NCSL PRESIDENT'S MESSAGE

More than 5 billion dollars is invested in measurement instruments each year. More than 50 billion dollars is now invested in instruments and facilities to produce more than 20 billion measurements daily. These measurements are used to achieve the proper levels of quality, reliability, interchangeability and economic values of our products. Metrology is an essential national resource and a key element of our technological effort and industrial development. But have we paid enough attention to the control of our measurements? Do we have control? Do we know what measurements in our plant need.....the greatest accuracy?.....the least accuracy? Do our design and test personnel know the cost of tolerancing? If we have too much accuracy in some measurements and too little in others we are wasting dollars and losing profits. To achieve quality assurance we must have measurement assurance. To achieve measurement assurance we need careful control of testing specifications, knowledge of allowable measurement errors, proper selection of measurement equipment, people and methods, and the assurance that the measurement process remains in control.

Our present idea of measurement control is an expensive one. We are relying on a calibration system where the attention is focused on instruments themselves. What about the user of the instruments? Is he properly trained? What about the environment of the instrument? Has it affected the accuracy? Measurement control involves more than just calibration. Some organizations are also auditing. But what are they auditing? In most cases all they are doing is checking to see if calibration labels are properly affixed to instruments and if the date has not been exceeded. Our audits must be more meaningful. They should be designed to tell us what instruments require calibration and/or repair and which ones do not. The auditing process should be built into the test and inspection equipment. We have an excellent opportunity now to do this by designing it into computerized test equipment. An automatic audit could be performed several times a day. Plug-in devices could be used by test and inspection personnel. In many laboratories, eighty to ninety percent of the instruments are returned to calibrations laboratories in an "in tolerance" condition. This isn't cost effective. The only instruments calibration laboratory personnel should see are those that need their service. Haven't we been doing things backwards? An auditing system can and should be developed to replace the calibration label and calibration interval system. Only then can we be assured that we are not either under or over calibrating. Both cost unnecessary dollars.

How can NCSL help? There is a need for tolerancing guidelines for design and test personnel. There is a need for measurement auditing procedures. There is a need for more education and training of all personnel engaged in measurements. Our committees can play an important role in developing these tolerancing guidelines, auditing procedures and training aids. In conjunction with NBS, we can provide our member organization with plug-in devices, procedures on how to use them and the coordination of pilot programs to measure their effectiveness.

I believe NCSL can and should help our organizations achieve cost effective controls in production and testing measurement processes, consistent with desired product reliability levels.
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**NCSL NEWSLETTER**

**MIKE SURACI, EDITOR**

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**MAILING ADDRESS**

NCSL Secretariat
National Bureau of Standards-200.01
Washington, D. C. 20234

The NCSL Newsletter is published quarterly in Houston, Texas by the National Conference of Standards Laboratories. It is sent to NCSL-Member Organizations and to a special listing of activities and key personnel whose work is closely related to that of NCSL. Non-NCSL-member subscriptions are available for $10 per year. Extra copies of an issue may be obtained at $2.50 each. Remittance should be made directly to the NCSL Secretariat.
MINUTES
BOARD OF DIRECTORS MEETING
NATIONAL CONFERENCE OF STANDARDS LABORATORIES
17 & 18 OCTOBER 1972--National Bureau of Standards
Gaithersburg, Maryland

ATTENDEES:

President: Ralph J. Barra (Westinghouse Electric Corporation)

Executive Vice President: Don J. Greb (Lockheed Missiles & Space Company)

Vice Presidents: Mort Angelo (Lockheed, California Company)
Ray Y. Bailey (U. S. Air Force)
Carl Boyer, Jr. (Honeywell, Inc.)
J. Dave Mitchell (Autonetics Division, No. American Rockwell)

Secretary: James A. Valentino (Sanders Associates)

Treasurer: Paul H. Hunter (Western Electric Company)

Sponsor's Delegate: Joseph M. Cameron (N.B.S., Washington, D. C.)

Past President: Frank J. Dyce (Martin Marietta)

Delegates: Marshall H. Brenner (Boeing Company)
Richard R. Boyce (Aerojet Nuclear Company)
C. James Lamey (Ball Brothers Research)
Maurice J. Sexey (E.G.&G., Inc.)

Medical Electronics Committee: Wesley H. McPhee (M.I.T. Draper Laboratory)

Directory Committee: Lewis R. Wears (Johns Hopkins University)

Newsletter: Wilbur J. Anson (N.B.S., Boulder)

************

NCSL Organization

The new NCSL organizational chart was reviewed.

Don Greb recommended that NCSL conduct a study on specification effects of instrumentation based on time and utilization vs. in-or-out of tolerance. A literature search was recommended to commence the study.

Secretary's Report

Mort Angelo displayed a sample of the new NCSL stationery and solicited remarks for correctness. Jim Valentino displayed a sample IBM membership tabulation and requested comments from the Board. The Secretary, Jim Valentino plans to send current membership status each quarter to the Board and regional coordinators. The tabulation will be broken into regions and will display the member organization, delegate, city, state, telephone number and NCSL activity.
MINUTES - continued

NCSL By-law Change

Dave Mitchell moved to amend the By-laws to read: "The NCSL President shall appoint all committee chairman."
The Motion was approved with required action to be taken by Frank Dyce.

Treasurer's Report

An estimated budget for Fiscal Year 1972-73 (October 1, 1972 to September 30, 1973) was presented by Paul Hunter, who asked the Board to review the budget and submit inputs so finalization could be performed on October 18, 1972.

A budget for regional coordinators and possible travel allowances were discussed by the Board. Ralph Barra voiced that the Fiscal Year operating budget does not require balancing. Projects requiring additional funds should be reviewed by the Board and acted upon. The proposed budget should be a guideline.

Frank Dyce suggested that a contingency fund be established for unforeseen circumstances.

Treasurer Paul Hunter suggested that the Savings Account be closed and the assets put into the Checking Account.

Carl Boyer moved that the Board ratify the above suggestion; seconded by Jim Leaney. The motion was approved with action to be taken by Paul Hunter.

Carl Boyer moved to accept the Treasurer's Report. Don Greb seconded the motion, which was approved.

Sponsor's Report

Joe Cameron reported that the NBS Fiscal Budget has been increased and will be expended mostly on controls and study programs. NBS has been funded for Automated Calibration System(s). NCSL has a new Secretariat - Mrs. Kay Etzler.

Vice President's Report - Administration

Organization Committee - Don Greb

An item of unfinished business is to change the By-laws on the election process to agree with the manner in which the 1972 election was held. To accomplish this, the following changes were recommended and approved by the Board:

Section V-D, changed to read:

"Delegates Assembly. Member Delegates and the Board of Directors, meeting in business sessions as the Delegates Assembly, shall consider reports of officers and committees and any other matters pertinent to the functions of NCSL. By resolution, the Delegates Assembly may
MINUTES - continued

recommend, but not direct, action to be taken by the Board of Directors."

Section VII-B, changed to read:

"B. Board of Directors

1. An election of officers and members to serve on the Board of Directors shall be held annually by secret mail ballot. Nominations and elections shall be conducted by the Nominating Committee, which will prepare a slate of two or more candidates for each position. The Immediate Past President shall be a member of the Nominating Committee. The new members of the Board shall assume their responsibilities on October 1 following the election and shall serve through September 30 of the year in which their respective terms expire.

2. The President, Executive Vice President, the Immediate Past President and Delegate Members shall serve one-year terms at the end of which the President becomes Immediate Past President, the Executive Vice President becomes President, and the Immediate Past President and Delegate Members retire from the Board unless elected to another position.

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

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

Section VII-C, changed to read:

"C. Balloting and Election Procedure. On or prior to July 1st, the Nominating Committee shall inform the membership of the proposed nominees. Additional nominations, by petition of three Member Delegates, shall be accepted until July 20. The Committee shall prepare a ballot to be mailed by August 1st, and all ballots
MINUTES - continued

returned to NCSL Secretariat by September 1st shall be validated
and counted and the results announced to the membership prior
to October 1st.

Section VII-D, deleted completely.

Honors & Awards Committee - Don Greb:

Wildhack Award - The 1972 William A. Wildhack Award for the best
paper at the JMC will go to Dr. Robert A. Kamper of NBS-Boulder for
his paper on the Josephson Junction. Arrangements have been made
for Ralph Barra to make the presentation early in November when the
JMC Steering Committee meets in Boulder.

Plaques for officers and Board members who are either terminating
their current service or are assuming new positions are ready for
presentation at this session of the Board. Letters of appreciation
are being sent to their management. A letter of appreciation was
sent to Dr. Elliott who spoke at JMC.

Meetings and Programs Committee - Don Greb

Tentative arrangements for the 1973 Conference have been made at the

Liaison Delegates’ Report

I.S.A. - Maurice Sexey.

Maurice Sexey had recently attended the I.S.A. Board of Directors
Meeting and offered the following:

a. I.S.A. is currently investigating to review what members wish in
way of technical shows and conferences.

b. The I.S.A. Board voted to incorporate in Canada. I.S.A. will now
comprise 73 sections in the U.S. and Canada.

NCSL Newsletter - Carl Boyer

Carl Boyer reported that the NCSL Newsletter will be published on
schedule. Mike Suraci, Lockheed Electronics Company, Houston, Texas,
has accepted the position of Editor.

Wildhack Award Guidelines - Don Greb

The NCSL Board of Directors has adopted the following as a guideline
for the Wildhack Award:
MINUTES - continued (Wildhack Award)

Background: The William A. Wildhack Award was established by NCSL in recognition of the man who was most instrumental in founding NCSL and who was the Sponsor's Delegate until his retirement from the National Bureau of Standards.

The award carries a $750 honorarium and an appropriately inscribed plaque and certificate. Presentation to the awardee is made by the President of the NCSL or his delegate in the executive offices of the company or agency where the awardee is employed. Presentation is to be made in the presence of the awardee's superior and the company/agency top executive.

Qualification: The award is made to an individual, company, or agency in recognition of a significant contribution to the field of metrology, with emphasis on metrology management.

In the years in which there is an NCSL conference, an award will be made to the contributor(s) of the best presentation at the conference.

In those years in which there is no NCSL conference, or at the option of the Board of Directors, an award may be made to the person, company, or agency deemed to have made an important and meaningful contribution to the field of metrology or toward the aims and purposes of the NCSL.

Administration: The award is administered by the NCSL Honors and Awards Committee.

NCSL Newsletter Distribution - Wilbur Anson

Wilbur Anson's remarks on the Newsletter distribution were reviewed by the Board and the following changes will take effect:

a. Each member delegate will receive two copies.

b. A copy will still be sent to the sponsor.

c. Each member of the Board of Directors and each Regional Coordinator will receive ten copies.

1974 Joint Measurement Conference - Ralph Barra

Ralph Barra is on the steering committee for the 1974 Joint Measurement Conference. A meeting of the committee is scheduled for November, 1972, and Ralph Barra will report at the next NCSL Board meeting.

Journal of Applied Metrology - Carl Boyer

A series of informal discussions before and during the recent Joint Measurement Conference led to the concept of a "Journal of Applied Metrology" as a possible solution to the communication problem.
The Board was given a presentation by Dr. James R. Seed of N.B.S., whose charter is to "study and define the National Measurement System Requirements and to develop a technique whereby the System can be continuously evaluated and updated".

Next Board Meeting:

The next NCSL Board of Directors Meeting is tentatively scheduled for January 25 and 26, 1973, in San Diego, California.
Ralph J. Barra - NCSL President
(Westinghouse Electric Corporation)

Ralph J. Barra received the B. S. degree in mechanical engineering from the Polytechnic Institute of Brooklyn in 1955. His graduate studies at the University of Pittsburgh and the University of Maryland include courses in Heat Transfer, Thermodynamics, Vibration and Stress Waves.

He has been employed by the Westinghouse Electric Corp. since 1955. In April 1968 he was appointed Manager of the Standardizing Laboratory. In May 1970 he was appointed Manager of the Product Qualification Laboratory. Both laboratories are located at the Defense and Electronics Systems Center in Baltimore, Maryland. He has been on the faculty of the Westinghouse School of Applied Engineering Science since 1966, as an instructor, teaching courses in "Mechanical Vibrations" and "Human Relations in Management".

Mr. Barra was elected a National Director of the Institute of Environmental Sciences (IES) in 1967. He has been a delegate to the National Conference of Standards Laboratories since 1968. In March 1969, he was appointed Chairman of the Calibration System Management Committee. In October 1969, he was appointed Co-Chairman of the Technical Program of the 1970 N.C.S.L. Conference. He was elected a Vice President in 1970 and is now serving as President of the National Conference of Standards Laboratories (NCSL), having been elected Executive Vice President in 1971.

He is a member of Pi Tau Sigma, IEEE and a Registered Professional Engineer in the State of Maryland.

Donald J. Greb - NCSL Executive Vice President
(Lockheed Missiles & Space Company)

Donald J. Greb was graduated from the University of Minnesota in 1941 with a Bachelor of Chemical Engineering degree. After a brief stint with Phillips Petroleum Company and service in the Air Force in World War II, he joined Honeywell in 1946 as a Quality Control Engineer and has been in the Quality Control and Metrology field ever since, working for Honeywell, Timex, Westinghouse, and now with Lockheed Missiles and Space Company in Sunnyvale, California, since 1963. He is a Fellow and Founding Member of the American Society for Quality Control and was Chairman of the Minnesota Section and Chairman-elect of the Lima, Ohio, Section. For the last five years he has been Manager of the Measurement Standards Laboratories at Lockheed Sunnyvale. He has been instrumental in setting up the State of California Measurement System.
Mort T. Angelo - Vice President
(Lockheed California Company)

Mort T. Angelo, Vice President for Administration, has been in the instrument testing and calibration field since 1934. After college, Mort began working for American Potash and Chemical Company, which included laboratory work at Brown, Taylor and Leeds & Northrup Instrument Companies.

Since April 1941, he has been working for the Lockheed Aircraft Corporation where he was instrumental in organizing the Standards and Calibration Laboratories. As the Manager of the Test Services Department, he is responsible for the Primary Standards and Instrument Calibration Laboratories as well as the Chemical/Physical/Metallurgical and Plastics Laboratories and Process Control throughout the Burbank and Palmdale facilities.

Mr. Angelo has been a member of the NCSL since its inception and has held several positions including Committee Chairmanships and NCSL Secretary. He is a Registered Professional Engineer in the State of California. His hobbies include photography and fishing - and bragging about the fishing!

Ray Y. Bailey - Vice President
(U. S. Air Force)

Mr. Bailey started his civil service career at Wright Patterson Air Force Base, Ohio in January 1946 after serving 3 years in the U. S. Army. He attended Sinclair College and the University of Dayton in Dayton, Ohio. He accepted a position at Dayton Air Force Depot as Chief of Plans and Programs in 1952. In 1958 he was appointed Deputy Director of Metrology for the Air Force, a position which he now holds. In 1962 he relocated the Directorate of Metrology from Dayton to Newark Air Force Station, Ohio. He was responsible for the design and construction of the air force Measurement Standards Laboratory at Newark Air Force Station. The planning, programming and operation of the air force metrology and calibration program has been his responsibility since 1958.

Mr. Bailey is a Vice President of the National Conference of Standards Laboratories; member of the National Research Council, Advisory Board to National Bureau of Standards; Air Force member, DOD Calibration Coordination Group and a member of many community and fraternal organizations in his home town, Newark, Ohio.
J. D. Mitchell - Vice President
(North American Rockwell Corporation)

J. D. Mitchell received the BSEE degree from the University of Colorado and continued in post graduate studies there while he was employed as an Electronic Scientist at NBS, Boulder. He has served in a variety of measurement-standards, quality-assurance, and management posts with Douglas Aircraft, Litton Industries, and the John Fluke Manufacturing Company, and is currently Manager of Metrology and Test Equipment Maintenance at the Autonetics Division, North American Rockwell Corporation. He is a member of IEEE and a senior member of both ISA and PMA. In the San Fernando Valley Section of PMA, he has served as Director, Vice President, and President, and has also been a Director and President of PMA's Orange Section. He is a member of the AIA Quality Assurance Committee - Calibration and Standards Project Team and also a member of the National Conference of Standards Laboratories (NCSL) since 1969 and was appointed Chairman of the Membership Committee in 1970. He has participated in numerous committee efforts and is currently Vice President for Laboratory Management and Operations.

Carl Boyer, Jr. - Vice President
(Honeywell, Inc.)

Carl Boyer, Jr., Vice President for Communications and Marketing, has been associated with precision measurements since 1927 when he joined the Rubicon Company in Philadelphia as an apprentice instrument maker. Since that time he has served as Chief Engineer, Rubicon Co.; Chief Evaluation Engineer of Honeywell's Brown Instruments Division; Product Manager, Laboratory Standards, Test Instruments Division of Honeywell; and presently as Senior Metrologist and technical advisor of Honeywell's Metrology Services Group headquartered in Annapolis, Maryland. He has also served as Adjunct Assistant Professor of Electrical Engineering at Drexel University, from which institution he received his BS.

A Member Delegate to NCSL since 1966, Mr. Boyer has served as member, and later chairman, of Specifications Committee; member, Calibration System Management Committee; and Delegate Member of the NCSL Board. He is also a member of ISA, PMA, and IEEE.
NCSL President, Ralph J. Barra (left) presents to Wilbur Anson of NBS-Boulder the NCSL "Outstanding Service" plaque. B. W. Birmingham (right), IBS Deputy Director represented NBS during the special presentation. Wilbur was editor of the NCSL NEWSLETTER for the past 2 years and was most deserving of the award.

NCSL President Ralph J. Barra presents to Frank Dyce the NCSL "Outstanding Service" plaque for his service as President of the NCSL. The new Vice-President looks on - going from left to right: Ray Bailey (USAF), Carl Boyer, Jr. (Honeywell), Ralph Barra (Westinghouse), Frank Dyce (Martin Marietta), Dave Mitchell (Autonetics), and Mort Angelo (Lockheed, California Co.)
ADMINISTRATION COMMITTEES - MORT ANGELO

Committee 1A - Meetings and Programs
Chairman: Andy J. Woodington of General Dynamics/Convair

Preliminary plans for the 1973 NCSL Conference are underway. The tentative dates are November 12-16, 1973, at NBS in Gaithersburg, Maryland.

A 1974 Joint Measurement Conference (JMC) Steering Committee has been formed. The next meeting is scheduled in conjunction with the ISA President's Winter Meeting and the NCSL Board Meeting (January 25 & 26, 1973)

Committee 1B - Honors and Awards
Chairman: Al Kelsey of R.C.A.

Committee 1C - Education and Training
Chairman: Marshall H. Brenner of Boeing Company

Video Tapes

Two tapes have been obtained from the Collins Radio Company as a gift to NCSL. These have been reviewed and their critiques are printed in this issue of the NCSL Newsletter.

The original plans of procurement and distribution have been thwarted during 1972. A new concept is now being negotiated with Hewlett-Packard (the major producer of applicable tapes) wherein Hewlett-Packard would continue to own all tapes and merely rent them to NCSL for distribution to and use by the membership. It is hoped that a working system can be resolved prior to the beginning of 1973.

This is the first of reviews on available videotapes which can be obtained from the Education and Training Committee and used by the membership for training purposes. These particular tapes are available in both 16 millimeter and videotape. Interested membership should direct their request to:

Marshall H. Brenner
Orgn. 2-4852 M.S. 87-46
The Boeing Company
Aerospace Group
P. O. Box 3999
Seattle, Washington 98124

Certifications of Laboratory Personnel

The Education and Training Committee has accepted another assignment which is an investigation to determine the value and mechanics of certifying laboratory personnel who are involved with calibration of test equipment. As this is developed and resolved progress will be reported in the Newsletter.
TRAINING TEXTS REVIEW

Two texts have been reviewed, their critiques prepared and printed in this issue of the NCSL Newsletter. Ten similar texts have been obtained from one publisher and are currently in the hands of committee members for review and critique.

The number of books to be reviewed and the task of doing so places a heavy burden on existing members; therefore, anyone who is interested in putting forth some effort in return for some new text should contact the Chairman.

"Introduction to Precision Electrical Measurements" by The Boeing Company's Metrology Laboratory Engineering Staff, Seattle, Washington; 3rd revision. Direct current and audio frequency measurements, standards and instruments are covered on 555 pages, 20 chapters, paper bound, 8½ x 11 inches. The intended reader is the laboratory technician making precision measurements at the standards laboratory level. Reader prerequisites include an elementary knowledge of: theory of electricity and magnetism, electrical circuit theory, and algebra and trigonometry. The text is excellent in its discussion of instruments, their operating theory and use. Schematics are given, relevant equations are presented with examples and the construction of standards are well presented. There is a wealth of general information which should be of value to anyone not already an expert in the specific measurement area under discussion. Chapters 2 through 9 on direct current measurements and the chapter on indicating instruments are exceptionally good. It is one of the best training texts available on the subject of precision direct current and audio frequency measurements.

"Experimental Backgrounds for Electronic Instrumentation" by Erickson and Wells, Laboratory Systems Research, Boulder, Colorado; 1970 revised. Direct current and audio frequency measurements, standards, and instruments with some electronic and transducer coverage are covered on 351 pages, 15 chapters, paperbound, 8½ x 11 inches. The text is directed to the laboratory worker at college level. Reader prerequisites include an elementary knowledge of: theory of electricity and magnetism, electrical circuit theory, and algebra, trigonometry, and some advanced mathematics. The text is a valuable source for the fundamental measurement techniques, especially direct current methods - resistance measurements, bridges, voltage dividers, et cetera. Additional information on electronics and transducers is given and a good chapter on rectifiers, filters, and waveforms is included. For a basic training text the references are above average and are a valuable feature. The text is clearly written with good continuity. It is an adequate text for all DC and most audio frequency parameters.
VIDEO TAPES REVIEW

Title: Simple Microwave Transmission Systems
Reel No's: ETV1-181, ETV1-0971-182
Program No: MWMT02-060368
Produced by: Collins Radio Company

Tape consists of two reels which should be viewed consecutively. Total viewing time is 90 minutes. The subject matter covers the basic considerations in the design of a point to point microwave communication transmission system. It discusses the concept of signal gain and loss in terms of dB, expressing of signal levels in terms of dBM, passive reflectors and antenna gain. Expressions for atmospheric transmission loss, and atmospheric effects on transmission paths (i.e., ray curvature) tables are given. Amplifiers and repeaters are treated as black boxes. The use of these concepts is demonstrated by several transmission system design examples. Tape is of primary interest to engineers, or engineering managers, being introduced to microwave communication transmission systems.

Title: Waveguide Measurements: Time Domain Reflectometry
Reel No: ETV1-0971-177
Program No: MWMT15-080169
Produced by: Collins Radio Company

This tape provides a brief introduction to waveguide time domain reflectometers (TDR's), followed by a laboratory demonstration of an operating waveguide TDR system. The viewers of this tape are assumed to be familiar with such terminology as attenuation, return loss, intermodulation distortion, and velocity of propagation. The function of such components as the pulse generator, diode switch, circulator, attenuator, and sampling oscilloscope in a waveguide TDR are explained during the demonstration. This tape is of primary concern to engineers or technicians involved with the installation or maintenance of waveguide transmission systems. Viewing time is 60 minutes.

MEASUREMENT REQUIREMENTS COMMITTEES - RAY BAILEY

Committee 2A - National Measurement Requirements Committee
Chairman: Marilyn L. Hed of TRW Systems

The National Measurement Requirements Committee is still in need of members. Anyone interested in serving on this important committee should contact Marilyn Hed - 213-535-1933 or Vice President Ray Bailey.
A report was made in the last newsletter concerning the NBS Study of the National Measurement System. At the NCSL Board of Directors meeting on 17-18 October 1972, Dr. James R. Seed was introduced as the NBS Coordinator for this study. Dr. Seed explained the desirability of NCSL participation in the NBS Study. A letter will be forthcoming from President Barra to the NCSL membership explaining the desired participation.

Committee 2B - Lab Evaluation

This committee is also still in need of members and a chairman.

Committee 2C - Medical Electronics
Chairman: Wesley H. McPhee of MIT Draper Laboratory
LABORATORY MANAGEMENT and OPERATIONS COMMITTEES -
DAVE MITCHELL

Committee 3A - Calibration Systems Management Committee
  Chairman: Laurel Auxier of Beckman Instruments

The original committee goal, that of developing a universal method for
feeding back out-of-tolerance data on instruments, is not practical, and
Region 13 is now drafting a position paper on the subject.

A possible goal is to investigate the possibility of developing a way of
optimizing maintenance and repair procedures. Investigations have shown
that the possibility of streamlining calibration procedures is small. More
realistic gains can be obtained in the repair/maintenance function. This
is being pursued now. (For additional details, please refer to "Notes from
Region 13's Meeting" elsewhere in this Newsletter.)

Committee 3B - Measurement Assurance Committee
  Chairman: Mike Suraci, Lockheed Electronics Company

The Measurement Assurance Committee has continued to pursue interlaboratory
intercomparisons placing particular emphasis on regional MAP activities.
Region #3 under the Chairmanship of Moe Corrigan (Lockheed Electronics, N.J.)
has established objectives which should prove to be of interest to other
Regions. A summary is contained in Region #3's report.

Committee 3C - Product Measurability Committee
  Chairman: Rolf Schumacher, Autonetics, Division of North American Rockwell

A new committee is being formed, the Product Measurability Committee, to
draft a plan of activities the calibration engineer should be engaged in to
interface the measurement specialties with the design of product and test
equipment to design both for maintainability. From practical examples and
case studies, the committee will develop methods for calibration engineering
to apply to this end.

From the metrology laboratory to the product, there are significant factors
which concern all metrology and quality assurance management and which
contribute much to product cost: tolerancing, product inspectability, and
measuring and test equipment maintainability. This committee has the task
of demonstrating how the cost of these factors can be minimized by overall
optimization and what role the calibration engineer should perform in this
process.

A committee charter is being drafted, and any ideas as well as nominations
of individuals interested in the problem and willing to participate in the
committee will be highly welcome by Rolf Schumacher (714) 632-5981.
COMMUNICATIONS and MARKETING COMMITTEES - CARL BOYER, JR.

Committee 4A - Newsletter
Chairman: J. M. Suraci of Lockheed Electronics

Effective with this issue, J. M. (Mike) Suraci has been appointed Editor of the NEWSLETTER and Chairman of the Newsletter Committee. Mike brings significant and related experience as Editor of the ISA Canaveral Section REBEL as well as Assistant Editor of the Lockheed Management Association's LEADER, published by the Houston Section of IMA.

Mike will actively solicit membership input for future NEWSLETTER issues. He is particularly interested in getting member delegate comments and suggestions. He may be reached at:

    Telephone  
    713-483-3105

Lockheed Electronics Co., Inc.  
Dept. 625-23/C03
16811 El Camino Real  
Houston, Texas 77058

Committee 4B - Information and Directory
Chairman: R. H. Verity of Leeds and Northrup Co.

250 packets of the 1971 NCSL Cost Visibility Exchange Reports have been distributed.

The new edition of the NCSL Directory is scheduled for publication February, 1973. L. R. Wears and E. B. Rogers are handling this project with J. M. Cameron of N.B.S.

The directory has been "computerized" to reduce preparation lead time and cost. This will also permit inclusion of additional timely and useful general information.

Copies of the current Directory are being sent to regional coordinators for distribution at regional meetings. Additional copies can be obtained from NCSL Secretariat. The Directory is a valuable tool for selling NCSL, and it is suggested that present member delegates use it as such when discussing membership with a potential candidate.

Committee 4C - Calibration Procedures
Chairman: M. L. Vyenielo of Lawrence Livermore Laboratory.

Committee goals include:

1. Removal of obsolete or incorrect procedures from GIDEP data bank.

2. Increasing the number of active GIDEP participants.

3. Working with NCSL Regional Coordinators to document cost avoidance and cost reduction savings data.

4. Investigation of calibration procedure documentation methods and formats. Microfiche, video tape, and others.
COMMUNICATIONS and MARKETING COMMITTEES - continued

Committee activities have included:

1. Participation with GIDEP in removal of obsolete procedures from data bank.

2. GIDEP Cost Avoidance/Reduction report was revised to include savings effected through use of calibration procedures.

3. Committee members were active at GIDEP meetings. Bob Littlefield, Hewlett Packard; Dave Worden, Navy Metrology Engineering Center; and Marty Vyenielo, Lawrence Livermore Laboratory were speakers at the 9th Annual GIDEP workshop. Committee members also conducted the Calibration Procedures Exchange Workshop at the October 1972 GIDEP workshop held at San Diego.

Committee 4D - Recommended Practices
Chairman: E. B. Rogers of Harry Diamond Labs.

With Elmo Johnson's transfer to the Office Chief of Naval Material, we were forced to lose his services as a Member Delegate and Chairman of Recommended Practices Committee. We are happy to report that Elmer Rogers, a long time committee member, has accepted the position as Chairman of Recommended Practices Committee.

In Elmo Johnson's final report, he noted that the committee had not received any proposals for new Recommended Practices during the past year. Further, that the May 1972 solicitation for comments on existing recommended practices, specifically RP #1, ESTABLISHMENT AND ADJUSTMENT OF CALIBRATION INTERVALS, and RP #3, PREPARATION OF CALIBRATION PROCEDURES.

Both of these are now two years old, and should be considered for review and possible update.

Chairman Rogers reports that the committee is actively exploring areas indicating a possible need for standard practice input. Further reports will be made as present activities develop.

PLANNING and OBJECTIVES COMMITTEE - DONALD J. GREB

This committee, which was formerly called the Long Range Planning Committee, has been made the responsibility of the Executive Vice President.

Considerable time at recent NCSL Board meetings has been devoted to ways and means by which the considerable resources of NCSL might be of greater benefit to the membership. One result of these discussions is the work of the Education and Training Committee toward making training tapes available. However, it still seems that the Board and committee chairmen are operating with somewhat limited input from the members in this respect. You can help us help you by letting us know your needs and desires.
THESE ARE YOUR REPRESENTATIVES

DELEGATES

M. SEXEY
R. BOYCE
A. AMES
L. PABLE
M. BRENNER
C. LEANEY

REGIONAL COORDINATORS

J. MINCK
R. SCHUMACHER
S. ALFORD
D. STARR
J. LEE

ZIP CODE

California 940-966
Arizona 850-880
Oregon 970-979
Washington 980-996
Alaska 995-998

Iowa 500-538
Wisconsin 530-549
Minnesota 550-567
South Dakota 570-577
North Dakota 580-598
Montana 590-609
Illinois 600-629
Missouri 630-658

Kentucky 400-427
Ohio 430-458
Indiana 460-479
Michigan 480-499

North Carolina 270-289
South Carolina 290-299
Georgia 300-319
Alabama 350-369
Tennessee 370-385
Mississippi 386-397

Florida 320-339
Puerto Rico 006-009

Massachusetts 010-029
Rhode Island 028-029
New Hampshire 030-039
Maine 039-049
Vermont 060-069
New York 090-119
Connecticut 060-069
New Jersey 070-089
Pennsylvania 150-196
Delaware 197-199
Washington, D.C. 200-216
Maryland 206-219
Virginia 220-246
West Virginia 247-268
MINUTES - REGION 3
MOE CORRIGAN, JR. OF LOCKHEED ELECTRONICS CO. (N.J.)
Regional Coordinator

The fourth meeting of Region Three was held October 12, 1972 at the James G.
Biddle Company, Plymouth Meeting, Pa. Attendance was thirteen—not an
unlucky number if individual participation can be used as a criterion.

Announcements of several coming events of interest were made by Herb Ingraham
of RCA Moorestown, New Jersey.

National NCSL Affairs
Carl Boyer reported on Board of Directors activities and related items.

NBS Current Awareness Service

There was considerable discussion of this service, in particular as to how
the NCSL membership could receive the maximum quantity discount rate to sub-
scribe. It appears that practically none of those present do subscribe but
that most of those present would subscribe at the lowest quantity rate. There
was general agreement that NCSL should investigate the possibility of pur-
chasing a large quantity of subscriptions and have them distributed to the
membership by a mailing service.

Automation in Measurement and Test

We received a series of very fascinating verbal reports from several of those
present on this subject as practiced in their respective companies. One
striking point of unanimity among all those present is that there is no
automated calibration activity carried on in any of their locations. The
reports show however, that automated testing and inspection is very heavily
established in the manufacturing activities. This applies to extremely
complex systems such as Military Electronics, as well as simple repetitive
component testing.

All of the Military Electronics Manufacturers indicated that their product
runs were quite small, down into the tens of pieces, and that nevertheless,
automated testing is used.

Jim Dock of Bendix gave the first report. All production testing is auto-
mated, much of it in computer control test bays. Products tested are Gyro,
Syncros, Radar and other similar electronic and pressure sensing equipment.
The test bays are built in-house, and in fact, they sell similar test vans
to the Air Force for testing the equipment in the field. The equipment is
based on digital voltmeters, and includes standards for critical quantities
and automatic self-checking routines which can take place as often as desired.

Jim noted, and others agreed, that the existence of this kind of test equipment
actually reduces the calibration load in the standards laboratory for two
reasons:
1. Measuring equipment is automatically tested by the built-in
   standards while in service and therefore only needs infrequent
   complete checking in the calibration lab.
MINUTES - REGION 3 continued

2. A lesser factor, since tests are made more rapidly on automated
test instruments in use for a given product through-put, is the cost of the automatic equipment compared to the manual equipment.

Ken Koep of Computer Diode Company reported that his company employs 60 people and makes various kinds of diodes and diode assemblies, including stabilized reference elements. At the present time, their only automated testing is a commercial unit for making routine tests on diode chips, and automatically sorting them. Although the reference assemblies are run on a production basis, there is no automated testing as yet, as the economics do not justify it. However, Ken is planning for this in the future by providing suitable interfaces on the manual equipment in use. He believes that automated voltage calibrations to plus or minus 1 ppm can be made at a rate of two per second when the economic factors justify the equipment investment.

Carl Boyer and Marty Lavin then reported for Honeywell Metrology. Carl has seriously considered commercially available automatic calibration systems and found that his operations are still far from being able to justify their use. He and Marty agree that the most serious limitation is that their operators tend to spend only a relatively small amount of their time calibrating instruments; there are always interruptions while adjustments or repairs are made, these being discovered in the course of re-calibration. There were also some comments about the claimed calibration time using certain automated equipment. Marty seemed to feel that his men can calibrate an oscilloscope in the same time claimed for the commercial automated equipment.

John Attanasio of ITT then reported that his plant employs in the neighborhood of 2000 people on defense communications work. Their automated test equipment includes computerized systems for testing transistors, integrated circuits, operational amplifiers and P.C. cards. These tests are made on Fairchild and Tereadyne mini-computer equipment. They also have a taped-programmed robot tester capability for doing continuity tests and the like. Two technicians are employed full time maintaining this equipment. John made a study of this equipment in his plant, finding about 4000 active electrical instruments. He has concluded that he cannot afford automated calibration equipment for this number of instruments.

Moe Corrigan reported for Lockheed Electronics Company. They have Tereadyne and G. R. computerized equipment for incoming inspection of all components and Ditmico Company cable tester for continuity in Hi-Pot. This is taped, programmed and uses a Burrough's computer to assist in programming. Their G. R. equipment checks P.C. cards and analyzes faults for testing larger sub-assemblies. They have both manual and computerized test stations, the later operated by a Univac computer. They are currently building a large check-out system for a Navy fire control. In the future they hope to add production control functions at each automated test station enabling feedback of product feedthru and reject information for managerial control.

For RCA Corporation, Herb Ingraham introduced Mr. Fred Pfifferling, Manager, Automatic Test, who gave a slide talk covering automated testing activities that have a wide variety of use in six different RCA plants making both low
MINUTES - REGION 3 continued

and high volume products. Magnitude of some of these test equipments was
impressive. RCA is currently experimenting with obtaining data feedback
from their test stations, and actually have designed a station at which the
operator reports the type of failure, repair parts used, etc. by pressing
keys on a small console as the work progresses.

Ken Jacobsen reported that R.F.L. has automated testers for incoming compo-
ment inspection. R.F.L. builds an automatic watt-hour meter and tester for
use by utilities, who must calibrate these meters in large volume. Ken warned
that it is necessary to pay careful attention to fixtureing when installing
automatic testing equipment. At his plant a system was installed,
but did not ever prove to be successful, and finally was returned to the
manufacturer.

Don Ironside reported for James G. Biddle Company with an employee total of
about 200 people that the product line is so diversified that no automated tests
are made, although the company has supplied automated component testers of a
specialized type, one example being testing of lightning arrester elements
for corona and other dielectric properties.

Measurement Capability Charts

Joe Gyurian, Lockheed Electronics Company, presented each person present with
a chart to be filled in with the measurement capabilities, including range
of parameter covered and accuracy, available at each laboratory. These charts
are to be filled in and sent directly to Joe well before the next meeting
(January) so that Joe can present some sort of a report on the overall capa-
bilities and proceed with the next step in this program for the January meeting.

Election of New Chairman

Moe Corrigan was elected Chairman of Region 3 for the coming year, succeeding
Herb Ingraham. The election was unanimous. Congratulations, Moe!

Next Meeting

The next meeting is scheduled for Thursday, January 11th at Bendix Corporation
in Teeterboro, New Jersey, with Jim Dock as our host.

Attendees:

Moe J. Corrigan, Jr. - Lockheed Electronics Company
Herb S. Ingraham, Jr. - RCA Moorestown, New Jersey
T. J. Hope - J. G. Biddle Company
Max J. Unis - Gage Laboratory Corporation
Don Ironside - James G. Biddle Company
Carl Boyer - Honeywell, Annapolis
Fred Pfifferling - RCA Corporation
John Attanasio, Jr. - ITT Defense Communications
Joe Gyurian - Lockheed Electronics Company
Kenneth J. Koep - CDCI Semiconductors
Martin T. Lavin - Honeywell, King of Prussia
James Dock - Bendix
MINUTES - REGION 5
JOHN LEE OF HONEYWELL, INC. (VA)
Regional Coordinator

The seventh meeting of Region Five was held October 5, 1972 at Johns Hopkins University Applied Physics Laboratory. Eleven delegates and guests attended.

Reports on JMC and the June NCSL Board of Directors meeting were informally presented by Ralph Barra and Carl Boyer.

The Measurement Assurance Program (MAP) was discussed, with a specific report by Elmer Rogers, Harry Diamond Laboratories, on techniques involving automated equipment and computer technology.

Member involvement in NCSL affairs was discussed. Region Five now has four members as committee members or officers, with six additional members volunteering for committee activity as a direct result of regional meeting activity. Mr. John Lee, Honeywell, Inc., 5558 Port Royal Road, Springfield, Virginia, was elected Regional Coordinator of Region 5.

The next meeting is scheduled for January 10, 1973 at the Timonium, Maryland offices of EIL Instruments, Inc. John DiGilio will be host.

Pictured Below: TOP: l to r - Gordon Morgan, E-Systems; John Rodgers, Bendix; Galen Sembower, IBM; Charles Stockman, Md. State Dept of W & M; Elmer Rogers, Harry Diamond Labs; Lewis Wears, JHU/Apl; (back to camera) John Lee, Honeywell; Carl Boyer, Honeywell.
Bottom: Elmer Rogers; Lewis Wears; John Lee; Carl Boyer; Ralph Barra, Westinghouse; (back to camera) John DiGilio, EIL; Gordon Morgan; John Rodgers. Missing: Ed Brockway, Page Communications.
MINUTES - REGION 13 - Southern California

ROLF SCHUMACHER OF NORTH AMERICAN ROCKWELL/AUTONETICS
Regional Coordinator

The Fourth Southern California Regional NCSL Meeting was held at Castagnola's Lobster House, Marina del Rey, on November 6, 1972. Nineteen member delegates and their guests, representing 12 organizations, met to work on 3 topics:

1. Working out a common position regarding the question of feeding back calibration data of out-of-tolerance measuring and test equipment.
2. Joint action to reduce equipment maintenance costs.
3. Determining regional calibration personnel pay scales, pay ranges, classifications, technician-to-engineer ratios, etc.

Feeding back out-of-tolerance data?

Laurel Auxier reviewed the history of the concept and the results of his recent NCSL Committee survey suggesting that individual methods, rather than a universal method, should be developed, geared to each organization's product and requirements, if the concept is viable. He proposed that Region 13 draft a Position Paper on the subject.

Donald Horton, Litton Industries, told of his company's long resistance against a feedback system and the amicable settlement of the dispute between his company and DCAS by Litton's recent introduction of a limited feedback system affecting instruments found 300 or more percent out of their calibration tolerance, averaging about one-half the product tolerance. The system has been in use for a few weeks, but no tangible results have been obtained with it as yet.

Rolf Schumacher summarized Autonetics' opposition to the concept as a method to be applied to all instruments. He maintained the concept is obviously an attempt to reduce quality costs (cost of erroneous acceptance or rejection of product) and as such with limited merit, since it ignores the cost of implementation of the method as well as considerations of alternative, less costly methods.

Bob Couture, Autonetics, described individual cases where feedback systems have been implemented at Autonetics despite Autonetics' rejection of the concept as a mandatory feature.

Dean Brungart, Teledyne Systems, described how other methods, such as an applied Measurement Assurance Program, may produce the effects intended by a feedback system.

Jerry Hayes, US Navy Metrology Engineering Center, maintained that industry should furnish what the customer wants and that the DoD, as a customer, wants defense contractors to implement a feedback system. If industry is opposed to the concept, it should make counter-proposals; he endorsed the idea of a Position Paper and urged that it be generated without delay. A modified version of MIL-C-45662B will again soon be pressed for acceptance by DCAS.
MINUTES - REGION 13 continued

Marilyn Hed, TRW Systems, Don Horton, and Rolf Schumacher volunteered to draft a Position Paper. Each will draft a version by December 1, 1972, and submit it to the other two. A joint draft will be prepared in a subsequent meeting and submitted to the Region 13 members prior to the Fifth Southern California Regional meeting at which time the delegates will vote on its acceptance and forwarding to the NCSL Board of Directors. Rolf Schumacher will coordinate the effort with Frank Dyce, Martin Marietta Corporation.

Efficient Calibration Procedures to Minimize Calibration Time

It was generally held that reduction in repair costs was a more fertile field for equipment maintenance cost reduction than reduction in calibration costs.

Jerry Hayes proposed that potential users formulate their requirements for automatic diagnostic systems to reduce test equipment repair time and that they indicate a potential market to manufacturers of such systems. The danger exists that each manufacturer develops his own system incompatible with those of other manufacturers; development will not progress rapidly unless a market is visible to the manufacturers. He proposed that Region 13 form a committee to attack this task; this proposal was well received.

Organizations and persons interested in participating on the committee are requested to contact Rolf Schumacher, Autonetics, 714-632-5983 or write Autonetics, Dept. 220, HCO2, 3370 Miraloma Avenue, Anaheim, California 92803.

Technician Ratios, Pay Scales, etc.

Hartwell Keith, Philco-Ford, presented a comprehensive listing method for comparing technicians' wages and prepared a listing from the inputs provided by the meeting attendees.

The meeting was adjourned at 3:15 p.m.

Attendees: Donald L. Horton - Litton Industries
William A. Ferguson - Quality Control Company
Jerry F. Jones - Lockheed California Company
Laurel M. Auxier - Beckman Instruments
Paul Micco - Beckman Instruments
M. L. Hed - TRW Systems
D. W. Packer - TRW Systems
Jerry Vellutini - TRW Systems
R. H. Guibord - TRW Systems
R. A. Stodola - TRW Systems
Hartwell Keith - Philco-Ford Corporation
James C. Hopkins - State of California
Bureau of Weights and Measures
Ron Erickson - Aerojet Electro Systems Co.
Richard Schultz - North American Rockwell, Rocketdyne
Robert J. Couture - North American Rockwell, Autonetics
Rolf B. F. Schumacher - North American Rockwell, Autonetics
Dean A. Brungart - Teledyne Systems
Ronald Canevari - Teledyne Systems
Jerry Hayes - US Navy Metrology Engineering Center
Dr. Robert A. Kamper, Cryoelectronics Section Chief, National Bureau of Standards Boulder Laboratories, was recently honored as recipient of the "William A. Wildhack Award" from the National Conference of Standards Laboratories (NCSL). The award consisting of a plaque and $750 was presented for the best paper given at the June, 1972 Joint Measurement Conference (JMC) held at NBS in Boulder, Colorado.

JMC's objective was to initiate and promote dialogue on Metrology among measurement engineers in different disciplines. In addition, JMC was endeavoring to show the importance of precision measurements and economical operations to various scientists and managers.

Dr. Kamper's paper, "The Josephson Junction and its Ramifications in Standards and Measurements", concentrated on superconductivity, the Josephson effect, and the closely related phenomenon of magnetic flux quantization. His paper was presented during the session on Interdisciplinary Solutions to Measurement Problems.

JMC was sponsored by the American Society for Quality Control, the Institute for Electrical and Electronics Engineers, the Instrument Society of America, the Precision Measurements Association, NCSL, and NBS. The conference was attended by over 350 professional people.
Dr. James L. Thomas

Dr. James L. Thomas, 78, world-renowned physicist, died suddenly from a recurrent heart attack at his home in Rockville, Maryland, on September 12. Dr. Thomas was born in Kenova, West Virginia, on September 5, 1894. After graduating from the University of Texas in 1917, he served for 3 years as an officer in the Signal Corps, U. S. Army. Returning to the University of Texas for graduate work, he obtained his MA degree in 1923 and served as an Instructor in Physics until 1927. At that time he joined the Scientific Staff of the Electricity Division of the National Bureau of Standards, where he remained until his retirement in October 1962. He obtained his Ph.D. from the University of Texas in 1932.

Dr. Thomas was the author of numerous scientific papers dealing with the accurate measurement of electrical resistance and with the construction of highly accurate and stable standard resistors. In a 1932 paper he first described "A New Design of Precision Resistance Standard", an improved version of which subsequently became known throughout the world as the "Thomas-Type Standard Resistor". Dr. Thomas studied the properties of numerous resistance alloys and held patents on several, one being a gold-chromium alloy having zero temperature coefficient of resistance. He had the ability to describe complex electrical measurement procedures in simple terms which were comprehensible to the laboratory technician yet informative to the more sophisticated metrologist. His NBS Circular on "Precision Resistors and Their Measurement" has been used widely in electrical measurement laboratories here and abroad.

Dr. Thomas was a Fellow in the American Physical Society, a member of the Washington Academy of Sciences, and active in the American Society for Testing and Materials. He received the Department of Commerce Meritorious Service Award (Silver Medal) in 1949. He was Chief of the Resistance Measurement Section (later Resistance and Reactance Section) in the Electricity Division of the National Bureau of Standards from 1943 until his retirement in 1962. After retirement Dr. Thomas served as a consultant in electrical measurements for several organizations including the Leeds & Northrup Company. He was much in demand as a lecturer, his last major undertaking being a series of lectures in the spring of this year at the University of Sao Paulo, in Sao Paulo, Brazil.

Dr. Thomas is survived by his wife, Louise, and a son, James L. Thomas, Jr., both of Rockville, Maryland. Also, a daughter, Mrs. M. L. Tenny and four grandchildren of Garrett Park, Maryland, a sister, Mrs. Katherine Dodd of Reading, Massachusetts, and a sister, Mrs. Virginia Cody, of Beren, Kentucky.

The members of the Metrology Division, and in particular the community of electrical metrologists, mourn the passing of Dr. Thomas and wish to join in extending their deepest sympathy to his family and friends.

Chester Peterson (NBS retired)
Andrew J. Drummond

Andrew J. Drummond, Chief Scientist of the Eppley Laboratory, died in Newport, Rhode Island, on August 26, 1972, at age 54.

Born in Bellshill, Scotland, he was educated at St. Andrews, before taking his first position at the Kew Observatory, London. He later became head of the Meteorological Division. He served as head of the Radiation Service of the South African Weather Bureau from 1949 to 1956. In 1956, he came to the Eppley Laboratory, where he was Chief Scientist until his death.

He was active in meteorological radiation studies, both on the national and international levels, and served on many committees involved in this field. He was a long term member of the Commission on Radiation of IAMAP of the IUGG. He organized or participated in intercomparisons of pyrheliometers and pyranometers and was well known for his part in establishing the International Pyrheliometric Scale. He was active in CIMO (WMO) matters in the time period of the IGY.

He was a member of many societies and represented the Eppley Laboratory Corporate membership in others. Included are the AMS, RMS, AIAA, IUGG, AGU, IAB, Solar Energy Society and OSA. He was a fellow of the Institute of Physics and the American Physical Society. He was Editor-in-Chief of SOLAR ENERGY and Director of the Eppley Lecture Series in Fundamental Radiometry.

He was author of over 100 scientific papers, mostly in radiometry and related fields, and was editor, co-author or contributor to a number of texts.

Recently he had been Principal Investigator of the Eppley JPL-SSME project during which the first extraterrestrial measurements of the solar constant were obtained. He was an investigator during project BOMEX on matters relating to albedo and atmospheric attenuation. He was co-Principal Investigator of the ERB (Earth Radiation Budget) program of the Nimbus F satellite at the time of his death.

J.R. Hickey and A.R. Karoli (Eppley Laboratory)

ADDRESS CHANGE

Phil Painchaud, Principal
METRON CORPORATION
4709 Brooks Street
Montclair, California 91763
Telephone: 714-626-2519
SUMMARY of the APOLLO EMBLEMS

Like their predecessors in the Mercury and Gemini programs, each Apollo crew has selected an emblem that symbolically depicts some particular aspect of their flight.

The emblem for the first manned Apollo flight in October 1967, shows the Apollo 7 command and service module passing over the Western Hemisphere in Earth orbit. The Roman numeral VII is superimposed on the Pacific Ocean with the surnames of Walter Schirra, Don Eisele, and Walt Cunningham circling the Earth. The spacecraft performed flawlessly through more than 780 hours in orbit.

The Apollo 8 emblem symbolizes the major feature of the mission with the loops of a figure "8" encompassing both Earth and the Moon. On this flight, men first flew to another body in the solar system, circling the Moon ten times. The crew of Frank Borman, James Lovell, and William Anders--whose names appear on the lower half of the "8"--covered 800,000 kilometers (500,000 miles) in 147 hours.

Astronauts James McDivitt, David Scott, and Russell Schweickart chose the Apollo 9 emblem for their March 1969 flight which exemplified its major objectives—the first manned flight of the complete Saturn V/Apollo complex. The emblem features a Saturn V rocket encircled by an orbiting command/service module station keeping with a lunar module. On this flight, the crew executed rendezvous and docking exercises in Earth orbit and the first Apollo walk-in-space was performed.

With Earth in the background, the Apollo 10 emblem shows the lunar module sweeping low over the lunar surface while the command/service module forms lunar orbit. This mission flown in May 1969 by Tom Stafford, John Young and Eugene Cernan tested the lunar module in the Moon's environment for the first time and was a dress rehearsal for the lunar landing.

The first lunar landing mission, Apollo 11 emblem depicts an American eagle with wings spread and clutching an olive branch about to descend to the Moon's surface. Earth can be seen in the distance. Apollo 11 is the only lettering on the emblem selected by astronauts Neil Armstrong, Buzz Aldrin and Michael Collins for their July 1969 mission.

The Apollo 12 emblem has a nautical theme appropriate to the mission's all-Navy crew: Astronauts Charles Conrad, Richard F. Gordon, and Alan B. Bean. The dominant figure is a Yankee Clipper ship approaching the moon. In keeping with this theme for the second lunar landing in November 1969, the crew named their command/service module Yankee Clipper and the lunar module, Intrepid.

The theme of the Apollo 13 emblem is the first to be based on the myth of Apollo. Three horses pull the Sun chariot from Earth to the Moon. The Latin phrase to the left of the horses, "Ex Luna, Scientia," translates to "From the Moon, knowledge." Scheduled for a lunar landing in April, 1970, a service module oxygen tank ruptured when the spacecraft was 320,000 kilometers (200,000 miles) on its outbound leg to the Moon which prevented the landing. Astronauts Jim Lovell, Jack Swigert, and Fred Haise used the lunar module (named Aquarius) as the command post and living quarters for the remainder of the flight around the Moon and back to Earth.

Astronauts Alan Shepard, Stuart Roosa, and Edgar Mitchell designed the Apollo 14 emblem which features the gold astronaut lapel pin approaching the Moon and
APOLLO EMBLEMS - continued

leaving a cosmic trail from the Earth. Astronauts who have flown in space wear gold pins while those who have not wear silver ones. Launched in January 1971, Apollo 14 was the third manned lunar exploration mission.

The surnames of astronauts David Scott, Alfred Worden, and James Irwin are centered in the white band at the bottom of the Apollo 15 mission emblem. The large disc in the center of the emblem has red, white, and blue symbols of flight, superimposed over an artist's concept of the Hadley-Apennine landing site. The fourth lunar landing mission, Apollo 15, launched in July 1971.

The Apollo 16 mission emblem is dominated by an eagle perched atop a red, white and blue shield superimposed on a lunar scene. The emblem is surrounded by a blue circle of 16 stars with the crew's surnames completing the bottom of the circle. Across the face of the shield is a gold symbol of flight, similar to that on the official NASA seal. Apollo 16, the fifth lunar landing mission was conducted in April 1972 by astronauts John Young, Charles Duke, and Ken Mattingly.

Apollo 17, with astronauts Eugene Cernan, Ron Evans and Harrison H. Schmitt aboard was launched on December 7, 1972. Apollo, the Greek god of the Sun, dominates the emblem designed for the final lunar landing mission which bears his name. In the emblem, Apollo gazes toward Saturn and a galaxy which symbolizes man's goals in space will someday include the planets and perhaps even the stars.
METROLOGY TREATY

On August 11, 1972, at the urging of President Nixon, the Treaty for United States participation in the International Organization of Legal Metrology (IOLM) was ratified by the U.S. Senate. The present membership in the 36-nation international measurement body includes most of the major trading partners of the U.S., as the following list shows:

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LETTER OF TRANSMITTAL

THE WHITE HOUSE, April 11, 1972.

To the Senate of the United States:

Today I ask the Senate to give its advice and consent to accession by the United States to the Convention Establishing an International Organization of Legal Metrology, as amended.

Legal metrology, as broadly defined, relates to the compatibility of standards of measurement and the legislation or regulations which may affect them.

The International Organization of Legal Metrology, established in 1955, is concerned primarily with standards for instruments and measurement techniques involved in the legal determination of quantity and quality. Presently, many of its 36 member nations and eight corresponding members are European.

The Organization's tasks fall generally into two groups:

--to serve as a center for documentation and information; to foster close working relations with national weights and measures services and other concerned organizations; and to furnish advisory assistance to interested countries.

--to determine the general principles of legal metrology; to recommend uniform international requirements for measuring instruments; and to work out model laws and regulations for consideration by member countries.

The Organization's recommendations are not binding but they are accepted by most member nations—many of which are also our major trading partners.

The United States has in the past been an interested observer in the Organization's work and I believe that accession to the Convention would now be of clear advantage to the United States. As the world's largest trading nation and as a world leader in the standards field, we would be better able to assume a positive role in the setting of international standards for measurements and, in so doing, to expand our international trade.

I recommend that the Senate give favorable consideration to United States accession to this Convention, as amended.

RICHARD NIXON.

(Enclosures: (1) Report of the Secretary of State; (2) copy of Convention, as amended; and (3) English language translation of Convention, as amended.)

(1)
IOLM is actually the "legal" counterpart of the International Conference of Weights and Measures, in which the U.S. has been an active member since its inception in 1875. However, because the U.S. had not previously been an IOLM member, the recommendations of IOLM have often ignored U.S. technology in measuring instrumentation. This has made it more difficult to sell U.S. made instruments abroad. The value of instruments which could be affected by IOLM recommendations runs to $400 million annually—about half of the total instruments sold overseas each year.

CONVENTION ESTABLISHING AN INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY

MESSAGE

FROM

THE PRESIDENT OF THE UNITED STATES

TRANSMITTING

THE CONVENTION ESTABLISHING AN INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY SIGNED AT PARIS ON OCTOBER 12, 1965, AS AMENDED

APRIL 11, 1972.—Convention was read the first time and, together with the message and accompanying papers, was referred to the Committee on Foreign Relations and ordered to be printed for use of the Senate.
The Morris E. Leeds Award was established in 1958 through agreement between the Leeds and Northrup Foundation and the American Institute of Electrical Engineers, and continued by the Board of Directors of the Institute of Electrical and Electronics Engineers. The award consists of a certificate and one thousand dollars. It may be awarded once each year to an individual or a group of individuals who have benefited the arts and sciences by making an outstanding contribution to the field of Electrical Measurement.

The award has been made as follows:
1959—Herbert B. Brooks
1960—Perry A. Borden
1961—Theodore A. Rich
1962—Bernard E. Lenehan
1963—Francis B. Silsbee
1964—John G. Ferguson
1965—Harold E. Edgerton
1966—William W. Mumford
1967—Henry R. Chope
1968—Albert J. Williams, Jr.
1969—Harry W. Houck
1970—Harold I. Ewen
1971—Martin E. Packard
1972—Forest K. Harris
FOREST K. HARRIS
1972 MORRIS E. LEEDS AWARD RECIPIENT

"For a lifetime of making outstanding advances in the science of high-accuracy electrical measurements, and of stimulating further advances through his teaching, authorship, and committee activity."
NCSL, with ISA and PMA, is represented on an ad hoc committee formed to study the need for better communication in the measurement community.

The committee is presently exploring the feasibility of publishing a new periodical, tentatively styled "The Journal of Applied Measurement". The concept is that of a periodic publication devoted to articles on measurement problems in the areas of science, engineering, and manufacturing. Solutions of those problems, particularly solutions having a positive economic impact, will be discussed.

It is intended that the Journal be addressed to the user of measurements as well as those who perform measurements in the laboratory. A prime goal will be to narrow the gap between the standards laboratory and the end user.

The committee needs the input of both supplier and user of measurement data. NCSL membership probably represents the best cross-section of the total measurement system that is readily available.

Do you feel a need for a periodic publication dedicated to measurement? If so, can you suggest a direction that such a publication should take?

Please address your comment and suggestion, positive or negative to:

Carl Boyer, Jr.
c/o Honeywell, Inc.
P. O. Box 391
Annapolis, Maryland 21404

MIL-C-45662B

From time to time we hear comments to the effect that Calibration System Requirements Specification MIL-C-45662A is due to be replaced by a "B" version.

At this writing, there is no evidence to show that the "B" version is imminent. There does appear to be some feeling that the "A" version is not enforceable because of its sometimes general language, and that this indicates a need for a "B" version.

As of early October 1972, the decision to resubmit "B" for DOD approval had not been made.

Information Committee
UPCOMING MEETINGS

ISA MEASUREMENT SYSTEMS ENGINEERING - 82 nd SHORT COURSE
Phoenix, Arizona
January 29 - February 3, 1973
Register by: January 22, 1973, c/o Professor Peter K. Stein, Director
5602 East Monte Rosa
Phoenix, Arizona 85018
Fees: $300.00

WORKING STATISTICS FOR ENGINEERS, SCIENTISTS, and MANAGERS
The George Washington University, Washington, D.C. 20006
January 31 - February 2, 1973
Fee: $225.00

1973 ELECTRICAL & ELECTRONIC MEASUREMENT & TEST INSTRUMENT CONFERENCE
Ottawa, Ontario, CANADA (1973 EEMTIC)
May 15-17, 1973
Call for papers:
Dr. Pieter G. Cath
Keithley Instruments, Inc.
28775 Aurora Road
Cleveland, Ohio 44139

1973 - 28th ISA ANNUAL CONFERENCE & EXHIBIT
Houston, Texas
October 15-18, 1973
Call for papers:
Clarence C. Teague, Program Chairman
Fluor Engineers & Constructors
Box 35000
4620 N. Braeswood Blvd.
Houston, Texas 77035

1973 NCSL STANDARDS LABORATORY CONFERENCE
National Bureau of Standards
Gaithersburg, Maryland
November 13-16, 1973

1974 CONFERENCE ON PRECISION ELECTROMAGNETIC MEASUREMENTS (1974 CPEM)
London, ENGLAND
July 1-5, 1974
Call for papers:
1974 CPEM Secretariat
c/o The Conference Department
The Institution of Electrical Engineers
Savoy Place
London WC2R OBL, ENGLAND

NEW VALUE FOR SPEED OF LIGHT

\[ c = 299,792.4562 \pm 0.0011 \text{ kilometers/second} \]

\[ (186,282.3960 \text{ miles/second}) \]
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**HOW TO JOIN NCSL**

The NCSL is a nonprofit association whose members are either measurement standards and calibration laboratories, organizations maintaining such activities, or other organizations which have related interests and are operated under academic, scientific, industrial, commercial or government auspices.

Applications may be mailed to: National Conference of Standards Laboratories  
c/o National Bureau of Standards (200.01)  
Washington, D.C. 20234

Checks should be made payable to the National Conference of Standards Laboratories. If an otherwise qualified organization finds it impossible to become a member organization by payment of dues as such, it may be granted member privileges by payment of an equivalent registration fee in advance of the Delegate's Assembly.

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**APPLICATION FOR MEMBERSHIP**

**NATIONAL CONFERENCE OF STANDARDS LABORATORIES**

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<td>hereby applies for membership in the National Conference of Standards Laboratories and appoints as its Delegate:</td>
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who will serve until further notice. The sum of fifty dollars ($50.00) is enclosed for membership dues for the current calendar year. Of this amount, two dollars and fifty cents ($2.50) is for our subscription to the NCSL Newsletter for that year.

| Appointed by: |  |
| Title:        |  |
| Date:         |  |