Bureau of Standards working in their inductance and capacitance laboratory. I am very persistent and work well with others or alone, and like to do research on what I am working to understand how it works or to find problems. Willing to relocate anywhere in the U.S. Plan to continue my schooling in the evenings to obtain a Bachelor's Degree which will benefit both myself and the company.

BRADLEY BELL, 20 years old, single

To begin my career, I am willing to relocate anywhere in the U.S. or overseas. My practicum project is being performed at McDonnell-Douglas Aircraft in St. Louis, Missouri, within the Calibration and Standards Laboratory. I feel that I am mechanically competent and eager to use and develop these qualifications to achieve the goals of my employer.

PAUL BECK, 21 years old, single

Interested in the mechanical and electrical metrology. I have accepted a position at Lockheed Electronics Company, New Jersey.

NATALIE COLOSIMO, 19 years old, single

I am mainly interested in electronics, but also in chemical and pharmaceutical. I will be completing my summer internship at Skyland Scientific Services in Belgrade, Montana, working as a calibration technician. I enjoy working alone, but also in a group. My career plans include continuing formal education while working to earn a degree in electrical engineering or a degree that relates to work I am doing. I am willing to relocate anywhere in the U.S.
The third NBS-NCSL Workshop on Electrical Measurement Assurance Programs was conducted at the Dallas Lincoln Radisson Hotel (Region 6) from March 25 to March 30, 1984. The first and second Workshops were in the Los Angeles area (NCSL Region 8) in January 1983 and the Boston area (NCSL Region 1) in October 1983.

The Dallas EMAP Workshop was attended by 34 participants including three persons from the Los Alamos National Laboratory, three persons from the U.S. Navy, one person from a technical school, one person from Puerto Rico and one person from Canada. The rest of the participants were from widely scattered U.S. industrial firms.

At the opening session of the Workshop Bill Simmons, NCSL Director for Regions 6 and 8, addressed the participants and described the NCSL role in measurement assurance. The technical sessions were then initiated by the NBS instructors for the week:

- Norman Belecki, Electrical Standards Division
- Woodward Bicke, Electrical Standards Division
- Carol Croarkin, Statistical Engineering Division
- Dominic Vecchia, Statistical Engineering Division

Two supervisors of participants were also present during the first morning of the Workshop.

A new feature was introduced at the Dallas EMAP Workshop in the form of "hands-on" laboratory experience in the comparison of two groups of four voltage reference standards. Data were obtained by each participant using an automated procedure. Each participant then applied the principles discussed during the Workshop for the evaluation of their data. This experience proved to be effective in driving home the objectives of the Workshop and it will be refined for future sessions.

Local NCSL support for the Workshop was provided by Robert B. Willett, Jr. of Rockwell International, Collins Transmission System Division. Computer equipment and instrumentation for the voltage standard comparison laboratory was loaned by Hewlett-Packard and a very agreeable reception was hosted by the local offices of John Fluke Company, Hewlett-Packard and Tektronix.

Future EMAP Workshops are planned for the Seattle area (October 22-26, 1984) and the Baltimore-Washington area in the Spring of 1985. Interested persons may contact Art McCoubrey at NBS (301) 921-3301.

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NBS/NCSL ELECTRICAL MEASUREMENT ASSURANCE WORKSHOP ANNOUNCED FOR SEATTLE AREA

NBS and NCSL will co-sponsor the fourth Workshop on Electrical Measurement Assurance Programs in the Seattle area from October 22 to October 26, 1984.

This five-day intensive workshop on electrical measurement assurance provides in-depth training for those involved in d.c. and low frequency electrical measurements with emphasis on the maintenance of traceability to NBS. Participants will receive instruction based on techniques used in the Electricity and Statistical Engineering Divisions of the National Bureau of Standards; the objective will be an understanding, by participants, of how to establish and maintain vigorous quality control programs in their own laboratories, to ensure the accuracy of electrical measurements. The primary purpose of the workshop is oriented toward quality control for d.c. voltage metrology; however, the techniques are applicable to other electrical measurement areas.

Each class day will consist of lectures by NBS staff members, to be followed by ample time for questions and answers and discussion of practical measurement problems. The workshop is designed for professional and senior technical personnel working in electrical measurements; it is not recommended for entry-level people unless they have a background in electrical engineering and physics. Some college level math is desirable, but attendees should, as a minimum, have a thorough knowledge of high school algebra. Each participant will be provided with lecture notes and reference materials that are useful in the application of measurement assurance principles.

The scope of the workshop will include a discussion of "why have a measurement assurance program (MAP)," covering the costs and benefits of such a program, the implications for traceability, the impact on the operation of a calibration or standards lab and related factors. Lab managers and/or
Training Information

supervisors of attendees are invited to join the group for a discussion of these factors during the opening session. (Each attendee may invite one additional person to attend the Monday morning session at no additional cost.)

The workshop will be held in a hotel in the Seattle area and a block of rooms will be reserved for participants. The details of the hotel and a registration form will be provided in a final announcement. Participants will be responsible for their own hotel room reservations.

The cost of the Workshop will be $725 per person (includes handout materials, full lunch each day, and coffee breaks each morning and afternoon).

Check-In/Registration will be from 7:00-9:00 p.m. on Sunday, October 14, and 8:00-9:00 a.m. on Monday, October 15. The Workshop will run from 9:00 a.m. to 4:30 or 5:00 p.m. Mon.-Thurs., depending on the amount of class discussion. The workshop will adjourn at approximately 2:00 p.m. on Friday.

Attendance is limited to 40 people on a first-come, first-served basis. This workshop will be cancelled if there are insufficient registrants. For further information on the Workshop or related questions, please contact Dr. Arthur O. McCoubrey, Center for Basic Standards, NBS, at (301) 921-3301.

Tentative plans have been made for Workshops on Electrical Measurement Assurance on a twice yearly schedule. Planning information is given in the following table:

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<tr>
<th>LOCATION</th>
<th>NCSL REGION</th>
<th>PERIOD</th>
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<tr>
<td>Northwest</td>
<td>9</td>
<td>Oct. 15-19, 1984</td>
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<tr>
<td>East Coast</td>
<td>3</td>
<td>Spring 1985</td>
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<td>North Central</td>
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<td>Fall 1985</td>
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<tr>
<td>Bay Area</td>
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<td>Spring 1986</td>
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<td>Southeast</td>
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<td>South Central</td>
<td>6</td>
<td>Mar. 26-30, 1984</td>
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<tr>
<td>Southwest</td>
<td>8</td>
<td>Jan. 24-28, 1983</td>
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Additional information and more detailed plans, as they become available, may be obtained from Dr. Arthur O. McCoubrey at NBS. Telephone: (301) 921-3301.

NBS AND NCSL SCHEDULE FUTURE WORKSHOPS ON ELECTRICAL MEASUREMENT ASSURANCE PROGRAMS

The NCSL Education and Training Committee, John Martin, Chairman, and NBS have coordinated plans for future Workshops on Electrical Measurement Assurance Programs on a twice yearly schedule. Planning information is given in the following table:

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<td>Fall 1986</td>
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NBS SEMINARS ON PRESSURE MEASUREMENT

A special course on the absolute measurement of pressure in the vacuum region was held at NBS during the weeks of May 8 and May 30, 1984. This seminar was concerned with the "Basic Theory and Use of the Spinning Rotor Gage." This instrument is useful, for example, in the calibration of ionization gages down to $10^{-4}$ Pascal ($10^{-6}$ Torr) equivalent nitrogen pressure with a random error of 1% or less. Two sessions of the seminar combining theory and "hands-on" laboratory experience were attended by a total of 24 specialists who are currently concerned with the use of spinning rotor gages for the measurement of pressure in the vacuum region.

The scheduled (NBS SP-250 Appendix) NBS seminar on the "Calibration and Use of Piston Gages" was held on May 17-18, 1984 and attended by 17 persons. A special course for 12 specialists on the use of controlled clearance piston gages for high pressures was also conducted during the week of April 2, 1984. The next scheduled seminar on piston gages will be held on November 15-16, 1984.
Future plans for additional courses or seminars on spinning rotor pressure gages and controlled clearance pressure gages have not been completely decided. Persons interested in the possibility of these training activities are encouraged to contact Dr. Charles R. Tilford at NBS. Telephone: (301) 921-2121.

NBS PRECISION THERMOMETRY SEMINAR

The scheduled NBS Seminar on Precision Thermometry was conducted during the week of March 19, 1984 and attended by 11 persons. This seminar is described in NBS Special Publication 250 — Appendix. The next scheduled session of this seminar will be October 15-19, 1984 depending upon the level of interest. Persons who may wish to attend this session are encouraged to contact Nancye E. McBryde at NBS. Telephone: (301) 921-3315.

(Above) Bob Willett, Rockwell-Collins, and Dr. Art McCourey, NBS, relax after the NBS/NCSL Electrical Measurement Seminar in Dallas, March 25, 1984. (Below) Seminar attendees at the Trail Dust Restaurant, probably discussing statistical data.
RAYMOND A. WILLIAMS PASSES

It is with much regret that we announce the death on April 18, 1984 of Raymond A. Williams, who had been the chairman of the GIDEP Metrology Committee for nearly four years. Ray, known to many of the metrology community for his dynamic leadership of that organization, was also for many years the top executive of SIMCO Electronics Inc. of Santa Clara, California. Unlike many other presidents of successful companies (as he had helped make SIMCO), he could rightfully claim that he had made it "all the way in Metrology." Ray started as an Air Force Technician; upon discharge he returned to school (Marin College); then went back into metrology as a technician and from there on up through lab management, sales, marketing, and finally President of SIMCO. He leaves his widow, Dorothy, who is also General Manager of Western Metrology of Buena Park, California, a daughter, Shana, as well as a host of friends. We will all miss him.

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NATIONAL TECHNOLOGY MEDAL NOMINATIONS OPEN

Nominations open May 1 for the second round of the National Technology Medals.

The medals are awarded periodically by the president to recognize individuals and companies for "outstanding contributions to improving the well-being of the United States through the promotion of technology or technological manpower."

Nominations may be submitted to the Commerce Department from May 1 through July 31. The medals will be presented next year.

Presentations of medals resulting from the first round of nominations in the fall of 1983 will be made later this year.

Instructions and nomination forms are available from Philip Goodman, Executive Director, National Technology Medal Nomination Evaluation Committee, Room 4824, U.S. Department of Commerce, Washington, D.C. 20230.

Purpose:

To give presidential recognition to individuals and companies for outstanding contributions to improving the well-being of the United States through the promotion of technological manpower.

Basic Eligibility Requirements for Nominees:

Any U.S. citizen or U.S.-owned company is eligible. Persons connected with administration or selection procedures for the Medal will not be eligible during the period of their service or for five years thereafter.

Frequency and Number of Awards:

Awards will be made periodically by the president. The number of recipients will depend on the number of deserving nominees. It is anticipated that no more than 12 medals will be awarded on any one occasion.

Making Nominations:

Nominations for the second series of awards should be submitted between May 1 and July 31, 1984. Nomination instructions can be obtained by writing to: Philip Goodman, Executive Director, National Technology Medal Nomination Evaluation Committee, Room 4824, U.S. Department of Commerce, 14th Street and Constitution Avenue, N.W., Washington, D.C. 20230.

CALL FOR COMMENTS TO PROPOSED STANDARD FOR CALIBRATION SYSTEMS

A proposed new Standard for Calibration Systems, developed by a Writing Group of the ASQC Metrology Technical Committee, is now available for review and comments. This draft standard covers only the operation of calibration and standards laboratories; a second standard for the accuracy control and maintenance of measuring instruments is in preparation.

The new standard offers two alternative means of calibration control: a Program Controls Method, paralleling essentially the traditional methods of calibration control as exemplified by MIL-C-45662A, and a Measurement Assurance Method based on objective verification of calibration uncertainties. The Measurement Assurance Method is explained in an appendix.

This Standard is available by sending a check or money order to:
Numerous persons affiliated with NCSL who have volunteered to review the Standard or have served in the Intermediate Approval Group will receive a copy from the ASQC with a request for vote.

The Writing Group now working on the standard for the accuracy control and maintenance of measuring instruments is open to interested and qualified individuals. Persons wishing to join the Writing Group may do so in writing to the Chairman:

Rolf B. F. Schumacher
Rockwell International
HCO2
3370 Mira loma Ave.
Anaheim, CA 92803

UTILITY LAB MANAGERS TO MEET AT ANNUAL NCSL CONFERENCE

There will be a meeting of utility lab managers at the fall NCSL conference in Gaithersburg in October. The purpose is to determine the interest in forming a utility committee within the NCSL. Such a committee would encourage personnel acquaintances within the industry and focus more attention on utility problems.

Please be sure to invite all utility lab managers in your regions to the Conference, NCSL members and nonmembers.

NBS PHYSICAL MEASUREMENT SERVICES STATUS REPORT

A new publication, NBSIR-84-2875, NBS Physical Measurements Services Status Report became available in May 1984. This report provides current information for each service on:

- the description of service
- documentation available
- training programs available
- future directions
- the NBS person to contact for additional information.

Copies of the new report are available from the NBS Office of Physical Measurement Services. Telephone: (301) 921-2805.

ANNUAL MEETING OF THE NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

Westin Hotel, Boston, Massachusetts
July 29 to August 3, 1984

The annual meeting of the Conference brings together weights and measures enforcement officials of the states, counties and cities of the United States, of manufacturers, industry, business, consumers, and other interested persons to discuss and act on matters that relate to weights and measures technology and administration. Sponsored by the National Conference on Weights and Measures. Contact: Ann Heffernan, Physics Building, Room A355, NBS, Washington, DC 20234, 301/921-3677.

SEMINAR ON FREQUENCY STABILITY AND ITS MEASUREMENTS

NBS, Boulder, Colorado
July 24 to 26, 1984

This seminar is an enhanced version of the Frequency Standards and Clocks Seminar held in previous years. It is intended as an advanced course for those with some experience and/or knowledge of the time and frequency field. The course will be taught on a theoretical level and will examine what frequency stability is and how it is measured. Topics will include long-term stability, short-term stability statistics of oscillators, phase noise measurements, and characteristics of commercial frequency sources. Registration fee is $575; registration deadline is July 13. Sponsored by NBS. Contact: James L. Jespersen, Division 524, National Bureau of Standards, Boulder, CO 80303, 303/497-3849.

SYMPOSIUM ON OPTICAL FIBER MEASUREMENTS

NBS, Boulder, Colorado
October 2 to 3, 1984

The Symposium is a two-day meeting devoted to the topic of measurement on optical
fibers. The Symposium provides a forum for reporting the results of current research and an opportunity for discussions that can lead to further progress. About two thirds of the sessions will consist of contributed and invited papers. The remainder will be devoted to the workshops led by invited panelists. Experimental and analytical papers on any aspect of the characterization of optical fibers and fiber systems are solicited. The meeting scope include the following specific subjects: attenuation, bandwidth/distortion, dispersion, index profile, cut-off wavelength, mode diameter/core geometry, fiber devices, physical measurements, link parameters, polarization characteristics, system performance, field measurements, and standards. Registration Fee: $90. Sponsored by NBS in cooperation with the IEEE Optical Waveguide Communications Committee and the Optical Society of America. Contact: Douglas Frazen, 724.02, NBS/Boulder, CO 80303, 303/497-3346, or Gordon Day on 303/497-5204.

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SEMINAR ON FREQUENCY MEASUREMENTS

NBS, Boulder, Colorado
October 24 to 25, 1984

This seminar is intended for engineers and lab technicians involved in making frequency calibrations. The course will be taught on a practical level with special emphasis on the new NBS Frequency Measurement Service. This service is a turn-key system installed at the user's site which provides high-accuracy frequency measurement traceable to NBS. Topics to be covered in the seminar include calibration of crystal oscillators, using frequency counters, choosing a frequency calibration source, care and use of frequency sources, using Loran-C, VLF, and WWV for frequency calibration service, and the new frequency measurement service. Registration fee is $400 and registration deadline is October 12. Sponsored by NBS. Contact: Mike Lombardi, Division 524, National Bureau of Standards, Boulder, CO 80303, 303/497-3212.

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From: GIDEP Program Manager

Subj: GIDEP ANNUAL REPORT

1. Since 1970, GIDEP has provided a unique service enabling Government and Industry participants to share technical data, and enabling the participant agencies, corporations and activities to greatly reduce expenditure of time and money through the utilization of available program data. In 1983, our participants reported $53 million in cost savings, realized from that utilization of program data.

2. A prime management objective has been to improve the program, to ensure that a maturity of operations, content and quality are realized as a process. Management actions, as discussed in the 1983 report, are being taken to accomplish this objective. One requirement within this objective is to ensure a continued increase in data utilization. Our actions have initially focused on top management awareness and participant reporting; top management awareness as related to increased cost savings, productivity and product quality. With regard to reporting, our Geographic Clinics are formalized and are taking program indoctrination into the field, in support of the individual representatives' requirements and system proficiency.

3. The GIDEP mission is to provide an effective data service which meets the broad requirements of the 1000 government and industry participants. Our management actions will continue to lead the program to that end.

4. This report is provided to you for information and to further the awareness of the program's benefits. In the interest of increasing utilization, please use this report, or any part, to support your internal organizational information program.

B. A. Butcher
Captain, USN

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GIDEP ANNUAL REPORT - EXECUTIVE SUMMARY

The Government-Industry Data Exchange Program (GIDEP) is a cooperative program between Government and Industry participants. The program provides a means to exchange certain types of unclassified and non-proprietary technical data. The primary objective is to reduce expenditures of time, money and material through maximizing the availability and use of existing technical information.

An established program organization and data management network supports the participants' demands for data essential to system and equipment development, manufacturing and life cycle support.

The program is sponsored by the Joint Logistics Commanders, chartered by the Chief of Naval Material and centrally managed by a
CHNAMAT-assigned Program Manager (MAT 06B). The GIDEP Operations Center is located at the Fleet Analysis Center, Corona, California. Over 1000 participants, approximately one-third government and two-thirds industry, use the data from four data interchanges:

* Engineering Data
* Failure Experience Data
* Reliability-Maintainability Data
* Metrology Data

GIDEP continues to receive national visibility regarding the GIDEP ALERT service provided to government and industry. Several recent micro-electronics problems and issues have precipitated the issuance of GIDEP ALERTS.

The successful operation of this voluntary program is directly proportionate to the dedication and effectiveness of the in-field GIDEP representatives, and to the support received from top management regarding the cost savings derived from use of the program data. 1983 cost savings were $53 million, an increase of 30% over 1982.

This report is intended to provide a current status of the chartering authority (Chief of Naval Material), the sponsor (Joint Logistics Commanders), and our membership (all participants) with a focus on overall program improvements necessary to maintain and increase effectiveness.

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NCSL EXHIBIT AT ASQC'S 38th ANNUAL QUALITY CONGRESS

In planning to attend the 38th Annual Quality Congress of the American Society for Quality Control (ASQC), May 14-16, 1984, in Chicago, I thought it may be a good idea to generate there some publicity for NCSL. Therefore, I asked Karl Speitel, Eastman Kodak, whether he could arrange for some space at the exhibit where we could mount the NCSL display and distribute NCSL brochures. Karl is the NCSL delegate to the ASQC and just finished his multi-year term as Chairman of the ASQC Metrology Technical Committee.

Karl got us the space for the display free of charge from ASQC Headquarters. At the same time, Doug Smith, Abbott Laboratories, NCSL Region 5 Coordinator, gracefully accepted the responsibility for receiving and erecting the NCSL display and arranging for assistance to man the display at times during the ASQC conference. Ed Nemeroff, Datron Instruments, NCSL Vice President, coordinated with Allan Herman, Cooper-Cameron, NCSL Chairman of the Publicity Committee, and with the printer of the NCSL brochures to have 200 copies of the brochures sent to Chicago. It took some considerable effort by Allan to have the new brochures ready at the last moment and specially shipped to arrive at my hotel the Day before the exhibit was to be set up.

Through the great cooperation of all involved, NCSL got good publicity at the ASQC conference. Many conference attendees stopped by the NCSL booth and picked up a copy of the brochure. At the end of the conference, all brochures were gone. My many thanks go to Karl Speitel, Doug Smith, Ed Nemeroff, and Allan Herman for their exemplary cooperation.

Last, but not least, NCSL also owes its gratitude to the Inspection Division of the ASQC which allowed us to use its space for the NCSL booth. I had some pictures taken of the booth, but unfortunately my camera with the film were subsequently stolen. But that's another story.

R.B.F. Schumacher

* * * * * * * * *
What's the primary role of the U.S. National Bureau of Standards for the U.S. microwave industry? An obvious motherhood-and-apple-pie answer is:

- To establish, maintain and disseminate primary microwave standards in the U.S. This has involved two main activities over the years:
  - Research and development of new techniques and standards.
  - Providing calibration services.

Currently, the NBS has 67 technical people based in Boulder, Colo., addressing microwave metrology; 24 in the areas of power, impedance and attenuation, and 43 in areas of noise, EMI, and antenna measurement. One of this group's most notable areas of success in recent years has been the R&D activity aimed at power and attenuation measurement using six-port techniques. Numerous papers have been published and experimental results have been superb in achieving unprecedented accuracy in low to medium dynamic range measurements on attenuators.

However, while this theoretical work has been stimulating and top-notch in an academic sense, what's been happening to the other role within NBS—the calibration mission? Ten years ago at NBS more than 60 percent of the staff was involved in calibration services, and the staff was considerably larger (with 100 people in microwave activities).

As Department of Commerce funding was reduced, severe staff cutbacks in 1976 and early retirements led to longer turnaround times and less capital budget for the calibration services. To avoid further staff reductions, DOD R&D funding was eagerly solicited and already scarce manpower was directed toward not just R&D, but also the manufacture of six-port systems for the tri-service metrology primary labs.

This reduction in NBS resources for the last 10 years has been directly opposite microwave industry growth in the United States and worldwide. The past decade has shown incredible growth in microwave technology and applications in both communications and defense.

The growing concern of many is that the United States is no longer number one in microwave metrology on an overall basis. While the NBS is the clear leader in six-port, other national labs and even commercial instruments have better capabilities in wider dynamic range measurements.

**Committee to Promote National Microwave Standards**

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After the cutbacks, many have deserted of turnaround times from NBS, and even though more recently, turnaround times have improved, they have chosen other national labs such as Canada's, or have lengthened their traceability path by using other industry labs. Also, the uncertainties quoted on the NBS calibrations haven't moved with the state of the art, nor have the six-ports have brought on-line in attenuation measurement in the calibration service. This has lead to many expensive industrial traveling kits and experiments to quantify better uncertainties.

With its strained resources, one can imagine the growing effects of millimeter activity on the Bureau. As research matures into production at 44, 60, and 94 GHz, everyone in the microwave industry is racing into these new frequency ranges. The MULSTAR need for WR-22 standards is a large new demand for NBS.

Most microwave devices are fitted with SMA connectors. While the SMA is clearly not a metrology-grade connector—there are instrument grade 3.5-mm alternatives that are SMA compatible. It might come as a surprise to many in the industry that most of the microwave components today cannot be traced to NBS. No services are currently available from NBS in 3.5 mm. However, after several years of industry input, an investigative project is just beginning (with DOD funding).

It's well and good to mutter and complain about the slow death of the NBS microwave capability—and about 40 percent of the staff will be at retirement age within five years and virtually no young engineers have been added in recent years. It's time to do something! An ad hoc committee of the MTT-5 of the IEEE has been formed—the Committee to Promote National Microwave Standards. The current members are listed below. It is a five-star panel representing both the instrument and aerospace segments of the microwave industry.

Their major goals are to help the NBS focus on the main mission by:

- Quantifying and prioritizing the industry needs, i.e., measurement needs and uncertainties necessary.
- This activity will be coordinated with the existing efforts of the NCSL in the microwave area and the tri-service Calibration Coordination Group (CCG).
- Assist the NBS in achieving adequate funding so that the staff may be sustained and enlarged to grow with the increased demands of the industry.

This latter goal is an obviously political one—requiring nationwide industry support and lobbying with Congressional Committees. Meetings have taken place already in January and a surprising early consensus on goals and requirements was achieved.

The microwave community can take pride in its position in U.S. industry today. Unlike steel, autos, and entertainment electronics, we are still number one and represent a significant portion of U.S. industrial exports. However, major overseas competition is looming. Lack of adequate support in the basic standards area can impact our worldwide trade position.

Lend your support by contacting a member of the committee and let's help to make the United States the clear leader in overall microwave metrology again.

Jim Fitzpatrick is product manager for high-performance network analyzers at the Network Measurements Division of Hewlett Packard, 1400 Fountain Grove Parkway, Santa Rosa, CA 95401; (707) 525-1400.
MEETINGS AND PROGRAMS ANNOUNCEMENTS

July 9-11, 1984
NCSL Board of Directors Meeting in Victoria, British Columbia.

August 5-10, 1984

August 20-24, 1984
CFEM will be held in Delft, Netherlands Conference. Chairman will be Dr. Robert Kaarls, National Service of Metrology, Box 654, Delft, Netherlands 2600 AR.

September 25-27, 1984
Electrical Manufacturing Expo '84 at O'Hare Expo Center, Rosemount, Illinois.

October 1, 1984
GIDEP Metrology Committee, Sheraton Hotel, Spokane, Washington.

October 2-4, 1984
GIDEP Workshop (Annual), Sheraton Hotel, Spokane, Washington.

October 1-4, 1984
NCSL 1984 workshop and symposium at the National Bureau of Standards, Gaithersburg, Maryland.

October 1-5, 1984
ISA Annual Conference.

October 4-5, 1984
NCSL Board of Directors Meeting at NBS, Gaithersburg, MD.

October 22-25, 1984
ISA.84 International Conference and Exhibit, Houston, Texas.

January 14-16, 1985
NCSL Board of Directors Meeting at the Marriott Hotel, Santa Clara, CA.

January 17-18, 1985
Measurements Science Conference (MSC) to be held at the Marriott Hotel, America Parkway, Santa Clara, CA.

July 15-18, 1984
The 1985 NCSL Annual Workshop and Symposium will be held at the Hilton Harvest House Hotel in Boulder, Colorado. The Conference theme: "The Metrologist's Mission in the Quest for Quality."

TO HAVE YOUR ORGANIZATION'S MEETINGS AND CONFERENCES ANNOUNCED, PLEASE SEND A NOTICE TO M. J. CORRIGAN, JR., CHAIRMAN, MEETINGS AND PROGRAMS COMMITTEE.

REGIONAL MEETINGS SCHEDULE

REGION 1
Typically holds two (2) meetings per year: a regional business meeting and a technical session. Generally, meetings are held in the spring and fall of each year with the next meeting being planned for the Fall of 1984.

REGION 2
Three (3) meetings are held each year: September, January or February, and May. The time and place to be announced.

REGION 3
Plans to hold two (2) meetings each year: spring and fall. The next meeting is scheduled for the Fall of 1984, the time and place to be announced.

REGION 4
Plans are to hold three (3) meetings each year. This year's regional workshop schedule is as follows: In the central Florida area, June 12, and November 15, 1984. They also plan to hold a sectional meeting in Macon or Atlanta sometime this year.

REGION 5
Holds two (2) meetings each year. The next meeting is scheduled for the last week of June in the Ohio/Michigan area.

REGION 6
The next meeting is tentatively scheduled for the first week in September, 1984, in the Dallas/Fort Worth area. Four sections have been established in Region 6, they are: Dallas/Fort Worth, White Sands/El Paso, Denver/Boulder and Houston.

REGION 7
Plans to hold two (2) meetings each year. The next meeting for 1984 is tentatively scheduled for November 14th.

REGION 8
Plans to hold six (6) sectional meetings each year. Each section will hold two meetings in their areas. The sections are: Phoenix/Tucson, San Diego, and Los Angeles. Note: The next meetings are scheduled as follows - September 12th, San Diego; October 22nd, Phoenix or Tucson; September 19, Los Angeles at the Proud Bird Restaurant.

REGION 9
Plans to hold three (3) meetings each year. The next meeting is scheduled for July 13, 1984, in Seattle at the Boeing Sta. Lab.

REGION 10 (INTERNATIONAL)
Plan to hold their next dinner meeting on October 2, 1984, at Gaithersburg, MD. They also plan to hold the next Canadian Section Meeting in late November or early December 1984.

Schedules will be updated as firm dates and locations are received.
TOPICS FOR DISCUSSION

TOPICS FOR DISCUSSION, INCLUDING SUGGESTIONS BY THE BOARD OF DIRECTORS, ARE AS FOLLOWS:

1. National Voluntary Laboratory Accreditation Program (NVLAP) has proposed a LAP on the accreditation of Pressure Calibration Laboratories. NBS requested and received applications from interested companies. A workshop was held on May 16 to develop a Pressure Calibration LAP Handbook. There is much activity in the lab accreditation area and persons wanting to stay on top of it should contact John W. Locke, Manager, Laboratory Accreditation, National Bureau of Standards, NVLAP, Tech B141, Washington, DC 20234.

2. Support and service problems experienced by member companies in their dealings with NBS. Continue to inform Del Caldwell concerning the latest survey taken by the National Measurement Requirement Committee. Each Region should include this topic on their agenda and submit a separate report to both Del Caldwell and Art McCoubrey (NBS).


4. Training, including local efforts and that of Butler County Community College, and Golden West College. Adjunct training, NCSL Video Training Library, etc.

5. MAP. What is it, and how can you participate?

6. Productivity in Metrology - explore various approaches that stimulate an increase in productivity in the Metrology Lab by round-table discussion or other methods.

7. Electrostatic discharge: what are the problems and solutions?

8. Bar Codes, how can it help the metrologist?
NEWS FROM NBS

MEASUREMENT OF POWER LOSSES IN TRANSFORMERS

NBS and ASEA Electric have begun a joint research program to develop a calibration system to improve the accuracy of low-power-factor measurements of power losses in transformers. Such measurements are of great economic importance to the electric power industry, but they are difficult to make at high levels of accuracy, in part because of the low power factor and the lack of adequate calibration equipment. NBS and ASEA Electric are designing a transportable system that will make possible routine calibrations of power measuring systems accurate to two percent when measuring losses of transformers with a one to two-percent power factor. The system will include internal references and a self-checking capability. Details of the system will be published in the open literature, according to NBS and ASEA Electric.

CONTACT: Michael Baum, 301/921-3181

NBS DEVELOPING MATERIALS TO ENSURE INSTRUMENT SPECIFICATIONS

The Commerce Department's National Bureau of Standards (NBS) is developing a new class of Standard Reference Materials (SRMs) aimed at ensuring private and government laboratories that analytical equipment these labs buy meets proper specifications.

The first of the new reference materials is designed for checking the performance of gas chromatograph-mass spectrometers, which are used widely for environmental and biomedical analyses.

Bureau researchers are calling the new SRMs-slated for release by this summer-a "test case" for producing the new class of reference materials. Dr. Harry Hertz, who heads the NBS Center for Analytical Chemistry, says the bureau's goal in developing these new materials is to improve the reliability of measurements made in testing analytical instrumentation while easing the burden on equipment manufacturers who now must produce their own testing samples.

"These instrument manufacturers are in the instrument business, not in the chemical preparation business," he says. "We think that carefully characterized panels can help both the buyer and the seller."

In the past, instrument manufacturers have had to make up their own performance evaluation samples to verify that newly installed equipment meets sensitivity specifications. Soon these companies will be able to buy these samples in bulk directly from NBS, which will recover its expenses from the SRM sales.

NBS picked mass spectrometry as a trial area for the new SRMs because there are only a handful of mass spectrometer manufacturers, and most use the same testing compounds, making it an ideal test case for these new NBS materials. Several manufacturers have expressed interest in an independent reference material to be used for testing the equipment.

Every unit of the Gas Chromatograph-Mass Spectrometer (GC-MS) Performance SRMs will contain four vials: two certified concentrations—1 ng/mL and 5 ng/mL—each of methyl stearate and benzophenone. The lower concentration is to perform sensitivity checks; the higher is for tuning checks and for locking on signals. Methyl stearate is used for testing electron impact mass spectrometry, while benzophenone is for chemical ionization mass spectrometry.

The GC-MS Performance SRMs are expected to be available within the next year.

If the reference materials are well received, NBS may produce similar SRMs for gas chromatography, liquid chromatography, and other analytical equipment.

When ready, the GC-MS Performance SRMs will join the nearly 2,000 SRM types the bureau has produced since 1906. NBS currently stocks more than 900 different SRMs and sells 40,000 SRM units a year to more than 10,000 customers.

HIGHLY STABLE LASERS BEING DEVELOPED FOR PRECISION EXPERIMENTS

There is considerable interest in using tunable, highly stabilized lasers for precision measurements with cooled, trapped ions; for some advanced types of optical memories; and for various precision tests of fundamental physical theories. A team of researchers at the Joint Institute for Laboratory Astrophysics (JILA) reports encouraging results in producing lasers for this purpose. In experiments using two JILA-built ring dye lasers pumped by argon ion laser light at 514 nm, the researchers have
NEW MILLIMETER WAVE NOISE STANDARD

NBS scientists, using a horn antenna, have developed the first national reference noise standard in the millimeter-wave region of the frequency spectrum. This cryogenic noise standard, in the frequency range of 75 to 110 GHz, will permit industry and government agencies to further the development and evaluation of critical components for millimeter wave systems. The standard represents a major step in noise standard development and will be useful in communications, defense, and aerospace applications. Design and Error Analysis for the WR10 Thermal Noise Standard (TN 1071) gives details on the design and construction of the waveguide horn antenna and isothermal cavity that serve as the noise power standard. The publication is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Order by stock no. 003-003-02538-1. CONTACT: Fred McGehan, 303/497-3246

REFERENCE FLAT PULSE GENERATOR DEVELOPED


SODIUM "POISONING" OF SEMICONDUCTORS STUDIED

Researchers in the NBS Center for Analytical Chemistry are using the bureau's 10 megawatt reactor to study how sodium ions can cause semiconductors to fail. Sodium can migrate in semiconductors, causing bridges that "poison" the devices, rendering them ineffective. To examine this, NBS scientists are "doping" samples with sodium to simulate conditions found during the manufacture and operation of semiconductors. Then using a nondestructive technique called neutron depth profiling (NDP), they are exposing doped samples to a beam of neutrons from the reactor. This allows a "map" to be made that profiles the depth distribution of sodium in the samples. Data from the NDP research will be used by manufacturers to design barriers for blocking sodium that will be placed within the protective oxide coating on semiconductors. NBS also is mapping other elements in semiconductors, such as boron and lithium. CONTACT: John Henkel, 301/921-3181

H-P RESEARCHER JOINS PROJECT ON LINewidth MEASUREMENT

A researcher from Hewlett-Packard Company has joined the NBS program to develop improved methods and standards for measuring linewidths on integrated-circuit photomasks and wafers using scanning electron microscopes (SEMs) or electron-beam measurement systems. As VLSI linewidths are reduced below 1 μm, SEMs are being used to measure these critical dimensions. However, the measurement theories, instrumentation, and reference standards that have been worked out for optical instruments do not exist for SEM and other e-beam systems. H-P physicist Dr. Steven Erasmus will work with the NBS Semiconductor Materials and Processes Division on a program to develop accurate edge-detection techniques; standard reference materials and procedures for the calibration of SEM and e-beam systems; and related instrumentation, including an automated SEM-based linewidth measurement system. This NBS Industrial Research Associate Program is expected to take about two years. CONTACT: Michael Baum, 301/921-3181
PROGRAM TO ANALYZE MICROELECTRONIC TEST DATA

NBS has developed a computer program, STAT2, which can be used to analyze data from integrated circuit test structures on semiconductor wafers. The program addresses the need to analyze, summarize, and display large amounts of data acquired using automatic test equipment. STAT2 reads data into a two-dimensional array; calculates the mean, sample standard deviation, and median; identifies outlying values; makes grey-tone, numerical, and contour maps on a line printer; makes a numerical map on a terminal; makes a histogram on a line printer; and identifies spatial correlations between data sets contained in a data base. STAT2 is written in FORTRAN for the VMS (VAX) operating system, but can be adapted to other systems. For more information or to have the files necessary to build the program transferred to a user-supplied tape, contact Richard Mattis, B356 Technology Building, National Bureau of Standards, Washington, D.C. 20234.

CONTACT: Michael Baum, 301/921-3181

NBS PUBLISHES NEW CATALOG OF STANDARD REFERENCE MATERIALS

A new catalog has been published which lists more than 900 standard reference materials (SRMs) available from NBS. For more than 75 years, NBS has provided SRMs to scientific, industrial, and commercial users throughout the world. They are used to help improve measurement accuracy by providing a way to calibrate instruments. SRMs, which are well-characterized materials with specific chemical or physical properties certified by NBS, include such items as cements, ores, metals, glass, plastics, foods, and environmental and clinical reference materials. The catalog's format provides quick access to material description, certified characterization, unit size, and type. Copies of the new NBS Standard Reference Materials Catalog 1984-1985 (SP 260), are available from the Office of Standard Reference Materials, B311 Chemistry Building, National Bureau of Standards, Washington, D.C. 20234, telephone 301/921-2045. CONTACT: Roger Rensberger, 301/921-3181

SEMINAR ON FREQUENCY STABILITY AND ITS MEASUREMENT

NBS will hold a seminar on frequency stability and its measurement July 24-26, 1984, at the NBS Boulder, Colo., laboratories. It will be an advanced version of the Frequency Standards and Clocks Seminar held in previous years and is intended for those with some experience and/or knowledge of the time and frequency field. The course will be taught on a theoretical level and will examine what frequency stability is and how it is measured. Topics will include short- and long-term stability, statistics of oscillators, phase noise measurements, characteristics of commercial frequency sources, time broadcast services, and methods for recovering time and frequency from these services. The fee is $575, with a registration deadline of July 13. For more information, contact James Jespersen, Division 524, National Bureau of Standards, Boulder, CO 80303, telephone 303/497-3849. CONTACT: Fred McGehee, 303/497-3246

WORKSHOP ANNOUNCED FOR NEW PRESSURE CALIBRATION SERVICES LAP

NBS is establishing a new laboratory accreditation program (LAP) to accredit testing laboratories that provide pressure calibration services for devices in the pressure range of 130 micropascals to 280 megapascals. To implement the LAP under the procedures of the National Voluntary Laboratory Accreditation Program (NVLAP), NBS will hold a public workshop to establish the technical requirements for accreditation and the proficiency testing methods for assessing laboratory capabilities. The accuracy of pressure measurements is important to nuclear power, aircraft operation, petroleum refining, food processing, and other activities that depend on accurate and reliable pressure measurements. For information on the Pressure Calibration Services LAP, contact: Manager, Laboratory Accreditation, B141 Technology Building, National Bureau of Standards, Washington, D.C. 20234, telephone 301/921-3431. CONTACT: Roger Rensberger, 301/921-3181

FAR-FIELD CALCULATIONS

A new publication, "Approximate Formulas for the Far-Fields and Gain of Open-Ended Rectangular Waveguide," (NBSIR 83-1689) provides electrical engineers with approximate formulas for calculating the gain and far-field pattern for open-ended rectangular waveguide probes used in making probe-corrected near-field antenna measurements. The two methods developed significantly reduce the previous limits of uncertainty for calculated probe characteristics. This publication is available for $8.50 prepaid from the National Technical Information Service, Springfield, VA 22161. Order by #83-233999
Measurement is a tricky business. Just when all the nanograms and millimeters—gathered with excruciating care—seem to be just right, there is always a "gremlin" ready to creep in and throw the whole pain-staking process out of whack.

The result can be stainless steel that rusts quickly. Or electronic circuits that don't work. Or dosages of prescription drugs that are ineffective, possibly even excessive.

This ever-present gremlin is something that plagues anyone who measures things in minute amounts: it's the lack of a reliable standard for comparing measurements. The Commerce Department's National Bureau of Standards (NBS) knows about the problem and often helps manufacturers, scientists, and lab technicians avoid the "drastic measures" that result from lack of standards.

Take the example of drugs used to control epilepsy. Most doctors—preferring the smallest effective dosage—prescribe anti-epilepsy drugs only after testing a patient with a trial dosage. The usual procedure is to draw a blood sample after the patient has taken the trial dosage for several days to determine the drug level in the blood. Then, relying on an accurate measurement by the lab analyzing the blood, the doctor decides on a dosage for the prescription. If the drug level found in the blood is too low to be effective, the dosage is upped; if the level is too high, the amount is dropped.

But suppose the lab reports the drug level as being low when it actually is above normal. The patient then could be prescribed excessive levels of the antiepilepsy drug. On the other hand, a high reading by the lab could result in a prescription that is too weak to work.

How could a lab that specializes in such measurements have these problems? It can happen when the lab doesn't have a standard for checking measurement accuracy. That is, the lab should have a standard sample of blood serum with a certified concentration of the drug being used. And for years, no such samples existed.

In 1974, the National Institutes of Health called on NBS to develop a reference material that once and for all would help produce correct lab reports. The resulting sample was offered for sale by NBS in 1979 and since has improved standardization in hospitals nationwide.

The bureau began producing Standard Reference Materials (SRMs) like the antiepilepsy drug sample nearly 80 years ago on the premise that instruments and people making precision measurements are not infallible. Even today, research has shown that measurement inaccuracies of 20 percent are common and that much larger errors—factors of 10 or more—are not unusual. NBS' goal is to steadily increase, through the introduction of about 25 new SRMs a year, the accuracy of the U.S. measuring system. Production costs are recovered through SRM sales.

Since NBS is not a regulatory agency, there's no federal law requiring that SRMs be used. But experience has shown that bad measurements can cause lost production time, wrong medical diagnosis, waste of energy and material, manufacturing rejects, and product liability problems. As a result, opposing parties can land in court over commercial, environmental, health, and safety issues. And the costs can be astronomical.

The bureau started its SRM program in 1906 when the American Foundrymen's Association approached the newly formed NBS with a request for a standard sample. Representing cast iron manufacturers, this group wanted the bureau to develop a reference material to check the composition of cast iron being produced. The four standard samples that resulted got the bureau program off the ground, and by 1911, at the request of organizations such as the American Chemical Society and the American Steel Manufacturers Association, NBS had produced SRMs for 25 different materials.

Reference materials the bureau has produced range from orchard leaves to urban dust to crushed-dried urine. Officials in the bureau's Office of Standard Reference Materials say they will tackle just about any request for developing an SRM given a justifiable need. Though more than 20 SRMs are added to the catalog each year, a like number are discontinued, and about 150 are re-issued. Of the 100 largest manufacturers in the United States, 83 use SRMs. Smaller companies also find NBS materials useful as references to produce their own "secondary" samples.

Although requests for new SRMs commonly come from private companies, other government agencies sometimes call on NBS to develop a reference material. That happened several years ago when the U.S. Environmental Protection Agency (EPA) needed help in measuring asbestos content in air samples.

EPA was studying emissions from roadway surfaced with crushed stone obtained from Montgomery County, MD, quarry. The stone contained small amounts of asbestos, and the environmental agency wanted to know how much was in the air around the roadways. Eight laboratories were contracted to measure the
asbestos concentration, and each produced vastly different results. For example, one lab measured 1,600 fibers per cubic meter while another came up with almost 55 million fibers for the same sample. Realizing that the problem was lack of a standard sample to evaluate the labs' analytical methods, EPA officials turned to NBS to develop an asbestos reference material. The resulting SRM, which has a certified number of asbestos fibers, is now available.

Over the years the bureau has offered nearly 2,000 different SRMs and currently has more than 900 available in its inventory. Each year about 40,000 units are sold to over 10,000 customers throughout the world. Funds from SRM sales cover the cost of production, certification and distribution of the materials.


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**EQUIVALENCE OF MEASUREMENT REFERENCE STANDARDS MAINTAINED BY UNITED STATES AND CANADA**

in Ottawa, on February 14, 1984, formal statements recognizing the equivalence of the National Measurement Standards of United States and Canada were executed for the following quantities:

- **SI Unit of Voltage** (equivalent within 1.5 parts on 10⁶, the Canadian unit being larger by 1.2 parts in 10⁶ within an uncertainty of 1 part in 10⁷, one standard deviation estimate)

- **SI Unit of Electrical Resistance** (equivalent within 2.5 parts in 10⁶, the Canadian unit being smaller by 2.0 parts in 10⁶ within an uncertainty of 1 part in 10⁷, one standard deviation estimate)

- **SI Unit of Electrical Capacitance**
  - (equivalent within 0.8 parts in 10⁶, the Canadian unit being larger by 0.6 parts in 10⁶ within an uncertainty of 1 part in 10⁷, one standard deviation estimate)
  - (another statement)

- **SI Unit of Length**
  - (equivalent within an uncertainty of 3.4 parts in 10⁻¹⁰, one standard deviation estimate)

- **SI Unit of Time**
  - (equivalent within an uncertainty of 1 part in 10⁻¹¹, one standard deviation estimate)

The statements were signed by Dr. Ernest Tipler, Director of the National Bureau of Standards for the United States and Dr. Larkin Kerwin, President of the National Research Council of Canada. Similar statements recognizing the equivalence of United States and United Kingdom measurement standards for these quantities were signed in October 1983. The statements of equivalence, the offsets and the related uncertainties are based on the results of interlaboratory technical cooperation.

The significance of the statements of equivalence of measurement units involves international trade and the related need to know the relationship of the national measurement systems of the partner countries. The statements are also important to programs for mutual defense.

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**NBS GUIDE FOR MEASUREMENT ASSURANCE PROGRAMS PUBLISHED IN TWO PARTS**

The long-awaited NBS guide for Measurement Assurance Programs (MAPs) has now been published in two parts:

- **Measurement Assurance Programs**
  - Part I: General Introduction
  - by Brian Belanger
  - NBS Special Publication 676-I

- **Measurement Assurance Programs**
  - Part II: Development and Implementation
  - by Carol Croarkin
  - NBS Special Publication 676-II


Those who are considering MAPs and those who are already using them will find the new publications to be helpful in resolving questions relating to benefits as well as questions that arise in MAP operations.

NCSL members interested in obtaining the MAP Guides may contact the Office of Physical Measurement Services at NBS. Telephone: (301) 921-2805.

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**NEW BIBLIOGRAPHY ON ELECTRICAL BREAKDOWN IN GASES**

The NBS Center for Electronics and Electrical Engineering has compiled a bibliography of currently published data on electrical breakdown in gases. The phenomenon of electrical breakdown or discharge in gases is an important consideration in the design and operation of power transformers and other
equipment using gas insulators. It is a complex phenomenon that depends on the gas involved, its temperature and pressure, the composition and shape of the electrodes, the location of dielectric solids, voltage and waveform, and other factors. The bibliography includes a list of archival papers and books published since 1950, an index indicating references that give particular types of data for each gas, an author index, and a list of relevant, regular technical conference. The compilation only covers gases considered relevant to electrical-insulation technology, and no attempt has been made to evaluate the data. "Bibliography of Data on Electrical Breakdown in Gases" (TN 1185) is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, $5.50 prepaid. Order by stock no. 003-003-02571-2. CONTACT: Michael Baum, 301/921-3181.

* * * * * * *

GUIDE TO CALIBRATING TEMPERATURE AND FLOW MEASUREMENT DEVICES

NBS researchers recently have developed guidelines on how to calibrate devices which measure temperature and flow of air, water, and steam in buildings. To efficiently operate energy management and control systems (EMCS), these measurements must be accurate. Two reports describe calibration techniques, give examples of how to use them, explain terms and devices, and provide other fundamental information. Both reports are available from the National Technical Information Service, Springfield, VA 22161. Order "On-Site Calibration Flow Metering Systems Installed in Buildings" (BSS 159) by PB #84-160993, $16 prepaid. Order "Calibration of Temperature Measurement Systems Installed in Buildings" (BSS 153) by PB #84-154004, $11.50 prepaid. CONTACT: Jan Kosko, 301/921-3181.

* * * * * * *
On March 27, 1984, the first meeting of the newly formed Denver/Boulder Section of NCSL Region 6 was held in conjunction with a previously scheduled Precision Measurements Association (PMA) meeting at Solar Research Institute (SERI) in Golden, Colorado.

The meeting agenda included:

a. A welcome speech by H. M. Hubbard of SERI.

b. A keynote address by A. K. "Ken" Armstrong of NBS regarding NCSL and its activities.

c. A roundtable discussion of area representatives' views regarding future activities for the new sections.

As expected, the turnout for this first meeting was relatively light with 14 individuals representing 9 organizations in attendance. Despite this fact, a cross-section of views were expressed that will form the groundwork for future activities.

The next section meeting has been tentatively scheduled for September 11, 1984.

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On May 16, 1984, the first 1984 Region 7 Meeting was held at the Decathlon Club in Santa Clara on May 16, 1984. Twenty-seven persons attended representing 22 organizations.

After a short introduction, a roundtable discussion was led by George "Rusty" Jarzombek of TRW Microwave on "Productivity in the Calibration Lab." During this lively discussion ideas and opinions were presented by the attendees on measuring, improving, and assigning a cost to productivity. There was an excellent interchange of ideas and future meetings will continue to have a roundtable discussion topic scheduled.

Carl Quinn of Simco presented some slides and notes on his trip to mainland China under the auspices of the United Nations. While in China he conducted seminars on metrology and visited several of the Chinese labs.

A committee of Jim Ingram, Mike Zall of Simco, and Tom Freeman of Watkins-Johnson will design a questionnaire on salaries in the metrology field. This will be sent to San Francisco Bay Area employers including NCSL members. The results of the survey will be reported at the scheduled November 1984 meeting.

The last agenda item for the day was a screening of the videotaped speech by Jack Jackson of American Airlines at the 1983 NCSL Conference at Boulder, Colorado. This was well received even by those who had attended the conference.

The next Region 7 meeting is scheduled for November 14, 1984.

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Alert members of Region 7 participate in lively discussions under direction of coordinator Jim Ingram.
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St. Louis, MO 63108
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49-104 Petah Tikva, Israel
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Tel. 03 9262232

Mare Island Naval Shipyard Vallejo, CA 94592
Delegate:
Vincent Damriss
Tel. (707) 646-4565

Chung Shan Institute of Science and Technology
P.O. Box No. 1-22-2
Lung-Tan, Taoyuan, Taiwan, Republic of China 325
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Yaw-Poo Lin
Tel. 02 3814014 X2604

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363 CRS/MAC
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Arnold Irving Rowe
Tel. (703) 455-7158

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Tel. (313) 777-7100

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Boulder, CO 80303
(303) 497-3237

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OTHER INTERESTED PARTIES

Dr. A. McCoubrey, Manager
Industrial Measurement Stds
Center for Absolute Physical Quantities
National Bureau of Standards
Washington, D.C. 20234
(301) 921-3801

R. Keith Kirby
Office of Management Services
National Bureau of Standards
Washington, D.C., 20234
(301) 921-2805

BUSINESS SYSTEM
AD HOC COMMITTEE
Roland Vavken
D120 D31-HC02
Rockwell International
3370 Miraloma Ave.
Anaheim, CA 92803
(714) 632-2560

G.A. Uriano
Director of Measurement Services
Physics Bldg., A363
National Bureau of Standards
Washington, DC 20234
(301) 921-2806

Stanley I. Warshaw
Director, Office of Standards Policy
National Bureau of Standards
Washington, DC 20234
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MEETINGS AND PROGRAMS
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(819) 997-3411

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OIML
R. Keith Kirby
Office of Measurement Services
National Bureau of Standards
Washington, DC 20234
(301) 921-2805

PRECISION MEASUREMENTS ASSOC.
Glenn Rasmussen
Litton Data Systems Div.
8000 Woodley Ave., MS 43-87
Van Nuys, CA 91409
(213) 902-4267

ASTM
Ron Kidd
Microwave Associates
South Avenue
Burlingame, CA 01803
(617) 272-3000, Ext. 1402

CONF. ON PRECISION ELECTROMAGNETIC MEAS.
Dr. Robert A. Kamper
National Bureau of Standards
325 Broadway
Boulder, CO 80303
(303) 497-3237

GIDEOP METROLOGY COMMITTEE
Phil Painchaud
1110 W. Dorothy Drive
Brea, CA 92621
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Microwave Associates
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Burlingame, MA 01803
(617) 272-3000, Ext. 1402

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Rockwell International/Autonetics
Department 120 031-HC02
3370 Miraloma Avenue
Anaheim, CA 92803
(714) 632-5981

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Ron Kidd
Microwave Associates
South Avenue
Burlingame, MA 01803
(617) 272-3000, Ext. 1402
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