PRESIDENT’S MESSAGE — “THEORY Z”

I am sure that your first reaction was similar to mine. “What is Theory Z?” William Ouchi, a professor in the Graduate School of Management at the University of California at Los Angeles, coined the term and has written the best seller, “Theory Z”. I suggest that you get a copy and study it. Many people believe that it will soon become a common business term. Professor Ouchi has done an in-depth study of Japanese business and management techniques, and compares them to United States companies. According to Ouchi, the secret to Japanese success is not technology, but a special way of managing people. The results are lower turnover, increased job commitment, and dramatically higher productivity. How would you like to be responsible for that happening in your Company?

Professor Ouchi explains, explores, and discusses in detail why productivity is dependent upon trust, subtlety (understanding the relationship between people) and intimacy. The experience of a Metrologist certainly confirms that trust is a key ingredient to quality and productivity. Measurement integrity is mandatory! Without it, there would be no productivity in a Metrology Laboratory.

The theme for our 1981 NCSL Workshop and Symposium is “Quality Productivity — Metrology Management’s Goal”. Many of the papers and workshops are directly related to the message that William Ouchi brings to us in “Theory Z”. “How Important It Is To Listen”, “Quality Circles”, and “Human Behavior” are just a few examples. I think you will find that this year’s Conference is outstanding and certainly “state-of-the-art”.

Michael Maccoby, the author of “The Gamesman” is quoted on the cover of “Theory Z” as saying, “William Ouchi shows that we cannot copy the Japanese, nor would we wish to. But he describes the few American companies that have become successful by integrating similar economic and human principles into a philosophy of management. Ouchi presents the right model for American business”.

My January 1981 President’s Message spoke to you on the subject of “Awareness”. We have discussed and debated for many years that we feel that “Upper Level Management” (“they”) are not “aware” of the importance of the metrology function. I recommend that you study “Theory Z” and put into practice the things that are appropriate to your organization. I realize that everything cannot be done within the Metrology organization — but it will be a start. Everything has to start somewhere. I can assure you that if you lower turnover, increase job commitment, and produce dramatically higher productivity, “they” will become “aware”.

I do not own stock in “Theory Z” — but I wish I did! I do believe in the message that it sends. I think you will too when you read it. The first paragraph in the introduction contains this statement:

“Not long ago, I arranged a luncheon for two of my Ph.D. students with the vice-president of one of the most respected and largest firms in the United States — a company that regularly appears on lists of the “ten best-managed companies”. The luncheon provided an opportunity for these educators of the future to ask our guest questions for which his position and experience had given him a unique perspective. After a discussion ranging over many issues, the students summarized their interests in a single question: “What, in your opinion, is the key issue facing American business over the next decade?” His answer: “The key issue will not be technology or investment, not regulation or inflation. The key issue will be the way in which we respond to one fact — the Japanese know how to manage better than we do.”

How are you going to respond to that one fact?

John J. Lee, President
1982 NCSL MANAGEMENT ROSTER

The election returns are in and here are the results:

President  Dean Brungart  Teledyne Systems Co.
Exec. Vice-President  *Hartwell Keith  TRW DSSG.
Vice Presidents  *Pete England  General Dynamics
  *George Rice  Rockwell International
  *Bryan Werner  Westinghouse Electric
  Doug Doi  Lockheed California Co.
Directors  *Cliff Koop  Rockwell-Collins
  *Bob Lady  Lockheed Georgia Co.
  *Hugh Starling  General Electric Co.
  *Bob Weber  Lockheed Missile Co.
Treasurer  *Gary Davidson  TRW DSSG
Secretary  Selwyn Smith  RCA

*1981 election

EDITOR'S MESSAGE

Thanks TRW

I forgot to credit John Silletto of TRW, Editor of their QUEST magazine for the photos I used in the June 81 NCSL Newsletter for the TRW lab tour. Thanks John! And sorry for the oversight.

Congressional hearings on NBS Organic Act.

For any of you with an interest in the future direction of NBS, there's an important story on page 20 regarding the House Committee on Science and Technology, and recent hearings on possible changes to the Organic Act of Congress which established the Bureau.

The story behind the story is that determining long range plans and strategies for NBS is a terribly difficult and interactive process. The reason is that they serve so many constituencies, and operate in so many technologies from fire research to material analysis in construction failures.

The NCSL Board feels that possible modifications to the Organic Act may impact our industry's relations with NBS in the measurement services and measurement R&D areas. Hartwell Keith will be heading an ad hoc committee to make recommendations on an NCSL position.

It would be ideal if every industrial member of NCSL could prepare an input of their company or organization's needs from NBS, for the use of Hartwell's committee. Give it some thought!

John Minck
AROUND THE NCSL CIRCUIT

DON'T MISS THE 1981 ANNUAL CONFERENCE IN BOULDER
OCT 5—8, 1981
Keynote Address "How Important It Is To Listen"

14 SPEAKERS ON CRITICAL TOPICS
- Quality circles
- Calibration by satellite
- Software management
- NBS Boulder overview
- Reverse resistance MAP
- NRC calibration services
- Human behavior
- Quality, key to productivity
- Metrology to the masses
- Millimeter standards
- Trend in calibration services
- Chemical standards
- Quality education
- Space shuttle update

6 WORKSHOPS
- Quality circles
- Automatic calibration
- ATE calibration
- Adjunct Training
- Assurance of measurements
- MIL-STD-45662

FOR MORE INFORMATION CONTACT:
KEN ARMSTRONG
(303) 497-3787

CLASSIFY YOURSELF
Are you an active member
The kind that would be missed
Or are you just contented
That your name is on the list?
Do you attend the meetings, and
Mingle with the flock,
Or do you stay at home and
Critcize and knock?
Do you take an active part to
Help the work along,
Or are you satisfied to be the
Guy who just "belongs"?

Do you work on committees to
See there is no trick,
Or leave the work to just a few
And talk about the "Clique"?
So come to meetings often and
Help with hand and heart,
Don't be just a member, but
Take an active part.
Think it over brother,
You know right from wrong,
Are you an active member,
Or do you just belong?

Wes McPhee retires — a legend in his own time.

On June 25, 1981 a retirement party was held for Wesley H. McPhee at Charles Stark Draper Laboratories in Cambridge, MA. Wes had been employed at the laboratories for 39 years. Many of his co-workers attended as well as a large contingent from Region #1 and the Region #2 Coordinator of the NCSL. He was given many presents as well as a plaque from the NCSL presented to him by Harry Haymes, thanking him for the many years of dedicated service to the NCSL.

The picture, presented to Wes by his employees, shows Wes in a simulated work position. The fire hat and boots signify his position as Assistant Fire Chief of the Rockland, MA fire department. The badge displaying "#1 Chef" is for his sideline as owner of a catering business. The profits of his business are turned over to his church. The crossed fingers probably mean as all metrologists do "I hope this instrument will work!"

We all wish Wes well in his retirement. He will continue to attend NCSL meetings as he was made a Member Emeritus.
The meeting was hosted by the 3-M Corporation and Region 5 with arrangements through the able assistance of Mr. and Mrs. Clifford Koop.

PRESIDENT'S REPORT - John Lee

John reported that he was informed by the DOD that the proposed revision of MIL-HDBK-52 is still under review. The DOD will be meeting this month and plan to issue a revised draft for comments from members of the government and industry. NCSL has been assured that they will be on the mailing list for draft copy.

Dennis Gallagher has agreed to accept the position of co-chairman for the 1981 conference. With able help, he has the conference moving toward another success.

Congressional hearings on the NBS Organic Act were held in Washington, DC, on June 16, 17, and 18, 1981. John Minck was in attendance for a part of the session and has furnished a copy of the testimony.

An action item was given to Hartwell Keith to organize an ad hoc committee for the purpose of formulating an NCSL position paper on the NBS Organic Act hearings.

EXECUTIVE VICE PRESIDENT'S REPORT - Dean Brungart

Dean reported that George Rice, Roland Vauken, and Bob Couture, and with assistance from Dean Brungart, Hartwell Keith, and Gary Davidson, volunteered to work on the NCSL Long Range Plan as part of their MBA degree. They have completed the plan entitled "Strategic Plan 1981 - 1986" and submitted it to the Board of Directors.

George Rice explained the plan to the members, describing the various sections. The report is 123 pages long and too extensive to go into in any great detail. The most pertinent part of the report deals with the impact of dues increase for the membership at large with the resulting increase in revenue and the projects that it will support.

SECRETARY'S REPORT - Selwyn Smith

The current status of NCSL membership as of July 8, 1981, stands at 504 with 461 paid members in good standing. The year-to-date new member organizations is now 62.

SPONSOR'S DELEGATE REPORT - Bascom Birmingham

Bascom elaborated on his proposal for an NCSL research associate whose functions would differ from that which had been considered for the Fellow. The thrust of the new position would be at the policy/planning and liaison level, with emphasis on identifying future measurement needs and priorities and helping NBS technical divisions plan, initiate, and expedite MAP and calibration services for NCSL members. Copies of the job description are available.

Brian Belanger presented an overview of how the Research Associate Program works, covering such items as duties, advantages to both NBS and NCSL, and possible candidate requirements. He elaborated on the administrative aspects of the research associate as an individual and suggested several alternatives for handling employment and benefits. The consensus was that the research associate would be beneficial if details and finances could be worked out. It was suggested that the Research Associate Program should be included in the Delegates Meeting at the 1981 Conference.

Brian Belanger discussed the possibility of conducting two workshops sometime next year. One workshop would be on measurement assurance programs; and the other would be on trends in measurement requirements with Del Caldwell's committee.

The proposed Measurement Assurance Program Workshop is to conduct a 3 to 4 day session on MAPs. The workshop would start with the assumption that the attendees know nothing about a MAP and would proceed to give them the necessary knowledge to conduct a successful MAP exercise. There would be a fee for the course and each student would be furnished with notebook and text. The course would be sponsored by NBS. It was recommended that the course be audio or video taped.

SECRETARIAT'S REPORT - Ken Armstrong

Ken reports that the mailing portion of his responsibilities was most active this quarter with the mailings of the following items:

1. Metrology education news with letter from Bryan Werner
2. NCSL training-aid order forms
3. 1981 NCSL conference announcements
4. Labels and envelopes for member delegate certificates
5. 350 membership kits

6. NCCL Directory of Standards Laboratories

Ken also announced that the Training Aid Library is presently very heavily subscribed to and that there is a waiting list for all video tapes. Ken is in receipt of a 3/4 inch video tape called “Mecca Indoctrination” whose subject is a navy automatic calibration system.

Correspondence was received from the Mexican Embassy extending an invitation to the NCCL to attend the 1981 5th ILAC Conference which is to be held in Mexico City, Mexico, October 26 through 30, 1981.

Notice of "A Conference on Medical Devices -- Measurement and Quality Assurance" was received. This conference will be conducted September 24 and 25, 1981, at NBS, Gaithersburg, MD.

VICE PRESIDENT - LABORATORY MANAGEMENT AND OPERATIONS - Hartwell C. Keith

The new Chairman for the Product Design and Specifications Committee is Dave Hopping of Hewlett-Packard.

Calibration Systems Management - R. H. Gilbord, Chairman. A salary survey of member organizations was conducted, responses were received from 106 domestic and 3 international members. Results are in the June issue of the "Newsletter." On an overall average, salaries increased 23% in the last 3 years with a top engineering increase of 30%.

Bob is in the process of providing a composite of typical job descriptions representative of the metrology community. The Calibration Systems Management Committee will conduct a "Quality Circle" workshop at the 1981 Conference in Boulder. Dr. Bonnie Hunt, a guest speaker, will be a key panel member. A copy of the "Guideline for Metrology Managers Manual" will be in the mail to the Board of Directors by September 1, 1981. John Lee asked that all members be prepared to speak on the manual.

Measurement Assurance - Laurel Auxier. Laurel is in the process of analyzing the "Report to NCCL on NBS MAP Service." The Southern California group MAP experiences were reviewed and discussion of general MAP concepts were held with other MAP participants and NBS staff members.

During this process, it became evident that there is a great deal of confusion among the NCCL membership as to:

a. What a MAP is and is not

b. What is the commitment in time and money an organization must make to effectively participate in one?

c. What are the potential benefits?

In view of this analysis, NBS should be encouraged to:

a. Establish a special program to disseminate the knowledge and techniques which are integral part of maintaining the levels of accuracy and measurement integrity required in today's environment.

b. Make liberal use of MAP concepts, statistical techniques and actual examples from various measurement disciplines which the participants can relate to.

c. Present the program at several locations across the country.

Laurel's comments touched off an extensive discussion as to whether the NCCL was indeed able to answer the Bureau's offer on MAP. After inputs from many sources, it was agreed that John Lee would draft a response to Dr. Ambler of NBS, and present it to the Board for approval.

The Gage Block Pilot MAP continues to progress slowly. Preliminary data have been returned to three participants. The blocks are currently at Lockheed-Sunnyvale. W. Simmons, Region 6, is continuing his efforts to establish group MAPs not only in voltage, but other disciplines as well.

The planning meeting between NBS personnel and resistance pilot MAP participants was held as scheduled. Many of the details were resolved and schedule was prepared.

The MAP Handbook is scheduled for release by year end. C. Quinn, Region 7, reports their group is attempting to establish a reverse voltage MAP.


Pete reported that his committee is planning to have the capability at the 1981 Conference to reproduce tapes for the attendees.

Dr. Bonnie Hunt, at the 1981 Conference, is to present a speech on "Quality Circles: Square Deal for Productivity." Don Hobey, of SAI Dallas, has agreed to speak on a new method of calibration currently under development. The topic will be "Calibration via Satellite." Don will also be moderating another ATE workshop.
A paper on NBS ATP activity by Barry Bell and Oskars Petersens of NBS will be made available to all of this year's attendees.

Pete has noted that in most correspondence he has received that the use of the word "metrology" is rare. He urges all NCSL people to use the word where appropriate.

National Measurement Requirements Committee - Del Caldwell. The NMRC has taken the following actions during the 2nd quarter after receipt of a letter from the NBS Office of Measurement Services which advised of possible changes in NBS service for the calibration of the index of refraction. A communication was also sent to the DOD calibration coordination group for their review.

A letter was sent to NBS requesting that they provide a brief report on their progress towards meeting objectives expressed in their response to the 1978 NMRC Measurement Requirement Survey.

The NMRC responded to Dean's letter requesting areas for future funding by NCSL and suggested that the following be considered:

2. Metrology training tuition
3. Metrology Management Innovation Award

Del reports that he and Brian Belanger are exploring the feasibility of conducting a workshop next year that would provide a forum to identify and prioritize NBS calibration service requirements and to communicate existing and upcoming service capabilities.

Laboratory Evaluation - Ron Kidd. Ron reports that NVLAP for several programs is in a holding pattern. Brian Belanger will notify NCSL when they begin to move again. It should be noted that comments on the Weinschel LAP are still welcomed.

An action item was given to John Lee to write a letter to NVLAP stating NCSL's opposition to the accreditation of standards laboratories.

Biomedical and Pharmaceutical Metrology - Bill Fitzgerald. A Biomedical and Pharmaceutical Metrology Committee meeting was held July 15, 1981, in Chicago, Illinois. The major areas of discussion centered around the need for a voluntary guideline that can be effectively used by the member delegates in the medical care products industry.

The consensus of the committee was that a guideline consistent with the Food and Drug Administration's GMP and GLP rules and regulations would be beneficial to the industry and the FDA.

The first draft of the guidelines is scheduled for full committee review by October. It is planned that the BPMC will have the document to present to the NCSL Board of Directors for their concurrence by July 1982. The committee task force for this effort is:

W. Fitzgerald Baxter Travenol Labs
T. Held Abbott Labs
D. Duff Eli Lilly and Co.
R. Bertermann G. D. Searle
T. Chase Scientific Products, Amer. Hcs. Supply

Training and calibration personnel and validation and control of software programs used in production and quality assurance measurement equipment will be addressed in the guidelines.

The committee is of the opinion that the revisions reflected in MIL-STD-45662 will affect the medical care products industry equipment calibration requirements. The main concern is the out-of-tolerance paragraph.

Concern was expressed that only a small percentage of the medical care products companies participate in NCSL activities.

The next meeting of the BPMC will be held in Boulder in concert with the 1981 NCsl Conference. The committee proposed that the FDA participate in the activities of the BPMC.

Vice President Administration - Douglas M. Doi

A five-year budget forecast for the three committees in administration was forwarded to Dean Brungard as requested.

Meetings and Programs - Doug Doi. Doug announced the appointment of Moe Corrigan as Meetings & Program Chairman for the remainder of the year, filling the vacancy left by the resignation of Mike Suraci.

Moe Corrigan will chair the Director/Coordinators Meeting at the 1981 Conference.

Honors and Awards - Robert Lady. Certificates for the member delegates are presently being completed and will be in the members' hands by the end of August.

Education and Training - Bryan Werner. Bryan began his report by presenting an organizational chart of the Education and Training Committee showing it's various subcommittees. He stated that this form of organization allowed the committee to obtain more delegates who would participate with the internal workings of NCSL.
The course register is being updated, with a new issue scheduled for October, 1981.

The adjunct training group will be presenting a workshop demonstrating the first packaged course at the 1981 conference.

The video tape library is open and has a selection of 56 tapes with one to three copies of each on hand for loan. A volunteer is needed to recover the defective tapes.

Dr. Tom Tenhoeve presented an outline of the metrology course to be offered at Butler Community College this fall. The course, which is designed to lead to an associate degree, can also be presented as individual courses for those who may wish to attend a few of the courses on an adult education type basis. Tom asked the Board to study the document he presented and respond to Jim Tesa with any comments.

William Loeffler presented the report of the Adjunct Training Subcommittee. He reported that the training handbook will be distributed in January of 1982.

The training coordinators have been requested to survey the delegates to determine the training needs of their respective regions. Bill then presented the overview of the training package for the basic metrology course. He showed the goals, time frame, setting, structure, and material of the course. The basic metrology course is designed to require six hours, and consists of eight segments which may be given as a unit or individually.

A budget was presented to the Board to support the training package.

A motion was made, seconded, and passed to increase the education and training budget by $4,700, to be applied to the adjunct training basic metrology package.

VICE PRESIDENT COMMUNICATIONS AND MARKETING - Clifford Koop

Information and Director Committee - Jim Gilbert. Jim reported that the 1981-82 Directory has been distributed and the balance has been sent to the office of the Secretariat.

Recommended Practices Committee - Al Kohler. Al reports his committee activity is minimal at this time.

Newsletter - John Minck. John reported that the June Newsletter was in the mail by the 17th of July, and that that issue had dropped 236 associate subscribers who had received a free copy for one year. The Newsletter distribution is 1511 copies, with 1424 domestic and 87 international. Two copies are sent to the delegates and one copy to the appointing officer.

REGIONAL REPORTS - DIRECTORS/COORDINATORS

Region One - Moe Corrigan. A most successful meeting was held in Region One under the leadership of Harry Haymes. Hosted by GTE Sylvania, the meeting was attended by 25 delegates who came for a combination business meeting and technical session.

Region Two - Ed Nemeroff. Ed reports that Region Two held a meeting at Singer, Kearfort Division, in May of this year with 23 in attendance. The meeting highlighted an inside look at interferometry and holography as used in the testing of gyros and mechanical standards. There was also a presentation of the automatic recall system as used by Singer for scheduling and maintaining the history of some 80,000 calibrations and repairs.

The next scheduled meeting will be a microcomputer workshop with hands-on capabilities. The meeting will be held September 3, 1981, and will have a course fee of $50. Plans are also underway to conduct a joint regional meeting between Region One and Region Two. Cells from NBS for the Region Two MAP are expected early in the month of August.

Region Three - Fred Kern. Fred Kern, Coordinator for Region Three, regrets to report that the proposed meeting planned for May, 1981, did not occur. However, another meeting is planned for the first week in August when it is planned to have Brian Belanger as a speaker. A meeting is also scheduled for the month of December and will be held at COMSAT hosted by Marlin Johnson.

Attempts are being made to start a resistance MAP with Fred Kern's lab at the Pivot lab. Meetings held with the military labs were met with enthusiasm but lacked management support.

Region Four - John Riley. Region Four will hold their next meeting on September 15, 1981, at the Honeywell facility in St. Petersburg, Florida, followed by a January, 1982 meeting to coincide with the Board meeting at Daytona Beach.

Region Five - Joe Katoch. Eighteen attendees met at a meeting April 1, 1981 to discuss "out-of-tolerance" and MIL-STD-45662. The meeting was hosted by Frank Flynn in Newark, Ohio.

The last meeting for Region Five was held July 22, in Minneapolis.
Board Meeting

Region Six - Bill Simmons. Bob Weber reports that the next regional meeting will be held in Houston, Texas, on November 18, 1981.

Regional Seven - Carl Quinn. The next scheduled meeting for the region will be a microcomputer workshop with hands-on capabilities. This meeting will be held in September. Bob Weber reported that Region Seven held a meeting on April 16, 1981, at Santa Clara. Regional Coordinator Carl Quinn organized a most interesting meeting centered around two presentations by Hewlett-Packard managers.

The next meeting is scheduled for November 17 at Santa Clara and November 19, at Portland, Oregon. Bob recommended that Region Seven be split into two regions: the first to serve the Seattle-Portland area, and the second to serve the San Francisco area. An ensuing discussion pointed out that several other regions may need to be alerted or divided.

Region Eight - Rolf Schumacher. Rolf reports stepped up activities to establish metrology classes in the Southern California public schools under the direction of Joe Rothdieder, California State Principal Metrologist. This has led to the formation of a Region Eight Metrology Education Committee under the leadership of Bill Gibbs. The committee has formed subcommittees for the development of curricula, identifying instructors and public relations programs. The ROP targeted two Los Angeles areas and has now decided to form a third area in San Diego.

The next meeting of Region Eight will be September 23, 1981, on the Queen Mary.

International Region - Graham Cameron. George reported that topics for discussion at the International Region meeting, to be held at the 1981 Conference in October, are being solicited from the international members.

Graham Cameron reports that he expects to have 10 to 15 members to attend the international meeting on the night of October 5.

Ed Nemeroff reported that he had visited the National Research Council in Ottawa and has confirmed that the calibration costs are one-third the NBS costs for like calibrations. However, this price is for Canadian companies. There is an additional surcharge levied on US companies of $100. The calibration costs for a typical 4-bank standard cell is about $400. It should be noted that the majority of the US companies are located close to the border of Canada and New York State. NRC is likely to advertise their services in the US.

LIAISON REPORT - Dean Brungart.

The 1981 Measurement Science Conference will be held in San Diego at the Vacation Village Hotel on January 21 and 22, 1982. Although the Conference Committee got a late start, everything seems to be falling into place.

OIML Report - Don Greb. Except for the awaited returns of comments on the draft of PS82 from the delegates, there are no further actions to report.

GIDEP Delegate - Chuck Corbridge. Chuck has nothing to report at this time. He has asked that a replacement be found as a liaison as he can no longer serve in this capacity.

PMA - George Rice. George reports that the PMA has donated $1,000 to the Butler County Community College for developing a metrology program. Election of officers were held for FY82. George Rice is serving as President and Carl Quinn has been elected as Executive Vice President, with Bryan Werner as Director-at-Large.

There are no reports from ASTM, ASQC, ISA, or AALA.

1981 CONFERENCE REPORT - K. Armstrong/D. Gallagher

D. Gallagher - In view of the slow development of the 1981 Conference program, a one-page flyer giving dates of the conference and providing motel/hotel reservation cards and NCSL registration card for the conference was prepared and mailed out.

The daily schedule for the 1981 Conference begins Sunday night with a registration and open house with open bar being held at the Harvest House. Registration will continue Monday morning and every morning except Thursday. The day will proceed with lectures and papers being presented in the morning and the workshop sessions in the afternoon. This year there are six workshop sessions. The Delegates meeting is scheduled for the Tuesday morning session and the International Region meeting for Monday night. This year there will be a Director/Regional Coordinators meeting scheduled during the session. Thursday afternoon will feature a conducted tour and open house at NBS, Boulder, and the continuing of the NCSL Board of Directors meeting.

Ken Armstrong - picked up the report with highlights of the entertainment. For the delegate there will be a cook-out on Tuesday evening featuring Beefalo. Wednesday there will be tickets available for the Boulder Dinner-Theatre which will be presenting "Westside Story." The spouses program is a full-day program for each of the three full
days and includes trips to the mountains, Denver, and a belly dancing class. The total cost for the spouses program is expected to be $74.

ATTENDEES:

J. J. Lee - U.S. Instrument Rentals
Dean Brungart - Teledyne Systems
Dennis Gallagher - Leeds & Northrup
Douglas Doi - Lockheed California
Hartwell Keith - TRW
Cliff Koop - Rockwell-Collins
Selwyn Smith - RCA Corporation
Gary Davidson - TRW
Bob Weber - Lockheed, Sunnyvale
Moe Corrigan - Lockheed Electronics
George Rice - Rockwell
Hugh Starling - General Electric
Bascom Birmingham - NBS, Boulder
Ken Armstrong - NBS, Boulder
Brian Belanger - NBS, Washington, DC
Ed Nemeroff - Guildline Instruments
Joe Katoch - Gould, Inc.
Bob Guibord - TRW
Bob Lady - Lockheed-Georgia
Bryan Werner - Westinghouse
Pete England - General Dynamics
Ron Kidd - Microwave Associates
William Loeffler - Toledo Testing Labs.
Thomas Tehoeve - Butler County Community College

LATE NEWS JUST BEFORE PRESS TIME

New NBS Calibrations Catalog
Now Available

The National Bureau of Standards has just issued a new edition of the agency's complete catalog of calibration services.

NBS offers over 300 different calibration services in the areas of mass and dimensional metrology, mechanics and acoustics, electrical and electromagnetic quantities, time and frequency, thermodynamic quantities, optical properties, and ionizing radiation. The new catalog contains a complete listing of these services, including the relevant technical details and contact points for additional information. This catalog reflects changes in NBS measurement services as of the second quarter of 1980. Price lists, information contacts, and service changes are updated every six months with a special supplement which is mailed free of charge to all subscribers.

The new catalog includes information on the latest NBS Measurement Assurance Program services. These "quality control" programs for measurement processes allow the user to determine whether or not measurements made in the user's laboratory are at the intended level of accuracy.

Calibration and Related Measurement Services of the National Bureau of Standards, (SP 250) is available from the U.S. Government Printing Office for $4.50. Specify catalog number 003-003-02299-3. Copies are also available from Department of Commerce field offices or from:

Office of Measurement Services
National Bureau of Standards
Washington, D.C. 20234

Program Information Office
National Bureau of Standards
Boulder, Co. 80303
Do your neighbors understand what a metrologist is? Does your family understand what you do for a living? Does your boss understand—really understand—how your efforts benefit his company? Are you having trouble finding people educated in the specific field of metrology?

Most of us would have to respond in the negative to these questions. Why? As a bunch of professionals, our public relations track record has been pretty poor.

A change is possible, and one place to start is to get out of our labs and into our local schools. High schools could be your main target, but elementary grades through college are fair game for developing an awareness of metrology. Remember, these students are the source of future employees, co-workers, managers, and others who directly or indirectly may eventually hold the purse strings for metrology support.

Scared to enter the arena of the classroom? Don't be. Just remember that what's important to the student is not the everyday excitement of pursuing a part per million. Instead you need to relate metrology to their health, their pocketbook, and their future, as well as to the emerging sciences. Run the gamut from soup cans to space science to get the concepts across that metrology impacts them personally and that it's a key to technology.

Some techniques for doing this will be explored at the 1981 NCSL Conference, and someday there may be a "presentation package" made up to assist you.

In the meantime, why not give it a whirl? Arm yourself with a can of soup, a graduated cylinder, piece of wire, or whatever you think of to demonstrate to them that even "simple" measurements are neither simple nor obvious. For instance, you might get a good dialog going with them on what "normal" body temperature is, which gets into temperature scales, measuring methods, and other things which are usually glossed over. Or you might explore with them the things that can affect the amount of gasoline they're actually getting at a pump.

You don't need detailed statistics. Get into simple things that affect measurements—volume changes with temperature—inductance in a resistor—unknown percentage of water in soup—implicit trust in a new but uncalibrated simple instrument. Keep it lively and make it a dialog, getting them into the act. Form a "company" with half of the class. Let them "make" a critical medicine for the other half. Innovate as you go along. Whatever you do, you'll find the experience exciting for them and for you!

H. Bryan Werner, Chairman
Education and Training Committee
A SAMPLING OF AVAILABLE LITERATURE
FROM EQUIPMENT MANUFACTURERS

EDITOR'S NOTE:

Most of our members are probably quite familiar with the free publications available from equipment suppliers. But since there are new people coming into our areas on a fairly continuing basis, I thought it might be useful to ask various manufacturers for a sampling of their available service-oriented or instrument news publications.

So here is the first batch of returns. I've shown a typical copy photo and give a name at the company that you can contact to put your name on their mailing list or request a particular item.

A number of companies offer both hard copies and microfiche version of their material. Since some metrology labs use microfiche extensively, that sort of record storage can be handy.

I'm anxious to run material from other equipment manufacturers. Just send in copies of typical literature along with a name and address of your literature manager.

JOHN FLUKE COMPANY

Fluke suggests calling their local office for specific literature or to get on their mailing lists. You can call (800) 426-0361 or (206) 356-5400.

Or Write: John Mulvey
Mail Stop 250C
John Fluke Mfg. Co.
P.O. Box C9090
Everett, Washington 98206

Fluke review gives you news on new instruments.

A typical technical bulletin, this one covering the IEEE-488 BUS.

An extensive tutorial on calibration philosophy with plenty of applications data.

Service bulletins are related to specific instruments.

GOULD CORPORATION

Gould's contact for literature or mailing list requests is:

Marketing Services
Gould, Inc., Instrument Division
3631 Perkins Avenue
Cleveland, Ohio 44114
(216) 361-3315

Gould offers a whole series of applications briefs that are market and applications-oriented.

A tutorial note covering measurement considerations on low noise signals.

There's a whole series of troubleshooting bulletins, each oriented to a specific instrument.
Literature can be obtained from local field offices or you can write:

Inquiries Manager
Hewlett-Packard Company
1820 Embarcadero Road
Palo Alto, California 94303
(415) 857-8504

Bench Briefs is HP's periodic newsletter for service and calibration personnel. This issue gave a cross reference of IC numbers vs. HP stock numbers.

Service Notes are written for each product that requires some notification to users.

Service note index compiles hundreds of notes vs. model number. You get updates in Bench Briefs.

Issued when potential hazard situations are involved. Announced in Bench Briefs.

A bi-monthly publication with news of new instruments.

Tektronix offers a wide variety of sales and service literature. You can get on their mailing list by calling any of their local offices or writing:

Tektronix, Inc.
P.O. Box 1700
Beaverton, OR 97075

Tekscope tells you what's new at Tek in instruments and service.

New product and applications information on the TM 500 product line.

Applications library newsletter for 4050 users.

Handshake is a newsletter for programming instrumentation.
TRAINING INFORMATION

TRAINING AIDS (TAs) FOR USE BY NCSL MEMBERS

Training Aids (TAs) maintained by NCSL in the form of video tapes are kept at the NCSL Secretariat Office for free use by members whose dues are current.

Requests for use of training aids must be made by member delegates by filling out an order form. Training aids will be shipped only to member delegates. They are thereby able to exercise responsibility for their use and timely return.

The NCSL Secretariat and the borrowers will use prepaid first class mail, air parcel post, or United Parcel Service to minimize transportation time required for the training aids. Borrowers agree to return the training aids to the Secretariat within 30 days of the date that they are shipped to them.

Orders for training aids will be filled in sequence as the orders are received. In the event that a training aid is not available, the Secretariat will advise the requesting member of the approximate available date. This will be calculated on the basis of 30 days for each person ahead of him on the waiting list. Please advise the Secretariat if you wish to be removed from the waiting list.

Attached is a list of the Training Aids that are available. Please select the Training Aids that you are interested in and mail the request to:

NCSL SECRETARIAT
National Bureau of Standards
325 Broadway
Radio Bldg., Room 4001
Boulder, CO 80303

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STATUS REPORT

The Education and Training Committee met in conjunction with the Adjunct Training Subcommittee on July 16-18, 1981, at St. Joseph, Michigan. Attending were Jack Park (our host from Heath Company), John Martin, Doug Doi, Will Louffier, Milt Towne, and Bryan Werner.

Fluke Company is producing a series of video tapes on the philosophy of measurement and expect to have the first installment available for purchase later this year. Mike Edwards is in charge, if you'd like more information.

The Adjunct group will conduct a workshop at the NSCL Conference to introduce the first packaged course. Talks will be given at the main sessions by Bryan Werner "Bringing Metrology to the Masses," and Carol Maines "Quality Education." This committee will meet, and subcommittees are urged to meet during, before, or after the conference. Subcommittee chairmen are urged to attend the Board meeting during the Friday session when your work will be presented and discussed.

The Video Tape Library just reopened with 56 different tapes. Milt Towne reports that counting duplicates, the total available to loan is 100 tapes. NSCL Secretariat Ken Armstrong, who handles the loan-outs, reported at the Board meeting on July 23 that all copies are already loaned out. An interim volunteer to handle library maintenance (recopying to replace bad tapes) is being sought until a suitable subcommittee is formed.

The Course Register should be out in time for the conference. Earl Amano is working on updating the information for this issue. There was discussion on whether Earl's group or Adjunct Training should act as a repository of training information. It was decided that other subcommittees should keep their own collection of information for their particular needs, but that a training information group be an overall and comprehensive repository for the Education and Training Committee as a whole. "A system to interchange new information in an orderly way" will be an assignment for such a subcommittee.

BUTLER COUNTY COMMUNITY COLLEGE - METROLOGY PROGRAM UPDATE

The fall semester at Butler County Community College began Monday, August 24, 1981. Eight students were officially registered for the first year of the new Metrology Program.

Mike Bair, Dan Black, Nick Grujich, Scott Gray, Bill Hawk, Eric Nowicki, Barry Rice, and Mike Spohn took on the challenge to be the first in this new program. Five of these young people are recent high school graduates with good backgrounds in science and mathematics; one has recently been discharged from the Air Force where he had been through the Lowery Training Center; and two have worked in industry for a few years.

One other student, Jim Teza, who has a college background in physics, chemistry, electronics, and mathematics, has started at the second year level of the Metrology Program.

If these nine young men are able to finish their metrology education at the college, they will be the first college degreed metrology technicians in this country. Although they will receive an Associate degree, their education and training will have been much more demanding than that required from the usual associate degree. It is expected that such graduates will fill the gap between the technician and the metrology engineer.

We cannot say enough about the courage and the spirit of these nine young men. It is never easy entering a new college; but, to also be entering a new discipline, a discipline that most people have never heard of, is truly commendable effort.

The metrology student's curriculum consists of two full years of study—four regular semesters and two intensified summer sessions. Approximately 60% of the students' time will be spent in the laboratory (physics, chemistry, or electronics). The curriculum is not composed of numerous fragmented courses; all necessary courses are united into the discipline of metrology. The student will be in the lab three hours a day, five days a week, with four hours a week provided for individual problems the student may be having. All course work will include team teaching.

The first year of the curriculum has been completely outlined; the outline of the second year will be completed within the next two weeks.

During the first year the student will be working with the foundations of the physical universe. Both the macroscopic and microscopic world will be explored. He will be introduced to statistics and the basics of dimensional and mechanical metrology.
In the second year of the program the student will work with the measurements necessary for systems and information processing. After being exposed to various facets of the field of metrology, the student, in his final semester, will study a system which is of particular interest to him; this could be a biomedical system, a chemical system, an electronic system, etc.

The system a student will interface with will have to be one from a local industry. Therefore, for the curriculum to be successful, a great deal of cooperation and support will be needed from local industries.

Bryan Werner, Chairman of the Education and Training Committee, appointed a subcommittee to assist the college in finding such support. Chairing this subcommittee is Jack Balog of the Westinghouse Electro-Mechanical Division in Cheswick, Pennsylvania.

The committee has contacted 84 industries in the Western Pennsylvania area trying to solicit support for the Metrology Program. Carol Maines and James Teza, Director of the Metrology Center at the college, are currently visiting these companies attempting to form a coalition between the Metrology Center and the industries.

Mr. Balog has spent a great deal of time and energy on behalf of the college and has had many favorable responses from the managers who were contacted. Many dedicated people have worked hard to make this model program successful to meet the needs of industry. But, the problems are numerous. With such a small number of students, the program at this time cannot possibly be considered successful, either from the viewpoint of the college or from the viewpoint of filling the needs of industry. The college has received dozens of letters from industries who are in need of the graduates. The demand is certainly there.

Butler County Community College is offering a product for which the demand is great but the resources to make the product are difficult to marshal. So the problem is: How do we sell the field of metrology to students?
ATTN: NCSL REGIONAL COORDINATORS AND DIRECTORS

At the July Board of Directors meeting held in Minneapolis, Minnesota, I volunteered, and was appointed Chairman of the Meetings and Programs Committee. I will complete FY81, then serve FY82, completing my duties with the co-chairmanship of the 1982 conference.

As Committee Chairman, my main duties will be to coordinate and publish the meetings and programs scheduled by you, as they pertain to NCSL business. I will also pass on to you topics of discussion to be included in your agenda. Finally, I will ensure that the output of your meetings are published timely, and that your concerns are heard by the officers and directors of the conference.

By now, I hope you all realize that you are expected to be an active participant of this committee. It will take a very small effort on your part to make my job easier and obtainable. So lets work together by starting this September to keep each other informed as to upcoming meetings, current issues, solutions, interesting metrology subjects, new developments in the standards and calibration labs, and new management techniques.

Attached please find my first NCSL Newsletter Meetings and Programs Announcement. It will appear in the September Newsletter and I plan to update it for each subsequent issue. Please copy and markup for future inputs, feel free to make corrections and/or additions wherever needed. I do not intend to do this job alone, I am counting on your support.

M. J. Corrigan, Jr.
Meetings and Programs Chairman

MEETINGS AND PROGRAMS ANNOUNCEMENTS

October 5-8, 1981
NCSL 1981 Workshop and Symposium, "Quality Productivity--Metrology Management's Goal"
Hilton Harvest House Hotel
Boulder, Colorado

October 8-10, 1981
Annual Technical Conference sponsored by the American Society for Quality Control, "Midwest 81"
Regency Inn
Denver, Colorado

October 15, 1981
Waveform Recorder Seminar at National Bureau of Standards
Boulder, Colorado

January 21-22, 1982
1982 Measurements Science Conference, "Innovation Measurement--Today's Requirement"
Vacation Village Hotel
San Diego, California

October 4-7, 1982
NCSL 1982 Workshop and Symposium
National Bureau of Standards
Gaithersburg, Maryland

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. The next meeting will be held at Teradyne, Inc., Boston, Massachusetts, on September 30, 1981.

Region 2 - three (3) meetings are held each year, September, January or February and May. The next meeting will be held at Elmsford, New York, on September 24, 1981. A special Microcomputer Workshop is being held on September 3, at Elmsford, New York.

Region 3 - plans to hold two (2) meetings each year, spring and fall. The next meeting is tentatively scheduled for this fall.

Region 4 - will hold a meeting on September 15, 1981 at Honeywell in St. Petersburg, Florida. The next meeting will be held at Daytona Beach, Florida, on January 13, 1982.

Region 5 - holds two (2) meetings each year, spring and fall, with their next meeting in conjunction with our 1981 Conference at Boulder, Colorado.

Region 6 - the next scheduled regional meeting to be held on November 18, 1981, at Houston, Texas. Normally two (2) meetings are held each year.

Region 7 - two (2) meetings are scheduled. One (1) in Santa Clara, California on November 17, and one (1) in Portland, Oregon, on November 19, 1981. Typically two (2) meetings are held each year.
Region 8 - plan to hold a meeting on September 23, "Rochelle's Restaurant," Long Beach, California. Generally three (3) meetings are held each September, January, and May.

International - plan to hold its annual meeting in conjunction with the conference, October 5-8.

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

TOPICS FOR DISCUSSION AS SUGGESTED BY THE BOARD OF DIRECTORS, BUT NOT LIMITED TO ARE AS FOLLOWS:

1. NBS Research Associate sponsored and paid for by NCSL. His position will be that of a policy-planning and liaison level emphasis on identifying future measurement needs and priorities, and helping NBS Technical Divisions plan, initiate and expedite MAP and calibration services for NCSL members. Cost should be discussed as it impacts our yearly dues. For discussion material please contact me or any member of the Board.

2. Support and service problems experienced by member companies in their dealings with NBS.


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

5. MAP. What is it, and how can you participate?
George O. Rice, Manager, Metrology Department, Rockwell International, Anaheim, has been named the 1981-1982 Boss of the Year by the Anaheim Angels Chapter of the American Business Women's Association (ABWA).

Rice was graduated summa cum laude from West Coast University in 1972 where he earned his bachelor of science physics degree.

Among his community and professional activities are membership on the Board of Directors, and Delegate Member to National Conference Standard Laboratories; Executive Vice President, Precision Measurements Association, member of U.S. Delegation to Conference in Cairo, Egypt; and consultant for United Nations project review for Singapore Institute of Standards and Industrial Research.

Boss Night is an annual event established to honor employers of ABWA members and to familiarize employers with the educational association. ABWA is dedicated to promoting the professional, educational, cultural and social advancement of business women. Now in its 32nd year, the association has more than 105,000 members in all 50 states and in Puerto Rico.

NEW MEASURE OF SILVER ATOMIC WEIGHT: IMPROVED VALUE FOR FARADAY

In some of the most precise chemistry experiments ever, NBS researchers have measured the atomic weight of silver to the unprecedented accuracy of about one-half part per million (ppm), a five-fold improvement on the best previous measurement. This result, combined with previous work at NBS to determine the electrochemical equivalent of silver, yields a new value for the Faraday constant estimated to be accurate to 1.4 parts per million, or five times as accurate as the best previously measured value. This series of experiments greatly reinforces the previously observed discrepancy between the calculated and experimental values for the Faraday. The implication is that other values in the interrelated circle of constants that includes the Faraday are more inaccurate than previously thought. CONTACT: Michael Baum, 301/291-3181.

YELLOW SPRINGS INSTRUMENT CO. PURCHASES LABORATORY STANDARD PLATINUM THERMOMETER PRODUCT LINE FROM LEEDS & NORTHRUP

YSI has purchased the Standard Platinum Resistance Thermometer (SPRT) product line from Leeds & Northrup Co., North Wales, Pennsylvania, for an undisclosed amount of cash, effective June 30, 1981.

The SPRT is an interpolation standard for the International Practical Temperature Scale (IPTS) and is used primarily to measure temperature where traceability to national laboratories, such as the National Bureau of Standards, is required.

The Basic Metrology Group at YSI will offer quotations and accept orders for SPRTs after July 1, 1981, and expects to make shipments after January 1, 1982. Leeds & Northrup will cease production when it has fulfilled its current backlog of orders. The YSI Basic Metrology Group is well-known for its developments in thermometric fixed-points and fixed-point cells and provides calibration services of high order.

YSI is an established producer of industrial platinum resistance thermometers, precision thermistors and fixed-point cells for thermometer calibration. The purchase of the L&N line adds breadth to YSI's line of basic standards of temperature, and, according to its president, Harry Trolander, it is the company's intention to continue to develop, produce and market additional instrumentation for use in basic metrology.

NBS REPORTS ON NONIONIZING RADIATION MEASUREMENTS

The need to develop and improve instrumentation, measurement standards, calibration services, and standardized measurement techniques for nonionizing radiation far outweighs the need to establish regional calibration laboratories at this time.

That is the conclusion of a group of radiation measurement and control experts as reported in a study submitted recently to the Senate Committee on Commerce, Science and Transportation by NBS.
Prepared by the Committee's request, the report provides a detailed assessment of the existing measurement capabilities, applications, limitations, and requirements of the national measurement system for nonionizing electromagnetic radiation.

Some 84 specific measurement-related needs were identified with slightly more than half considered to be of high priority. About 80 percent of these high-priority tasks are being addressed by NBS and other organizations, the report says. The group listed the capability to make simultaneous measurements of both the electric and magnetic fields from a nearby source as the most important measurement problem to be solved at this time. This problem is among the high-priority tasks being addressed by NBS.

For the purpose of the report, nonionizing radiation is defined as that portion of the electromagnetic spectrum extending from 0 hertz to 300 GHz. This portion of the spectrum includes both static (D.C.) and slowly varying electric and magnetic fields (e.g., those from high-voltage power transmission lines), as well as microwave and other radio frequencies. Common sources include commercial and private broadcast stations, radar, and navigational aids, as well as microwave ovens and medical diathermy equipment.

**SOME SELECTED PUBLICATIONS OF NBS**


Key words: calibration; capacitance; four-terminal pair capacitance; impedance standards; inductance; residual series inductance; resonance techniques; three-terminal capacitance.

The low frequency (1 kHz) capacitance values of three-terminal and four-terminal pair air dielectric capacitors can be extrapolated to higher frequencies if the residual series inductance is known. A resonance method for evaluating the residual series inductance of these capacitor types, together with the extrapolation procedure, is described. For the region where the product of capacitance in farads and frequency in hertz is $10^{-2}$ or less, uncertainties of one percent or less may be obtained.


Key words: linear voltage response; rf voltage comparator; Schottky-barrier diodes; voltage comparator; wideband comparator.

A wideband rf voltage comparator is described which enables highly accurate rf voltage measurements over the range of 10 mV to 20 V rms from less than 100 kHz to beyond 1 GHz. This device uses a pair of matched Schottky-barrier diodes in each of two independent dual channel configurations. The coaxial line sections are impedance compensated to assure a VSWR of less than 1.03 up to 1 GHz.


Key words: attenuation; bandwidth; fiber optic joints; fiber optics; fiber optical-single mode; index profile; measurements.

This volume contains summaries of twenty-nine papers presented at the Symposium on Optical Fiber Measurements held October 28-29, 1980 at the National Bureau of Standards in Boulder, Colorado. Subjects included are the measurement of attenuation, bandwidth, distortion, and index profile, joint/defect characterization, measurements on single mode fibers, applied measurements and measurement standards.

**NBS-OCR-80-282. ALTERNATIVES TO PRECISION MEASURING AND TEST EQUIPMENT (PMTE) OUT-OF-SERVICE CALIBRATIONS, Raytheon Service Company (NBS contact: Ken Edinger), 98 pages (Aug. 12, 1980). Order from NTIS as PB81-110181, $8.00.

Key words: calibration labs; calibration, out-of-service; central calibration; in situ calibration; measurement; metrology; on-site calibration; PMTE.

This report describes various alternatives to out-of-service calibration within the Federal Government and private industry. Current calibration practices and recommendations for improvement are presented. Findings and recommendations are based on data gathered from visits to 23 government and industry calibration laboratories and survey questionnaires received from representative calibration labs in the Federal Government.

**NBS-OCR-80-283. OPTIMIZING CALIBRATION RECALL INTERVALS AND ALTERNATIVES, Raytheon Service Company (NBS contact: Ken Edinger), 112 pages (Oct. 1980). Order from NTIS as PB81-109597, $9.00.

Key words: calibration interval; calibration interval algorithms; calibration requirements; decision table; interval adjustment; measurement; metrology; PMTE; recall intervals.
This report describes methods currently used for establishing and/or adjusting calibration intervals within the Federal Government and private industry. Each interval method is analyzed in some detail and recommendations of feasibility for use are presented. Data for the report were gathered from visits to 23 government and industry calibration laboratories and survey questionnaires received from 51 representative calibration labs in the Federal Government.

**NIST 80-2078. THE NBS GAGE BLOCK CALIBRATION PROCESS USING A MEASUREMENT ASSURANCE PROGRAM.** D. C. Tucker, 9 pages (June 1980). Order from NTIS as PB80-200132, $5.00.

Key words: check standard; gage blocks; measurement assurance; random errors; standard deviation; systematic errors; uncertainty.

The calibration method for gage blocks, employing a measurement assurance program, is described for the use of an NBS calibration report. The various parameters and their significance to the calibration process are discussed.

**HOUSE SUBCOMMITTEE HOLDS HEARING ON NBS ORGANIC ACT**

The Bureau received high marks from Secretary Baldrige, a series of private sector and university witnesses, and members of the House Subcommittee on Science, Research and Technology during recent hearings the Subcommittee held on the NBS Organic Act. The Subcommittee scheduled the hearings to review the adequacy of the original 1901 law that established NBS and under which the Bureau still operates. A Subcommittee draft of proposed amendments to the Organic Act was circulated in advance of the hearings.

"I view it as one of the best (research labs) in the world," said Baldrige, who was the opening witness on June 18 for the 3 days of hearings. NBS Director Ernest Ambler accompanied the Secretary at that session. Baldrige noted that the Organic Act has allowed the Bureau to work on a wide range of problems and has encouraged it to develop close relationships with all elements of the public and private sectors. While it is important that we examine the Organic Act to make sure it still meets our current needs, I am not recommending any major changes to it at this time." As presently drafted, Baldrige said, the Organic Act "has been sufficiently flexible to permit NBS to strike a balance between its original mission and the needs of emerging technologies, such as automation, very large scale integrated circuits, and metals processing."

Baldrige outlined to the Subcommittee a series of organizational changes he is considering to "make the Department of Commerce more useful in helping improve the productivity of our industry and the competitiveness of our exports." He told the panel, "The National Bureau of Standards will figure prominently in these plans, I assure you."

Specifically, Baldrige announced his intention to create a new position of Under Secretary for Economic Affairs to bring various economic components of the Department together. Baldrige said that he expected the Bureau to work closely with DOC economic and policy analysis. This interaction would permit NBS "to gain considerable insight from this relationship for developing its own programs and setting its own priorities," he added.

In the same vein, Baldrige said that NBS "can provide our International Trade Administration" with help in understanding U.S. technological strengths and weaknesses and how American product standards differ from those of our competitors and our potential customers.

Declaring that "I am not sure our present structure takes full advantage of the Bureau's capability for evaluating technological factors" and referring to the expected NBS liaison with a new Under Secretary for Economic Affairs, Baldrige announced that he is "considering having the Bureau's Director report directly to me and not through any intermediate layers of management." The Secretary suggested that "this could help assure that NBS contributes more fully to our decision-making and, in return, gains valuable information on how it can contribute to our goal of helping American industry increase its productivity." He also said that it was considering shifting the Department's National Technical Information Service and the Office of Product Standards Policy to NBS.

With these changes being considered, Baldrige told the Subcommittee that "it would be a mistake to alter the mission of the Bureau or otherwise affect its operations by legislation until we have seen what develops from its new relationship to the rest of DOC." The Secretary suggested that he would be prepared to comment to the Subcommittee on the appropriateness of revising the NBS Organic Act in about 6 months.

Baldrige did comment on selected provisions of the Subcommittee's draft bill. With regard to the Bureau's overall mission, he stressed its foremost responsibility for custody, maintenance, and development of standards of measurement and related functions.

Baldrige made it clear that he wanted NBS to remain a research laboratory, and that he was strongly opposed to several sections of the Subcommittee draft which would detract from the Bureau's capacity to perform in-house
research. Along these lines, Baldrige expressed his opposition to sections of the draft which he said would "pressure NBS" into entering into joint research or joint technology development center arrangements. He also objected to the draft's provisions for NBS authority to award fellowships for graduate study in colleges and universities in science and engineering, and to the draft's call for a list of criteria which would, in his opinion, "compel NBS to contract out" various research projects. Baldrige testified, "I do not believe the bill gives NBS enough flexibility to consider other important factors such as the need for objectivity or the loss of capacity to perform in-house research. This can occur if we replace scientists with grant or contract administrators."

Baldrige also suggested that while provisions explicitly recognizing the Bureau's authority to work on measurement-related research in biotechnology would be welcomed, language authorizing NBS to perform research into medicine and life sciences would be inappropriate. The Secretary endorsed a clarifying section of the draft which states that NBS would perform a service for another agency only if the other agency agrees to pay for the work or if Congress appropriates funds.

Several Subcommittee members stressed their support for the Bureau's work and their desire that the Organic Act not be a factor which limits NBS' activities. Representative Don Fuqua (D-Fla.), Chairman of the Full House Sciences and Technology Committee, called NBS "one of the finest Federal agencies that we have." Fuqua said that the hearings would help determine "in the times of the 80's...where the work of the Bureau fits in with our overall purposes and policy." Subcommittee Chairman Doug Walgren (D-Wa.) suggested a longer range view, saying that he wanted to look at the question, "What should the Bureau be doing for the country 5, 10, and 20 years from now?"

Ambler answered a variety of questions about how the Bureau's work relates to technology development for industry, a key concern of several Subcommittee members. "The mission and functions of NBS are well accepted by industry. We work with them very well," but Ambler suggested that it would be inappropriate to use the Act for the actual development of technology.

He explained the Bureau's measurement versus development role in automation research, an area which Representative Allen Ertel (D-Pa.) suggested had a tenuous relationship to measurement and standards. Ambler told the panel, "We are extremely concerned that as U.S. industry, and small firms in particular, decide to use automated machine tools and robots...there will be this very serious problem with interfaces." He said, "It is precisely this interface where the Bureau of Standards is working." Ambler added that the current NBS Organic Act is adequate to permit NBS to continue research in this area.

Ertel was particularly interested in the NBS reduction in force and its impact. Responding to Ertel, Baldrige cited the need to reduce the size of the Federal government in general and suggested that in his experience any organization, including NBS, should be able to reduce its staff by 10 percent while still operating efficiently. Baldrige added that if the Bureau's role is expanded as a result of the increased DOE emphasis on industry economics and competitiveness, he would seek additional staffing for NBS.

Others testifying during the 3 days of hearings on the Organic Act included: Dr. Herbert I. Fusfeld, Director of the Center for Science and Technology Policy at New York University; William Carey, Chairman, NBS Visiting Committee and Executive Officer of the American Association for Advancement of Science; F. Karl Willenbrock, Professor of Engineering, Southern Methodist University, School of Engineering and Applied Science; Sidney Andrews, President, American Society for Testing and Materials and Director, Division of Standards, Florida Department of Agriculture and Consumer Services; James Bird, Director, New Jersey Office of Weights and Measures, representing the President of the National Conference on Weights and Measures; Daryl E. Tonini, Technical Director, Scale Manufacturers Association; and Stephen Berry, University of Chicago.

NEW NBS INSTRUMENT OFFERS ASSISTANCE IN MEASURING ELECTROMAGNETIC RADIATION

Private industry and government agencies, including the military, that are concerned with electromagnetic interference and hazards will be interested in a new instrument for monitoring electromagnetic radiation.

Developed by the Commerce Department's National Bureau of Standards (NBS), the isotropic electric-field monitor (EFM-5) meets the needs for measuring electromagnetic radiation in a variety of circumstances. The EFM-5 provides for the first time in a survey instrument a frequency range covering the AM, FM, and TV broadcast bands. It also responds to a wide range of signal strengths, with an accuracy of ±2dB the instrument covers the frequency range 200 kHz to 3000 MHz, which includes many broadcasting bands as well as special industrial applications—such as radio-frequency heat sealers and curers.

With the original goal of developing an instrument that could be commercialized, the NBS designers of the EFM-5 used readily available components and a system which is amenable to conversion for production. One company has already taken advantage of this opportunity and now offers a commercial version of the EFM-5, as a catalog item; several other companies having similar marketplace interests have been in contact with NBS.
In terms of its dynamic range, the EFM-5 can monitor electromagnetic fields on the order of 1 volt/meter, such as those produced by a broadcasting antenna at moderate distance from the antenna; such fields may produce interference or electromagnetic "smog" problems. The instrument can also measure electromagnetic fields as high as 1000 volts/meter, sufficient to monitor electromagnetic leakage at close quarters (e.g., within 5 centimeters, or 2 inches) from devices such as medical diathermy equipment, plastic sealers, and chambers for drying and curing materials.

The EFM-5 is completely self-contained and portable and is intended for use by one person in a variety of environments. The instrument consists of a probe (basically three mutually perpendicular dipoles, detectors, and filters), an electronic measuring and readout instrument, and a special high-resistance plastic transmission line which minimizes the EFM-5 disturbance of the field being measured.

The EFM-5 is described in Design and Calibration of the NBS Isotropic Electric-Field Monitor (EFM-5), .02 to 1000 MHz (TN 1033), which provides specifications and design, calibration, and performance data. This information is offered without patent restrictions, and NBS encourages others to make full use of the data.


MEASUREMENT COURSES OFFERED

Data-Validity, Cost Effectiveness, and Productivity-Increase in Measurement Systems

The latest development in the new Unified Approach to the Engineering of Measurement Systems will be presented at two short courses: Measurement Systems Engineering, March 1-5, 1982; and Measurement Systems Dynamics, March 8-12, 1982 in Phoenix, Arizona. Program emphasis is on how to increase productivity, cost-effectiveness and data validity of data acquisition groups in the field and in the laboratory. For 21 years almost 200 of these programs have been sponsored all over the U.S., Canada, Europe and the Far East by private industry and government installations. The March programs are the only ones open for registration by the general engineering profession. Featured speakers include Peter K. Stein, President, Stein Engineering Services, Inc., developer of the Unified Approach; Dr. Robert J. Moffat, Professor of Mechanical Engineering at Stanford University and Director of its Thermosciences Division; L. Spencer Wirt, Senior Research Scientist, Lockheed California Company, developer of a new family of acoustic materials and of the Dam-Atoll ocean-wave energy extraction method; F. Michael Tovey, Engineering Manager, Interface, Inc., Scottsdale, Arizona, Material Scientist and Transducer Designer; Patrick L. Walter, Ph.D., Supervisor of Test Measurements and Telemetry Division at Sandia National Laboratories, Albuquerque, New Mexico, for many years expert in the acquisition of high-speed transient data.

The program is intended for engineers, scientists and managers of industrial, governmental, and educational organizations who are concerned with planning, executing, and interpreting experimental data and measurements. The emphasis is on electrical measurements of mechanical and thermal quantities. The program level is at the Bachelor of Science college degree, although experienced technicians may obtain considerable benefit.

The fee for each course is $700; for both courses it is $1,250. Registration deadline is February 22, 1982. Descriptive brochure and information from Peter K. Stein, Director, 5602 East Monte Rosa, Phoenix, Arizona 85018. Telephones: (602) 945-4603, (602) 945-7333. CEU credits and certificates will be awarded.

NBS RESEARCH FORGES STRONG LINK WITH INDUSTRY

NBS is now inviting industry to expand its participation in the Bureau's Research Associate Program, particularly in the areas of automation, materials processing, electronics, and chemical engineering.

The program enables scientists and engineers from private companies, trade and professional associations, and other organizations to conduct cooperative research at NBS on projects of mutual interest. This year there are about 100 research associates. With their salaries paid by sponsoring employers or organizations, research associates pursue a wide range of projects including robotics, electromagnetic interference, fire safety, nondestructive evaluation, and dental materials.
The interaction is a two-way street. Research associates can benefit from the use of NBS facilities and from the opportunity to consult in person with the diverse NBS professional staff. Then they can take newly developed technology back to their organizations for prompt application. NBS gains from the program by learning firsthand the views and needs of the industrial community.

"The program is a great way for NBS to strengthen its working ties with industry," says Peter de Bruyn, NBS industrial liaison officer and coordinator of the program since 1966. "We welcome having researchers and managers tell us how they would like to work with us."

If you know of any companies or trade and professional organizations that might be interested in participating in the NBS Research Associate Program, you should call Peter de Bruyn at (301) 921-3591.

11TH ANNUAL NATIONAL MEASUREMENT SCIENCE CONFERENCE AND EXHIBITION

"Innovative Measurements — Today's Requirement"

The MSC Conference will be held on January 21-22, 1982, at the Vacation Village Hotel, Mission Bay, San Diego, California.

It is the only national conference of its kind, and is formatted to be of interest to all engineers, scientists, managers, lab supervisors, and technicians responsible for, or working with, measurements, measurement assurance, product testing, and quality control. Featured will be information exchanges and experiences in the problems of measurement. State-of-the-art approaches and technology, combined with the exhibition, offers the opportunity for open exchange with your counterparts in the measurement field.

Contact: Pete England, General Dynamics/ Pomona (714) 629-5111, ext. 4312/3945.

TECHNOLOGY TRANSFER FACT SHEET PUBLICATION AVAILABLE

The Navy Air Systems Command publishes a short newsletter every other month which reports on a variety of technology projects of interest to industry. A recent example was a remarkable rust-removal method in which a thick paste is applied to deep rust and the whole film peels off, rust and all. Another example is a digital electronic thermostat.

CONTACT:
Navy Technology Transfer Fact Sheet
Code E411
Naval Surface Weapons Center
Dahlgren, VA 22448

NEW NBS PUBLICATIONS ON OPTICAL FIBER MEASUREMENTS

Measurement of Far-Field and Near-Field Radiation Patterns from Optical Fibers (TN 1032). By Ernest N. Kim and Douglas L. Franzan, describes systems for measuring the far- and near-field radiation patterns from optical fibers. The authors discuss parameters that affect measurement from optical fibers. They also describe, with examples, radiation-pattern based measurements of other fiber parameters including radiation angle (numerical aperture), attenuation (using mode filters), index profile, core diameter, and mode volume transfer function.

Backscatter Measurements on Optical Fibers (TN 1034), by B. L. Danielson, describes in detail an optical time domain reflectometer and its components. The author examines the system performance for this device and describes experimental methods for measuring several parameters that characterize optical fibers. These include scattering loss and capture fractions for unperturbed fibers. He also reports experimental capture-fraction values for several step and graded-index fibers. These results are compared with theoretical predictions. Rayleigh backscatter signatures are presented for several fibers from different manufacturers, and fault signatures are shown for some intrinsic and extrinsic fiber perturbations.

The work supporting the data in both reports was done in the Electromagnetic Technology Division at the NBS Boulder Laboratories. Copies may be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. TN 1032 is available for $2.50 prepaid; order by stock no. 003-003-02304-3. TN 1034 is available for $3.25 prepaid; order by stock no. 003-003-02303-5.

NVLAP NEWS AVAILABLE FROM D.O.C.

For any members working in areas of laboratory accreditation, you may wish to get on the mailing list for NVLAP News. It covers news on a variety of LAP programs such as thermal insulation materials, carpet and concrete. For example, a planning meeting to discuss a discipline approach to accrediting chemical labs was reported.

CONTACT:
NVLAP News
Room 3076 DOC
Washington, DC 20230
June 16, 1981
GTE Sylvania
Needham, MA
H. B. Haymes
Region 1 Coordinator

Harry Haymes welcomed everyone on behalf of NCSL and host Herb Barclay of GTE Sylvania. Harry opened the meeting with an announcement that Wes McPhee of Draper Lab will be retiring at the end of June. Harry thanked Wes on behalf of NCSL for all his past assistance to the organization and a well deserved round of applause was generated by the meeting members.

Jim Valentino reported from the Board. His initial comments were directed towards the need for the lack of technician training programs in metrology. Jim suggested that the void created by the lack of training programs be filled by our region's members and stated that enough expertise is contained within our group to supply meaningful training.

Jim then followed with a brief talk on the status of Butler County Community College's metrology program. Three members of NCSL's Executive Committee accompanied Jim to Butler last spring on a fact-finding tour. They were confident that they will have enough students enrolled to begin academic activities in September of 1981. Texas A&M is exploring the possibility of a four-year BS program, although it is generally felt that the two-year curriculum at Butler has a greater chance of success and could easily be adapted to our local colleges.

The economic impact of budget cuts is being acutely felt by the Bureau and especially by their electrical department. Functional reorganization is in the process of being implemented which will entail reassigning personnel to departments displaying the greatest need. Jim suggested that the Bureau give up some of its calibrations to industry in order to improve measurement support to industry. The companies selected to perform the calibrations could, in turn, interface directly with the Bureau on basic measurements. Jim noted that many of our aerospace companies have the laboratory facilities and the discipline to do the job for the nation.

The growth of NCSL during the past two decades has made the organization large enough to prompt the suggestion that we become a professional group, enabling us to gain lobbying power in Washington. The report continued with a look at some of the problems facing today's calibration manager. Cited were the new set of challenges we did not have to face during the '60s, namely, high productivity goals, accurate measurements in an AT&T environment, depleted labor pool and a declining economic base to operate from. "Productivity" will be the theme of the '80s.

The NCSL Research Associate Proposal of the past several years, was never implemented, and a new proposal was generated by the Bureau. This proposal would ask the same parties to support a technical assistant to work at the Bureau in a laboratory environment. If a calibration manager has a candidate in mind, call either Jim Valentino or John Loe.

The final item in the report dealt with the proposal that Standards Labs be accredited. The proposal has met with mixed reaction through the industry. Jim noted that along with lab accreditation, you cannot have one without the other. The proposal can have far reaching ramifications, both at the lab and personnel levels.

A brief question and answer period followed the Board of Directors report. Wes McPhee asked if the extra funds collected from the increase in dues would be pumped back into the education programs. Jim answered that he hoped that would be the case, as it is the most desirable area to allocate a budget increase to.

Harry Haymes introduced Ken and Dennis Koep of Standards Reference Labs Company. Ken and Dennis time-shared a slide presentation on solid state voltage standards. A technical manual dealing with solid state references was distributed prior to the very informative session. The history of the volt, Josephson Junctions, Zero TC operating current, and buffer amplifier errors were among the subjects so expertly presented.

At the end of the presentation an informal discussion on MAP was held. Dennis commented that Region 2 has a 40-cell MAP working. Their ability to check check will eliminate the need to travel to the Bureau every year and that time could be extended to every five years or maybe never at all. Every area could tailor a MAP for its own needs. Wes McPhee said that Draper Lab has 10 banks of cells and he felt that a couple of banks could be donated to Region 1 for our MAP. The cell intercomparison calculations are done on a HP9845 desk top computer and a copy of the program can be obtained by sending Ken Koep a tape. Wes then circulated a questionnaire to determine how many cells we have among the group and if there was an interest in Region 1 MAP.

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Ken stated that Region 2 would be willing to share their method of operation with us since they have had a MAP going for two years. The pros and cons of a Region 1 MAP will have to be explored at future meetings.

Harry stated that due to the lack of time, discussion of the effects of MIL-STD-45662 would have to be postponed until our next meeting in the fall.

Harry closed the meeting thanking our gracious host, Herb Barclay, a special thanks to Wes McPhee for his participation and Ken and Dennis Koep, for their excellent presentation. Harry then announced that the next meeting of NCSEL will be hosted by Ted Majewski of Avco Systems Division.

ATTENDEES

H. Barclay
R. Bustin
N. Carbonneau
L. Carpenter
W. Conary
T. Driver
J. Erano
W. Paley
Plantaca
G. Gorman
C. Gustafson
H. Hale
P. Hardy
H. B. Haymes
J. Hersh
J. Kilroy
D. Koep
K. Koep
Lanzillo
R. Lozoki
T. Majewski
W. McPhee
F. Norris
R. J. Pietrowski
L. Potaro
D. Quimby
W. Robinson
R. Ross
A. Roy
H. Saltmarsh
G. Sherback
W. Spring
M. Towne
J. Valentino
P. Vogel

GTE Sylvania
Raytheon (Northboro)
Microwave Associates
Sandere Associates, Inc.
Analog Devices
Sprague Electric Co.
Northrop Corporation
Raytheon (Portsmouth, RI)
Continental Instrument
Hayes Instrument Lab.
Dept. of the Navy (Portsmouth, NH)
Naval Underwater Systems (Newport, RI)
Charles Stark Draper
Sanders Associates
GenRad
Standards Reference Labs
Standards Reference Labs
Essoo Standards Lab.
Avco Corporation
Charles Stark Draper
Raytheon (Andover)
Sanders Associates, Inc.
Teradyne, Inc.
Itel Corporation
Raytheon (Portsmouth, RI)
Electronic Development Corp.
Raytheon (Andover)
Raytheon (Wayland)
Charles Stark Draper Lab.
Digital Equipment Corp.
Sanders Associates
Sanders Associates
Guideline Instrument

Bill Wightman, representing John Fluke Company, the host organization for the workshop, welcomed the participants and presented an historical perspective of the development of the John Fluke Company and the test equipment which it produces.

Overview of the NCSEL BOD Actions: Hugh Sterling (GE Neutron Devices), NCSEL member, provided the participants with an overview of the structure, methods of operation, current actions and concerns of the NCSEL officers and directors. Hugh advised participants of recent BOD actions.

Hugh pointed out the desirability of member delegates being active on NCSEL standing committees, serving as regional coordinators and candidates for NCSEL offices. Such increased participation by member delegates is a major factor in influencing the course of the organization and maximizing the benefits of membership.

Regional Measurement Assurance Program Activity: J. Riley (NASA/KSC) proposed initiation of a Regional Measurement Assurance Program for mass. The proposed program calls for distribution to participating laboratories of pairs of 100 gram, 10 gram and 1 gram check weights which would be intercompared on a continuing basis by the participant as part of his routine mass measurement processes using weighing designs given in NBS TM952 Designs for Calibration of Standards of Mass and the participants usual mass measurement procedures. The purpose of the regional program is to provide participants with a means verifying the status of their mass measurement processes and to develop methods and procedures for group maps which can be applied to a variety of measurement categories in the future. The NASA KSC standards laboratory will serve as the "pivot" laboratory for the first phase of this effort. A participation questionnaire was distributed. REMINDER: Please return your completed questionnaires to the regional coordinator as soon as possible.

New Instruments and Techniques for Platinum Resistance Thermometry. Bill Jennings (Biometrics) described modification of a Mueller bridge to permit the use of the .01 ohm/step, .001 ohm/step and .0001 ohm/step dials as precise "decade" resistors which are quite useful in the calibration of other Mueller bridges. Bill pointed out that provisions for this were incorporated into some LAN 8169 bridges. Vern Stark (Biometrics) described calibration and use of a 8520A DVM and 162C
platinum resistance thermometer (PRT) as a system for direct reading of thermometer resistance when monitoring the temperature of circulating oil, temperature calibration batches. Because of the 10 milliamper current passing through the PRT, the effects of self-heating are significant and must be reckoned with in the calibration and use of the system. John Riley (NASA/KSC) demonstrated a commercial version of the AC thermometer bridge developed by the National Measurement Establishment laboratory for Australia. The inexpensive, portable bridge can resolve 0.025°C/0.01 ohm dial step when used with a 100 ohm thermometer, the unit also has a recorder output which provides resolution of much smaller temperature increments.

Education and Training Requirements Survey: A questionnaire prepared by the Education and Training Committee was distributed. A follow-up questionnaire was enclosed for those who did not attend the meeting or who have not completed one and was to be returned to Bob Schnepf, RCA, Regional 4 E&T Coordinator, as soon as possible.

Fluke Service Center Visit and Demonstration: Participants visited the Fluke Service Center repair and calibration facility and were given a demonstration of a new Fluke Automated Calibration System by host Bill Wightman and Walt Witko.

MIL Handbook 52 Revision: Participants were advised of the current status of the revision of MIL-HDBK-52. This document is of necessity being revised to be consistent with MIL-STD-45662B. Copies of those sections of the revision related to evaluation of contractor compliance with Sections 5.6.16 of the MIL-STD, Out-of-Tolerance Evaluators were then discussed. Only one facility of those represented had an ADP system in operation capable of identifying all equipment tested using a particular standard in the event of an out-of-tolerance condition of the standard visible to be detected. This capability was a creation of opportunity incorporated at the time major ADP program changes were made.

All participants agreed that significant cost impacts will result from compliance although no basis exists at present for determining what will constitute satisfactory compliance. All participants maintain record systems capable of establishing which standards and instruments were used to calibrate a particular lower level standard or unit of test equipment, with the one exception noted the procedure could not be reserved in existing systems and programs without major modifications. The consensus suggests a reasonable interpretation of the requirement places responsibility on each echelon for the evaluation of the impact of out-of-tolerance equipment on its own process and/or product. In addition, the echelon must notify echelons to which it provides equipment, services or materials which must in turn assure responsibility for their own evaluation and corrective actions.

It was agreed that the major impact of compliance will likely be for equipment user organizations/elements with a lesser impact on the calibration repair service provider organization/element. Obviously adoption of strategies such as identification of accuracy critical instruments/functions, redundant measurements at critical points, built-in system check standards, frequent operational checks will be implemented as a means to avoid potential problems. The short lead time for the circulation/review/comment sequence for the revision seems to indicate disinterest on the part of DoD in comments or recommendations from the technical community when R&QA program documents are revised.

Future Regional Meeting Schedule: The next Region 4 meeting was scheduled for September 15, 1981. The host organization will be Honeywell in St. Petersburg, Florida. The first 1982 regional meeting will be held in Daytona, Florida, on January 26, 1982. The host organization for this meeting with be GE (Daytona facility). This meeting will be held immediately preceding an NCST BOD meeting.

ATTENDEES

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<thead>
<tr>
<th>Name</th>
<th>Organization</th>
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<tbody>
<tr>
<td>B. Holbaugh</td>
<td>Florida Solar Energy Center</td>
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<td>B. Jennings</td>
<td>The Bionetics Corporation</td>
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<tr>
<td>R. Kotowski</td>
<td>The Bionetics Corporation</td>
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<tr>
<td>V. Stark</td>
<td>The Bionetics Corporation</td>
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<td>H. Starling</td>
<td>GE Neutron Devices</td>
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<td>N. Stan</td>
<td>GE Neutron Devices</td>
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<td>H. Cahill</td>
<td>GE, Daytona</td>
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<tr>
<td>D. Bowen</td>
<td>Harris</td>
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<tr>
<td>B. Mecheid</td>
<td>RCA World Services</td>
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<td>B. Schnepf</td>
<td>RCA World Services</td>
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<tr>
<td>R. Saxon</td>
<td>Honeywell, Clearwater</td>
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<td>J. E. Schumake</td>
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<td>L. Pinchock</td>
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<td>A. Devereaux</td>
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<td>B. Sabins</td>
<td>NASA, KSC</td>
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<td>J. Riley</td>
<td>NASA, KSC</td>
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<tr>
<td>B. Wightman</td>
<td>John Fluke Co.</td>
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The meeting was opened with an introduction of 18 attendees and the companies they represent.

Under Education and Training an announcement was made by Jim Valentino concerning Butler Community College's intent to produce a course of study in metrology, leading to a two-year associate degree.

CALIBRATION SYSTEMS MANAGEMENT, under Bob Guilbord, is working on the workshop for the upcoming conference, a salary survey, internal survey, and a metrology guidebook. Per the action item for Regional Coordinators
regarding the needs and wants of the membership of NBS calibrations or complaints against the same was mentioned with a request that they be forwarded to the Bureau directly with a copy sent to the respective coordinators for follow-up action.

Doug Dool announced that the John Fluke Mfg. Co. was in the process of producing a video tape on the subject of "Measurement Philosophy," a take-off on the manual of basic metrology published by them. Metron also has courses available, and these might be available through the tape lending library of NCSL.

Brian Beinger on the subject of user inputs to NBS of calibration needs, noted that inputs to the committee be a consensus of needs, collected and reviewed by organizations like NCSL. Needs that are required in the future due to the advancement of technology and research. Norm Belecki also reemphasized the need for user inputs both on the individual, as well as the organizational level. NBS, as any other corporation or facility, has budget restrictions, and therefore is bound to pursue the most pressing needs of the technical community. Without inputs from us, as members of this community, they must assign priorities according to the information they receive.

A round table discussion of Paragraph 5.6, Out of Tolerance Evaluators, of the new MIL-STD-45662 followed. One of the first problems that arises is the identification of product lines whose output could be used as either a saleable commodity, or become part of a larger system. In the latter case other inspection processes would detect an out-of-tolerance condition. However, if this part is sold as a repair part, or as the basis of a manufactured device, by another party, stricter controls must be used.

The part flow must be examined, with respect to the amount and position of the inspection up to the break off point. Identification of the equipment used and what policies nd procedures exist or are required to insure the delivery of a workable quality product or service. Depending on the complexity or the numbers of output versus time, daily, weekly, etc., would dictate the inspection system required. In the case of a rather simple, high volume PC board, a daily check at the start and finish of each shift of a master board with known and documented outputs would give an overall picture of the system operation. Any variance in the test results would involve only the production of one shift or PCB. It would be advisable to contact the outside inspection group as CASR to agree on what they will or will not accept to insure compliance with the regulation, per their interpretation.

Does this standard apply only to new contracts, or is it retroactive to past contracts still in effect? The consensus of the group was that each contract must be examined and judged on the specific wording. Also in the same light, we as members of NCSL should advise our respective contract administrators of this change so as to keep them informed to make the necessary corrections to maintain profits.

The question was raised on the definition of "An Out-of-Tolerance Condition." Are equipment malfunctions that render it inoperative considered the same as a shift of parameters? Are they listed as different categories, and what impact does this have on the test system.

The comments and ideas that were presented here seem to revolve around several key points. First and foremost was the necessity to examine both the actual operation and the existing documentation and their agreement. Does the existing documentation provide a means and the system for the handling of an Out-of-Tolerance Condition? This applies to both product and test equipment. Attempting to assign values or limits on the magnitude of an out-of-tolerance condition on test equipment before it impacts the quality of the final product. The institution of weekly, daily, or shift tests to verify the proper operation of the test system if at all possible.

A documented calibration chain of traceability for equipment on the production line back to a national standard by model and serial numbers. A system to inform QA or production and vice versa when an out-of-tolerance condition is suspected and what steps were taken to verify and/or correct it. This system should have the facility to inform those areas involved should a recall of the product become necessary.

The key words are formal documentation of a total procedure to handle the condition if and when it does occur. This procedure must include any exceptions or corrections that may be voiced by outside regulatory inspection personnel. To minimize the cost impact on the profit picture the manager must be made aware of these changes.

Norm Belecki of NBS spoke on some of the programs of the Bureau for AC calibration, reducing the extended turn-around times on some calibrations and the reasons causing the delays. Support of professional people in the various areas that may be lacking the professional support they require. This also holds true for the technician support that is necessary to maintain the smooth flow of work. Again, the need for inputs as to what is required for future standards and measurements as technology advances.

The meeting then moved to a demonstration of an ATE system programmed to run a performance and calibration on a bench type of DVM. The system used the IEEE-488 GPIB, and the device
under test together. The ease of selecting the various test parameters and their re-
selection and the tabulated results were demonstrated. Using a desk top calculator as
the controller with its internal printing capabilities produced a permanent record that
could be inserted into a calibration report.

Patrick F. Kelly of the Cleveland Electric Illuminating Company was the winner of the
door prize, a 25" tape donated by the Instruments Division of Gould, Inc. Frank A. Flynn
also received one for acting as the host.

The meeting ended with a tour of the excellent facility located in the Aerospace Guidance
and Metrology Center. As always, the membership was very impressed with the electrical
and mechanical laboratories.

ATTENDEES

C. M. Attinoto  Technicare, Inc.
N. B. Belecki  NBS
H. E. Bent    Monsanto Research Corp.
W. Crager    TTT North Power Systems
R. Ervin    TTT North Powre Systems
F. A. Flynn    Aerospace Guidance &
B. Gehiken  Cleveland Electric
J. E. Jaskiel Cleveland Electric Illuminating Co.
J. S. Katoh  Cleveland Electric Illuminating Co.
P. F. Kelly Cleveland Electric Illuminating Co.
C. Koop    Rockwell-Collins
K. A. Mayner Bailey Controls Co.
D. Pyko    Contel Standards Lab.
L. L. Royce GMC Truck & Coach
D. Satava  Technicare, Inc.
J. D. Schultz Magnavox Electronics Co.
E. Valdmanis Cummins Engine Co.
B. Weaver General Electric

NVLAP, MIL-STD-45662, and MIL-HDBK-52A - We
were honored to have Mr. John Lee (NCSL Pres-
ident) from U.S. Instrument Rentals, Inc., San Mateo, California, visit with us and to
discuss some of the NCSL program activities concerning laboratory evaluations. John
discussed NVLAP, MIL-STD-45662, and MIL-
HDBK-52A from the following three prospective points: the pros and cons of each viewed by
an NCSL executive; a businessman's point of view; and a personal point of view. Particu-
lar attention was given to MIL-STD-45662, page 3, paragraph 5.6, "Out-of-Tolerance
Evaluation." This requirement can have a significant economic impact regarding both
calibration management and product warranty. John suggested that each and every one of us
perform an in-depth review of the document to determine how the revision may effect our
particular calibration system.

NCSL Recommended Practices - We were also
very fortunate to have Mr. Robert Berger (NCSL
Director) from Lockheed Missiles and Space
Company, Sunnyvale, California, at our meet-
ting to discuss some of the NCSL Recommended
explained the NCSL Recommended Practices
Committee function and the current NCSL pub-
lished recommended practices, i.e. Establish-
ment and Adjustment of Calibration Inte-
ervals, Evaluation of Measurement Control
Systems and Calibration Laboratories, Pre-
paration of Calibration Procedures, Calibra-
tion System Specifications, and Preparation of
Specifications.

Region Meeting Poll - The recent poll of the
region membership resulted in the following
preferences: region meeting frequency, once
every six months; meeting location (in
preference order) Dallas, San Antonio,
Austin, Houston.

New Region 6 Delegate Members - Three new
dele t e  m e m b e r s  h a v e  b e e n  w e l c o m e d  i n t o
Region 6; they are as follows:

• Robert Berger, Aerospatiale Helicopter
  Corp.
• Andy Bradshaw, Rockwell International
• James Tew, Texas Instruments, Inc.

Automatic Test Equipment/Automatic Calibra-
tion System - The feature topic at this meet-
ing was Automatic Test Equipment (ATE) and
Automatic Calibration Systems (ACS) with Mr.
Don Tobey of Science Applications, Inc., in
Dallas, Texas. Mr. Tobey briefly discussed
his paper, "A Matrix Approach to Identifying
ATE Calibration Related Problems..." a new
three-dimensional contingency matrix is pro-
viding metrologists with solutions to complex
calibration problems. Mr. Tobey included in
his discussion: advances in ATE calibration
 techniques, self-calibration challenges,
traceability error, precision versus accu-

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Regional Reports
Aeronutronic Division of Ford Aerospace & Communications Corporation, a wholly-owned subsidiary of Ford Motor Company, is dedicated to the design, development, and manufacturing of advanced defense systems. The development by Aeronutronic of capabilities in tactical missiles, electro-optical systems, and ordnance and fire control, has demanded special capabilities of the Metrol-

The Aeronutronic Metrology Lab, a section of the Quality Assurance Department, has the following charter as delineated in the division's policy manuals.

- Maintain the Division's Primary Reference Standards, and establish the traceability chain from the National Bureau of Standards to the final measurements made on produced hardware.
- Provide calibration, maintenance and repair services on all calibrateable test equipment and systems.
- Maintain equipment calibration history records.
- Administer the computerized equipment recall system.
- Operate a division-wide pool for general purpose test and measuring equipment.

The Metrology Laboratory occupies over 8,000 square feet of floor space, services an inventory of more than 24,000 pieces of measuring and test equipment, and performs more than 20,000 individual calibration/repair events per year. A tour of the laboratory would include a look at the following basic functional areas:

- Primary Electrical Standards: Here the division's reference for the Volt, the Ohm, the Farad, and the Henry are maintained and disseminated.

The most notable recent accomplishment here is the successful transfer of the volt from NBS to the second Southern California Group in a MAP (Measurement Assurance Program) scheme. After 3 years of hard work, this transfer has been made to Jet Propulsion Lab, Teledyne, General Dynamics Pomona, and ASCO Labs, with Aeronutronic serving as the Pivot lab. Measuring systems had to be reworked and old equipment had to be replaced to accomplish this. The measuring system developed to make the measurements as the Pivot lab included an Aeronutronic-designed switch system which can be connected to three, six cell banks (1 reference and 2 unknowns), and a means of automatically recording and reducing the measured data with a HP 9825A Programmable Calculator system. The input to the calculator is from the TEGD-450 BUS output of a Guildline 9577 Precision Digital Voltmeter which is basically measuring the difference between two standard cells.

- Physical Measurements Lab: Two dead weight testers provide a standard pressure to 6,000 psi. Just being installed and implemented is a new vacuum standard - a Datametrics Type 1018 Electronic Manometer with a 1,000 torr Barocel Pressure Sensor. Temperature reference is provided by the L&N Platinum Resistance Thermometer and the Platinum 10% Rhodium thermocouple. The most often used bath medium is a Techni Dry fluidized bath which can operate to 600°C Celsius.

Infrared Radiometry has long been a requirement of the lab. Implementing lamp or blackbody standards into usable optical calibration systems has been a challenge requiring the implementation of the engineering concepts of design, manufacturing, assembling, precision measurement, error analysis, and reporting.

- Dimensional Lab: This lab is a Sheffield Modulab of some 740 square feet, containing its own independent environmental control system. The temperature is maintained as 20 ± 0.14°C Celsius and the relative humidity is less than 50%. It is equipped to make a variety of dimensional characteristics measurements with such equipment as a gage block comparator, internal measuring machine, standard measuring machines, helical path analyzer, roundness and concentricity measurement system, surface plates, gage blocks, thread wires, master thread set plugs and ring gages. Metric capability has been implemented on the standard measuring machines with an encoder and digital readout system. A MAP transfer with NBS has recently been completed for the Master Gage Blocks.
The Electronic Calibration Lab: This lab is responsible for the calibration, maintenance, and repair of all types of general purpose test equipment. Both a Julie Locost 106 Automated Calibration System and a HP 9825A Programmable Calculator System are utilized to automatically or semi-automatically calibrate such equipment as digital voltmeters, time interval probes, programmable power supplies, function generators, synthesizers, and counters. Oscilloscopes, recorders, power supplies, and RF signal generators, attenuators, spectrum analyzers are also calibrated by this group.

The Tester Calibration Lab: This is a satellite lab responsible for the calibration and maintenance of production test systems and equipment used in the division's manufacturing facilities. The development of "roll-up" standards is a continuing goal of this group. Fluke AC and DC voltage standards are successfully being used along with a programmable controller to perform automated calibration at the testers.

- The Division Test Equipment Pool not only provides a central agency for supplying the general purpose test equipment needs, it also screens the major project proposals for new technological requirements, and it receives requests for new types of equipment from the various using departments. The corporation over the past several years has realized the need to put modern technology into the hands of its people, and thus the pool has been replacing old equipment, obsoleted either by age or technology, with the newest available test equipment.

Programmable calculator systems, consisting of disk drives, thermal and impact printers, and a 4-color plotter are used not only for the automatic calibrating work described above, they are also used for support tasks such as automatically printing special forms required by the lab, doing special data reduction tasks and statistical summaries, and being utilized as a management tool to present budgets and work performance summaries to higher management.

In January, 1980, Aeronutronic joined only six other companies in the United States having been granted by the Department of Defense Contractor Assessment Program (CAP) award. The CAP award is granted for proven ability to control production quality. As part of the quality system, the Metrology Lab's high quality performance helped to make the CAP award possible.

The primary and working standards and the newer and more sophisticated technologies are only part of the story. People are also part of the story. More than 40 people consisting of supervisors, engineers, technicians, and support personnel all with extensive backgrounds of many years of service as metrologists are also the story in making the Aeronutronic Metrology Lab of the highest professional quality.
Phasemeter calibration measurements, using the Dytronics 311/RT-1/717 as the primary standard.

Measuring frequency offset of Crystal Oscillator using Rubidium vapor gas cell as primary standard.

Julie Research Labs Locost 10G Automatic Calibration Systems shown being used to calibrate a digital multimeter.

Swept attenuation and reflection coefficients measurement using Network Analyzers and swept generators.

The test group's "Roll-Up" Standard - Here shown under the control of the HP 9825 programmable calculator calibrating a Digital Multimeter.
Portable standards such as these are used for on-site calibration as much as possible.

The Standard Measuring Machine in the dimensional lab shown with the encoder and digital readout which expanded its capabilities to include metric measurements.

Roundness and concentricity measurement set-up in the Dimensional Lab.

Pratt & Whitney Helical Path Analyzer being used to assure proper thread characteristics on newly purchased gages.
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