TURNING ANOTHER PAGE

After a year of reflection on the past 35 years of NCSL’s accomplishments, I feel very privileged to serve as your 1997 NCSL President. There are many challenging goals for the organization that have been set forth in this year’s Long Range Plan by the Board of Directors. Our tasks range from goals to develop and publish new documents to guide and assist the calibration professional in the accomplishment of their jobs, to goals to strengthen NCSL’s international role and influence.

Some of the key actions that the committees and the Board of Directors have identified in the Long Range Plan are:

- Development of RP’s on Laboratory Health and Safety, Shipment of Test Equipment and Standards, Measurement Comparison Programs, and a new publicity brochure
- Development of RISP’s for Deadweight Pressure Gages and the Quantum Hall Resistance Standard, Revision of RP-7, Laboratory Design

Some other exciting things may be starting this year as a result of the NIST/NCSL managers’ meetings held at NIST Gaithersburg last November. NCSL was asked during these meetings to join a task force to educate the US Congress on the importance of measurements to trade. It is not clear yet exactly what shape this will take but Congress must understand this issue before they are likely to take action to fight for US industry against restrictive technical trade regulations.

The NCSL’s membership has now topped the 1500 member companies mark and continues to grow at 10% per year so we collectively are becoming a strong and compelling voice for our metrology community. This is an issue that is very important to many of our member companies as they try to compete in a global market.

This issue seems to be a good subtopic for the 1997 annual NCSL Workshop and Symposium whose theme is, “Success in the 21st Century Depends on Modern Metrology”. This conference follows our largest conference ever in Monterey, California last year. This year’s conference will be held in Atlanta, Georgia and, as always, will provide a forum for the exchange of ideas, techniques, and innovations among those engaged in the measurement sciences.

On behalf of the organization, I would like to thank Tony Anderson for his efforts as President last year and in particular for his raising our awareness to international issues that are, or will be soon affecting all of us. I would also like to welcome John Ragsdale to the Board. The new board assignments have Charlie Motzko taking over as the Operations and Marketing Vice President from Bill Quigley who is the new Executive Vice President and John Ragsdale taking over as the Western Region Vice President from Charlie. Tom McGovney has been appointed as Treasurer to replace Jeff Taylor, and Bill Doyle has been appointed to the position of secretary to replace the retiring Max Green.

Finally, NCSL remains a volunteer organization. If you are reading this and are not already involved, consider becoming involved on a committee, in one of the regions or on the Board of Directors. It’s your organization and there is plenty to be done.

Kevin Ruhl
NCSL President
THE 1997 ANNUAL MEASUREMENT SCIENCE CONFERENCE
PASADENA CONVENTION CENTER
PASADENA, CA
JANUARY 23 & 24, 1996

THEME:
NEW DIRECTIONS IN MEASUREMENT SCIENCE

CONTACT: Duane Allen 909-273-4783 or, website:http://www.inland.net/msc
See page 43 for more information

EDITOR'S MESSAGE:

Off and Running in 1997
With a new administration, a new newsletter color, and a new President, NCSL is off to the races again. This year will have a little less excitement than last year, the 35th year anniversary, but there is still plenty to do. We hope that everyone brings along the same enthusiasm as last year.

Expression of Uncertainties
You all know that I have never done any honest work in any Metrology Lab, but spent most of my career in various marketing assignments for HP. I dabbled just close enough to the technical part of Metrology to be dangerous, but really avoided all that hard work.

Recently, one of the projects I am working on at HP, is a re-write of an old application note, and we have decided to use an example of the new ISO and US Guide to the Expression of Uncertainties. So now I am REALLY close to this new process. I have been impressed with some of the HP engineers who are now implementing this new process into HP's specification process. I think I even understand it.

But the real effect is that I have an entirely new appreciation of your work on test engineering and uncertainty analysis using commercial specifications and other measured data. It is not easy.

Helper Charlotte
As I went to press on the October issue, I had pictures of the convention, and one showed Mike Suraci and his always-popular door prize raffle. Trouble was that his helper, “Charlotte,” was unidentified, other than by first name. I kept trying to find Charlotte’s real name, but time ran out.
HIGHLIGHTS OF THE BOARD MEETING

Sheraton Hotel
Charleston, SC
Nov. 4-6, 1996

The Fourth Quarter National Conference of Standards Laboratory Board of Directors’ Meeting was held November 4-6, 1996, at the Sheraton Hotel, Charleston, SC.

Tony Anderson presented his President’s Report. Tony announced that Graham Cameron had resigned as Chairman of the Multimedia Committee. NCSL continues to grow. There were twenty eight (28) new members this quarter, which brings the total of new members this year to one hundred thirty five (135).

The meeting with Dr. Prabhakar, NIST Director has been canceled and rescheduled with Dr. Robert Neben, Deputy Director. Tony undertook to set up a meeting with the Department of Commerce, Under Secretary of Technology, Dr. Mary Good, which was accomplished during the NIST/NCSL Manager’s meeting.

Topics of discussion for the NIST/NCSL Managers Meeting follow:

International

- NIST’s role in protecting US Industry from Technical Trade Barriers: current initiatives, future regulatory impact, and cooperation with international organizations.

- Comparison of NIST with other national laboratories in the support of foreign trade, funding, travel, and personnel.

Measurement Services

- Current status, improvements, areas of concern, and future requirements.

- NIST’s position on the use of other national laboratories for traceability. How to comply with US Government contract requirements, where no traceability to NIST exists.

- NIST participation in round robins: policy, concerns, and future requirements.

- Loss of DoD funding for measurement research and status of funding for NIST to assume this role.

- NIST Measurement Workshops, status and future plans.

- Accreditation, and ISO standards; NIST/NVLAP’s role.

General

- Status of reorganization legislation (HR 1756); current projections and impact.

- Replacement of senior personnel and continuation of technical personal resources with changes in staff.

- Membership on Visiting Committees, procedure for NCSL participation.

At the 2nd Simetro in Brazil, during the keynote address by COPEL, there was talk of setting up an International Accreditation Body. The Australians are working on this. Some seem to think that we need a worldwide body to recognize accreditors.

Kevin Ruhl presented his Executive Vice President’s Report. The draft LRP was presented to the attendees for review and discussion on November 6, 1996.

Our known Board of Directors losses next year: Max Green, Secretary and Jeff Taylor, Treasurer. Tom McGovney, TRW will assume the Treasurer position with Board approval.

Early 1997 Board of Directors’ Meetings:

January 27-29, 1997, Lake Tahoe, NV
April 21-23, 1997, Port Ludlow, WA.

Max Green presented his Secretary’s Report. From feedback provided, it is apparent that the Board of Directors’ Highlights are well received and appreciated by Board Members and Coordinators who have seen and used them at region/section meetings.

Tony Anderson presented the Treasurer’s Report due to the absence of Jeff Taylor and the problem of getting connected to the hotel E-Mail system. An Action Item was given to Kevin Ruhl to have the incoming Treasurer write a procedure, for the procurement and payment of goods and services, which will be translated into a guideline.

Shipping costs in NCSL continues to be an item of concern. From a management perspective it seems that things are done at the last minute and we must pay for overnight shipments. This is not just a business office concern, we must manage the same as we do in our own corporations.

The NIST Representative’s report was presented by Dr. Peter Heydemann, with a special thanks to Ms. Sharrill Dittmann for putting it together.

Congress adopted a 1997 budget for NIST with the following provisions:

FY97/FY96
STRS Lab Programs $265.1M/$255.8M
Quality 2.9M/2.9M
ATP* 225.0M/220.9M
MEP** 95.0M/80.0M
Construction 0.0M*/60.0M

* A “Bonus” by Congress, passed to get out of town for election campaigning?
** Includes a $16 million recession from the FY96 balance.

Initiatives of NIST (Challenge by the Deputy Director)

1. Improve quality of NIST Measurement Services: Reduce turnaround times; less than 24 hr. return of phone calls.

2. Improve accuracy, attend to international metrology needs and cover unmet needs (expand coverage by factor of 2).
3. Present a well developed concept for meeting challenge (with same staff) by December, 1996.

4. A Task Force will put a plan together for improvements in the Calibration Program; Standard Reference Materials and Standard Reference Data (Chaired by Laboratory/TS Director).

An Action Item was given to Dave Abell to work with Dr. Peter Heydemann on how NCSL could participate in the Saudi Arabia export project, at rewriting and reviewing the entire documentary standards system, and report back to the Board in January.

Brian Fitzpatrick presented his VP Laboratory Systems Report. He has continued work on the pressure round robin. The artifacts were characterized at the Pivot Lab (Consumer Power) and passed on to the first test lab (NIST). A rotation list is in process. There are 20 participants.

Brian presented the Laboratory Facilities Committee Report for Dr. David W. Braudaway.

Charles Motzko presented the Equipment Management Forum Committee Report. There was an extensive discussion on the shipping standards issue and it seems that it has gotten worse since being brought up as an issue several years ago. There was a consensus of the Board that an RP on shipping standards is needed. An Action Item was given to Brian Fitzpatrick to develop a recommended practice (RP) on the packing and shipping of Standards.

Bill Quigley presented the VP Operations and Marketing Report. He is continuing to promote membership, over 60 follow-up letters and packages were sent this quarter. The NCSL Business Office is moving to Windows 95. The Secretariat's Disaster Recovery Operation Plan is 85% completed. A desk guide with most sustaining activity and requirements has been documented.

Honors and Awards: The new chairperson is Ms. Hong Rossen, Rockwell.

The Publicity Committee report was presented by Bill Quigley for Carol Singer. The publicity brochure has been updated to increase the emphasis on the benefits of membership to the sponsor.

The new Membership Chairperson is Ms. Louise Shadomix, HTI Bio Services.

Wilbur Anson presented the Secretariat's Report. NCSL Membership as of October, 1996 is 1,491. NCSL Publications sold this year have brought in $48,000. New material has been prepared and submitted to NIST for updating the NCSL Web homepage.

Georgia Harris presented her VP Measurement Science and Technology Report.

ASTM has a Web Site addressing specific concerns such as its Cross-check Program for petroleum quality testing and for metals proficiency testing at: http://www.astm.org/statqa.htm.

Dave Nebel presented his Automatic Test and Calibration Committee Report. The NIST letter expressing concern regarding the handling of a recent NCSL sponsored and published Interlaboratory Comparisons (ILC) was discussed at length. Jim Wheeler, Committee Chairman is working on the response to the letter which will be reviewed by the Vice President, Measurement Science and Technology. It was recommended that the NCSL Board of Directors adopt the policy that is in the draft RP for conducting ILC's.

A Motion was made by Georgia Harris and seconded by Kevin Ruhl to adopt a policy regarding ILC's to ensure that:

A. All participants agree in writing regarding anonymity and publication of final results;

B. All participants must agree to any changes regarding anonymity status; and

C. No reports are distributed or published without opportunity for technical analysis and corrective action.

During the continuation of the discussion on the NIST letter to the MCP Chairman on a recent round robin, and a policy on interlaboratory comparisons that was tabled earlier, two issues surfaced:

A. Should one group be able to stop presentation or publication of data?

B. The importance of anonymity.

The consensus of the Board is that the norm should be anonymity of the data, all data should be shown and approval is needed from all participants presenting data. Kevin Ruhl withdrew his second to Georgia Harris's Motion on a policy for interlaboratory comparisons and Harris withdrew her original motion to address some of the bigger issues that came up during discussion.

Georgia Harris ask for a straw vote, and received overwhelming support from attendees, on board concurrence/opinion of the need for a policy that:

A. Emphasizes anonymity;

B. Emphasizes agreement of all participants;

C. Emphasizes that data analysis should be circulated to all members of the group for corrective action; and

D. Says no data will be eliminated from analysis or publication.

The matter will undergo further study.

Dr. Tom Huttemann presented his VP Conference Management Report.

The NCSL '96 Conference, Monterey was a great workshop - symposium, by any measure. Jim Ingram, Conference Director, asked that a special thanks be passed to his Conference Committee and to all who volunteered and helped in orchestrating a most successful conference. All evaluations and comments were reviewed and the following reflects the feelings of the participants who submitted evaluations:

Editor's Note: See pages 10-11 for a graphic summary of the Evaluation Report. The Board thanks Janyle Koren of AT&T Capital Corp. for preparing the report.
1. Positive Comments:

- Organization of the workshops
- Papers
- Networking Opportunities
- Location - It seemed as though everyone liked the location

2. Negative Comments:

- Couldn't attend all sessions (5 tracks) - we get this one every year
- Some papers not well presented
- Food

3. Requested topics recommended for more coverage at future conferences:

- Uncertainty Determination
- Dimensional Metrology
- Nano-Metrology
- International Traceability and Accreditation

Exhibits: Dean Brungart presented the Exhibits Chairman's Report. There was a record number of exhibit spaces of 137 (121 booths and 16 tables), record exhibit receipts ($162,550) and record drayage of 73,138 lbs. Registration: Record attendance of 1,186. Paying Registration: 642. Complementary Registration: 211. Exhibits Only: 333. Total: 1,186.

Guest Program: A special thanks to Jan Lee and Rose Motzko for another great guest program. There was high attendance every day.

Gary Shuler presented his VP Industrial Programs Report.

The Healthcare Metrology Committee report was presented by Gary Shuler for Mitch Johnson. The committee meeting was very successful with 33 people attending. Four areas of concerns were identified that the committee wanted to work. A Subcommittee Chairperson was appointed for each area. The responsibilities and Subcommittee Chairpersons are:

- Rewrite of RP-6: Michael Czech - St Jude Medical Center
- Software Validation: Paul Marciniak - Siemens Medical Systems.
- Procedures: Tim Wofford - RPR Gencell
- Equipment: Gary Melsom - USAF

Two individuals have been appointed as Vice Chairperson to help coordinate the different committee activities and as training for committee chair at some point in the future. They are:

Ms. Annalisa Evans - Amylin Pharmaceuticals
Tom Couch - Baxter Healthcare

John Ragsdale presented the Utilities Committee Report. He discussed the necessity of revising RP-10, "Establishment and Operation of an Electrical Utility Metrology Laboratory." This review and revision project will be added to the committee's goals and objectives for 1997.

Don Dalton presented his report as VP of Education and Training.

Personnel Training Requirements: They are developing a Distance Learning Program - two courses to be offered in Metrology in January by Aurora Community College.

Training Information Directory - The 1997 edition of the NCSL Training Information Directory has been completed and delivered to the printer. It has 52 pages (4 more than last year) and the estimated cost will be $6,500.

Dave Abell presented his VP of Quality Programs Report.

Progress versus objectives were presented. It was a very productive year with: the Z540 handbook published and put on CD ROM; benchmarking survey completed; successfully defended Z540-1; RP-1 updated and published with software; and Z540-2 ready for publication, pending NCSL/ANSI approval.

John Wehrmeier presented the Laboratory Evaluation Committee Report. Tony Anderson recognized individual members of the Laboratory Evaluation Committee with the presentation of plaques for their outstanding work on the Z540 Handbook.

Renaming of the committee to reflect the full range of its activities was discussed and will be further discussed with the Vice President for Quality Programs. They have identified several future projects such as updating the Z540 Handbook once the ANSI/NCSL Z540 Standard and the ISO/IEC Guide 25 is revised.

Dave Abell presented the International Measurements Coordination Report for Graham Cameron.

Jack Ferris presented his ANSI/NCSL Writing Committee Report. The final draft of the ANSI/NCSL Z540-2-199X has been submitted to ANSI for the required 60-day comment period. Following the comment period the Standard will be submitted to the ANSI Board of Standards Review for final approval as an American National Standard. Mr. Ferris asked for NCSL Board of Directors approval in parallel with the ANSI comment period to enable printing as soon as the ANSI Board of Standards Review has given final approval.

A Motion was made by Dave Abell and seconded by Dr. Tom Huttemann, that the proposed ANSI/NCSL Z540-2-199X Standard, "American Guide to the Expression of Uncertainty in Measurement" be approved by the Board of Directors. The motion was unanimously adopted.

Jack Ferris presented a RP-2 vs Z540 matrix comparison and showed that all of the subject areas contained in RP-2 are covered in ANSI/NCSL Z540-1-1994.

A Motion was made by Dave Abell, and seconded by Tony Anderson that RP-2 be withdrawn in favor of the more current ANSI/NCSL Z540-1-1994. The motion was unanimously adopted.

Dave Abell presented an ISO Guide 25 Road Map as the first step in getting NCSL more focused on ISO Guide 25 participation. The road map brought about three recommendations which are:

1. Have official NCSL representation in ANSI/ICAC and other ANSI sponsored U.S. TAGs.

2. Influence the ICAC with representation from our membership through their companies.
3. Increase involvement in ASTM E-36 beyond existing liaison.

An Action Item was given to Dave Abell to appoint an NCSL representative to the ANSI/JCAC Committee.

Dr. Klaus Jaeger led a discussion on Calibration System Standards and the use of Z540-1 versus ISO 10012 for ISO registration. The DoD letter dated January 20, 1995, identified the use of Z540-1, ISO 10012 or equivalent for registration. Items noted were:

1. Many labs are signing up to ISO 10012 because it is easier.
2. Accuracy ratios are not in ISO 10012 (Hints at 3.1).
3. The note in ISO 9000 only includes ISO 10012 or equivalent. Many take this for gospel and believe that only ISO 10012 can be used. Note needs to be expanded to call out other standards.

Bill Quigley in his analysis found that there was a fairly equal three way split:

- Z540-1
- ISO 10012
- Company's own system (written and defended)

Dr. Plantenga commented that there is a tendency away from ISO 10012 to EN 45001.

Jim Cigler made a presentation on "Accredited Laboratories and Traceability" to explain the policy that testing or calibration laboratories desiring accreditation by NVLAP must achieve traceability directly to NIST or through the use of accredited laboratories.

1. 15 accredited labs - 17 in process (below expectations of 50 per year).
2. NVLAP must comply with ISO Guide 58 requirements.

Interpretation in international community (EAL-P1 Document) is that, whenever possible, testing labs must use services of accredited calibration laboratories or services of National Measurement Institute (NIST).

- Traceability is not an easy attribute to assess.
- Self Declaration and second party audits are not recognized.

Options:

1. Become Accredited
   - Could increase business
   - Could reduce second party audits
   - Should allow entry in international markets
2. Refuse to Become Accredited
   - Continue to comply with multiple audits
   - Calibration and test data not recognized internationally

NVLAP is not dictating that all labs in the country must use accredited calibration laboratories, only those wanting to be accredited by NVLAP. NVLAP is open to alternative approaches to satisfy traceability requirements that will be accepted internationally.

Schedule for getting NVLAP accredited by EAL is the summer of 1997. Some American corporations are pursuing European accreditation because NVLAP does not have international recognition at this time. A representative of a member of EAL stated that NVLAP will be accepted in Europe after the signing of the EAL assessment.

Dave Abell commented there should be some way to deal with very complex instruments (i.e. spectrum analyzers) short of a complete measurement uncertainty budget. NVLAP is willing to be flexible and work with customers in interpretation of uncertainties.

Small businesses cannot afford the costs of ISO registration or NVLAP accreditation.

Ed Nemeroff presented his International Division Vice President's Report. He wrote an article for "Cal Lab" magazine on the Egyptian Metrology Workshop.

The level of international activities that NCSL is willing to support was discussed. The International Vice President will develop a plan, for presentation to the January Board Meeting, that will provide recommendations for international participation.

Dr. Menno Plantenga made a viewgraph presentation on the NCSL-like conference in Europe in 1999 - A bridge between needs of industry and government agencies. There are indications of support from Euromet and EAL (have received some inputs from the proposal submitted but not all have responded).

Steering Committee support was requested (two board members on the committee). Support on setting up conference requested. NCSL could be one of a few sponsors (6 or 7). The conference gives a forum to promote NCSL and American industries. Denmark, United Kingdom and France Coordinators are in place and have indicated their willingness to support the conference. Financial support delayed until January 1997, after official Euromet and EAL support response.

An Action Item was given to Dr. Tom Huttemann to keep the liaison open with Dr. Plantenga/Simon de Vries to see how the Euromet decision goes.

Dr. Klaus Jaeger presented his VP of Publications Report.

Oversight Committee: Two Co-chairpersons and 5 people on committee (added three people at the Monterey Conference.) The committee is active in gathering existing publication procedures from other organizations.

Glossary Committee: Moving very fast. Recommend publishing all definitions and highligh the those recommended for use with source attributions.

Compendium Committee: Cataloging all NCSL talks given over the last nine years; sorting by author, subject, keyword, etc.

Woody Tramel presented a VP Eastern Division Report.

Marlin Johnson, Region 3 Coordinator, is trying to establish a section in the Virginia area with Don Martin as the Section Coordina-
tor. Jim Bufano, North Carolina Section Coordinator has changed companies but still wants to be a Section Coordinator.

David Hall of Lockheed Martin has been appointed as the Central Florida Section Coordinator. The Atlanta and Tennessee Section Joint Meeting was very successful.

John Wehrmeyer presented his Region 2 Coordinator's Report. A special thanks to Ed Nemeroff for his support, which has been enthusiastically received, and presentations at region/section meetings. The New York City Section is doing very well under Peter Mauro. The loss of activity in the Philadelphia area is a concern at this time.

Dr. Donald Drum, with the help of his friends, organized and hosted a Pittsburgh Section Meeting in October.

David Nebel presented his Region 5 Coordinators Report. Mark Sitterly, Detroit Testing Lab, has been appointed as the Michigan Section Coordinator. Region 5 would also like to thank Ed Nemeroff for his support and presentations at three section meetings.

Leon Barnes presented his Central Division Vice President's Report. Leroy Britain, Quality Training and Consulting, has been appointed as the Region 11 Coordinator. He has a very ambitious goal of doubling the size of membership in Region 11 and establishing a section in every Central Division State. Roy Campbell of Caterpillar has been appointed as the Section Coordinator for the new Region 11 section, being organized in Peoria, IL. The new Albuquerque Section, under Tom Wunsch of Sandia National Labs, held their first meeting on November 11, 1996.

Charlie Motzeko presented his Western Division Vice President's Report. Bruce Mayfield, Telogy, has been appointed as the Region 7 Coordinator. He is getting very close to naming a new San Diego Section Coordinator.

The regions and sections wants and needs, as well as the problems of commercialism at meetings was discussed at length by the Board of Directors. Membership wants to be advised of new instrumentation and new technologies but not a commercial pitch at region, section or area meetings.

There must be equal opportunities and access for speakers of technology. NCSL material is available for door prizes and give aways. Tours are educational and most believe they should be encouraged. There should not be any “shake downs” for door prizes. Should there be a dollar value on trinkets, give aways by hosts or vendors? Is it ok for hosts to provide coffee and donuts? Banquets are out but can modest lunches be provided? Regardless of what the membership wants, the Board of Directors has a responsibility to ensure image and integrity of the organization. The policies must be widely publicized.

An Action Item was given to the Division Vice Presidents to develop a guideline, for hosting region, section, and area meetings, that deals with responsibilities, limitations and commercialism, to be provided by the January Board Meeting.

The A2LA Liaison Report was presented by Kevin Ruhl. A2LA has invited testing and calibration assessors, NIST, standards writing bodies and other interested parties together to discuss practical approaches to determining “Uncertainty Determinations” for calibration and testing laboratories. A2LA Calibration Accreditation Policy requires the use of accredited calibration laboratories after June 30, 1997.

An APLAC team and two observers from EAL and SCC visited A2LA to determine conformance with ISO Guide 58 using procedures established for the APLAC mutual recognition agreement. A2LA now has 850 accredited laboratories, 6 registered reference materials supplies and 15 laboratories registered to ISO 9001 or 9002.

The MSC Liaison Report was presented by Tony Anderson for Chet Crane. The Measurement Science Conference is January 20-24, 1997, in Pasadena. There are NIST Workshops on Monday and Tuesday and half day workshops on Wednesday.

The CPEM Liaison Report was presented by Norm Belecki. See the Liaison reports for a summary of highlights of the CPEM in Germany. The 1998 CPEM will be held in Washington DC and Mr. Norm Belecki is Conference Chairman. CPEM cherishes NCSL support that has been provided in the past and requested that financial support for the CPEM in 1997 rather than 1998 to cover the up front expenses.

A Motion was made by Kevin Ruhl and seconded by Dr. Klaus Jaeger to provide financial support for CPEM in the amount of $2,000. The motion passed with one abstention, Georgia Harris.

The APLAC Liaison Report was presented by Kevin Ruhl. The APLAC is meeting the week of November 18, 1996. A seminar on the “Revision of ISO/IEC Guide 25” will be held during the week.

The ASTM Liaison Report was presented by Kevin Ruhl. Three ISO/CASCO Guides are being balloted for adoption as ASTM Standards. They are Guides 61, 62, and 65. ASTM has already balloted its own equivalent standards (E348, E1301 and E994) to ISO/IEC Guides 25,43 & 58 respectively, which deal with laboratory accreditation. These three ASTM Standards have been adopted as ANSI Standards in early 1996.

The NCWM Liaison Report was presented by Georgia Harris. The NCWM Interim Meeting is schedule for January 12-16, 1997, in Rockville, MD.

The combined SIM/NACC/NORAMET/APMP (932/926) Liaison Report was presented by Sharrill Dittmann. The SIM General Assembly is meeting November 7, 1996, in Mexico. Hector Navajairmes is the new director. Dr. Steve Carpenter and Hratch Smerjian will attend representing NIST. Kim Konero was re-elected as Chairman of NORAMET. The APMP meeting last month, in Manila was well attended: Terry Quinn of BIPM; VP of PTB; a delegate of NPL in England; Sharrill Dittmann as NORAMET; Dr. Elfiqai of Egypt; and 19 member countries in AP. This was the first time that there has been this mass at a regional Metrology meeting, and the participants took advantage of this to get some discussions on:

What will the protocol be for achieving the equivalency of National Standards. What measurements do we need to do? The Consultative Committees (virtually all) have defined a set of measurements for their particular disciplines, as a baseline for operation.

A Motion was made by Tony Anderson and seconded by Kevin
Board Meeting

January. The motion passed with one abstention, Georgia Harris.

Attendees:

Dave Abell
Tony Anderson
Wilbur Anson
Leon Barnes
Norman B. Beleeki
Dean Bringard
James L. Cigler
James Crane
Don Dalton
Sharrill Dittmann
Jack Ferris
Brian Fitzpatrick
Amos "Max" Green
Georgia Harris
Tom Hattemann
Peter Heydemann
Klaus Jaeger
Charlie Motzko
Dave Nebel
Ed Nemeroff
T.M. Plantenga
Ed Pritchard
Bill Quigley
John Ragsdale
Kevin Ruhl
Gary Shuler
Bill Simmons
Woody Tramel
John A. Wehrmeyer

Hewlett-Packard
Guillilme Instruments, Inc.
NCsl
Allied Signal FM & T
NIST Electric Division
Burrnag Management Services
NIST/NVLAP
Keithley Instruments, Inc.
Fluke
NIST
Consumers Power
Hi-Tech, Inc.
DynCorp
NIST
Eastman Kodak
Lockheed Martin Msl. & Space
C.A. Motzko & Associates
Electronic Distributors, Inc.
Wavetek
NMI Van Swinden Lab.
Lockheed Martin Energy Systems
Hughes Missile Systems
Tennessee Valley Authority
TRW Space & Electronics Gp.
Duke Power Company
W.A. Simmons & Associates
PFC
Eastman Kodak

Incoming Exec. VP Bill Quigley reviews some organizational details. The Exec. VP writes the annual 5-year Long Range Plan and is responsible for organizational planning.

Dr. Peter Heydemann gives his NIST report to the Board.
OMT OARD INGS

NCSL President Tony Anderson (c) manages his last Board Meeting as Dr. T. Plantanga, our Netherlands Coordinator, looks on.

Secretary Max Green (c), shown with his "ears on," recording the meeting proceedings. Max has resigned due to his workload situation. I will miss him greatly, because he was always on time for his editorial deadlines.

Look at all those laptops. I guess business just can't get along without them anymore.

John Ragsdale, Jack Ferris and John Wehrmeyer enjoy the Board dinner proceedings by reading the NCSL brochure.

Dean Brungart, Georgia Harris and Sharrill Dittman. Georgia and Sharrill give us some great support from NIST.

Looks like the Board had outstanding weather and a nice turnout for the Charleston Board meeting.
SURVEY STATISTICS FROM 1996 NCSL CONFERENCE

General Conference

Number of Conferences Attended

Top Principal Job Functions

Interaction & Dialog Among Attendees

Top Industry Classification of Their Companies

Report prepared by Janylle Koren of AT&T Capital Corp.
ISO 9001: A TOTAL QUALITY APPROACH

Author & Presenter: Andrew Baker, Quality Manager
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* This paper received the “Allen Astin Best Paper Award” at the 1996 NCSCL workshop & symposium.

Abstract

At Oxford Instruments, NMR Instruments our Total Quality programme focused on process improvement and teamwork supported by in depth experience and on-going training. This is not, however, the traditional approach to ISO 9001 registration despite these philosophies being captured within the spirit of the standard.

Process gives way to functional activities; training is overwhelmed by procedures and work instructions; teamwork is stifled by an urge to centralize, and experience and pride are rarely measured or captured in words.

In approaching the simultaneous implementation of Total Quality and ISO 9001 the requirement was to succeed at both. This required utilizing experience and training at the expense of detailed procedures and work instructions; de-centralization of activity and a focus on teamwork, along with documentation and internal auditing that have a process not a functional basis. The result is a registered but exhausted organization and a continuing Total Quality programme.

Introduction

Currently many businesses are aiming to realize their potential by releasing the full abilities of their employees. It seems that this trend is set to continue. Quality, in every sense, will continue to play a full part in this although compliance with system requirements, such as ISO 9001, is often seen as restricting the available opportunities. Increased paperwork, more centralization and restrictive procedures are just some of the most frequently communicated negative messages associated with compliance. It is of little surprise therefore that the implementation of a quality management system is not high on the business priority list. This is particularly so in small to middle sized businesses where it is perceived there is little added value in implementing a Quality System.

Background

Oxford Instruments, NMR Instruments, employing approximately 180, are engaged in the manufacture of magnets for Nuclear Magnetic Resonance and other purposes. The culture of the organization is such that long ago the philosophies and values associated with fully utilizing their employees abilities were adopted. From the outset engineers had complete involvement in the projects being manufactured, from design to procurement and manufacture to installation. As the company expanded and individuals’ roles became increasingly specialized the spirit of responsibility and ownership remained.

In 1992 having reviewed the Quality System requirements of BS 5750, predecessor to ISO 9000, NMR Instruments decided not to pursue registration to the standard but to embrace the philosophies of Total Quality Management. This was seen as the means to attaining the business aims and objectives whilst also being the best route to achieving customer satisfaction. The Total Quality approach fitted extremely well with the culture of the organization and measurable improvements were achieved in key business processes. By mid 1993 business needs and customer demands required NMR Instruments to comply with the requirements of ISO 9001. Furthermore registration was to be achieved before the end of 1994.

Criteria for implementation

The criteria for implementation of ISO 9001 were defined and agreed with the senior management team:

- Quality system implementation was not to jeopardize the on-going Total Quality programme (and vice versa)
- Quality system implementation should retain the NMR Instruments culture
- Registration must be achieved by the end of 1994

There were no available models for such an implementation so here was an opportunity to take the requirements of ISO 9001 and apply them in the spirit in which they were intended.

Define the approach

The first steps to achieving the goal were to determine how ISO 9001 would fit into the Total Quality approach being taken and to decide how the implementation would be resourced.

The Total Quality approach employed by NMR Instruments focuses on process improvement through the involvement of all employees and is based on nine key elements:

- Mission and Strategy
- Organization structure
- Individual abilities
- Leadership style
- Management practices
- Motivation and Attitudes
- Corporate values
- Systems and Procedures
- Individual values

Each of these elements being a necessary part of achieving the Total Quality vision.

It is clear that ISO 9001 belongs in the Systems and Procedures element and is therefore a subset of the overall Total Quality approach. To give the best opportunity for integrating both initiatives it was essential to ensure that it was treated as such and that it did not take precedence over the Total Quality programme.

The management of this dual implementation was the responsibility of one person, the Quality Manager. This ensured the elimination of any conflict between the two initiatives whilst giving a clear overview that is essential for a smooth implementation.
Deciding how to resource the implementation was a little more difficult. In order that the Total Quality programme had best chance of success key personnel had been used in the initial process improvements. In smaller organizations the availability of such human resource is frequently limited and must not be overloaded. It was not, therefore, possible to draw upon this group of employees as the focus of ISO 9001 implementation activity. The option selected, entirely in keeping with the Total Quality programme, was to involve as many employees as possible in the implementation process. This would require employees at all levels to identify and generate their own documentation.

An immediate benefit of this approach is that the implementation of the Quality Management System does not require a centralized resource. In fact only two people were required in consultation/facilitation roles. Given less aggressive timescales one person could achieve the same result.

The fundamental approach to implementation was now set and the detailed implementation process could be defined.

Define the process

To build further on the NMR Instruments culture and Total Quality philosophies it was necessary to have a process approach to minimize the documentation and to focus on training and experience. The steps to be followed were:

• Model the processes.
• Apply the standard.
• Define the response.
• Define the internal auditing system.

Model the processes

Since functional inefficiencies had been identified by the process improvements it was important to ensure that the Quality System would be compatible with future improvements. Responding to the ISO 9001 requirements in process terms allows for the alignment of the documentation with the activities occurring in the organization. In this way process improvements are facilitated rather than being restricted by functional boundaries.

Each department developed a process model for their function from which the procedure and work instruction requirements were identified. At this point it became evident that the approach being taken was too idealistic; the organization had not yet achieved complete process orientation and functional boundaries still existed. As a result the method was modified to identify the processes align them with the requirements of ISO 9001 and then break them down into functional blocks and apply the documentation at that level. The aim being to promote departmental ownership whilst leaving sufficient scope for future process improvements. Figure 1

Another benefit arose at this point in that the method identified some inefficiencies and overlapping responsibilities from which improvements were initiated. However the scale of these improvements was intentionally restricted to a minor level as major improvements at this stage, whilst being beneficial, would have given rise to new and unfamiliar processes to be understood and adopted at audit time.

Figure 1. Showing how processes are broken into functional pieces and procedures allocated.

Apply the standard

Often organizations determine their documentation requirements from the standard and implement them directly into their organization. In may cases this leads to duplication of processes, i.e. a documented process to satisfy the standard and then the process that everyone knows will work on a day to day basis. Ensuring that all possible circumstances are covered through the use of excessive documentation and checksheets is the consequence. In worst cases organizations take prepared sets of documentation, bearing no relationship to processes or functions to which they are applied, and risk major disruption and the success of the accreditation whilst attempting to implement them. Any Quality System implementation must be cost effective whilst ensuring that compliance is achievable.

For NMR Instruments it was the aim to minimize the amount of change and disruption necessary in complying with the standard. Until this point the standard had not been referred to, only the way the organization currently performs had been identified. The standard was now scrutinized in detail, line by line, or in some cases word by word, to establish how it could be fitted to the modeled processes. It is necessary to interpret and fully understand the requirements of ISO 9001 and then to search the defined processes to identify where in the organization the corresponding activity takes place. It can be all to easy to overlook an activity and implement a new method causing duplication and increasing the potential for non-compliance. Using the NMR approach, the amount of necessary change is minimized and, as on this occasion, only fine tuning rather than major surgery is required.

Define the response

It is a requirement of ISO 9001: 1994 that procedures are generated to document the quality system. But section 4.2.2 of the standards states "... the range and detail of the procedures that form part of the quality system shall be dependent upon the complexity of the work, the methods used, and the skills and training needed by the personnel involved in carrying out the activity." In
addition, section 4.9(a) requires that for process control, other than special processes, procedures are only required "... where the absence of such procedures could adversely affect quality". These clauses were interpreted to give NMR Instruments the flexible approach necessary to reduce the volume of documentation whilst drawing on training, skills and experience.

In defining the response to the standard the traditional structure of quality manual, procedures and work instructions was used. However, to be consistent with the NMR Instruments approach of employee involvement the procedures were to be generated by the people who would operate the systems. In defining the document format the following criteria were to be fulfilled:

- Simple to produce.
- Easy to understand.
- Maximize training, skills and experience.
- Encourage ownership.

Fundamentally any procedure states who does what and, where necessary, what they should do it with. For some reason procedure writers often embellish this basic content resulting in a loss of clarity and lengthy documents. To simplify the writing and to ease the burden on the author the procedures were formatted as a series of action blocks that capture the essential steps along with the responsibility for the action and any related documents.

Figure 2

<table>
<thead>
<tr>
<th>Document number</th>
<th>100.1234</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document title</td>
<td>Contract amendment</td>
</tr>
<tr>
<td>Objective</td>
<td>To ensure changes to the original contract are resolved</td>
</tr>
<tr>
<td>Scope</td>
<td>All changes to contract</td>
</tr>
<tr>
<td>Procedure</td>
<td>Action</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Reference document</td>
</tr>
</tbody>
</table>

Sales department  
Receive the request for amendment.  
Request file  
File the request.

Sales administrator  
Amend the internal order.  
100.2345

Figure 2. Showing a typical procedure format

Where two or more departments were required to comply with the same section of ISO 9001, the departmental differences where accommodated in separate procedures. An increased quantity of documents is inevitable but compliance is more probable as departments are working to their own process and not some hybrid procedure attempting to satisfy all eventualities. Providing the content of such procedures remains compliant with the standard it is not necessary for all areas to operate the same process.

In considering how to document work instructions applying ISO 9001 section 4.18 - Training - appeared to be a favorable option. This encourages the recording of training, skills and experience for all employees and can therefore be used as a route to reducing the amount of documentation in the system whilst fully recognizing the employees abilities. After all, if the training is well documented it should not be necessary to repeat everything in the work instruction. There are also negative aspects to over documenting the work instructions.

- Trained/skilled/experienced individuals can find it demoralizing to have instructions, that may never capture their knowledge and abilities, prescribing their activities.
- Trained/skilled/experienced individuals will tend to work to their own methods whatever the content of a work instruction therefore increasing the amount of noncompliant activity.

The benefits from using training are:

- The employee is encouraged to use their acquired skills and experience resulting in pride and ownership in the job.
- The company benefits from the stimulation that this provides in generating new ideas and work practices.
- The individual is given recognition for their contribution by way of a documented training record.

NMR Instruments used the training route as first choice in controlling manufacturing processes. This required training records for all employees which are kept local to the working environment. To supplement this approach an appropriate level of check sheets was introduced. This provides the auditor with essential evidence that the process is under control.

For those areas that required work instructions employees were given the option of producing the document in a format that gave them best opportunity of achieving the desired specification. Many options were considered: video's; storyboards; models; written documents. All the instructions eventually produced were either a written document or a check sheet/instruction combination. The most important aspect here was, as with the procedures, the ownership of the document. Once the author had formatted and written their own document there was greater accuracy in working to it and, of course, less opportunity for non-compliance. As with procedures, team ownership was encouraged.

Having implemented the methods described it became essential to put in place an updating mechanism that could respond to the rate at which the documents would change. The continuous improvement philosophy that had been taken on coupled with the ownership that was being felt by individuals and teams resulted in procedures and work instructions being updated on a regular basis. In some cases this happened before a previous issue could be implemented; excellent from a Total Quality perspective but not so good if the auditors are visiting.
Define the internal auditing system

The quality system had been derived on a process basis it was logical therefore that the internal auditing system should follow the same basis. Internal audits at NMR Instruments are conducted with a process, rather than the more traditional departmental, basis. This allows for some continuity in the audit trail and for a section of ISO 9001 to be explored in detail rather than confusing this with a departmental search for non-compliance.

The audit trail can more easily be followed from department to department allowing for a thorough audit of the process to be undertaken. Process activities become more important than departmental boundaries thus monitoring the process performance rather than allocating blame for non-compliance at a functional level. This approach to auditing can also be used to encourage the auditor to identify process improvements as the audit is conducted.

Such an auditing process can be quite demanding on the auditor, particularly if the processes cover a large geographical area. However, the benefits of being able to audit the process are worthwhile and more internal auditors can always be trained.

Conclusion

To obtain the best from a Quality System it should be aligned with the manner in which an organization currently conducts its business. Anything other than this will cause disruption within the organization as it adapts to differing and non-complimentary methods of working. A successful implantation will focus on the business needs rather than the standard. In turn this will result in a documented system that is the basis for future improvement initiatives.

None of this can be possible without the employees in the organization. They have the detailed knowledge of the mechanisms that form the processes. Utilizing this resource will give involvement and ownership at the level where people are responsible for the activity. Skills, experience, training and, to a certain extent, the pride of the employees, are captured in the documents. Where documents have not been used the employees training record is in place to give further recognition and a basis for personal development.

These ingredients capture the intent of ISO 9001 whilst still retaining the culture of the organization and providing the best in customer satisfaction.

The approach taken by NMR Instruments was recognized by British Standards Institution who approved the organization for registration to ISO 9001 just fifteen months after the process had begun. Only after this did we see the one problem associated with the approach taken. The level of quality activity dropped significantly, not because of the lack of desire but because of the intensity of the effort that had been made by many of the employees in achieving registration whilst adopting the new Total Quality philosophies. That effort was gradually raised over the subsequent months and the number of employees involved in improvements returned to the previous high level.
METROLOGY CALENDAR

NCSL MEETINGS

January 23-24, 1997
MSC Symposium & Workshop
(January 22 - Tutorial Workshop)
Pasadena Convention Center, Pasadena, CA
CONTACT: Steve Phleger (310) 812-4667

July 27-31, 1997
NCSL Workshop & Symposium
Hyatt Regency Hotel, Atlanta, GA
CONTACT: NCSL Business Office, (303) 440-3339
FAX: (303) 440-3384

INDUSTRY/GOVERNMENT MEETINGS

April 14-18, 1997
Basic Mass Metrology Seminar
NIST Office of Weights & Measures, Gaithersburg, MD
Call fax-on-demand system 1-800-925-2453 & request document # 503 for additional information

May 4-8, 1997
43rd International Instrumentation Symposium
Sheridan North, Orlando, FL
CONTACT: William Stange, (513) 255-2351

May 4-9, 1997
Institute of Environmental Sciences
43rd Annual Technical Meeting & Exposition
Los Angeles Airport Hilton & Towers, Los Angeles, CA
CONTACT: Inst. of Environ. Sciences, (708) 255-1561

REGION MEETINGS

REGION 5
Northern OH, Southern OH/Northern KY, Central Indiana, Northern Indiana, Michigan Sections,
May 1997 (3rd week)
Topic: Round Robins & Msmt. Assurance Programs
CONTACT: Dave Neibel, (513) 438-1168

REGION 8
LA/Orange County Section, April 17, 1997
Southern California Edison, Westminster, CA
CONTACT: Mike Magin (714) 895-0488
FAX: (714) 895-0868
e-mail: magindm@sceme.com

Phoenix/Tucson Section, May 8, 1997
Ramada Hotel, Tempe, AZ
CONTACT: Wayne Benda (520) 794-4483
FAX: (520) 794-5658
e-mail: webenda@cccgate.ha.com

LA/Valley Section, June 17, 1997
Calabasas Inn, Calabasas, CA
CONTACT: Brian Conroy (818) 866-2211 x2533
FAX: (818) 717-6881
e-mail: conroyb@litton.gcs.com

LA/Valley Section, November 11, 1997
Calabasas Inn, Calabasas, CA
CONTACT: Brian Conroy (818) 866-2211 x2523
FAX: (818) 717-6881
e-mail: conroyb@litton.gcs.com

Please send Metrology Calendar corrections to Wilbur Anson, NCSL Business Office,
(303) 440-3339 FAX:(303) 440-3384, or E-mail to ncsl-staff@ncsl-hq.org

NCSL PAST PRESIDENTS

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H. Curtis Biggs

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Lloyd Wilson

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A.J. Woodington

1965-66
John Van deHouten

1966-67 1967-68
Charles E. White

1968-69
Harvey W. Lance

1969-70 1970-71
Jerry Hayes

1971-72
Frank Dyce

1972-73
Ralph J. Barra

1973-74
Donald J. Greb

1974-75
J. David Mitchell

1975-76
J. Michael Suraci

1976-77
John L. Minck

1977-78
Laurel Auxier

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1979-80
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1980-81
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Dean A. Brungart

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Hartwell Keith

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H. Bryan Werner

1986-87
Ed Nemeroff

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Gary Davidson

1989
Del Caldwell

1990
William Simmons

1991
Graham Cameron

1992
Robert Smith

1993
James Ingram

1994
Ralph Bertermann

1995
William F. Doyle

1996
Anthony Anderson
TRAINING INFORMATION

COAST QUALITY MEASUREMENT UNCERTAINTY COURSE

Please refer to Training Information Directory for more course information.

1997 Dates:

Jan 27-31, 1997, Anaheim, California
July 21-25, 1997, Atlanta, Georgia

Contact COAST Quality Metrology Systems, Inc.
35 Vista del Ponto
San Clemente, CA 92672-3130
Phone/FAX (714)492-6321

********

ADDITIONAL EDUCATIONAL INSTITUTION NOT LISTED IN THE TRAINING INFORMATION DIRECTORY:

Dave Lorenzen has submitted this listing.

Amarillo Technical Center
P.O. Box 11197
Amarillo, Texas 79111
Attn: Tony Thorpe
(806)335-02316

Offering: AAS Metrology

********

TRAINING INFORMATION DIRECTORY

Copies of the 1997 NCSL Training Information Directory have been mailed to all NCSL delegates. If yours has not yet arrived, contact the NCSL business office.

ADDITIONAL TRAINING COURSES WHICH MISSED THE TRAINING DIRECTORY

COURSE TITLE: Introduction to the Creation and Control of the Vacuum Process Environment

This course provides a comprehensive overview of vacuum technology in the context of moderate to high throughput process systems. Through discussions involving a logical progression of vacuum systems, each with its own set of issues and complexities, the concepts of vacuum and the related measurement & control instruments are learned in a cohesive manner that is intended to make the topics relevant to equipment and process personnel. The lecture is complemented with numerous demonstrations and hands-on activities using a fully instrumented training apparatus.

SPONSOR: MKS Instruments, Inc., Six Shattuck Rd., Andover, MA 01810

CONTACT: Steve Hansen (508) 975-2350

LENGTH/COST: 1 Day

DATES: Call for dates, locations and customized on-site programs.

COURSE TITLE: Vacuum Gauging and Thermal Mass Flow Controllers

Courses are offered on the following:

Vacuum Gauging: Covered are indirect and direct total pressure gauges. Specific indirect total pressure gauges discussed include thermocouple, Pirani, convection enhanced Pirani, hot & cold cathode ion gauges and the spinning rotor gauge. The primary emphasis of the course is on capacitance manometers. Calibration principles for total pressure gauges are also covered and a concluding section covers the basics of residual gas analyzers including examples of process monitoring applications.

Thermal Mass Flow Controllers: A comprehensive overview of thermal mass flow control technology. Topics include mass flow terminology, descriptions of the various sensor and control valve configurations and characteristics, materials and construction considerations, performance characteristics and sensitivities, calibration procedures, in-situ verification and basic troubleshooting techniques and guidelines.

A variety of demonstrations and hands-on activities using an instrumented vacuum system are incorporated in these courses.

These courses are usually customized to meet the customer's particular requirements.

SPONSOR: MKS Instruments, Inc., Six Shattuck Rd., Andover, MA 01810

CONTACT: Steve Hansen (508) 975-2350 x5605

LENGTH/COST: Call for information
MEASUREMENT UNCERTAINTY TRAINING COURSE

Ed Note: See Training Directory for Details

Feb. 4-7, 1997
Scottsdale, Arizona

Course Objectives
After completing this course, each student will understand the nature of measurement errors and be able to determine the random, systematic and total uncertainties of a measurement system. In addition, students will understand how to monitor and control the results of a measurement process, on a continuing basis, to produce evidence that the measurement process is in statistical control.

Tuition
The tuition for this training course is $895 per person. The tuition includes all course materials, a comprehensive notebook and refreshments during class hours. It does not include transportation, meals or hotel accommodations.

Future Classes
Measurement Uncertainty
Liquid Flow Measurement
Gas Flow Measurement

Registration
To register for this course, contact:
Flow Dynamics, Inc.
7419 E. Helm Drive, Suite B
Scottsdale, AZ 85260

A tentative registration can be made by telephone, (602) 948-3789, or by Fax (602) 948-3610.

Editor's Message
(Continued from page 2)

But now we know. CHARLENE Ryan sent me an email message, identifying herself and her organization, SEH-America. So, actually, I didn’t even have the first name correct. My apologies to Charlene, and kudos to her company for sponsoring her for the conference, and for her help at the drawings.

No Internet Page this Issue
I didn’t get any inputs for Internet goodies for this issue, other than Jim Wheeler’s note that his MCP Committee is on the Internet. See his committee report.

Technology Marches On
For the first time in newsletter history, I received and printed Regional meeting photos which were scanned in Japan and sent on the HP Internet. We imported the pictures into our camera-ready copies and I was pretty impressed with the print quality.

Now in terms of sending over the Internet with its encoding processors, I may still have a ways to go to learn all those black magic steps, but I am ready to start.

John Minick, Editor
THE 1997 NCSL WORKSHOP AND SYMPOSIUM

ATLANTA

July 27-31, 1997
Hyatt Regency Atlanta
Atlanta, Georgia

SUCCESS IN THE 21st CENTURY DEPENDS ON MODERN METROLOGY

Conference Theme
With industry rightsizing and operational costs increasing, businesses utilizing properly maintained and managed metrology programs will become more successful in the 21st century. Have you evaluated your future metrology requirements? Does your company plan metrology into the quality of your products? Does your company fully understand the benefits of maintaining measurement traceability to national and international measurement standards? Does your metrology program meet the requirements of ANSI/NCSL Z540-1-1994?

LEARNING OPPORTUNITIES

Networking
NCSL provides many opportunities to meet other conference attendees from all over North America and other parts of the world - people who have interests, problems, perspectives and situations similar to yours.

- Reception - Sunday Evening
- International Dinner - Monday Evening
- Conference Banquet - Tuesday Evening
- Exhibits - Sunday thru Wednesday
- Luncheons and Breaks - Monday thru Wednesday

Committees
Join with the people who are doing the inside work in committees such as:

- TQM Committee on Calibration System Requirements
- Utilities Instrumentation & Calibration
- Medical Instrumentation & Calibration
- Laboratory Facilities & Evaluation
- Calibration Intervals, System & Procedures
- Automatic Test & Calibration
- Intrinsic & Derived Standards
- National Measurement Requirements

Exhibits
Meet face to face with key company executives and technical experts from more than 100 leading manufactures supplying products and services to the measurement community.

- New Equipment Demonstrations
- Applications Information
- Problem Solving and Networking

TOPICS
Topics will be presented in separate program tracks on Monday, Tuesday and Wednesday:

Theoretical
- New Standards & Improved Standards
- Intrinsic and Derived Standards
- Advances in MeasurementDisciplines
- Standards & Calibration at National Laboratories

Applied
- Laboratory Automation
- New Trends in Instrumentation
- Metrology for Petrochemicals, Utilities, Pharmaceuticals and Chemistry

Managerial/Quality
- ISO Documents (9000, Guide 25, etc)
- Metrology Management Info Systems
- Strategic Planning
- Equipment Management
- Quality Standards
- Laboratory Accreditation
- Metrology Education and Training
- Self-Managed Workforce
- National Measurement Systems Around the World

For Information contact the NCSL Business office
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®
Our next speaker is Paul Brown. Paul is going to talk about the transfer from NBS to the Department of Transportation, of a good bit of work here that had to do with automotive safety that was initiated in the period after World War II, and grew at the Bureau as the Department of Transportation was established and put money into the Bureau to conduct research and testing on important automotive components. Our speaker, Paul Brown, is an engineer. He received his B.S. in mechanical engineering and a master’s degree in engineering administration from Washington University in St. Louis. He joined the Bureau in 1966 after having a number of engineering management positions in industry. At the Bureau, he headed up the automotive safety work. In 1972, the entire package of automotive safety research and testing at the Bureau was transferred to the Department of Transportation becoming the technical arm of the then new National Highway Traffic Safety Agency. I regard this spinoff as in the classic mold, that is, the Bureau taking on some early work when an agency didn’t have its own technical capabilities, building it up to a point at which it was viable, and then when the other agency was ready to accept it, transferring it to the agency.

I’d like now to call on Paul Brown, who when leaving the Department of Transportation, went to the Department of Energy, where he became involved and very much interested in electric vehicles. Now, in his “retirement,” is the Executive Director of the Electrical Vehicle Association of the Americas. Paul Brown.
AUTOMOTIVE SAFETY LABORATORY

Paul J. Brown

Introduction

It is indeed an honor and a privilege to be part of this Symposium in Celebration of the Ninetieth Anniversary of NBS/NIST. Some 24 years ago, in 1967, the National Bureau of Standards established an automotive safety laboratory at the old site at Connecticut and Van Ness in Washington, D.C.

Accompanying me today is my close friend and colleague, Dr. F. Cecil Brenner. As a scientist-engineer team we recruited the staff, planned the programs and fought for funding each year from the Department of Transportation. Dr. Brenner also was directly responsible for the management of the Tire Division's research programs. Representing the staff of that laboratory, we can state that we were proud to have been part of the history of the National Bureau of Standards.

Let us go back in time to the fall of 1966. There was a concern over the growing number of fatalities on our nation's highways that had reached over 50,000 a year, as well as some 3 million serious injuries a year, that led to the passage of the National Traffic and Motor Vehicle Safety Act of 1966. On September 9, 1966, when President Lyndon Johnson signed the Act, he stated that this effort was second only to Vietnam in the priorities of his Administration.

1. Laboratory History and Mission

The Office of Vehicle Systems Research in NBS was established by a Memorandum of Understanding signed by the Secretary of Commerce, Alexander Trowbridge, and the Secretary of Transportation, Alan Boyd. Boyd had been the Undersecretary of Commerce for Transportation under Trowbridge and became the first Secretary of Transportation when the Department was created by Congress in 1966.

The Office of Vehicle Systems Research (OVSR) was funded by the interagency transfer of funds from the Department of Transportation until the transfer into the National Highway Transportation Safety Administration (NHTSA) in 1972 in accordance with the original Memorandum of Understanding. In March 1972 the entire laboratory facility and professional staff were transferred to the Department of Transportation, and our name was changed to the Safety Research Laboratory. The laboratory was located in the Industrial Building of the old NBS until we were relocated during the Nixon Administration to leased facilities in Riverdale, Maryland.

The objectives of the laboratory were to provide the scientific and technical bases for motor vehicle safety performance standards in three areas: tire systems, braking systems, and occupant restraint systems. An additional important and challenging task was to provide the technical basis for a Uniform Quality Grading System for Tires.

2. Occupant Restraint Systems

Prior to the passage of the National Traffic and Motor Vehicle Safety Act of 1966, the National Bureau of Standards was responsible for the implementation of a seat belt law. That law did not require that the auto industry install seat belts in cars, but if they elected to install seat belts, the belts had to meet or exceed the design standards promulgated under the seat belt law. The specifications and methods of testing the design standard for seat belts were developed by NBS in consultation and consensus with seat belt companies and the auto industry. The testing of seat belt assemblies was done on the OVSIR Instron. Important design standards for strength, elongation, flexing, stain and moisture resistance, and retractor performance were established to ensure that seat belt restraint systems installed in motor vehicles operating on U.S. highways would protect the motoring public.

One of the major tasks of OVSR/NBS was to improve the dynamic performance of the available anthropomorphic dummies to better simulate human reactions in the automotive crash. A unique and very economical sled was designed and fabricated by OVSR to provide a dynamic test of occupant restraint systems and to evaluate anthropomorphic dummy performance. The impact pulse of the vehicle is simulated by a belt over a cam that pulls the sled in reverse.

On the Daisy Decelerator at the Holloman Air Force Base, the Air Force and the NBS conducted human volunteer experiments on car seats with lap belts alone, and lap belts and shoulder harnesses in levels up to 16g which represents a 17 mph auto crash into a barrier. With identical tests on dummies we could determine what changes in dummy design were necessary to improve the human fidelity of test dummies. The high-speed motion pictures and test data were shared with the automotive safety community in a special meeting.
in the NBS Red Auditorium in Gaithersburg. Some 200 members of the automotive safety community, including overseas guests, attended this meeting. Our human volunteer test data were used and cited in the Federal Register as justification for mandating shoulder harnesses in motor vehicles.

The discomfort and inconvenience of seat belts and shoulder harnesses were early issues that contributed to the low usage rates. OVSR conducted a study of existing and experimental restraint systems with a number of different-sized male and female volunteers to make recommendations for improvement in retractor location and the use of inertia reel retractors.

3. Braking Systems

A dual-end inertial dynamometer designed and built to the OVSR specification was used to test and evaluate braking systems of automobiles and trucks. On the dynamometer, inertia discs were used to simulate any vehicle from a small compact passenger car to a large truck or bus up to 80,000 pounds gross vehicular weight.

In a cooperative agreement with the U.S. Army at the Aberdeen Proving Ground, we were able to conduct tests using a number of instrumented tractor-trailer rigs for wet pavement performance in straight-ahead stopping, lane changes, and braking-in-a-turn maneuvers. In these tests on the Aberdeen 11-mile strip and skid pad that NBS installed, we were able to test and evaluate the effectiveness of the new anti-skid braking systems.

The braking system performance for repeated stops, fading, and brake lining or disc wear can be evaluated on the dynamometer. The ducts over the test specimen simulate the cooling of the brakes that occurs in the wheel well as the vehicle travels over the road.

Correlation of the laboratory dynamometer tests with vehicle road braking performance was obtained through instrumented vehicles on test tracks. Laboratory and vehicle test methods for safety performance standards for vehicle braking systems and brake components such as lining and disc pads, cups, seals, and cylinders, were developed by OVSR. A chemical laboratory at OVSR also developed the safety standards for hydraulic brake fluids, and pioneered by field and laboratory tests the determination of the adverse affects of water pickup by brake fluids over time on lowering the reflux boiling temperature.

4. Tire Systems

Tire research at NBS preceded the Motor Vehicle Safety Law by many years. Early in automotive history, an “NBS Tire Test Wheel” was developed to evaluate the strength of various materials for tires. The test wheel was being used by the tire and auto industries to determine the load-carrying capacity of pneumatic tires at different velocities. OVSR ran a large number of tire tests in the laboratory and in vehicle tests to verify the load ratings for the initial tire safety standards.

Skidding on wet pavements was determined from accident statistics to be the predominant tire-related safety issue particularly with worn tires. Skid trailers were used to measure the coefficient of friction of pavements using a standard tire. OVSR used and modified a skid trailer for the measurement of new and used tires. The laboratory also tested tires on vehicles in spin out maneuvers on a Standard J Turn at Texas A&M. One of the results of this research was the requirement to place tirewear indicators in the bottom of the grooves in tires, which required replacement of the tires when the tires were worn to 1/8 inch of the bottom of the groove.

The laboratory also developed a Mobile Tire Traction Dynamometer to measure braking, driving, or cornering traction over a wide range of driving conditions. The dynamometer is a towed trailer similar to the skid trailer with watering capability to measure wet pavement performance but with the added capability of changing the steering, camber, and braking during road operation.

5. The Uniform Tire Quality Grading System

One of the biggest challenges to the Safety Laboratory was the development of the controversial Uniform Quality Grading System for Tires mandated by the law. From a host of tire performance attributes, treadwear, traction, and temperature resistance were selected for the grading system. To measure treadwear, the laboratory established a prescribed test on the public roads in Texas. For wet traction, the laboratory constructed standard concrete and asphalt skid pads. To measure temperature resistance, the laboratory tire test wheels were used.

It is significant to note that the tire industry was opposed to any quality grading system for tires from their marketing point of view. They spent considerable resources in fighting the rulemaking all the way to the Supreme Court where the Government's position was sustained in large part due to the technical and scientific basis provided by the laboratory. However, one of the tire companies that strongly opposed the rulemaking is now citing the grading of its tires under the Government system in its advertising.

Operating out of the Goodfellow Air Force Base in San Angelo, Texas, the Safety Research Laboratory developed the test procedures for measuring
Our final speaker this afternoon is Dr. Gordon Little, who is going to talk about the Central Radio Propagation Laboratory and its spinoff from the Bureau. Dr. Little was educated in Manchester, England, where he received a bachelor of science degree in 1948, and a Ph.D. in radio astronomy in 1952. In 1953, he came to the United States, where he became Deputy Director and Research Professor in the Geophysical Institute at the University of Alaska. He was there until 1958, at which time he left to join the Central Radio Propagation Laboratory at Boulder. He transferred with the CRPL to the Environmental Science Services Administration, that is ESSA, in 1965. It subsequently became part of the National Oceanic and Atmospheric Administration in 1970. Dr. Little resigned from NOAA in 1986, and since 1987 he has been with the Navy, based in Monterey, California, but he is a Senior Fellow at the National Center for Atmospheric Research in Boulder. Dr. Gordon Little.
CENTRAL RADIO PROPAGATION LABORATORY

C. Gordon Little

Fifty years ago, at the outbreak of World War II, the United States combined Chiefs of Staff were faced with many technical problems. One of the most important of these was how to communicate with aircraft, ships, and armies overseas. The only known way to communicate with such locations beyond the horizon was by reflecting high frequency (HF) radio waves off the ionosphere—that is, off the electrically conducting ionized layers of the upper atmosphere. The range of radio frequencies effective for this purpose was known to be very variable. Over the previous 10 to 15 years, the NBS had identified strong diurnal, annual, and sunspot cycle variations, which depended also on latitude, and less strongly on longitude. Moreover, these “irregular” variations were at times greatly disturbed by ionospheric storms triggered by activity on the sun. However, by 1939, NBS had begun to prepare predictions of ionospheric radio wave propagation conditions one to three months in advance. With the onset of war, NBS was asked by the Joint Chiefs of Staff to accept the wartime responsibility for providing the armed services with radio communication research and services.

In response, then, the National Bureau of Standards formed the Interservice Radio Propagation Laboratory (IRPL) in the summer of 1942. Its activities included the regular radio standards activities of the Bureau of Standards. IRPL served the war effort very successfully. Even before the end of the war, it was recognized that there would be a peacetime need for continued, centralized radio propagation and radio standards research and services to support the civilian as well as the military establishment. So, with interagency and Congressional approval, the wartime IRPL was replaced in May 1946 by the NBS Central Radio Propagation Laboratory.

CRPL grew steadily, then, within the National Bureau of Standards in Washington during the late 1940s, rapidly straining the facilities at the Van Ness site. During this period, CRPL made many important contributions, especially in developing ionospheric and tropospheric forward scatter systems, which greatly expanded the range of frequencies available and the reliability of communication beyond the horizon. In 1954, in response to the overcrowding at the Van Ness site, and influenced by a policy of decentralizing the Government functions from Washington, CRPL completed the move to Boulder, Colorado. There it had, of course, access to much more space, to a much more varied terrain and climate, and to a major university.

In the period 1954 to 1965, CRPL continued to expand its radio standards and radio wave propagation studies within NBS, Boulder. But then, in 1965, a major reorganization occurred within the Department of Commerce. Studies initiated by Dr. Hollomon, the Assistant Secretary of Commerce for Science and Technology, had identified many important similarities between three of his science agencies; specifically, the Weather Bureau, the Coast and Geodetic Survey, and the Central Radio Propagation Laboratory of NBS. And so, in 1965, a new Department of Commerce agency, the Environmental Science Services Administration (ESSA) was formed by merging these three organizations, with the notable change, of course, that the radio standards activities stayed with the National Bureau of Standards' Institute for Basic Standards.

In ESSA, the Central Radio Propagation Lab was renamed the Institute for Telecommunication Sciences and Aeronomy (ITSA) and joined three sister institutes from the Weather Bureau and the Coast and Geodetic Survey, namely the Institutes for Atmospheric Science, for Oceanography, and for Earth Sciences. Together then, these four institutes formed the ESSA Institutes for Environmental Research (IER). These institutes were headquartered in Boulder, although scattered in different locations across the country. They reported to Boulder, and through Boulder to the Director of IER, located in Boulder, who reported to the Administrator of ESSA in Washington.

The creation of a single, geophysically oriented research organization from four very different research components of greatly different size and with quite different histories, stature, and traditions, was quite an important challenge. To this challenge, CRPL/ITSA was very influential. It was much the largest unit in terms of size and it had grown up within the National Bureau of Standards—that is to say, within a research organization—whereas the other three institutes had grown up in operational agencies, whose prime mission was not research. I personally count myself very fortunate to have spent the formative years of my Federal research and research administration career within an excellent organization, the NBS. NBS, and NIST, of course, is an agency which understands that its research products are
produced low in the organization by its scores of Section Chiefs and hundreds of Project Leaders, and not, of course, by top management. They recognize that effective upward and downward communication of new results, new needs, new priorities, is extremely important to the vitality and success of the organization. Therefore, it is extremely important that the number of levels in the hierarchy be kept at a minimum. This is true not only because such levels consume valuable resources, but perhaps more especially because each level inevitably delays the upward and downward flow of signals, and typically, unfortunately, to some extent each level distorts, attenuates, and masks the signals flowing through it. Perhaps one of the most important contributions CRPL/ITSA made to the process of forming the research arm of ESSA was to ensure that in 1967 we succeeded in persuading the ESSA administrator to abolish the Institute Director level. So the four Institute Director offices and the associated staffs were dispersed. One or two left, but in many cases they went down into the research labs. This allowed the lab directors to report directly to the Director of the Environmental Research Laboratories. I must admit that this had the additional, though unadvertised, advantage of ensuring that the Director of IER would be so busy that he would not have time to micromanage the ten labs. This was a significant hazard when we had one Director and four Institute Directors and their associated staffs.

The single goal traditionally uniting CRPL/ITSA was to study, understand, model, and predict the interaction of waves, acoustic and electromagnetic, with the propagation medium and its boundaries. But just as there are two sides to a single coin, so there are two reasons why we needed to study these interactions—first, to understand their effects on telecommunication systems, and second, to use these interactions to provide information about the propagation media. In other words, to exploit the interactions, not for telecommunication purposes, but for environmental remote sensing—a typical example, as the telecommunication people would say, of “One man's signal is another man's noise.”

The move of CRPL/ITSA into the Environmental Science Services Administration accentuated rather than softened this dichotomy between the two sides of the CRPL coin. Considering first the telecommunication side of the coin, studies within the Department of Commerce, stimulate by ITSA, concluded that the telecommunication policy formation and research needs of the United States Government were not being met. And so, in 1967, the Department of Commerce formed within itself the Office of Telecommunications, and within IER, the two telecommunication labs were united to form the Institute for Telecommunication Sciences (ITS), still remaining within ESSA. In response to continued studies, in 1970 the Office of Telecommunications Policy (OTP) was formed in the Executive Office of the President. At that time, ITS was transferred from ESSA to the Office of Telecommunications of the DOC. Then in 1977, a further reorganization combined the policy formation functions of OTP with the policy implementation and supporting research functions of the Office of Telecommunications in the Department of Commerce into a new single agency, the National Telecommunications and Information Administration (NTIA). Currently in 1991, ITS is still performing some propagation research, especially to extend radio telecommunications to the higher millimeter wave frequencies, i.e., the shorter millimeter wavelengths. But its mission has expanded to include research in support of telecommunications policy formation by OTP, telecommunication standards (both national and international) technology for telecommunication system evaluation, and technology transfer to industry. Thus, 25 years after leaving NBS, ITS is very much alive and hard at work.

Turning now to the environmental science side of the CRPL coin, 1967 also saw evolution of the environmental science component of CRPL/ITSA. A new lab, the Wave Propagation Laboratory, was formed to develop new remote sensing techniques applicable to research and services in the Earth’s atmosphere and ocean. Then in 1970, a further Federal reorganization added some non-Doc activities, chiefly from the Navy, to ESSA, and ESSA was given the new name National Oceanic and Atmospheric Administration (NOAA). With the simultaneous transfer of ITS from ESSA/NOAA to OT/DOC, the Institutes for Environmental Research were given their present title, the Environmental Research Laboratories (ERL) of NOAA. Their headquarters continue to be in Boulder.

For the past two decades, the environmental science component derived from CRPL have flourished in ERL, initially in the form of three labs. The Aeronomy Laboratory has conducted research on chemical and physical processes in the Earth’s atmosphere to advance the capability to monitor, to predict, and to control its quality. Currently, their major focuses are research on air quality and climate, with special emphasis on such areas as stratospheric ozone depletion, tropospheric ozone production by pollutants, and the greenhouse effect, acid rain, and climate change. So a very broad range of air quality and climate change studies are continuously pursued within the Aeronomy Laboratory. The Space Environment Laboratory performs research and services directed towards understanding, monitoring, and
forecasting solar and geomagnetic events. These can have undesirable, harmful, and costly effects on activities on Earth or in near-Earth environments. They may even be health- or life-threatening. As part of these activities, the Space Environment Laboratory operates in Boulder, jointly with the U.S. Air Force Weather Service, the Space Environment Services Center. This Center provides solar terrestrial prediction services 24 hours a day, year in and year out, for users in the nation’s military and civilian organizations. The Wave Propagation Laboratory is NOAA's remote sensing lab. It focuses on studies of the interactions of acoustic and electromagnetic waves with the atmosphere and the ocean, with particular reference to their use for remote sensing purposes. It develops and evaluates new geophysical remote sensing concepts and systems, and applies the unique advantages of these newly developed remote sensing techniques, which typically provide two to six orders of magnitude more data than an individual thermometer or wind sensor. It seeks, through the transfer of these new remote sensing technologies to others, to advance the nation's atmospheric and oceanographic research, and its atmospheric and oceanographic forecasting and warning services.

Spinoffs from the Wave Propagation Laboratory, specifically the PROFS (Program for Regional Observing and Forecasting Services) and the Profiler Program, a clear air Doppler wind profiling system, helped form a fourth laboratory, the Forecast System Laboratory. This lab focuses on the development and transfer of new forecast systems for the nation's weather services or for the National Ocean Service.

In conclusion, I believe that the National Bureau of Standards/NIST may well be proud of the impact achieved over the years, and still being achieved, by its 1965 spinoff child, the Central Radio Propagation Laboratory.

AUTOMOTIVE SAFETY LABORATORY

(Continued from page 22)

treadwear on this course. Convoys of vehicles with test tires were run over Texas public roads to determine the treadwear after a day's run. Wear measurements were made by a laser device developed by the laboratory to measure and record precisely to within ten-thousandths of an inch the wear of the day's operation. Tests were completed to tire wearout. This data determined that comparative treadwear ratings could be made after 6,400 miles and a break-in of 800 miles of operation over the NHTSA prescribed course.

To measure wet traction performance, two standard skid pads were constructed at the Goodfellow Air Force Base, one concrete and one asphalt for the comparative testing and grading of tires.

On the sidewall of your tires, the treadwear, wet traction, and temperature resistance properties are graded in accordance with the test procedures and the test facility established by the laboratory at the Goodfellow Air Force Base. We believe that the tire grading system will enable you to make an informed choice in your selection of replacement tires.

Summary and Conclusions

This then has been a quick overview of the Office of Vehicle Systems Research that was spawned in the National Bureau of Standards. We are convinced that the laboratory made a significant contribution to the development of safety performance standards for motor vehicles that have resulted in the saving of lives and reduction of injuries on our nation's highways. Thank you for inviting us back today to participate in your 90th Anniversary.
OPERATIONS & MARKETING
William (Bill) Quigley, VP

Activities:

Note on insurance. After the unfortunate loss of lap top computers at Monterey by President Tony Anderson and Executive Vice President Kevin Ruhl, I talked with the NCSL insurance agent. He strongly recommends that if you travel with a computer or other high value asset you purchase a supplement to your personal insurance to cover these items. There is a strong precedent in common law that precludes any other form of coverage or liability by an organization or facility where such a loss may occur.

Committee Activities:

BUSINESS MANAGER
Wilbur Anson

Plan to aggressively work on NCSL World Wide Web presence this next quarter. Wilbur will provide additional details.

PUBLICITY COMMITTEE
Carol Singer

Conference Publicity

CAL LAB Magazine carried a summary of the conference in the September/October issue and the Call for Papers for the 1997 Workshop in the Calendar section. The Call for Papers was also included in the Calendar section of CAL LAB's web site with hyperlinks to the NCSL e-mail address.

Brochure

Following the last board meeting and conference, I felt that the "Benefits of NCSL Membership" section needed to be changed to provide stronger reasons for organizational membership. This section has now been re-written with an emphasis on the benefits of staying current on changing standards, accreditation and regulatory requirements. The section now also includes reference to NCSL involvement in international forums of education and development of standards.

We also made two minor word changes in the "Who Should Join" section and broke the section into two paragraphs for better readability.

The incorrect e-mail address for the NCSL office was corrected.

A reprint of 2,000 copies was done at a cost of $816.22 ($757.51 + tax $58.71). A larger printing will be completed after we have determined from this distribution that there are no further corrections required.

Education Committee Search for Metrology Schools

CAL LAB Magazine carried a 1/4 page size version of Don Dalton's "Wanted" poster in the September/October issue to locate metrology schools eligible for the NCSL Education Scholarship Award Program.

I am in the process of developing a press release for the general engineering media and related organizations announcing the scholarship program.

LABORATORY SYSTEMS
Brian Fitzpatrick, VP

Activities:

Continued work on the pressure round robin; The artifacts were characterized at the pivot lab (Consumers Power) and passed on to the first test lab (NIST). A rotation list is in process. We have 20 participants.

Committee Activities:

LABORATORY HEALTH & SAFETY
Roger Hickey

LABORATORY FACILITIES
David Braudway & Doug Cooper

A meeting was held at NCSL in Monterey. The results of this meeting were quite positive although the number of attendees were few. Steps were taken to accomplish the following:

A. Active contact of those who have indicated an interest in participation. This contact is structured to reach all who have indicated an interest in the RP7 review, the development of a "planning" guide to assist environmental selection and the facilities operation document.

B. The available draft facilities operations guide will be split into two sections. The first of these will cover those requirements specific to standards laboratory operation; the second will cover facility operation requirements which are important but generic and which are required of all facility operations. The reason for the split is simply that large organizations have in place requirements governing the second half; small operations need to respond directly to these on their own. However, all need to respond to the specific requirements on standards laboratories.

C. The Laboratory Environments document I wrote some years ago as a guide for the DOE Weapons Complex Laboratories and which was released for use in preparation of RP7 will serve as the basis for preparing a guide to Laboratory Environment Selection to augment RP7 and serve as an initial guide in selecting needed environment specifications.

D. We are beginning to process of accumulating updated information for inclusion in RP7.

A meeting is planned for the Measurement Science Conference in January and, of course, for NCSL 97, Atlanta. Plans were set to have the Environmental Selection Guide and Facilities Operations Manual finished near middle of 1998.
EQUIPMENT MANAGEMENT FORUM
Charles Motzko

Charlie Motzko reports that the EMF committee is in the process of reconstituting the forum, and is not active at this time. He is also looking for a new chairperson to replace him, but will stay on until someone is found.

MEASUREMENT SCIENCE AND TECHNOLOGY
Georgia L. Harris, VP

Activities:

Contacted ASTM regarding management of Laboratory Crosscheck Program for petroleum testing.

Discussed concerns regarding anonymity and publication of round robin reports with Miguel Cerezo by telephone and Jim Wheeler by e-mail. Recommendations submitted below.

Jim Wheeler obtained technical contacts for specific measurement areas and put them on the Web site (http://members.aol.com/ncslmcp/mcp.html) for people needing support to contact. All recent meeting attendees are also listed.

Summary of ASTM Crosscheck Program

ASTM has a Web site addressing specific concerns such as its Crosscheck Program for petroleum quality testing and for metals proficiency testing at: http://www.astm.org/statqca.htm.

The following information is taken from that source.

"ASTM's Interlaboratory Crosscheck Programs provide participating laboratories with a statistical quality assurance (SQA) tool, enabling them to compare their performance in the use of ASTM methods against other laboratories worldwide. Over 700 laboratories participated in the 1995 testing, [>800 in 1996] including over 20% international participation. These programs are sponsored by ASTM Committee D-2 on Petroleum Products and Lubricants, with over 1,800 members and more than 440 published standards.

Each laboratory returns their test data to ASTM for use in generating statistical summary reports. Published summary reports, provided to participants only, contain:

- Each participating laboratory's test results (coded)
- Statistical analysis of test data
- Charts plotting test results versus laboratory code
- Other pertinent information.

Long-term statistical reports selected over a specified historical period will be provided for each test when sufficient amount of data is generated."

The ASTM manager of the program is David Bradley. He estimated that they use resources of about 3 FTEs and the most costly aspect of the program has been the database and computer programming. Each set of data is analyzed using a Microsoft Excel spreadsheet and Youden plots are generated when appropriate using Excel. The program is 3 to 4 years old and the annual cost for participation runs between about $400 and $700 per test method - for which a participant generally receives three samples per year. In the case of petroleum testing, a Coordinating Group of ASTM Committee D-2 acts as technical advisors in establishing procedures, reviewing problematic data, and making suggestions for ASTM program improvements. All samples and sample distributions are subcontracted.

The ASTM National Exchange Group (NEG) is an interlaboratory organization established in the 1930's under Subcommittee 1, Committee D-2, to obtain precision data on ASTM test methods. The group provides their own samples to keep costs lower and the program is contracted with Dixie Services, Galena Park, TX, 713/672-1619.

Policy Recommendations for NCSL-Sponsored Interlaboratory Comparisons

A letter expressing concern regarding the handling of a recent NCSL-sponsored and published ILC was sent to Jim Wheeler. I have not investigated the full scope of the concern among all parties involved; however, I have talked with Miguel Cerezo regarding the draft RP for conducting Interlaboratory Comparisons (ILC) which already contained these recommendations. I recommend that the NCSL BOD adopt the following policy regarding ILCs to ensure that:

1. All participants agree in writing regarding anonymity status and publication of final results;
2. All participants must agree to any changes regarding anonymity status;
3. No reports are distributed or published without opportunity for technical analysis and corrective action.

"All participants shall agree in writing regarding anonymity status of a specific ILC prior to its conduct. In the event that any participant desires the anonymity status to be changed, it must be agreed to by all participants in writing prior to the release of any identifying data or reports. A draft report and data analysis shall be prepared and circulated to all participants for technical review and possible corrective action prior to a final publication being prepared for wider circulation or publication in any format. All participants must agreed to publication of results. Further, anyone coordinating an ILC must be informed of the policy and agree to implement it."

Committee Activities:

MEASUREMENT COMPARISON PROGRAM
Jim Wheeler

The Measurement Comparison Program (MCP) highlights can now be found in the NCSL area of the GIDEF BBS and at URL http://members.aol.com/ncslmcp/mcp.html on the WWW. The website is continually updated, check it periodically for new information.

A MCP meeting will take place at MSC in Pasadena on Wednesday at 4:00 PM. The meeting place will be posted on the bulletin board in the registration area.
The MCP Recommended Practice Sub-Committee hopes to provide a draft at Measurement Science Conference (MSC) in Pasadena in 1997. Call Miguel Cerezo (Amen) for more information at (805) 447-1128. This committee will also meet on Wednesday at MSC.

A list of round robin (RR) volunteers was created following NCSL in Monterey. This form lists people who are willing to share their expertise in roundrobin in certain measurement areas. The list is as follows:

<table>
<thead>
<tr>
<th>Measurement Area</th>
<th>Name</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensional</td>
<td>Brian Conroy</td>
<td>818-717-6872</td>
</tr>
<tr>
<td>DC/LF Electrical</td>
<td>Les Huntley</td>
<td>208-746-0786</td>
</tr>
<tr>
<td>Microwave/RF &amp; S Parameters</td>
<td>Ron Ginley</td>
<td>303-497-3634</td>
</tr>
<tr>
<td>DC/LF &amp; Microwave/mmwave parameters</td>
<td>Larry Tarr</td>
<td>205-876-8417</td>
</tr>
<tr>
<td>Mass &amp; Volume</td>
<td>Georgia Harris</td>
<td>301-975-4014</td>
</tr>
<tr>
<td>Microwave</td>
<td>Jim Wheeler</td>
<td>619-545-9698</td>
</tr>
<tr>
<td>Pressure</td>
<td>Brian Fitzpatrick</td>
<td>410-987-4000</td>
</tr>
</tbody>
</table>

I attended the DOD / NIST Microwave Calibration Coordination Group Meeting in Boulder, CO the week of November 18. The following information was from that meeting:

Dylan Williams (NIST, Boulder) announced that there is a onwafer millimeter-wave interlaboratory comparison underway between NIST, TRW, and IEMN in France. Call Dylan for more information at (303) 497-3138 or e-mail at dylan@boulder.nist.gov.

NIST will hold a Radar Cross Section (RCS) Range Certification Meeting on March 4 to 6 1997. Dr. Lorant A. Muth can be contacted at (303) 497-3603 or e-mail at lorant@cassowary.cccc.bidroc.gov for more information. DOD personnel and all members of the RCS community in government and industry are welcome to attend to provide technical input. Topics for discussion include RCS range characterization, RCS uncertainty analysis, range measurement improvement/ assurance programs (MAP), procedural, organizational and implementation issues, technical requirements for certification, establishment of a DOD RCS Certification Demonstration Project, and project time lines. Security clearance will be required. See the following information.

NIST is also sponsoring a Mode-Stirred Chamber, Anechoic Chamber and Open Area Test Site (OATS) Users Meeting in Vale, CO on April 28 through May 2 1997. Contact Galen Koepeke (NIST, Boulder) at (303) 497-5766 or e-mail koepeke@boulder.nist.gov for more information. See the attached flyer in the NCSL Newsletter for more information.

MCP News

The Cylindrical Ring Gage Round Robin is in progress according to Steve Morse (Superior Gage Service). There are 8 participants. The round robin (RR) began in Sept. 1995 and should be completed by the end of December 1996. The artifacts are 3 Ring Gages. John Stomp is the point of contact (POC) at NIST Gaithersburg. Steve reports problems with slow returns of the artifacts. A report on this effort will be given at the NCSL Region 6 meeting in Dallas. Call Steve at (918) 456-1554 or FAX (918) 456-2838 for more information.

Dr. Klaus Jaeger (Lockheed Martin) informed me that a new 10 Volt J-Array RR will begin in January 1997. Clark Hamilton (NIST Boulder) will be the POC. Contact Klaus at (408) 756-0270 for more information.

Lockheed Martin is sponsoring a new Magnetics RR at the NMR level. The proposed artifact is a 0.1 Tesla magnet. Call Dennis Dingmann (Lockheed Martin) for more information at (408) 756-2326.

Charles J. Ellis (Martin Instruments) reports on a torque round robin 2E Jeff Otto (3M) and Charles are POC's on this round robin. This effort included three stages: test, problem solving and training participants and finally re-test. There are 13 participating facilities. The artifacts are now at laboratory 11 and will then go to laboratory 12. The RR began in October 1995 and will end in January 1997. The artifacts are 10 torque wrenches. Charles also reported that he has received the Youden Plot Software from Brian Conroy (Litton Guidance and Control). This software will be used to plot the data from participating laboratories. A report on this RR will take place at the January 16, 1997 NCSL Section Meeting in Minneapolis. Call Charles at (612) 882-8223 or FAX (612) 882-8222 for more information.

Dean Jarrett (NIST) reported on a high resistance round robin now underway. The artifacts are 10 MOhm and 1 GOhm resistors. It is sponsored by BIPM and has international participation with 14 labs including NRC Canada. Dean also reports that he may start a domestic resistance round robin next year. Dean can be contacted at (301) 975-4240.

Marc Buttel (Micro Motion) is looking for participants for a flow RR 2E. The artifact has been evaluated at Micro-Motion. There are international participants. The artifact is a Micromotion Model CMF100 Coriolis Flow Meter. Marc will present results of this effort at a future NCSL meeting. Call Marc for more information at (303) 530-8562 or FAX (303) 530-8596.

A mass RR started in January 1996 according to Dave Dikken (Minnesota Department of Public Service). There are 10 laboratories interested at this time and the round robin will last approximately one year. Dave invites international primary laboratories to participate in this round robin. The artifacts consist of 2 sets of kits from 1 mgm to 1 Kgm. The round robin includes density and magnetic permeability measurements 2E Call Dave for more information at (612) 649-4010.

Brian Fitzpatrick (Hi-Tech Inc.) reports on a pressure RR. It began in August 1996 and should finish by December 1997. There are 20 participants including NIST. The artifact is a Parascientific 200 psig Digital Pressure Gage (0.01% FS). The artifact is now at NIST. It will then go to Consumers Power which is the pivot lab. Jack Ferris (Consumers Power) is the POC at the pivot lab. Stu Tison is the POC at NIST Gaithersburg. A letter was sent to Sharrill Dittmann (NIST Gaithersburg) in November requesting NIST support for this effort. Call Brian at (410) 987-4000 or FAX (410) 987-4034 for more information. Brian also reports no further progress on the air piston gage RR. He is looking for artifacts.
Committee News

Clyde Orrison (Texas Instruments) reports that a new RF power RR has begun. The artifact is a Type N Connector Model HP 8478B Thermistor Mount 2E. Clyde is also interested in a gage block RR. Clyde can be reached at (214) 995-5032 or FAX (214) 995-4802.

Greg Burnett (HP) reports interest at HP in a 10 Volt Zener, 10 KOhm Resistance, and RF Power RR. Call Greg at (303) 649-5460 if you are interested in those areas.

The Ford Flow MCP is in progress according to Richard Caron (Ford Motor Co.). There are 6 participants. The RR began in January 1996 and will end in approximately June 1997. The artifact is a tandem critical flow venturis. The artifacts are now at NRLM Japan and will next go to KRISS in Korea. NPL in the United Kingdom is also participating. Dr. George Mattingly is the NIST POC. Richard can be contacted at (313) 390-7075 or FAX (313) 337-9671 for more information.

Ronnie Eubanks (Halliburton Energy Services) reports that he needs NIST Gaithersburg participation for a Gage Block RR. He has 7 participating labs. The artifacts are 10 gage blocks. The artifacts are now at Halliburton and will next go to Compaq. He plans on reporting this effort at the Spring NCSL Region 6 Meeting. The RR began in October 1996 and should be completed by March 1997. For further information contact Ronnie at (214) 418-4034 or FAX (214) 418-3426.

Ronnie also reports that he needs NIST Gaithersburg support for a Thread Plug Gage RR. The artifacts are 1/2 - 13 UNC Plug and 5/8 - 11 UNC Plug Thread Gages. This RR will begin in December 1996 and should be completed in April 1997. There are 6 participants. The artifacts are now at Halliburton and will next go to Texas Instruments. Ronnie will report on this effort at the Spring 1997 NCSL Region 6 meeting.

ARFTG Verification Kits

The Automatic RF Techniques Group (ARFTG) MCP chairman is Bob Judish (NIST, Boulder). Bob can be reached at (303) 497-3380. NCSL is now supporting NIST Boulder with funds provided by Sharrill Dittman (NIST, Gaithersburg). ARFTG is continuing their round robin efforts with vector automatic network analyzers:

Phil Yates (JPL) is the coordinator for the 3.5 mm Verification Kit Round Robin. The kit consists of a 3.5 mm verification kit with shorts. Phil can be contacted at (813) 354-2981. Phil prefers contacting him using E-mail at pyates@inst-sun1.jpl.nasa.gov

Connie Ondrejka (NIST, Boulder) is the coordinator for the 7 mm Verification Kit Round Robin. The kit consists of 20 dB and 50 dB Attenuators, 50 Ohm ad 25 Ohm Mismatch Airplanes and a short. Connie will possibly report on this effort at the 1997 NCSL Conference. Connie can be contacted at (303) 497-3264 or FAX (303) 497-3970.

Pat Nolan (Lockheed Martin Missiles and Space) is the P.O.C. for the Type N Verification Kit Round Robin. The kit consists of a 20 dB Attenuator, a 50 dB Attenuator, a Beadless Airplane, and a set of Offset Shorts (M/F). Pat reports that problems have occurred with the male offset pin loosening and other connector problems. He has since modified the instructions for the MCP to include special instructions to preclude these problems. Call Pat at (408) 756-2144 or FAX (408) 742-4435 for more information.

Ed Daws (Wiltron) is the P.O.C. for the 2.92 mm K Connector Verification Kit RR. The kit consists of a 20 dB Attenuator, a 40 dB Attenuator, a Bead Standard Airplane and an Airplane. Ed is looking for more laboratories to participate. He can be reached at (408) 778-2000.

Ken Wong (Hewlett Packard) coordinates the 2.4 mm Verification Kit. Contact Ken at (707) 577-2616 for information.

For further information on the NCSL MCP committee call Jim Wheeler (Navy Primary Standards Laboratory) at (619) 545-9698, FAX (619) 545-9861 or E-mail at: JIMKJ65X@AOL.COM.

NIST RCS RANGE CERTIFICATION MEETING
DoD Demonstration Program

March 4-6, 1997 • Boulder, CO

PURPOSE To inform the RCS community on RCS measurement range certification issues and to gather information to support planning of the DoD RCS Certification Demonstration Program.

LOCATION The meeting will be held at the National Institute of Standards and Technology (NIST), Radio Building, Main Auditorium, 325 Broadway, Boulder, CO 80303-3328.

ACCOMMODATIONS A limited number of rooms are being held at three local hotels for your convenience. Reservations should be made early in order to ensure space at the hotel of your choice. Be sure to mention that you are attending the RCS Certification Conference at NIST/Boulder.

REGISTRATION $90 (includes cost of refreshments and working lunch). Please complete and return the enclosed registration form for by January 15, 1997.

Technical Information
Lorant Muth, NIST, 813.08
Telephone: (303) 497-3603
Fax: (303) 497-3122
muth@boulder.nist.gov

Registration Information
Jerry Hendrix, NIST, 346.16
Telephone: (303) 497-5646
Fax: (303) 497-3371
hendrix@mief.nist.gov
1997 Mode-Stirred Chamber, Anechoic Chamber, and OATS
User Meeting
April 28-May 2, 1997
at
Lion Square Lodge & Conference Center Vail Colorado

Hosted by the Fields and Interference Metrology Group,
National Institute of standards and Technology

NIST

* A special tutorial session on measurement uncertainty
  analysis is planned for Monday and Tuesday AM. The presen-
  tations and discussions for the Users Meeting will begin
  on Tuesday PM.

* We are requesting short papers and presentations on my
  topic related to the design, construction, evaluation, analy-
  sis, and/or use of Mode-Stirred Chambers, Anechoic Cham-
  bers (including semi-anechoic), and Open Area Test Sites
  (OATS).

Please send a title and abstract or inquiries to:
Galen Koepeke
NIST-Mail Stop 813.07
325 Broadway Boulder, CO 80303-3337
Phone: (303) 497-5766

INTRINSIC/DERIVED STANDARDS COMMITTEE
Richard Pettit

The following represents a status of the various Working Groups
sponsored by the NCSL Intrinsic/ Derived Standards Committee
(IDSC). Each Working Group is developing a Recommended
Intrinsic/Derived Standards Practice (RISP):

1. Rand Elmquist, NIST, chairman of the Quantum Hall Resis-
tance working group, has completed a final document which was
submitted to the IDSC committee members for review on October
14, 1996. Any comments received by Dec. 16, 1996 will be for-
warded to Rand for review and the revised document will be sub-
mitted to the NCSL Board of Directors for review.

2. D. Duff, A-Metrology-Z, chairman the Two-Pressure Humidity
Standard working group, is developing an outline and assignments
for the document.

3. An Intrinsic/Derived Standard Reference Catalogue, developed
by R. Pettit, Sandia, documenting over 40 intrinsic/derived stan-
dards has been revised based on many suggestions received from
NIST. The revised document has been sent to all IDSC commit-
tee members for comments. After this review the document will
be submitted to the NCSL Board for review.

4. C. Ehrlich, NIST, and Laurie Baker, Rockwell, have updated
the RISP on Deadweight Pressure Gauges based on comments
obtained at the 1996 NCSC Conference. A final draft will be re-
viewed at the 1997 MSC. After the MSC review, the RISP will be
ready for circulation to the IDSC committee members for their
review.

5. John Ball, US Army, is coordinating an effort to develop a de-
finition of an Intrinsic Standard. John has updated his definition
after the 1996 NCSL Conference. Additional thoughts on a de-
finition were obtained from Henry Sostmann for consideration.
Another proposed definition is currently being circulated to all
IDSC committee members.

6. Paul Levine, Lockheed-Martin, is leading up a working group
that is developing a RISP on the Argon Triple Point Cell. The
working group is developing an outline for the document.

* * * * * *

INDUSTRIAL PROGRAMS
Gary Shuler, VP

Activities:

Attended the start of the Healthcare Metrology committee at the
conference. Mitch Johnson has facilitated getting several sub com-
mittees under way. This committee is working well. Mitch will
be providing a report and hopes to attend the Board meeting in
Charleston.

The Utilities committee held a meeting at the conference. NIST
representative Dr. Garner attended with an update on Xray step
 tablets that has been a growing concern for this industry.

Exchange on information with other Industry groups.

I have made contact with an Aviation Industry group in Winston
Salem. Will follow up on this contact and see if we can develop
something in this area. This goal has been here for several years
and has been difficult to get an inroad into this industry. See com-
ments above reference the mailing.

Promoting Recommended Practices.

The Utilities Committee is planning on reviewing RP10 and 13
for possible revisions before tackling new vistas. Mitch has indi-
cated the need to review the Healthcare RP soon also. He has
followed up on acquiring the standards that were listed in the BOD
minutes for his review and will have a report on that activity also.
He also mentioned in conversation that there are some new FDA
requirements that are forthcoming that will need incorporating in
the RP.

Committee Activities;

UTILITIES COMMITTEE
John Ragsdale & Jack Burdick

All Committee Goals and Objectives for 1996 have been achieved
and are completed.

We submitted a list of the most active Committee members to the
Vice President, Industrial Programs.

We have discussed the necessity of revising RP-10, "Establish-
ment and Operation of an Electrical Utility Metrology Labora-
tory" with the Vice President, Industrial Programs. This review
and revision project will be added to the Committee's goals and
objectives for 1997.
HEALTHCARE METROLOGY COMMITTEE
Mitch Johnson

The committee meeting in Monterey was very successful with 33 people attending. After some lively discussions four areas of concerns were identified that the committee wanted to work on. A Subcommittee Chair was appointed for each area to coordinate the efforts of those who signed up to work on the different committees. Below is the list of the subcommittee chairs and their areas of responsibilities.

Rewrite of RP-6
Michael Czech
St. Jude Medical
177 E. County Rd. B
St. Paul, MN 55117
612-490-4495

Software Validation
Paul Marciniak
Siemens Medical Systems, Inc.
Oncology Care Systems Group
4040 Nelson Ave
Concord, CA 94520
510-602-8089

Procedures
Tim Wofford
RPR Gencell
5301 Patrick Henry Dr
Santa Clara, CA 95054-1114
408-492-9200

Equipment
Gary Melsom
436th CRS/LGRT
USAF Type III Laboratory
913 Arnold Dr. Ext.
Dover AFB DE 19902
302-677-6120

The rewrite of RP-6 is to bring the document up to date with the changes in the FDA’s GMP’s (Good manufacturing practice’s) that might take effect in 1998 and incorporate the ISO guidelines. This will create a procedure that meets all the ISO and GMP requirements. Software validation is a requirement of the GMP’s but with no guide lines of how it will be done. By using RP-15 as a starting point to come up with acceptable guidelines for the FDA.

The procedure committee wants to put together a web site for calibration procedures, that will be available to those who are looking for written procedures to use or modify for their own use.

The equipment committee wants to write calibration procedures for equipment that has no calibration procedures or poorly written procedures.

I have appointed two people to the position of Vice Chair to help with the coordinate of the different committees and as training for committee chair at some point in the future.

Annalisa Evans
Amylin Pharmaceuticals
9250 Trade Pl.
San Diego, CA 92126
619-547-7822
Fax: 619-693-5989

Tom Couch
Baxter Healthcare
Metrol. & Inst. Svcs.
Round Lake, IL 60073
847-270-5949
Fax: 847-270-5999

I have reviewed the four ISO documents that were brought to my attention at the meeting in Monterey and had no comments or changes that needed to be made. I definitively think the NCSL needs to be involved a lot earlier in the ISO process. Because at this point in the review cycle for a ISO document very little change would happen if their were serious problems with things that needed to be changed. In the future I would be more than happy to be involved earlier in the ISO creation or review process.

EDUCATION AND TRAINING
Don Dalton, VP

Activities:

There has been very little NCSL activity for me personally to report about this quarter. As you can see below, Dave Lorenzen has been busy publishing the Directory. Good Job Dave.

I did attend several NCSL regional meetings and continue to work with HEAT-Lowry on developing a national metrology education program. Of course, Tom Kimbrell does that every day.

Committee Activities:

TRAINING RESOURCES
Bill Sorrells

Not much to report this quarter. Bill has been busy, “Drinking out of a hose.”

TRAINING INFORMATION DIRECTORY
Dave Lorenzen.

The 1997 edition of the NCSL Training Information Directory has been completed and delivered to the printer. It should be ready for distribution to the membership before the end of October. The directory has a total of 52 pages, four more than last year, and the estimated cost will be $6500. This is about $500 over budget.

PERSONNEL TRAINING REQUIREMENTS
Tom Kimbrell.

Conducted committee meeting at Monterey with the following

Attendees:

James Cigler member
Gloria Neeley member
Friedo Evaskis attendee
Kurt Grossman attendee
David Hurria attendee
Mitch Johnson attendee
Don Martin attendee
Randy More attendee
Jan Waidus member
Rasha Carver new member
Ken Rolf new member

Members not attending:

Don Drum, Herb O’Neil, J. Lyle Bagley

- Worked on evaluation of existing materials.

- Handed out evaluation materials for continued work to be compiled by Gloria Neeley.

- Scheduled next meeting at MSC in January 1997.

- Attended NCSL regional meeting at Chattanooga and did a presentation on duties and tasks evaluations for metrology technicians.
EDUCATION SYSTEM LIAISON
Tom Kimbrell

- Conducted committee meeting at Monterey.
- Working with the State University of New York College, at Brockport to begin training in Dimensional Metrology.
- Recruited a new committee member from the University of Colorado at Denver, James Gerdeen, to bring influence of a university to the committee.

QUALITY PROGRAMS
Dave Abell, VP

Activities:

Unfortunately, I missed what was the best conference at Monterey because of company business in Europe. Thanks to my committee chairs for carrying the ball and conducting business at the conference.

Committee Activities:

LABORATORY EVALUATION COMMITTEE:
LeRoy Britain and John Wehrmeyer

The Laboratory Evaluation Committee held a meeting in Monterey in August. The highlight of the meeting was the presentation of plaques in recognition of the committee's work on the Z540 Handbook by Anthony Anderson. The balance of the meeting was spent discussing potential future activities, a new mission statement, and possible new name for the committee.

The committee agreed that its current name does not reflect the full range of its activities. After collecting some proposals for a new name, it was agreed that the chairman would discuss this issue with the Vice President for Quality Programs.

As the committee looked toward future activities, a list of possible projects were identified. We expect the Laboratory Evaluation Committee will be utilized as a writing group once the ISO/IEC Guide 25 and ANSI/NCSL Z540 ASC so that the next edition of the Handbook can be printed promptly after the Standard is reissued.

Several other possible projects were discussed. Finally, it was agreed that the possibilities would be reviewed with the Vice President for Quality Programs before deciding upon these additional activities.

CAL SYSTEMS:
J. Wade Keith

CAL INTERVALS:
Dr. Howard Caster

ANSI/NCSL WRITING COMMITTEE
Jack L. Ferris

1996 Goals and Objectives

1. Pursue acceptance of calibration laboratory accreditation by U.S. Government agencies and international acceptance.

Results: This is an ongoing goal. Contact has recently been made with the Nuclear Regulatory Commission about acceptance of the Z540-1-1994. I am awaiting their response.


Results: ANSI/NCSL Z540-2-199X, the U.S. Guide for the Expression of Uncertainty was approved by the Z540 Accredited Standards Committee at the meeting held in Monterey. The proposed standard has been submitted to ANSI for the required comment period. In addition the standard has been sent to IEEE, ASME, ASTM and ASQC for their information and comment. It is anticipated that the standard will be ready for submission for approval by the ANSI Board of Standards Review in January.


Results: The revision process is awaiting the revision of ISO/IEC Guide 25. The committee is providing input to the revision of Guide 25. Comments have been gathered on Draft 5 and are being collected for submission to ISO CASCO WG 10.

4. Be proactive with U.S. laboratory accreditors.

Results: An ongoing dialog is maintained with NAVLAP and A2LA.

5. Identify other NCSL documents that could become ANSI/NCSL Standards.

Results: The committee was charged with providing suggestions for candidate standards. Several ideas have been submitted and will be communicated with the entire committee.

INTERNATIONAL MEAS. COORD
Graham Cameron

Graham will be unable to attend the next Board meeting. His presentation along with Sharril Ditman on "International Organization and Accrediting Bodies" will be postponed until the January meeting.

PUBLICATIONS
Klaus Jaeger, VP

Activities:

The latest NCSL conference provided an opportunity to have a kick-off meeting for the Glossary committee. Jesse Berlanga is chairing this committee and got off to a fast start. His committee is well staffed and the project for next year has been clearly identified.

Don Dowell is chairing the Compendium Committee.

The Equipment Documentation Committee is on hold at this time pending a decision of continuance. Files and related papers of this committee have been forwarded by Kevin Ruhl to me.

The Oversight Committee has two co-chairs with Dr. S. Kupferman and Mr. S. Stahley. In addition, three other people volunteered for this committee at the recent NCSL conference. These new committee members are Mr. James Bowman, Mr. Pierre Portman
Committee News

and Mr. Robert Warner. The committee members are active in gathering existing publication procedures. So far, information for such procedures have been obtained from Sandia National Labor (Style Manual), from Metrologia (Style Manual), from the American Physical Society (Style Guide), Legal Aspects from the ASTM, Recommended Practices from the NCSL. Upon receipt of further information from ANSI, IEEE and other professional societies, the committee will draft a publication procedure proposal for the NCSL. This will be presented to the Board in the near future, hopefully by the Spring '97 meeting.

GLOSSARY COMMITTEE
Jesse Berlanga

Report from Aug. 26, 1996 Meeting

1) Prior to the Glossary Committee (GC) meeting, Klaus Jaeger presented the third quarter report on his three standing committees. Concerning the GC (182), Klaus presented our charter as follows:

"Locate, obtain, evaluate, compile, and catalog a listing of terms and their various definitions that are related to measurement, test, and calibration. Publish and distribute a NCSL Glossary of useful definitions."

2) In this our first GC meeting, we collaborated very well and we received valuable input from all present. Bhamma Iyer, from ICAR and also the NCSL Area Coordinator from India, sent her regrets for not being able to attend. During the meeting, Kurt Solis volunteered to become a member of the GC. The GC discussed in detail all five agenda items as were provided to GC members via FAX as well as at the meeting.

3) We achieved an early consensus on the agenda 'Plan' and 'Time Constraints'. This will be periodically reviewed as work progresses. Stan Conquest agreed to translate the revised Glossary into French. The other languages may have to be delayed until further revisions. The firm time constraints are as follows:

a) Review period — September 2, 1996 to December 2, 1996
b) Draft period — December 3, 1996 to August 4, 1997
c) Publish period — August 5, 1997 to September 2, 1998

4) There was considerable discussion regarding the agenda item addressing 'Review'. In brief, the expressed concern focused on a perceived need for harmony among Metrologists. Such harmony may be enhanced if a single definition for metrology related terms could be agreed upon. However this is not realistically achievable under the above charter for the GC.

After consideration of the expressed views of all present, and within the structure of the charter, it was consensually agreed to:

a) Identify (asterisk, or list first) terms and definitions as being "NCSL Preferred".
b) Add new terms and definitions with references.
c) Delete existing terms and definitions.
d) Edit existing terms and definitions.
e) Table, for future revisions, those terms and definitions we cannot agree upon within our time constraints.
f) NCSL Executive Board approval for all GC authored revisions or definitions.
g) Include Handbook ANSI/NCSL Z540-2 references.

Copies of the "International Vocabulary of Basic and General Terms in Metrology", published in English and French, were provided to GC members for use as a reference. The NCSL Glossary was also provided in disk form. The above Handbook ANSI/NCSL Z540-2 will be sent to all GC members as soon as it is available.

5) concerning the agenda 'Glossary Assignments' — Since we now have eight GC members, each one is responsible for reviewing fourteen pages. Each fourteen page increment overlaps the page assignments of two other GC members to assure adequate critique. The assignments are as follows:

GC members should limit their total number of revisions to no more than ten terms with their assigned fourteen pages. However, all GC members should feel free to do more if they are so motivated and work within the above time constraints.

6) The final agenda item, 'NCSL Membership Review and Comment', was discussed and it was decided to provide information concerning our revision effort via the NCSL newsletter.

7) It was agreed to reconvene the GC at the Measurement Science Conference this coming January 1997. I will keep everyone advised regarding the details of the next GC meeting.

8) It is important that we continue to communicate with each other via e-mail, FAX, telephone or mail. Please send me your completed drafts and comments, on disk if possible, so that I can send them to the other GC members. Also, please call me if these minutes are incorrect or incomplete.

Attendees:

Jesse Berlanga* Navy Primary Standards Lab - Chairman
Denis Dubost* Pacific Gas and Electric
Thomas Wanda* Hart Scientific* 
Simon de Vries* Netherlands Measurement Institute*
Stanley Conquest* Stephens Analytical, Inc. (Canada)*
Don Dowell* Prati and Whiley/SPO
Gary Shulie* Duke Power Co.
Bob Hardy* Thermo Scientific Corp.*
Pierre Portmann* Los Alamos National Laboratory
John P. Evans* Consulting Metrologist
Henry E. Stosman* ISO TECH Consultant*
Klaus Jaeger* Lockheed Martin Missiles & Space
Kurt Solis* Raska Instrument Corp.*

*Glossary Committee members

COMPLEMENTARY COMMITTEE
Don Dowell

The data base provided by Ralph Biderman containing all the scheduled NCSL talks over the last nine (9) years, has been converted from Macintosh format to PC, and I have done some cursory analysis. I have identified several problem areas which will be fairly simple to correct. I have also restructured the data and added a field so that authors and titles can be indexed and searched by year of publication. Outstanding action items include building a front end to the data database so it may be electronically searched. I have 5 Meg available on my local ISP for a web page, and may put the database there for experimental use.
A meeting to address DOE metrology issues and concerns is scheduled for March 19-20, 1997, at the National Institute of Science and Technology in Gaithersburg, MD. The principal topics of the meeting will be those identified during an organizational workshop in August, 1996, at Sandia National Laboratories (Sandia). The meeting will provide an overview of DOE metrology and will establish a centralized, DOE-sponsored group to help identify metrology needs and spearhead DOE metrology efforts. One of the key issues at the NIST meeting will be the new group’s formal recognition, through acceptance by the general membership of a proposed charter.

Those attending will form a standing committee to be sponsored by the DOE Technical Standards Program. Membership will be open to all DOE and DOE-contractor metrology personnel. The March meeting at NIST will address issues identified at the organizational workshop on communication, resources, and uniformity, plus other common areas of concern expressed by personnel working in standards and related measurements field. In addition to adopting a charter, the participating members will address initialing a position paper on metrology, developing ways to share information and resources to improve cost-effective metrology services, and other related issues.

Representatives from throughout the DOE complex are invited to attend this NIST-sponsored meeting in Gaithersburg, MD, early next year. There is no charge for attendance. Address questions to Bob Wayland, Sandia National Laboratories, phone 505-271-7917, FAX 505-271-7974, email: jrwayla@sandia.gov.

THE U.S. STANDARD RAILROAD GAUGE -
or HOW MILSPECS LIVE FOREVER

The U.S. Standard Railroad Gauge (distance between the rails) is 4 feet, 8-1/2 inches (further obscured in metric measures as 1.44 meters). That’s an odd number.

Why is this gauge used? Because that’s the way they built them in England, and the U.S. railroads were built by English expatriates.

Why did the English build them like that? Because the first rail lines were built by the same people who built the pre-railroad tramways, and that’s the gauge they used.

Why did they use that gauge then? Because the people who built the tramways used the same jigs and tools as they used for building wagons, which used that wheel spacing.

OK! Why did the wagons use that wheel spacing? Well, if they tried to use any other spacing the wagons would break on some of the old, long distance roads, because that’s the spacing of the rails.

So who built these old rutted roads? The first long distance roads in Europe were built by Imperial Rome for the benefit of their legions. The roads have been used ever since.

And the rails? The initial rails, which everyone else had to match for fear of breaking their wagons, were first made by Roman war chariots. Since the chariots were made by or for Imperial Rome, they were all alike in the matter of wheel spacing (rails again).

Thus we have the answer to the original question. The United States standard railroad gauge of 4 feet 8-1/2 inches derives from the original military specification (MILSPEC) for an Imperial Roman army war chariot. MILSPECS live forever.
PRESIDENT APPROVES FY 1997 BUDGET FOR NIST

On Sept. 30, 1996, President Clinton signed into law NIST's fiscal year 1997 budget appropriation of $388 million. In a time of tight fiscal constraints, this is a very good budget for NIST. Several programs that originally were targeted for elimination or drastic reductions were given sufficient funding to continue promoting U.S. economic growth. Highlighting the budget is $268 million for the agency's laboratory programs (which also includes $2.9 million for the Baldrige National Quality Program), $225 million for the Advanced Technology Program (without restrictions on the use of funds) and $95 million for the Manufacturing Extension Partnership. In a setback, funding for NIST's facilities upgrade effort in Gaithersburg, Md., and Boulder, Colo., was zeroed and a $16 million rescission was assessed to the project's account balance. Prior year funds will cover the completion of the Advanced Chemical Sciences Laboratory now under construction in Maryland, and go toward maintenance and necessary fire and life safety upgrades for existing NIST facilities. A detailed history of the FY 1997 budget process is available by faxed request to (301) 926-1630 or on NIST's World Wide Web site (http://www.nist.gov; click on 'News' and then 'Budget Updates'). Contact: Michael E. Newman, (301) 975-3025.

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JANUARY MEETING TO ESTABLISH LAB ACCREDITATION COUNCIL

Manufacturers, exporters, conformity assessment officials in industry and government, and others concerned with the acceptance and uniformity of test data from accredited laboratories are invited to attend an open forum on Jan. 7, 1997, at NIST's Gaithersburg, Md., headquarters to consider establishing a National Council on Laboratory Accreditation. NACLA is proposed as a cooperative partnership between the public and private sectors that would provide a comprehensive U.S. national laboratory accreditation infrastructure. In the resulting system, a laboratory will be accredited in a given field of testing by a NACLA-recognized body, leading to world-wide recognition of the laboratory's competence and the validity of its test data. Users will benefit from a test only having to be performed once to receive international acceptance of the results. NIST is participating in the NACLA effort under the National Technology Transfer and Advancement Act. The meeting is co-sponsored by NIST, ANST and ACIL, sponsors of the predecessor Laboratory Accreditation Working Group. For information, contact Belinda L. Collins, Office of Standards Services, Bldg. 820, Rm. 282, NIST, Gaithersburg, Md. 20899-0001, (301) 975-4000, fax: (301) 963-2871, e-mail: jbaker@nist.gov.

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SOUNDING OUT* IMPROVED MATERIALS

An inexpensive acoustic wave transducer developed by NIST mechanical engineers soon may make it easier for researchers to decide if new composite materials or film coatings have the right mechanical properties for specific applications. The transducer sends a pulsed sound wave through a test sample that is submerged in water. The speed of the reflected wave provides a measure of the material's elasticity (its ability to flex under stress), while the direction of the reflected wave provides details about crystal planes or defects within the material. Current acoustic microscopes use "lenses" and may cost hundreds of thousands of dollars. The NIST device uses off-the-shelf parts costing less than $20,000, yet can provide similar information about material's properties. Rather than use a lens, the NIST instrument uses a curved transducer made with an inexpensive piezoelectric, plastic film. For more information, contact Nelson Hsu, A147 Sound Bldg., NIST, Gaithersburg, Md. 20899-0001, (301) 975-6630, e-mail: nelson.hs@nist.gov.

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NVLAP NEWS

Thirteen calibration laboratories have been accredited as of this date, the latest being the State of Virginia Metrology Laboratory and the Instron Force Calibration Laboratory. Two more are in the final stages of becoming accredited, with fourteen others in various stages of review, on-site assessment and proficiency testing. NVLAP is receiving many calls seeking information and application packages from testing and calibration laboratories. NVLAP is very sensitive to the fact that the network of accredited calibration laboratories in the United States is still very small; it is however, beginning to grow. NVLAP intends to work with its customers and potential customers in a partnership to achieve the desired goal of the use of accredited calibration and testing laboratories as a basis for achieving confidence in the validity and traceability of measurements and to facilitate domestic and international trade.

In the international area, NVLAP is getting very close to signing mutual recognition agreements with Australia (NATA), New Zealand (Telarc), and Hong Kong (HOKLAS) based on reciprocal visits which have been completed by assessment teams from all of the countries involved. NVLAP will host an assessment team representing the member countries of the European Cooperation for Accreditation of Laboratories (EAL) at the end of January. We look forward to entering into a mutual recognition agreement with that regional group in the coming year.

NVLAP representatives attended the International Laboratory Accreditation Cooperation (ILAC) meetings in Amsterdam during the week of September 9-13. While there, James Cigler, NVLAP Chief, signed the ILAC Memorandum of Understanding (MOU) as one of the recognized U.S. accrediting bodies joining the new organization. Belinda Collins, Director of NIST’s Office of Standards Services (OSS) was elected vice chair of ILAC. She will become chair in 1998, and will host the ILAC General Assembly meeting in the year 2000. Contact: James L. Cigler, (301) 975-4171.

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FASTENER PROGRAM UNDER WAY TO PROTECT PUBLIC

A national program to protect public health and safety by ensuring that certain nuts, bolts and other fasteners used in critical situations (such as attaching aircraft engines to fuselages) conform to specifications was launched on September 26, 1996, with the publication in the Federal Register of the final rule of the Fastener Quality Act of 1990. The announcement calls for the rule to become effective on November 25, 1996, and the act to become official on May 27, 1997. The interval will give NIST and others time to accredit laboratories that test fasteners. The act protects public safety by (1) requiring that fasteners covered by the legislation conform to exact specifications, (2) providing for accreditation of

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PROPOSALS SOUGHT FOR PRECISION MEASUREMENT GRANTS

Project proposals are now being accepted for two research grants for fiscal year 1998 in the field of precision measurement and fundamental constants. The NIST Precision Measurement Grants are awarded annually to faculty members at U.S. universities or colleges for work in determining values for fundamental constants, investigating related physical phenomena, or developing new, fundamental measurement methods. Each grant is $50,000 for one year, for a total of $150,000. Prospective candidates must submit summaries of their proposed projects and biographical information by February 3, 1997. For proposal requirements and other information, contact Barry N. Taylor, NIST, Radiation Physics Building, Room C229, Gaithersburg, MD 20899-0001, (301)975-4220.

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NORAMET NEWS

The Asia-Pacific Metrology Programme (APMP) meeting was held in Manila, Philippines on October 7-8, 1996. Sharrill Dittmann attended as an observer for NORAMET. Her participation is part of a plan for observers from NORAMET, EUROMET (the European Metrology Cooperation) and APMP to attend each other's meetings and become more aware of programs, plans, and issues in the various regions.

Following the APMP meeting Ms. Dittmann attended the Asia-Pacific Economic Cooperation Conference in Manila on the topic of conformity and standards. Speakers from any nations and overseas from BIPM, ISO, EAL (the European Cooperation for Laboratory Accreditation) among other were part of the program.

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NEW TOOL MAY LEAD TO OVERLAY STANDARDS

The mother of a unique NIST instrument is a semiconductor industry necessity: high-accuracy measurement tools to ensure precise alignment of the intricately patterned photomasks defining a computer chip's complex circuitry. During the sequential, level-by-level micropatterning process, misalignments greater than 10 percent of the size of the smallest feature on a chip—a shrinking target that now stands at 0.35 micrometer—can jeopardize yields.

NIST researchers have built a unique "overlay metrology system" to characterize types of misalignment errors, and later, to produce the quality-assuring measurement artifacts requested by industry.

Producing full-field views or series of point-to-point, three dimensional images gathered during scans of silicon-wafer-sized samples, the system's confocal microscope is mounted on a vibration-reducing platform, supported by NIST-patented strut joints that greatly simplify adjustments. Interferometers track sample movements in three dimensions, measuring displacements as small as 0.6 nanometer, the radius of about two atoms. A high resolution digital camera and photometer also provide essential measurement data. Once NIST researchers determine the relative contributions of equipment imperfections and sample irregularities to measurement uncertainty, they will develop standard reference materials containing features with relative displacements measured with nanometer-scale accuracy. With these and other planned standard references, companies will calibrate the on-line optical microscopes used to check their alignment of photomasks. For more information, contact Rick Silver, NIST, Metrology Building, Room A107, Gaithersburg, MD, 20899-0001, (301)975-5609, E-mail: richard.silver@nist.gov.

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CONNECTIONS WITH REFLECTIONS CAUSE ERRORS

A study by NIST's Optoelectronics Division in Boulder, Colorado, has found that users of optical fiber power meters can expect as much as a 10 percent error if the meter is used with a connector different from that used to calibrate the meter. The error sources are reflection properties of the detectors, windows and connectors involved. When the power incident on an optical fiber power meter is measured, radiation is transmitted through a fiber attached to the detector by a fiber connector and adapter. The closeness of the fiber connector to the detector—and its associated window—provides an opportunity for reflections that introduce errors in the power readings. To perform this study, six common connector types were selected from four randomly chosen vendors. Calibrations were performed on four types of power meters at three telecommunications wavelengths: 850, 1310 and 1550 nanometers. "We found significant measurement offsets resulting from the use of various connectors and a variability within a single connector type obtained from different vendors," the NIST researchers reported. "It is very important to calibrate an optical fiber power meter with the same type of connector used in the actual measurement." For a copy of paper number 25-96 outlining their results, contact Sarah Harrs, NIST, Division 104, Boulder, CO 80303-3328, (303)497-3237, E-mail: sarabeth@micf.nist.gov.

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ELECTRONIC MATERIALS GROUP URGES R&D COOPERATION

In an effort to improve the competitiveness of the United States electronics industry, materials experts from industry, government and universities met at a recent workshop to identify dominant issues facing industry and critical to its advancement in the international marketplace. These experts called for greater cooperation between industry and government in electronic materials research and development. The workshop was held by the Electronic Materials Working Group, an organization of representatives from government agencies supporting various electronics programs. Recommendations and other findings by the experts are in a new report, Beyond the Technology Roadmaps: An Assessment of Electronics Materials Research and Development. "To support the continuing push towards increased material complexity and reduced feature size," the report says, "the United States government should work to create an environment that encourages electronic companies to increase their participation in R&D." It also recommends that "long term goals should be focused on structuring the traditional industry, university and federal laboratory materials research community to assure effective coordination of research to meet the future needs of the electronics industry." Cop-
NIST News

ics of the report, NISTIR 5777, are available from Michael A. Schen, NIST, Polymer Building, Room B320, Gaithersburg, MD 20899-0001, (301)975-6741, Fax: (301)869-3229, E-mail: michael.schen@nist.gov.

PRACTICAL ON-WAFER MEASUREMENTS WORKSHOP DRAWS INDUSTRY CROWD

The characterization of high-speed microelectronic components requires the use of “on-wafer” technology for injecting microwave signals into structures built upon semiconductor wafers and then probing the response. Several years ago, researchers in the Electromagnetic Fields Division pioneered accurate calibration and measurement techniques for use with on-wafer measurement. Industry interest in practical applications of these techniques continues to grow. As a result, the Microwave Measurement Committee of the Microwave Theory and Techniques Society (MTT-S), part of the Institute of Electrical and Electronics Engineers (IEEE), asked the division’s Dylan F. Williams and Roger B. Marks to organize a tutorial workshop on the topic. The result, entitled “Making Accurate On-Wafer Measurements,” was presented at the IEEE MTT-S International Microwave Symposium in San Francisco, California on June 17, 1996. Lectures were presented by Marks and Williams as well as by Sunchana Pucic and James Baker-Jarvis, all of the division. In addition, five practitioners from Hewlett-Packard, Cascade Microtech, ATN Microwave, and TRW presented industry views. The emphasis throughout was on procedures that can be conveniently implemented on commercial measurement equipment in industry laboratories. To this end, many of the lectures discussed readily available calibration and measurement software, much of it freely distributed by NIST. The registration of 83 people indicated that this technology continues to reach new users with new applications. Contact: Robert M. Judish, (303)497-3380.

SRM 2073A SINUSOIDAL ROUGHNESS SPECIMENS, CERTIFIED AND RELEASED

Standard Reference Material (SRM) 2073a for sinusoidal roughness recently was certified and released for distribution to the public. This SRM is required by industry for calibrations of roughness measurements performed in the automobile, aerospace, and other mechanical parts industries. SRM 2073a is a steel block with an electroless nickel coating in which a sinusoidal roughness pattern was machined by numerically controlled diamond turning. The SRM is one of a series of five SRMs, which are certified for average roughness height (Ra) and surface spatial wavelength (D). The nominal Ra of SRM 2073a is 3 μm and was measured on each specimen with an accuracy of 1.1 percent (calculated as two times the combined standard uncertainty). The nominal spatial wavelength is 100 μm and was measured on each specimen with an accuracy of 0.033 percent. The first series of SRM 2073, consisting of 100 units, was issued in 1985 and sold out. Ted Vorburger, Jun-Feng Song, Brian Renegar, Cynthia Rymes, Brian Scace, and Fred Rudder in the Precision Engineering Division (MEL); Lisa Gill in the Statistical Engineering Division (CSL/CAML); and Nancy Trahey and Rob Gettings in the SRM Program (TS) collaborated in this effort. Contacts: Ted Vorburger, (301)975-3493, Rob Gettings, (301)975-5573.

NIST AND SEMATECH JOIN FORCES TO PRODUCE AN ELECTRONIC STATISTICAL HANDBOOK

Statisticians from the NIST Computer Systems Laboratory and the Computing and Applied Mathematics Laboratory (CSL/CAML) met recently in San Antonio, Texas, with the SEMATECH Advisory Council for a progress report on a joint NIST/ SEMATECH venture to produce an electronic statistical handbook. To be disseminated via the Internet, the handbook will provide access to modern statistical and graphical techniques for solving engineering problems. A demonstration for the council focused on integration between viewing the handbook with a web browser and doing real-time computations with the public domain software package Dataplot. The Council supports the project and will provide reviewers from the member companies for individual chapters of the electronic handbook. Contact: Carroll Croarkin, (301) 975-2849.

SPECIALIZED RADIOMETER DEVELOPED FOR LASERS

NIST scientists have designed, built, and characterized a specialized radiometer for measuring very low levels of pulsed laser radiation produced by Q-switched lasers operating at a wavelength of 1064 nanometers. The instrument combines the functions of peak power and pulse energy measurement into one unit, improving the responsivity by two orders of magnitude greater than previous NIST designs calibrated at 1064 nanometers. The radiometer is based on an infrared-enhanced silicon avalanche photodiode with 100-millimeter diameter full aperture collecting optics. Selectable aperture sizes and a neutral density filter extend the measurement range of the instrument to higher levels, especially with large diameter beams. The output is a voltage waveform that can be measured with an oscilloscope. Calibration uncertainty for the radiometer is typically less than plus or minus 8 percent; improvements in the NIST calibration system may reduce this to plus or minus 5 percent. For a copy of paper number 22-96 that describes this new radiometer, contact Sarabeth Harris, NIST, Division 104, Boulder, CO 80303-3328, (303)497-3227, E-mail: sarabeth@mici.nist.gov.

GUIDE TO ELECTRONICS PACKAGING AT NIST PUBLISHED

Electronic Packaging, Interconnection and Assembly at NIST: Guide and Resources (NISTIR 5817) is an inventory of research projects supported by NIST in a technology critical to the U.S. microelectronics industry. The guide outlines NIST’s laboratory-based efforts that support the measurements and standards infrastructure of the industry in semiconductor packaging, electronic interconnection and assembly. It also provides a summary of Advanced Technology Program awards in these same technologies. The guide contains information from more than 25 principal NIST investigators and managers who are working collaboratively with researchers and manufacturers from 60 U.S. microelectronics and materials companies, consortia, trade associations, standards bodies, universities and other government agencies. For a copy of NISTIR 5817, contact Michael A. Schen, NIST, Polymer Building, Room B320, Gaithersburg, MD 20899-0001, (301)975-6741, Fax: (301)869-3229, E-mail: michael.schen@nist.gov. The guide soon will be available on the World Wide Web at http://www.mse1.nist.gov.
FEDERAL R&D PROGRAMS REPORT NOW ON-LINE

The materials research and development programs of nine federal departments and agencies are described in a new report, 1995, The Federal Research and Development Program in Materials Science and Technology. This comprehensive look at the current federal materials R&D effort is available on-line through the World Wide Web. It is a guide for material researchers in industry, government and universities to the programs, people and resources that make up the more than $2 billion-a-year materials R&D effort. The emphasis in the report is on R&D directly linked to industrial applications, particularly in the national priority areas of aeronautics, automotive technology, electronics, environmental technology and infrastructure. Organizations listed are: the Departments of Agriculture, Commerce, Defense, Energy, Health and Human Sciences, Interior and Transportation; and independent agencies NASA and the National Science Foundation. The report can now be accessed on the NIST Materials Science and Engineering Laboratory's WWW homepage, http://www.msel.nist.gov. Just click on the report's title in the "Technology Policy and Assessment Reports" section. It also is available on CD-ROM and in a printed form. For information, contact Samuel J. Schneider, NIST, Materials Building, Room B309, Gaithersburg, MD 20899-0001, (301)975-5655, Fax: (301)975-8349, E-mail: samuel.schneider@nist.gov.

HIGH-ALTITUDE SENSING GETS LIFT IN ACCURACY

The new NIST Facility for Advanced Radiometric Calibration, (FARCAL) will boost the accuracy of remote sensing instruments used in global warming and climate research. Established by the Optical Technology Division of NIST's Physics Laboratory, FARCAL will help ensure the reliability of data used to shape future environmental policy. It also will help improve the accuracy of remote sensing used in defense and industrial applications and resource management. FARCAL will facilitate industry's use of the national radiometric standard, which allows the accuracy of radiometric data to be traced to a single source: NIST. With this standard, researchers can compare data collected with different instruments in different parts of the world. FARCAL also will cover a wide range of radiometer calibration needs. In addition, the facility will hold training exercises and workshops for radiometer manufacturers and users. NIST developed FARCAL in response to NASA's request for assistance in assessing the reliability and comparability of measurements made by radiometers on different Earth-orbiting satellites. For more information, contact Carol Johnson, NIST, Physics Building, Room B208, Gaithersburg, MD 10899-0001, (301)975-2322, E-mail: bjJohnson@nist.gov.

NIST REALIZES ITS-90 FROM 0.65 K TO 5 K WITH UNPRECEDENTED ACCURACY

NIST recently has completed the most accurate realization to date of the International Temperature Scale of 1990 (ITS-90) from 0.65K to 5.0K using vapor-pressure thermometry with 3He and 4He. The results will be published in an upcoming edition of the journal Metrologia. The vapor-pressure realizations were performed in a new NIST facility designed to realize ITS-90 from 0.65K to 83.8058K in a single copper block. The block has separate cells for 3He and 4He. From 0.65K to 3K, ITS-90 is defined by the vapor-pressure/temperature relations of He and from 1.25K to 5K it is defined by those of 3He. The overlap of definitions from 1.25K to 3.2K results in a possible non-uniqueness of the scale over this range, since both definitions are considered equally valid.

The expanded uncertainties (k=2) of NIST's ITS-90 temperature realizations are 0.12mK or less over 97 percent of the range of the ITS-90 definitions and reach a maximum value of 1.6mK. From 1.8K to 5.0K, they are 0.05mK or less. Contributions to the uncertainties in the realizations come from the pressure measurement system, pressure corrections accounting for aerostatic pressure head and thermomolecular effects, temperature control of the cells, and the resistance measurement systems used for calibrating the thermometers. The two published realizations from other national laboratories have corresponding uncertainties of 0.3mK and 0.5mK. The small uncertainties of NIST's realizations will allow thermometer calibrations at NIST with considerably higher accuracy. Additionally, the NIST results are sufficiently accurate to demonstrate a non-uniqueness of approximately 0.2mK in the ITS-90 definition in the overlap region (1.25-3.2K).

As part of this work, three rhodium-iron resistance thermometers, which held NIST's previously maintained wire scale, were calibrated in terms of ITS-90. The NIST measurements indicate that the previous wire scale differs from the current ITS-90 scale by as much as 0.9mK below 1K and by as much as 0.5mK (in the opposite direction) above 1K. These comparison measurements clarify the relation between the past and present scales disseminated by NIST and show the degree of self-consistency of the IT-90 scale that is expected to be the international standard for many years to come. Contact: Christopher Meyer, (301)975-4825.

HIGH-ACCURACY SCALE FOR ABSOLUTE SPECTRAL RESPONSE

A central problem in optical metrology is to link optical power, in watts, to other forms of power, such as electrical, mechanical and thermal. The exacting process of realizing a principal NIST optical power scale, that of spectral responsivity, has been described in a series of recent papers.

In the March 1, 1996, edition of Applied Optics, the story begins with the detailed analysis of the primary standard, the high-accuracy cryogenic radiometer (HACR), which measures optical watts in terms of electrical watts. This paper describes the construction, operation, and measurement uncertainties of the HACR, which has a combined relative standard uncertainty of 0.02 percent under the proper conditions. An article in the August 1 edition of Applied Optics tells the next chapter in the story, how the HACR data are used to realize the NIST absolute spectral response scale over the entire spectral range from 406 nm (ultraviolet) to 920 nm (infrared). Typical relative standard uncertainties are 0.03 percent over this range. Finally, the measurement services that NIST offers, based on the scale, are explained in the March-April NIST Journal of Research. These services are backed by a quality system that conforms to ANSI/NCSL Z540-1-1994. The expanded relative uncertainty in the calibration of customer detectors is typically 0.22 percent (k=2), owing the nature of these detectors. While these results represent a substantial improvement in the basis and the delivery of the services, the Optical Technology Division continues to explore new detector designs to improve the measurement uncertainties at each stage of the process. Contact: Jeanne Houston, (301)975-2327.
TWO MANUFACTURERS, TWO SERVICE FIRMS WIN BALDRIGE

President Clinton and Commerce Secretary Mickey Kantor announced four companies as the winners of the 1996 Malcolm Baldrige National Quality Award on October 16, 1996. They are: ADAC Laboratories, Milpitas, Calif. (manufacturing category); Dana Commercial Credit Corp., Toledo, Ohio (service category); Custom Research Inc., Minneapolis, Minn. (small business category); and Trident Precision Manufacturing Inc., Webster, N.Y. (small business category). The award recognizes achievements in quality and business performance. It is not given for specific products or services. Since 1988, 28 companies have won the award. Criteria for the award are widely accepted as the standard for business performance and excellence. In addition to serving as the basis for applying for the award, the criteria are used by thousands of organizations of all kinds for self-assessment, planning, training, and other purposes. More than a million copies have been distributed since 1988. Further information on the 1996 award winners and the award is available on the World Wide Web at http://www.quality.nist.gov. Contact: Jan Kosko, (301)975-2767

NIST, FTC REPORT SCANNERS ARE MORE ACCURATE

In the 22 years since the first checkout scanner was installed in a supermarket in Troy, Ohio, automated price checkers have increased checkout productivity, and improved sales and inventory records. Electronic price scanners tally a large portion of the $2 trillion in U.S. annual retail sales; however, consumers and retailers have concerns about errors at the checkout. A new study on checkout scanner accuracy contains fairly good news for consumers. The study, prepared by the Federal Trade Commission, NIST, and state weights and measures enforcement agencies, found a total error rate of 4.82 percent for 17,928 items checked. More items were undercharged (2.58 percent) than overcharged (2.24 percent), and the total dollar amount of undercharges exceeded overcharges. Food stores as a group had a lower error rate than non-food stores. Among non-food stores, department stores had the highest rate of pricing errors. The National Conference of Weights and Measures, located at NIST, has adopted a sampling and inspection procedure which state weights and measures officials can use to conduct price verification inspections in retail stores. Copies of "Price Check, A Report on the Accuracy of Checkout Scanners," as well as brochures for retailers and consumers, are available from Public Reference, Federal Trade Commission, Washington, D.C. 20580, (202)326-2222. Electronic copies are available on the Internet at http://www.ftc.gov.

FEDCIRC HELPS PROTECT GOVERNMENT'S ONLINE INFO

To help federal government agencies deal with security threats that can compromise critical computer networks, NIST has established a Federal Computer Incident Response Capability, or FedCIRC, thanks to start-up funding from the Government Information Technology Services Innovation Fund. Resulting information will be shared with companies and others concerned about protecting their own data. The new initiative combines the experience and expertise of the Defense Advanced Research Projects Agency’s CERT(SM) Coordination Center located at the Software Engineering Institute and the Department of Energy’s Computer Incident Advisory Capability located at the Lawrence Livermore National Laboratory. FedCIRC expands their reach to offer coordinated incident-response services to the whole civilian federal government. Agencies now have quicker access to expertise and support services they need to protect their electronic information from security threats such as computer viruses and hackers. Onsite security evaluations, 24-hour emergency support, coordination with other agencies, incident advisories and other services will be available to FedCIRC subscribers. Additional information is available from the FedCIRC office at (301)975-4369 or on the World Wide Web at http://escr.nist.gov/fedcirc.

NEW TESTER TAKES THE MEASURE OF THIN FILMS

A NIST scientist, David T. Read of the Materials Reliability Division, has developed a machine for assessing the tensile strength and other mechanical properties of thin films that eliminates many of the problems incurred by other test devices. The piezoelectric-actuated microtensile test machine avoids the need to manually part the thin film specimen (fabricated on silicon substrates by photolithography procedures used in the semiconductor industry) from the substrate, thus preventing tension and deformation on the specimen. Other advantages include mechanical rigidity that allows testing of silicon-framed specimens, piezoelectric actuation for precise control of the applied tension, cantilevered moving parts for frictionless operation, and closed loop control to accurately control and change load and displacement rates. The microtensile tester can be reproduced at a very reasonable cost using simple mechanical components and off-the-shelf piezoelectric stacks, power supply and sensors. Scientists are working on two main shortcomings of the tester—lack of the ability to measure strain in the gage length and limited resolution of the force measurement. For paper no. 31-96 describing the tester, contact Sarabeth Harris, Div. 104, NIST, Boulder, Colo. 80305-3328, (303)497-3237, e-mail: sarabeth@mie.nist.gov.

SPECIAL BROCHURES AVAILABLE FOR 16 PROGRAM GROUPS

NIST has prepared a series of special brochures that offer quick access to important information on Standard Reference Materials in 16 special categories. These materials are part of a total inventory of approximately 1,300 SRMs currently available from NIST. Brochures are available in the following program areas: agriculture and food, analyzed gases, ceramics and glasses, environmental inorganic, environmental organic, ferrous metals, non-ferrous metals, health, Industrial hygiene, ion activity, optical properties, metrology, polymers, powder diffraction, semiconductor and spectrometric. The NIST SRM program provides science, industry and government with a central source of well characterized materials certified for chemical composition or for some chemical or physical property. SRMs are used to calibrate an apparatus or to assess a measurement method. Copies of the special brochures, as well as the general NIST Catalog of Standard Reference Materials (SP260), are available from the SRM Program, 204 Engineering Mechanics Bldg., NIST, Gaithersburg, Md. 20899-0001, (301)975-OSRM (6776), fax: (301)948-3730, e-mail: srminfo@enhd.nist.gov.
**BETTER WELDS POSSIBLE WITH ARC SENSING AND CONTROL**

Can process sensing and control replace a skilled welder so that high-quality welds are consistently made under a variety of conditions? Yes, say NIST researchers, particularly for gas metal arc welding. The areas where they believe arc sensing and control systems can improve weld quality are: (1) in semi-automatic welding where control systems can detect and correct problems faster than a human, and (2) in fully automatic welding where control systems can emulate the eyes and ears of a skilled welder. In a recent paper, the NIST researchers say the control systems are only as good as the sensing information they receive. "The wider the range of sensory data, the better the ability to maintain weld quality," they report. The paper shows how arc current and voltage signals and arc light intensity can be used to monitor and control contact tube wear, degradation of shielding gas, wire feed interruptions, arc length and droplet transfer. For a copy of paper no. 34-96, contact Sarabeth Harris, Div. 104, NIST, Boulder, Colo. 80303-3328, (303) 497-3237, e-mail: sarabeth@nicf.nist.gov.

**IMPROVED ACCURACY IN OPTICAL RADIATION REPORTED**

Accurate measurements of infrared, visible and ultraviolet light are critical to our national defense, in monitoring environmental changes and for a variety of industrial processes. NIST provides optical radiation standards to ensure the accuracy of these measurements. For many years, photometry units were established using optical sources, such as standard lamps available through the NIST Calibration Program. Now, technological advances have enabled NIST's Optical Technology Division to switch to a more accurate, detector-based system for transferring standards for radiometry, photometry and pyrometry. NIST is encouraging all its customers to switch to this improved method of calibration. A National Measurement System for Radiometry, Photometry, and Pyrometer Based Upon Absolute Detectors (NIST Technical Note 421) describes the more accurate measurement methodologies in detail. A limited number of copies are available from the Optical Technology Division, A207 Physics Bldg., NIST, Gaithersburg, Md. 20899-0001, (301) 975-2316, e-mail: parr@nist.gov.

**U.S. ACTIVITIES DOCUMENTED IN NEW DIRECTORY**

The 1996 edition of a popular NIST directory summarizes the standard activities of more than 700 organizations in the United States, including approximately 80 federal agencies and 620 private-sector groups. The new directory is the seventh in a series started in 1941. Its largest section contains an alphabetical listing of approximately 620 non-government organizations that develop standards or contribute to the standardization process by working with other organizations, or are sources of documents and information. Each listing includes the type of organization, the scope of its standards and standardization activities (whether voluntary or mandatory), the availability of its standards and its other conformity assessment activities. The directory also contains a section on sources for standard and related information; a subject index; and listings that cover organizational acronyms and initials, former names and groups listed in the previous directory that are no longer involved with standards. Copies of Standards Activities of Organizations in the United States (NIST special Publication 806) are available for $58 prepaid from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, (202) 512-1800. Order by stock no. 003-003-03427-4.

**NEW WEB SITE CUTS METRIC QUESTIONS DOWN TO SIZE**

U.S. businesses and organizations are increasing their use of the metric system, realizing its importance in science, international trade and manufacturing. The metric system, or International System of Units (abbreviated SI from the French "Système International d'Unites"), is the preferred system of weights and measures for U.S. trade and commerce. To assist users, the NIST Physics Laboratory recently created a special home page on the World Wide Web at http://physics.nist.gov/SI. From this page, computer users can access three NIST publications on SI units and a helpful diagram. The Guide to the International System of Units gives definitions of the SI units and guidance on how to use them. The International System of Units is an English Language Translation of a brochure published by the International Bureau of Weights and Measures. The third document, Metric System of Measurement: Interpretation of the International System of Units for the United States, was published in the Federal Register in 1990, and gives the Department of Commerce interpretation of the SI for the United States. The diagram shows how the 21 SI-derived units with special names are related to the seven SI-based units. The new SI home page is expected to be the most definitive and up-to-date site for information on the SI.

Contact: Linda Joy, (301) 975-4403

**NEW GUIDE TO TECHNOLOGY SERVICES AVAILABLE FROM NIST**

![Image of Guide to Technology Services available from NIST](image-url)
LIAISON NEWS

APLAC LIAISON REPORT
Peter S. Ungar, Liaison Delegate

The Asia Pacific Laboratory Accreditation Cooperation (APLAC) met the week of 18 November, 1996, in Sydney, Australia.

An APLAC evaluation team of the APLAC Mutual Recognition Agreement Council completed its first evaluation of an accrediting body. A2LA, which submitted its written response with completed and proposed corrective actions on 24 October 1996.

The APLAC MRA Council at its meeting during the week of November 18 will evaluate how to proceed to the eventual establishment of a multi-lateral MRA.

Issues to be decided at the General Assembly include amendments to the draft APLAC Constitution and approval of new members (national laboratory accrediting bodies from economies not signatories to the original Memorandum of Understanding).

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ASTM LIAISON REPORT
Peter S. Ungar, Liaison Delegate

Three ISO Committee on Conformity Assessment (CASCO) Guides related to conformity assessment are being balloted for adoption as ASTM standards. Since ASTM standards on conformity assessment have become ANSI standards, there is a fundamental need for the U.S. standards to be in harmony with international standards. The CASCO Guides balloted are:

- Guide 61 on General Requirements on accreditation bodies for certification/registration bodies;

- Guide 62 on General requirements for the competence of certification bodies.

- Guide 65 on General requirements for product certification bodies.

ASTM has already balloted its own equivalent standards (E548, E1301 and E994) to ISO/IEC Guides 25, 43 and 58 respectively, which deal with laboratory accreditation. These three ASTM standards have been adopted as ANSI standards in early 1996.

The meeting of ASTM Committee E-36 was held on December 9-11, 1996 in New Orleans, Louisiana. A workshop on conformity assessment was held on December 10, 1996.

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A2LA LIAISON REPORT
Ramona Saar, Liaison Delegate

1. Strategy Meeting - Uncertainty Determination

The ISO "Guide to the Expression of Uncertainty in Measurement" has gained international acceptance as the method to use in determining uncertainty. There is a need for practical guidance on the interpretation of this document, as well as a need for a long-range strategy which permits a realistic transformation to occur at the working level for both testing and calibration laboratories.

A2LA invited testing and calibration assessors, representatives from NIST, representatives from several standards writing bodies, and other interested parties together for an October 30, 1996 strategy meeting at ASTM Headquarters to discuss practical approaches to determining uncertainty for calibration and testing laboratories. The information collected at the meeting will be used to develop training courses on practical approaches to determining uncertainty.

2. A2LA Calibration Accreditation Policy

At its recent October meeting, the A2LA board of Directors reaffirmed the A2LA Calibration Accreditation Policy, which requires the use of accredited calibration laboratories after June 30, 1997. A2LA will issue a more detailed implementation plan to accredited testing and calibration laboratories in early 1997.

3. APLAC Assessment of A2LA

A four person assessment team of the Asia Pacific Laboratory Accreditation Cooperation (APLAC) and two observers (from European Cooperation for Accreditation of Laboratories (EAL) and the Standards Council of Canada (SCC)), visited A2LA headquarters during the week of September 16th to determine A2LA conformance with ISO Guide 58 using procedures established for the APLAC mutual recognition agreement. A2LA was the first accreditation body to be assessed under these MRA procedures. A2LA responded to the findings on October 24th.

Status of Program Activity

A2LA now has 850 accredited laboratories, 6 registered reference materials suppliers, and 15 laboratories registered to ISO 9001 or 9002.

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ASIA PACIFIC METROLOGY PROGRAMME (APMP)
Tony Rocha, Liaison Delegate

12th APMP Committee Meeting

The 12th APMP Committee Meeting was held in Manila, Philippines, on 7th and 8th October, 1996. The meeting was attended by 34 representatives from 20 member laboratories with observers from the Asia Pacific Economic Cooperation/Standards & Conformance Sub-Committee, (APEC SCSC), NORAMET, EUROMET and BIPM. Since the 11th APMP Committee Meeting, the APMP Membership has been expanded to include an "Associate Member" category, the National Institute of Standards of Egypt. The meeting agenda included sessions on: the current suite of APMP Inter-laboratory comparisons, with reports by the coordinating member representatives; the APMP Memorandum of Understanding (MOU); the APMP Mutual Recognition Agreement (MRA); needs of member laboratories; reports from the APEC SCSC and other international and regional metrology bodies; strategic planning; and country/territory reports.

APMP Inter-laboratory comparisons

The current round of APMP comparisons covers 20 measurement areas; including hardness, spectral responsivity, RF/microwave
power, accelerometer, line standard, DC voltage, EMC, capacitance, AC/DC transfer, power and energy, surface roughness, humidity, acoustic calibrator, mass, luminous intensity, force, laser wavelength, pressure, radiation thermometry, and thermal diffusivity. EUROMET laboratories from France, the Netherlands and Germany are participating in three of these comparisons and APMP is looking forward to similar involvement from NORAMET. A recent initiative of the BIPM is, through its Consultative Committees, to identify key comparisons covering fields and ranges to best demonstrate traceability of national measurements. APMP Members are using their best endeavors to align any new comparison programmes with these key comparisons.

APMP Memorandum of Understanding

APMP is in the process of completing its Memorandum of Understanding (MOU). Members have considered a penultimate draft MOU at the 12th APMP Committee Meeting which, incorporating the comments at the meeting, will be finalized and circulated for signature in March 1997.

APMP Mutual Recognition Agreement

A draft multilateral Mutual Recognition Agreement (MRA) was also tabled for discussion at the 12th APMP Committee Meeting. APMP hopes to develop the MRA based on demonstrated competence through participation in inter-laboratory comparisons at the regional and international level. It has been agreed that APMP will seek to coordinate its activities in developing an MRA with those of NORAMET and EUROMET in order to ensure consistency between the regions. The importance of developing an international document which is accepted globally is well recognized by BIPM, which is enthusiastic to coordinate the activities in the various regions.

New APMP Publications:

- A new APMP Directory of Regional Standards and Calibration Facilities has been produced by CMS/ITRI, the Taiwanese member.
- The APMP Secretariat has produced two new issues of the APMP newsletter over the past twelve months.

First APEC Conference on Standards and Conformance 9th-11th October 1996, Manila, Philippines

The 1st Conference on Standards and Conformance was held on 9th and 10th October, 1996, in Manila, with a half day devoted to laboratory/industrial visits on 11th October. The Conference programme highlighted the interactive nature of the various elements of the standards and conformance infrastructure, with contributions from key spokespersons in the international standards and conformance community, representatives of the Asia Pacific Specialist Regional Bodies, as well as leading industrialists trading in the Asia Pacific economies. The Conference attracted over 200 delegates, with more than half coming from outside the Philippines. It successfully drew together a broadly based audience, comprising representation from government, the APEC SCSC, the technical infrastructure, and industry. Outcomes from the Conference are currently being assessed by the Specialist Regional Bodies in the form of a report to be provided to all APEC economies and the members of the Specialist Regional Bodies.

The conference was the largest yet with over 600 participants from all over the world. The program consisted of presentations of 125 orally presented papers (24 sessions) and 240 poster papers (28 sessions), covering current research and applications in all aspects
of electromagnetic metrology, as well as fundamental constants. There were two plenary sessions with talks on the quantum Hall effects by Klaus von Klitzing, quantum nanoelectronic devices by Konstantin Likharev, and quantum optics of a single atom by H. Walther.

In order to promote the status of poster papers, the CPEM 96 gave a prize each day for the best poster paper. The prizes were donated by the exhibitors and given out at the closing session.

The conference and its sponsors supported the attendance of 23 promising young scientists from around the world and there were 26 students in attendance. The conference was enhanced by corporate and governmental sponsorship and had an exhibit featuring products from 23 companies. The exhibits were in the hallways around the entrances to the meeting rooms and there was very heavy interaction between the attendees and the exhibitors.

On the first evening of the conference, attendees were invited to a reception and welcome by the Mayor of Braunschweig in the Alstadt Rathaus. The conference banquet was held in a tenth century Imperial Palace, the Kaiserpalz, in the walled, medieval city of Goslar, some 60 km south of Braunschweig, following a guided walking tour of the city. Entertainment consisted of a minstrel show followed by a sing-along.

This was a very successful conference. The Conference Digest, a compendium of summaries of the presentations, is available through the IEEE, Catalog Number 96CH35956, and selected papers will be published in a special issue of the IEEE Transactions on Instrumentation and Measurement in April 1997.

CPEM 1998

The CPEM 98 will be held in Renaissance Washington Hotel, July 6 - 10, 1998, with a reception Sunday evening, July 5. We have blocked 300 rooms for the conference and are guaranteed a rate equal to the U.S. government per diem, including taxes. The hotel is pleased to extend the rate to the evenings of July 3 - 5, for those attendees interested in the lavish Independence Day festivities and spectacular fireworks that take place on the Mall.

We distributed the initial announcement of the conference at CPEM 96, and plan a general mailing later this month. Abstracts and summaries for proposed papers should be received by the Conference Secretary January 5, 1998.

Tours of NIST laboratories will be available on Friday afternoon, July 10, following the conference closing. An extensive Companions Program is being planned, including trips to many tourist attractions in the area as well as shopping opportunities.

Because of the success of the exhibit at CPEM 96 and input from a number of companies, we plan on having an associated equipment exhibit, and are in the process of developing a prospectus for potential exhibitors. Those interested should contact the Exhibits Chair (see below).

We will offer free exhibit space to NCSL, the Measurement Science Conference, and the IEEE I&M Society.

Tech. Program Chairs:  Dean Jarrett  301-975-4240
jarrett@eeel.nist.gov
Ed Williams  301-975-4206
williams@eeel.nist.gov
Exhibits Chair:  Anne-Marie Jeffrey 301-975-4246
jeffrey@eeel.nist.gov

Plan to visit our WWW-site at <http://www.eeel.nist.gov/cpem98>.
Due to difficulty in finding a meeting site, the fall meeting has been delayed. Several potential speakers have voiced an interest in speaking, but without a meeting site, plans cannot be made. If anyone in Region 1 would be willing to host the meeting, please call me at (617) 762-9921.

Correction as reported in the Region 1 report on page 36 of the July 96 Newsletter. It was incorrectly stated that L.S. Starrett Company is A2LA Certified. Please note that L.S. Starrett Company is presently seeking Lab Accreditation to the ANSI/NCSL Z540-1-1994 standard through A2LA.

Oct. 24, 1996
Butler County Community College
Butler, PA
Donald A. Drum, Ph.D.
Pittsburgh Section Coordinator

The meeting for the Pittsburgh Region of the Northwest section was chaired by Dr. Donald A. Drum, Butler County Community College, Butler, Pennsylvania.

Esther Schielbel to Jerri Jordan, Michele Weiss, Nicole Rishel, Dennis Antunes, and Brent Orr. Work scholarships were also presented to sophomores Brent Orr and Dennis Antunes. Then, Tim Stark presented a $1,000 Wavekit Scholarship to Brent Orr. Wavekit DM23XT Digital Multimeters were distributed to sophomores Metrology students and visiting Metrology students from Ghana, Africa.

Ed Nemero, former NCCL President and William A. Wildhack Award Recipient, discussed the growing membership in a worldwide NCCL organization. He provided information about a workshop meeting on "Metrology Standards and Conformity Assessment" in Alexandria, Egypt, on June 9-13, 1996. Communication and a measurement assurance program have been expanded between NIS (National Institute for Standards), NIST and Egypt's quality bodies. Ed Nemero provided the regional NCCL attendees with a view of the international NCCL activities during his recent visit to Egypt and the U.S. National Institute for Standards.

Tim Stark, Wavekit Corporation, gave a presentation on "Automated High Performance Oscilloscope Calibration." Calibration of oscilloscopes is perceived as complex and is driven by ISO-9000. Also calibration requires more measurement functions and accuracy, and bandwidths are increasing. Typical operations for calibration of oscilloscopes were outlined. High-performance oscilloscope calibration simplifies oscilloscope calibration, reduces calibration time, and reduces oscilloscope instrumentation required for calibration. The Wavekit 9500 system architecture, calibration techniques and active head technology were discussed in detail. The use of a pulse forming filter reduces distortion, improves matching and displays greater consistency of signal. Calibration tractability to NIST was thoroughly outlined. It is possible to achieve full automation through a single instrument with dramatic increase in throughput with a simplified support philosophy.

Bill Wightman, Fluke Corporation, spoke on "High Accuracy Calibration Issues." He discussed build-up specifications and primary specifications for traceability. Secondary and tertiary specifications are important issues. Comparing specifications of instruments requires an understanding of the confidence interval.

Calibration can reduce risk. Instrument specifications are for a population of instruments. Various international organizations use different sigmoids. Sigma level affects Tests Uncertainty Ratio. Risk is a function of TUR. ANSI/Z540-1 outlines the methods that must be used if the TAR is less than 4:1 ratio. Guardbanding can be used to decrease common risk by having an acceptable 4:1 ratio. K factor calibration versus TUR redefines the specification limit to maintain a desired test uncertainty ratio. The Fluke 5720A and Fluke 5500A/EP instruments can produce 2 sigma and 3 sigma specifications. The goal is to manage calibration risks and costs by using confidence intervals, test uncertainty ratios, and guardbands.

John Wehrmeyer, Eastman Kodak Company—"New and Future Trends in Metrology"—Change can be crushing but we can learn to live change. Change drivers are economical, political, and technological. Politically we are in a shrinking world. While we are into multinational corporation and international markets, some doors are open while others are closed and blocked. NCCL is becoming an international organization. In the area of quality, economics and quality have become very important in this country.

In the world of 2006, the information age will become a most valued asset with security of information becoming an issue. Coexistence (a new word) means that four competing companies worked together to develop a product. Highly automated large scale business is being emphasized giving rise to a small business explosion. The world in 2000 means more mobility, less large buildings, more diversified work force, more empowered employees and greater networking, dynamic organizational structure and cross-functional teams of workers.

There are changing rules for technicians in 2006 with more senior technicians or engineers with less time on the bench and more time consulting. There is an increasing demand for technicians. In 2006, Metrology will become a digital world and more automation at high accuracies. Metrology is moving toward the production line. Smaller and more compact Metrology labs will be the norm.

Instruments are more reliable, have longer calibration integrals, self-calibrating, etc. Paper-less calibration, intrinsic standards usage, and increases in measurement assurance programs are important features of the future. Discussion about the requirements of Z540 followed.

David Schielbel discussed "Industry Training Needs in the Area of Metrology." He discussed modernized training needs and requirements across the country. Theory of operations, sources of
error, and statistical analysis have been emphasized in training courses.

I would like to thank everyone who attended the meeting for their interest and participation. Special thanks to Ed Nemeroff, Tim Stark, William Wightman, John Wehrmeyer, and David Schiebel for their excellent presentations.

Attendees:

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
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<tbody>
<tr>
<td>Earl Caldwell</td>
<td>Murata Electronics</td>
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<td>Wallace Cypher</td>
<td>Murata Electronics</td>
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<tr>
<td>Steve Harvill</td>
<td>Westinghouse</td>
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<td>Andrew Harvill</td>
<td>Pre-Cal Services</td>
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<td>Harvey Hecker</td>
<td>Westinghouse</td>
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<td>Jim Hoffman</td>
<td>Murata Electronics</td>
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<td>Harry Johns</td>
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<td>Rich Kenner</td>
<td>Murata Electronics</td>
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<td>Tim Milne</td>
<td>Respionics, Inc.</td>
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<td>Gary Osick</td>
<td>Armacco</td>
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<td>Bob Pagey</td>
<td>Mine Safety Appliances Co.</td>
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<tr>
<td>Richard Perhats</td>
<td>WKM (Fluke)</td>
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<td>John Pipp</td>
<td>Westinghouse</td>
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<td>Richard Roddis</td>
<td>Wavetek, United Kingdom</td>
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<td>Bob Scharf</td>
<td>EQS Systems, Inc.</td>
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<td>Larry Smith</td>
<td>Murata Electronics</td>
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<tr>
<td>Ted Tomter</td>
<td>U.S. Army (ACRC)</td>
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<tr>
<td>Tim Wetzle</td>
<td>Mine Safety Appliance Co.</td>
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<tr>
<td>Bud Witten</td>
<td>Duquesne Light</td>
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<tr>
<td>Dr. Donald A. Drama</td>
<td>BCCC</td>
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<tr>
<td>Dr. Ed Nemeroff</td>
<td>Metrology Consultant</td>
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<tr>
<td>Tim Stark</td>
<td>Wavetek Corporation</td>
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<tr>
<td>John Wehrmeyer</td>
<td>Eastman Kodak</td>
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<tr>
<td>William Wightman</td>
<td>Fluke Corporation</td>
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<td>David Schiohel</td>
<td>BCCC</td>
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<td>Greydon Kay</td>
<td>BCCC</td>
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<td>Dr. Michalopoulos</td>
<td>BCCC</td>
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<td>John Sanders</td>
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<td>E. Jerry Aloth</td>
<td>BCCC</td>
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<td>Dennis Antunes</td>
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<td>Kwasi O. Boadu</td>
<td>BCCC</td>
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<td>Andrew Brannon</td>
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<td>Richard Dollah</td>
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<td>John Dzissah</td>
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<td>Gerri Ann Hoffman</td>
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<td>Kerri Jordan</td>
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<td>Brandon Kamerer</td>
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<td>Clifford Kangas</td>
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<td>Ryan Lefevre</td>
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<tr>
<td>Brent Orr</td>
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<td>William Stoble</td>
<td>BCCC</td>
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<tr>
<td>Michele Weiss</td>
<td>BCCC</td>
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</table>

Brent Orr, Michele Weiss, Kerri Jordan, Nicole Rishel, Dennis Antunes, all BCCC.

Richard Roddis, Wavetek, Brent Orr, BCCC, Tim Stark, Wavetek.


The Atlanta Section will have their spring meeting at the Southern College of Technology March 19, 1997.
Contact: Karen Renner (770) 246-6354

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Nov. 6, 1996
AT&T Capital Corp.
DFW Airport, TX
Clyde Orrison
Central Texas Section Coordinator

The Fall meeting of the Central Section was hosted by Bill Doyle, Operations Director of AT&T Capital. George Schultz, General Manager of AT&T Capital greeted the attendees.

Jim Patterson, Region 6 Coordinator, discussed NCSL business, and polled the members regarding problems of experiences. Don Dalton, NCSL VP of Education and Training shared information about the Board meeting.

Roy Wilson, Texas Instruments, presented a laboratory photo tour of the new TI consolidated calibration lab in Dallas. Roy discussed the major reorganizational steps that have been taken to provide faster service by the new Asset Management organization, and displays slides of the new "hub" facility for TI Systems Group in Dallas.

Don Dalton, Fluke Corp., presented an overview of automated calibration issues, and specifically addressed oscilloscope calibrations using Fluke MetCal software. Don covered major issues to be considered when software-controlled calibration of programmable oscilloscopes is planned.

Marty Jost, Tektronix, Irving, TX, addressed the evolution of software-assisted oscilloscope calibration at Tektronix. Marty described the calibration system supporting most analog and digital storage scopes, and the hardware and software used internally by Tek.

Keu Osetkowski, Wavetek Corp., described the general features of a new line of oscilloscope calibrators, and software available to control the calibrator and programmable oscilloscopes. The major calibrated parameters of oscilloscopes were addressed.

Clyde Orrison, Texas Instruments, discussed elements of ISO 9002, and how ISO-9004 may be used to assist in developing internal quality systems to address calibration lab business processes. A detailed discussion of ISO-9002, Paragraph 4.9 followed, with good general discussion of this issue.

Door prizes were awarded to attendees. The next section meeting is scheduled for April 9, 1997 at Texas Instruments, tentatively.
Central Section Meeting, Dallas, Texas April 9, 1997

South Texas Section Meeting, San Antonio, TX. February 5, 1997

A new Section has been formed in Albuquerque, New Mexico first meeting is being held December 5, 1996. Tom Wunsch, Sandia National Laboratories is Section Coordinator.

The attached graph [Chart 1] describes the reduction of FY 1996 funds for the eight NIST Laboratories. More substantial cuts were made in the extramural Advanced Technology and Manufacturing Engineering Programs. The funds came in eight separate budget allocations, some covering only two weeks, interrupted by periods when we had no funds and had to send everybody home. The NIST budget for FY 1997 has not been passed by Congress, but will undoubtedly contain further cuts. In spite of the cuts, we are expected to provide the same or expanded services. If you are interested to see the FY 1997 budget, please contact me in a few weeks.

Thanks for your interest.

Regards,

Peter L.M. Heydemann,
Director Technology Services

طنئ تو: Wayne E Benda at 5-M30182-TU Subject: Services
We realize that the cost of many calibration services at NIST are very high, particularly for small and midsize companies. The reasons for this are, I presume, well understood. We are a primary standards laboratory, aiming to achieve the highest accuracy, the
greatest confidence, and are backed by research and development. I have just started to review and rethink the way we disseminate our measurement services. It is too early to see in which direction we will move. One possibility is to use accredited laboratories, which could be more efficient, quicker, and less expensive than our services. We could also set up a new organization akin to the German "Deutscher Kalibrier Dienst", a government organization, separate from but overseen by the PTB. We could use the DOE National Laboratories, which are looking for new missions. So, this is an indication that we are concerned about our cost, and we will deal with it. I hope I can give you more definitive information before long. In the mean time, I would be very happy to receive comments or proposals from you and your group.

Thanks,
Peter Heydemann

One person in our group responded that it sounded, "bureaucratic." Wayne Benda commented that he had measured the values in the chart supplied by Dr. Heydemann with a micrometer. The total Science and Technology Research and Services (STRS) budget measured $229M before cuts and $185M after cuts (0.001 inch). The NIST Representative's report, dated November 1996, reveals the STRS received an appropriation of $268M.

Automated High Performance Oscilloscope Calibration — Ken Osiekowski (WaveTek Corporation) discussed the changing requirements of oscilloscope calibration. Oscilloscope calibration has become complex, especially for high frequency/width bandwidth designs. Also, ISO drives the need to calibrate oscilloscopes. They are no longer just display devices. The old method of supplying signals through a cable leads to degradation of the calibration signal when frequencies go as high as 20 GHz and risetimes can be 45 p. Ken then described the WaveTek 9500 technology. The critical signals are generated at the connection to the oscilloscope. This provides the minimum path length possible. Ken went on to describe calibration and traceability to NIST of the 9500 heads.

After his presentation, Ken led the discussion on the 9500 technology. We discussed computer interface problems, data storage problems, transfer device error stack-up, calibration intervals and their justification and international acceptance of manufacturer certifications. (Whew! I was not expecting so much from an oscilloscope topic — Wayne)

Get Smart Part 1 — Walter Wiley (Hughes Aircraft Co.) described changes to the way his department (dimensional/mass metrology) handled mass calibration after a visit to Arizona State Weights and Measures in 1991. Prior to this visit, Walt assigned a mass value to his standards equal to the most recent value found by the Hughes Primary Standards Laboratory. After the visit he assigned the average value of all previous mass determinations.

This change was not without problems. The technicians using the mass standards had been taught that the last value assigned was the correct value. They pointed out that the average value was a value that had never been measured. Overcoming this resistance has been slow.

Two of the mass standards appear to have changed. The average value may be wrong. Another tip picked up from State Weights and Measures is to intercompare your own masses. A one pound and two two pound masses can be compared against a five pound mass. Two five pound masses can be compared against a ten pound mass, etc. This intercomparison can help make the decision whether to use the average value or the new (changed) value.

An advantage to these methods was to increase the interval the reference standards are sent out for calibration from 2 years to 5 years. Another advantage is that you gain more knowledge of your uncertainty. A disadvantage was that another mass set had to be purchased. The method requires a minimum of three artifacts. If you only have two, and one changed, you would not know which one had changed. Another disadvantage is that you may discover that your uncertainty is larger than you thought.

Bill led the discussion that followed. Several ideas and suggestions were presented by those present.

Get Smart Part II — Bill Quigley (Hughes Missile Systems Co.) presented a paper on, "Achieving an Ideal Calibration Interval." Bill told us we were enslaved by our scheduling system. Many of us report that 95% (or better) of our equipment is found in specific at the time of calibration. These calibrations were not required! Bill then went on to describe how intercomparison of electrical/electronic measurement instruments, sources and the product test results can be used to determine the exact time calibration is required. The challenge is to reduce cost and maintain traceability by leveraging technology.

We already have computer controlled testing and automated data collection. The imagination of the integrator [person putting the test software package together — Wayne] is an important part of the process. The test process could yield automated data analysis and real time notification of out-of-tolerance-conditions [a test instrument is due for calibration — Wayne].

Bill revealed that HMSC has implemented a trial demonstration to prove the concept.

Bill led the discussion that followed his presentation. Topics discussed were: Would you adjust at every calibration? Is product stable enough to use in the comparison? Uncertainty grows with time (between calibrations). There are many different data collection schemes. Statistical process control. Production shut down time with this scheme compared to traditional calibration. Is calibration in a circle a good idea?

Review of RF-9 — Wayne Benda led the discussion of NCSL's recommended practice on "Calibration Laboratory Capabilities Documentation Guidelines." A comment was made on the examples looking like advertising.

I Have a Problem, What's Your Solution? — The topic discussed was teaming and team members who do not wish to play by the rules. [Judging from the small number of solutions, this looks like a good topic for the next meeting. — Wayne]

Door Prizes — The NCSL business office supplied our meeting with door prizes. These were won by Del Caldwell, Corlin Crowther and Miles Smith.

Attendees:

Patrick Petty
Israel H. Zepeda
Delbert H. Calwell
Michael Bair
Steve Chambers
Don Wyatt

Allied Signal
Burr-Brown Co.
Caldwell Consulting Group
DH Instruments Inc.
DH Instruments Inc.
Diversified Data Systems
The Region 8, Phoenix/Tucson section, and their friends, give a photo opportunity to the press.

Operations & Marketing Vice President, William F. Quigley, brings us up to date on the latest news from the Board of Directors.

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Regional Reports

Patrick Lafave
Gene Gardner
Raymond P. Maleck
Harold M. Foxhoven
William B. Humes
Bob Groene
Steve Wasinger
Ken Nield
Chris Collins
Michael Buckhurst
Walter D. Wiley
Wayne Berada
William Quigley
Eduardo Ricaud
Howard Cunniff
Miles L. Smith
Corbin Crowther
Matt Collon
Kim M. Johnson
Duane Allen
Lyn A. Whitcomb
Ken Oniskowski
Steve W. Briggs

EG&G Flow Technology
Electronic Instruments
Evergreen Air Cir
Florin Daniel
Florin Daniel
Honeywell
Honeywell
Honeywell BCAS
Honeywell IAC
Hughes Aircraft
Hughes Aircraft
Hughes Missile Systems
Integrated Electronics
Instruments
Incorporated
Instruments
Incorporated
Orbital Sciences Corp
Orbital Sciences Corp
SAIC AMSEC
US Navy
US Navy
Wavetek San Diego, Inc.
Zent Electronics

Getting to know you... Is what lunch break is about.

October 24, 1996
Southern California Edison
Westminster, CA
Mike Magin
LA/Orange County Coordinator

The LA/Orange County Section of the NCSL held their biannual meeting on October 24, 1996 at the Southern California Edison Company located in Westminster, California. Mike Magin of Southern California Edison opened the meeting and informed the group of the employment, and training opportunities within Orange & San Diego Counties. Additionally, Mike informed the group of a written paper for Calibration & Performance of conductivity system to meet USP 23. Mike made available copies of this paper and copies of USP 23 Monographs.

The section was addressed by Miriah Arther, President of the 1997 Measurement Science Conference. Ms. Arther presented the section with the current status, tutorials and workshops that will be held in January 1997.

An IEEE committee update was given by Vicky Van Meter of the Wavektek Corporation. Ms. Van Meter informed the section of the current assignment and progress. Vicky shared with the group the methodology of why she is participating and how other members could join other committees that are forming. A discussion on methods for advertising for committee members was addressed. Some methods suggested for obtaining volunteers would be on the internet or in the NCSL quarterly publication.

Cynthia Noble of the Federal Aviation Administration (FAA) conducted a presentation on the responsibilities of the Western Pacific Region Inspection Division. Ms. Noble is in a management position for the FAA and explained the jurisdiction, responsibilities and assigned work program that the Western Pacific Inspection Division is performing. Ms. Noble shared with the section the FAA's stringent training & qualification program. It was quite inspirational and informative to learn about the methods and extensive coordination it takes, on behalf of the FAA, to conduct and/or administer a coordinated calibration program.

John Barr, of the Hughes Primary Standards Laboratory, presented a paper he developed for the NCSL. Mr. Barr's paper was titled, "Adequate Measurement Accuracy Using The 6 Sigma Philosophy". John explained the philosophy behind establishing statisti-
cal models for reducing defects and increasing accuracy. John graphically explained the value of the accuracy ratio and the variance ratio. This was further explained using examples in torque and dimensional.

Karen Hester of the US General Services Administration (GSA), Pacific Rim Region for acquisition support made a presentation to the NCSL. Ms. Hester described the responsibilities of the GSA and the opportunities for obtaining service contracts. Ms. Hester shared with the group methods for reviewing and addressing the GSA procurement office. Ms. Hester explained the GSA procurement process and future methods for advertising bids on the Internet. Currently, the GSA advertises through the CBN, however the GSA will be using their own home page in 1997. We will be looking forward to viewing the new GSA home page.

REGION 10

Nov. 1, 1996
Japan Electric Meters
Inspection Facility
Tokyo, Japan
Katsumi Yokoi
Japan Area Coordinator

The fifth meeting of NCSL Japan area in Region 10 was held at the Japan Electric Meters Inspection Facility in Tokyo on Nov. 1, 1996.

The meeting was hosted again by Hisao Hashimoto, Director of Measuring Standards Division in JEMIC. Many thanks to Kunihiko Takahashi of JEMIC for the preparation of the meeting.

The meeting was opened by Katsumi Yokoi, NCSL Japan Area Coordinator. He welcomed 93 participants for the NCSL Japan 5th meeting, and suggested an improvement of the next meeting because the participation has increased. He also explained statistical meaning of combined rectangular distribution of the calibration uncertainty regarding the ISO GUM Annex G, G.2.2 EXAMPLE.

Program
Laboratory tour of JEMIC: We went around the calibration area for DC/AC voltage, resistance, impedance, high voltage, light standards in JEMIC.

1st Speaker: Eiji Ogita, Yokogawa Electric Corporation
Theme Determination of step number in DC voltage standard

2nd Speaker: Akiu Yamazaki, Hewlett Packard Japan
Theme DC 10 V Zener standard system using predictive method

3rd Speaker: Masaru Ikeda, Panasonic
Theme An sample of calibration uncertainty for DC voltage

4th Speaker: Toshihiko Kamite, Fluke
Theme Introduction of Fluke primary standards laboratory

5th Speaker: Yasuhiko Sakamoto, Electrotechnical Laboratory and Akira Ohwa, National Research Laboratory of Metrology
Theme Panel discussion for Artfact calibration

Final wrap up was made by Katsumi Yokoi. And then Mitsuosh Ishii, secretary of NCSL Japan, told about his offering services for members of NCSL Japan. The five presentations were all of excellent contents for 93 participants.

Attendees:
Tomosuke Inamura
Kazushiro Kinoshiba
Kazumi Hayakawa
Hidetik Amamoto
Kazumori Satoh
Toshihiko Kamite
Kitada Hiroshi
Tadashi Endo
Ioji Kinoshiba
Yasushi Murayama
Toshikazu Nakamura
Hidehumi Nishinaka
Akio Hukushima
Akio Iwata
Yasuhiko Nakamura
Akiro Satou
Yasuhiko Sakamoto
Akira Ohwa
Toshiro Komori
Katsumi Mitsuhashi
Yukihiro Onzou
Masahiko Kawahara
Yoshinori Ohcuki
Shigeru Igashira
Masahiro Miyasaki
Keiko Sato
Norio Seki
Mitsuo Ishii
Katsumi Nagaoka
Tadashii Nakanuma
Yoshinori Hosoya
Yukitoshi Setoyama
Koji Takahashi
Hideo Kobo
Hironori Uchida
Katsumi Tanimoto
Wataru Ohizumi
Noriaki Nakamura
Yasuzi Ikeda
Nori Takakura
Satoru Ichizuka
Yoshinobu Kasumi
Eiji Ogita
Nobuyuki Matsuhashi
Akira Nakamura
Naoki Hayashi
Kazuto Kiyono
Junichi Mori
Youchi Uchida
Yasuyuki Kihara
Keiji Kuroki
Tsunomo Tsuchiya
Toru Yamaguchi
Masanori Nishijima
Seiichi Miyazaki
Yasuo Tada
Takeshi Komatsuzaki
Masaru Ikeda
Mitsuo Kameda
Yoshiki Kuman
Syuzou Suzuki
Jun Oda
Kumihiro Nogi
Hideaki Sawada
Mutsumasa Inoue
Hiroaki Okamura
Ryuouke Yasuda
Naoyuki Eguchi
Michi Iwagawa
Mr. Har
Yasuhiko Tomita
Kazuyoshi Akiyama
Hisao Nishiyama
Hiroshi Yosada
Yoshika Zenitani
Toshibata Yamamoto
Motohiko Ootake
Kazuo Shinkai
Kouichi Kumakura
Natsuhisa
Natsushin
Fluke
Hitachi
JQA
JQA
JQA
JQA
Nippon
MTRCAL
JQA-North Kansai
JQA-North Kansai
Alpha Electronics
Antial
Ori
Keytecnio
Keytecnio
ROHM
Yokogawa Rental & Lease
Yokogawa Rental & Lease
Yokogawa Rental & Lease
Yokogawa Electric Corporation
Yokogawa Electric Corporation
Yokogawa Electric Corporation
Yokogawa Engineering Service
Yokogawa Engineering Service
OKI Engineering
OKI Engineering
OKI Engineering
OKI Engineering
OKI Engineering
Yamatake Honeywell
Yamatake Honeywell
Yamatake Honeywell
Matsushita Communication Eng.
Matsushita Communication Eng.
Matsushita Communication
Panasonic
Panasonic
SOSHIN
SOSHIN
Tokyo Metropolitan Industrial Techn
Japan Amateur Radio
Victor Company of Japan
JEMIC
JEMIC
JEMIC
JEMIC
JEMIC
Hitachi Shonan Electro
Fuji XEROX
Fuji XEROX
Fujiitsu-Nasu
Fujiitsu-Nasu
Fujiitsu-Nasu
Fujiitsu
Fujiitsu
Fujiitsu
Regional Reports

Mitsuo Tamai
Katsutoshi Hase
Hiroyuki Chiba
Masahiro Iwata
Tsuyoshi Hukase
Masahiro Iwata
Takashi Tominaga
Toshio Uchino
Osamu Yokoi
Takitori Eijima
Katsuki Ito
Miiko Nakagawa
Akiu Yamazaki
Katsuki Yokoi

Fujitsu-Suzaka
Fujitsu Denso
Japan Ground Defence Force
Japan Ground Defence Force
Japan Ground Defence Force
Japan Ground Defence Force
Japan Air Self Defence Force
Japan Air Self Defence Force
Eiri Engineering
Eiri Engineering
HP Japan
HP Japan

NCSL Japan 5th meeting boasted a good turnout of 93 metrology experts. Two white dress shirt men, Mitsuo Kamata (L) and Katsuki Mitsuhashi (R) are the leaders of Japanese metrology society of industry area.

Masaru Ikeda of PANASONIC presents the Fluke 732B uncertainty derivation in accordance with the ISO GUM.

Eiji Ogita of YOKOGAWA presents the decision method of an absolute value for the JJA step voltage using frequencies.

Oct 25, 1996
Lifecore Biomedical
Chaska, MN
Carol Hockert
Twin Cities Section Coordinator

On October 25, 1996, the Twin Cities Section of Region 11 held its fall meeting at Lifecore Biomedical in Chaska, Minnesota. Lifecore President Jim Braeke welcomed the group of 80+ attendees to their facility.

Ed Nemeroff, Vice President of International Division of NCSL, gave an interesting presentation on his experiences in Egypt and places abroad. He spoke with enthusiasm about the future of the NCSL overseas and the benefits of having a strong representative around the world.

LeRoy Britain was introduced as the new Region 11 Coordinator. LeRoy laid out his plans for the next year and talked about forming a section for every state in the region.

The first guest speaker of the day was Bernard Morris of ASL. Bernard’s presentation on Thermometry Applications covered all aspects of thermometry from high precision Class I laboratories to secondary equipment used in many cal labs.

After a short break, Richard Rodgers, of Wavetek, gave a talk on Automated Oscilloscope Calibration. Richard pointed out changes in technology over the last few years and described the advantages of automating as much of a calibration as possible.

During lunch, Lifecore offered a short tour of their facilities to those interested in attending. Lifecore makes dental implants and a micro-organism called hyaluronan which is used in some surgeries.

After lunch, Wayne Cummings, of Fluke, spoke about Software Validation. Wayne’s presentation sparked some lively discussion among the attendees and left some unresolved issues to be discussed at a later date.

Carol Hockert gave a short recap of the events in Monterey during the National Conference.
Tom Smith gave the Proficiency Testing Committee report.

Mitch Johnson, chair of the HealthCare Metrology Committee, gave a short update on what is happening nationally and what his committee is doing.

The next meeting will be held on January 16, at the Burnsville City Hall. Speakers will include Brad Miller of True Stone, who will be speaking on Surface Plates, Ross Nelson, of 3M, who will talk about the new Z540 and differences between Mil-Std, Z5 and Guide 25, and Chuck Rheault, of Lockheed Martin, who will be giving an overview of Uncertainty Analysis.

Attendees:

Bruce Adams
Harold Albrecht
William Banet
Rodger Bodine
Robert Bohrer
John Bolger
Lori Boyen
Jim Brocke
Ralph Brandenburg
Keith Braun
Lecky Brittain
Doug Burch
Jim Carlson
Terry Chocen
Danny Clink
Carl Closemore
Terry Conder
Wayne Cummings
Ben DeLamater
David Dikken
James Dolezal
Chuck Ellis
Robert Engvall
Ron Falconer
Jerry Flor
Willard Fruencher
Steve Gennserend
Jim Gillman
Scott Gingerich
Jodi Glunt
Scott Hasstad
Bob Hagberg
Tom Hansen
Paul Hanninen
Dave Haudala
Carol Hoolker
Randy Horan
Terry Horne
Ozzie Jacobson
Mitch Johnson
Joey Kalser
Jay Killian
Gary Kies
Dan Knut
Doug Koenig
Bill Martin
Shawn Mason
Bob McCarty
Tim Mohrman
Dave Moser
Jana Myers
Ed Nemeroff
Dan Novak
Herb O'Neil
George Parker
Marshall Peterson
Ryan Peterson
Randy Pohl
Scott Matle
Bob Remer
Chuck Rheault
Richard Roddis
Larry Roden
Brian Rubischko
Kevin Rust
Corin Scherb
Cindy Schiller
Wes Schroeder
Den Snellens
Dave Slack
Tom Smith
Tim Stark
Mike Stegall
Bob Stockman
Terry Strensch
Jim Swanson
Laura Thilacker
Kathy Thruman
Wayne Torren

State of Minnesota
NM Instruments
Seagate Technologies
St. Jude Medical
Northwest Airlines
Truth Hardware
Lifescience Biomedical
Kato Engineering
Kato Engineering
Quality Training
Metrology
Northwest Airlines
Northwest Airlines
Protein Design Labs
Northwest Airlines
3M Metrology Lab
Fluke
Medtronic
MTL
United Standards Lab
Martin Instruments
Cira Labs
Protein Design Labs
Protein Design Labs
Flowserve
Northwest Airlines
Graco
MTS Systems
Seagate Technologies
Honeywell
3M, Menomonee
Protein Design Labs
Workplace Training
IBM
State of Minnesota
Base Eight
Lifescience Biomedical
Gorecki Manufacturing
Angelo Corporation
Northern Balance
Andersen Windows
ONAN
Rosemount Aerospace
PRCI

Ed Nemeroff from NCSL gave a report on the NCSL 1996 Workshop and International activities.

Mark Maxwell from McDonnell Douglas was the first speaker. His presentation covered their automated systems, including software and data base technology used by McDonnell Douglas.

Robert Gangawer from Guidline was the second speaker. He covered methods used to upgrade your standard resistor maintenance program.

Edward Peterson from MB Dynamics was the third speaker. His presentation focused on accurate calibration of vibration transducers from 0.25 to 11,500 Hz.

Richard Roddis from Wavetek, UK was our fourth speaker, who covered automated high performance oscilloscope calibration.

The last speaker for this meeting was Bill Alexander from TICMS. He paperless presented his calibration and control method to choose, and how to avoid becoming locked into one supplier.

Thanks to BDC, DTI and Wavelet for the door prizes they supplied. Our next meeting will be at the end of March or early April, 1997.

Attendees:

Jim Ballard
Darryl Gibbons
Ken Brown
Roy Campbell
Dick Elers
Bernard Fiebels
Bob Gangawer
Ken Wibbenmeyer
Bruce Ohr
Lerbert Patzuis
Peter Racenis
Mel Whitton
Edward Peterson
Forrest Hammer
Mark Maxwell
Bryan Bicker
Peter Lewis
Ed Nemeroff
Ed Lang
Joe Bunning
Cindy Jeffries
Glenn Thompson

ACE Electric
BDC, Inc.
Bio-Resources
Caterpillar, Inc.
Dynamic Technology
Feike, Inc.
Guideline Instrument
Hewlett-Packard Co.
Incal
Incal
ISL
Lucent Technologies
MB Dynamics
McDonnell Douglas
McDonnell Douglas
Monsanto
Monsanto
NCSL
PMI Instrument
Protiva
Protiva
Protiva
Regional Reports

Aundra Welch  Protiva
Karl Schmeer  Shore Industrial
Bill Alexander  TIC-MS
Tim Stark  Wavetek
Richard Roddis  Wavetek, UK
Jack Granick  White Rodger

Mark Maxwell, McDonnell Douglas, discusses automated systems used at his company.

Robert Gangawer, Guildline, covers maintenance strategies for standard resistor programs.

Edward Peterson, MB Dynamics, presents calibration procedures for vibration transducers.

Canadian Fall Workshop and Symposium

We are pleased to report on our successful fall workshop and symposium held November 14 and 15. It was held in the Sheridan Park Conference Centre, hosted by Lucio Cinelli of Ortech Corporation, Sheridan Park Research Centre, Mississauga (Toronto), Ontario.

The 85 Canadian members who travelled from as far as Vancouver and Halifax were joined by international presenters and exhibitors from England, Massachusetts, Florida, Texas, California and Washington State. We were afforded the opportunity to participate in two full days worth of presentations and workshops and to learn of the latest solutions to our measurement problems from the 13 exhibiting member companies.

Marilyn Ross, our region secretariat, will be mailing copies of the presentations with the minutes as soon as she receives them all. Marilyn is thanked for all the time she spends on arranging our meetings and for producing a very comprehensive report which is sent to all our members as well as all persons attending. In our large country it is not economically feasible for many member delegates to attend meetings. These reports ensure that no one is left out.

Lively discussion ensued on Frank Doucet's 10 Volt DC CLAS round robin, a panel discussion lead by Jim Mullins of Pylon Electronics on obtaining from suppliers calibration methods and meaningful calibration reports and a discussion lead by Graham Cameron of the SCC on the current revisions of ISO Guide 25.

Our first day began with a welcome from Ross Woodland, Director of Ortech, who talked of the major impact to be made by very powerful computers in the near future. Basically, 'You haven't seen anything yet'!

Declan McEvoy arranged for our first speaker, John McDonald of the Department of National Defence, Quality Engineering Test Establishment in Hull Quebec. John made an interesting presentation with video on the contribution Tribology makes to our defence initiative. Tribology, I learnt, is the analysis of bearing failure.


Our first panel presentation, organized by Les Peer, presented the results of the first round robin for laboratory accreditation organized by Frank Doucet of the Canadian Laboratory Assessment Service at the National Research Council. This round robin was a success, running on schedule, without problems and with all the nine laboratories reporting results within their accredited uncertainties. Frank described the artifacts used, the scheduling and the application of Youden Diagrammes to analyze and present the results.
Following Frank’s description of the round robin and presentation of results, Dr. Dave Ingls of the NRC described Canada’s national standard for resistance and how it traces down to the transfer standards used in the round robin. Interestingly metrologists from all 9 of the CLAS/SCC accredited resistance laboratories were present at the symposium. Time allowed for three of them to describe their measurement procedures, those being Robert Armand of IREQ (Quebec Hydro), Karel Ebenreif of Bruce Nuclear (Ontario Hydro) and Satoshi Nishie of Miller Instruments in Vancouver, BC.

A 10V DC CLAS round robin is currently running and we are expecting presentation of the results at our spring 97 meeting.

Gilles LeFebvre of IREQ in Varennes (Montreal), presented details of software they developed for ISO 9000 calibration management by computer. The software is available from IREQ for about $1500.00 in French and English.

In Peter Holden’s absence, Graham Cameron of the Standards Council of Canada (SCC) updated us on International developments and agreements on conformity assessment.

John Leckey of Hewlett Packard in Mississauga arranged a presentation on the Government Industry Data Exchange Programme (GIDEP) given by Jim Carlton of the US Navy. Jim braved the cool weather to explain in great detail how GIDEP works, how to access it and the wealth of data available to those seeking calibration procedures. Jim brought up a great display and plenty of literature.

Our second day’s first speaker, arranged by Carlo Rea of Technel Engineering in Woodbridge (Toronto), was Ken Kolb of Ruska Instrument Corporation in Texas who clearly described the new RSS uncertainty estimates and how they effect pressure measurements.

A very lively panel presentation followed, organized by Jim Mullins of Pylon Electronics in Ottawa. Accompanying Jim were Wayne Sampson of Litton Systems in Halifax, George Parker of Litton Systems in Toronto and Anthony Ulrich of F. Ulrich Gauge Laboratory in Montreal. Difficulties and solutions were described regarding the acquisition of calibration procedures for instruments calibrated by subcontractors. Many companies supply woefully inadequate information on their calibration methods and standards used, even some foreign ones who claim ISO Guide accreditation. Without such information it is impossible to establish credibility with those subcontractors and difficult to satisfy one’s own auditors. Those with niche markets basically say take it or leave it knowing we have no where else to go.

Pat Stuart of Fluke Electronics Canada Inc. arranged for Steven Chapman of the Fluke Corporation to come over from Everett, Washington to present Verification of Artifact calibration. Steven is International Sales Programme Manager of traditional calibration products.

Graham Cameron brought to our attention the current revision of ISO Guide 25. Discussion ensued on section 3.9.2.5, which states, “When, in the case of calibration certificates, parameters claimed to be within specified tolerances, the measurement values, extended by the estimated uncertainty of measurement, shall fall within the appropriate specification limit.

Participants were encouraged to communicate their concerns of the ramifications of this clause to Peter Holden at the SCC for incorporating in the Canadian comments.

Noel Briones of Sir Sandford Fleming College in Peterborough Ontario outlined changes at the college which will allow the post diploma metrology course to restart in 1997 Fall. In addition Noel is working with various companies and government departments to introduce week long modular training. Those interested can phone Noel at 705-749-5550. Many NCSL members have worked diligently with the college in setting up these courses, lets back them up by supporting these courses.

Our final presentation arranged by Gary Hysert of the NRC was Dr. Peter Cashmore of Ortech Corporation. Peter thoroughly described the Canadian Technology Network (CTN) and its advantages. Names of companies joining the network will receive referrals from other seeking solutions to their technical problems. Without cost the two parties are put in touch with each other to negotiate solutions. Every company offering calibration services should list with the network. Gary Hysert can be phoned at 613-998-5648.

Many attendees took advantage of the tours of Ortech organized by our host Lucio Cinelli. Time was well spent organizing venues and contents for next years meetings.

The spring regional meeting will be at the Royal Military College in Kingston, Ontario. The fall symposium is planned for Miller Instruments in Burnaby (Vancouver) British Columbia. In the fall of 1998, IBM will be our host in Bromont, Quebec.

Planning will be incorporated earlier in future programmes to allow more attendees to provide input on their desires. Carlo Rea of Technel Engineering in Woodbridge, Ontario is thanked for all the work in arranging this years exhibitors. We greatly appreciate the participation of the 13 member companies who presented instrumentation and services designed to solve our measurement problems. As always our continental breakfasts and coffee breaks were held in the exhibit area affording all the maximum opportunity to interact.

Eileen Gordon, Manager of the Sheridan Park Association organized the excellent lunches and the roast beef dinner on Thursday night. As a bonus we had an unexpected after dinner speaker as Ed Nemeroff, VP NCSL International Division described his recent trip to Egypt were he spoke in Cairo and Alexandria on the benefits of NCSL membership. Ed’s enthusiasm rubbed on a lot of us who left knowing we are fortunate to be member delegates to a wonderful organization. Where else can one get such a wealth of measurement information and in such a pleasant manner.

I shall be stepping down after three years as region co-ordinator but expect to continue to see all of you at our future meetings. It has been both a privilege and a rewarding experience to have served our NCSL members.

Exhibitors:

Technel Engineering
Ruska Instruments
Guilford Instruments
Fluke Electronics Canada Inc
Regional Reports

Interfax
Wavetek
SRP Controls
Automatic Systems Laboratories (ASL)
Measurements International
Dalmar Instruments
DH Instruments
Hydro Quebec Research Institute (IREQ)
Ontario Hydro Technologies
GIDEP
Ortech
Institute for National Measurement Standards at NRC
International Business Machines
Cal Services Canada

Attendants:

Robert Armand        Hydro Quebec
Robin Banorie        Canadian Marconi
Harvey Baahs         Dalmar Instruments Inc.
Al Basa              NRC/NIMSS, Ottawa
Gaetan Bergeron      Fratt and Witney
Alok Bhattacharya    Canadian Marconi
Peter Bowman         Atmospheric Environment
Ross Boylan          Pylon Atlantic, Inc.
Noel Briones         Sir Sandford Fleming College
Graham Cameron       Standards Council of Canada
Jim Carlzon          NRC/INMS, Ottawa
Lucio Cinelli        Ortech Corp.
Steve Chapman        Fluke Corp.
Frank Doucet         Nortel
Karil Ebenstreiten   Ontario Hydro
Kim Eitherton        InterX Systems
David Fleming        United Testing Systems
Marlene Foster       Ontario Hydro
Gianfranco Garonton  Bivall Corp. Int.
Colin Gauthier       Atomic Energy of Canada
Douglas Gee          National Research Council
George Glyn-Williams GIGE Electronics
Bert Greepson        Fluke Electronics
Gilbert Guettin      Transport Canada
Frank Hack           Teklogix
Art Heatley          Pylon Electronics
Peter Holden         Standards Council
Gary Hyser          NRC/NIMSS Ottawa
Dan Jacob            Sherwood Electromotional
Dave Inglis          NRC/NIMSS Ottawa
Jim Ingram           Guideline Instruments
Tom Janson           Measurements International
Tom Kelly            EP&T
Ken Kolb             Ruska Instruments
Nell Lachke          Ontario Hydro
Ian Lado             Ontario Hydro
Michel Laplante      IBM Canada
John Lecoy           Hewlett-Packard
Gilles Lefevre       IBM Canada
Andy Ling            Celestica Inc.
Allan Longley        Nortel
Denny Lowe           Nortel
Roy MacDuff          Tektronix
Derek Magee          VACS Ltd.
Kevin McClure        Fluke
John McDonald        Quality Engineering
Declan Mccoy         Quality Engineering
Dave McFadden        Ontario Hydro
Adrian Michaud       Canadian Marconi
Bill Miller          Miller Instruments Ltd.
David Moss           Guideline Instruments
David Morgan         Automatic Systems Labs
Benord Morris        Pylon Electronics
Jim Mullins          Celestica
Marryn Nelms        Gidep Support/Dynincorp.
Larry Neison          Miller Instruments
Satoshi Miller       Oerlikon Aerospace
Steve Olivier        Litton Systems
George Parker        Litton Systems

Les Peer                 Environment
Mike Portugais          NRC/NIMSS
Carlo Rea                Techno Engineering Inc.
Alan Robertson          NRC/NIMSS
Richard Rodds           Ortech Corp.
John Rodrigues          Litton Systems
Wayne Sampson           SRP Control System Ltd.
Joe Santo                Hewlett-Packard
Rosny Schweiger         Siemens Electric Ltd.
Beata Sobiesiak        Atomic Energy of Canada
Joe Soucy               Ortech Corp.
Tim Stark
Pat Stuart
Doug Thompson
Anthony Ulrich
Jamie Walker
Tracey Wollon
Bruce Whalen
Paul Zavitanos
Dennis Zvanovec

India Region Report
J. S. Raja
Regional 13 Co-ordinator

REPORT FROM INDIA REGION
FOR PERIOD SEPTEMBER - NOVEMBER 1996

RAJU RELINQUISHES OFFICE OF DG (STQC) ON SUPER-ANNUATION

J. S. Raja, Director General (STQC) and NCSL India Region co-ordinator has retired from active government services on superannuation with effect from 30th November, 1996. In his more than 35 years of active service, he has held many important positions, the last being Director General (STQC) and Adviser DOE. During his tenure, STQC has etched itself as an organisation of repute. He steered STQC well, and placed it on the International Quality map. He was the prime motivator of the NCSL activities in India. The upgrading of NCSL India chapter from AREA to REGION 13 stands out as a testimony to his untiring services to the field of metrology in India. His dynamism, sharp and right judgement of any complex problem/situation has won him much admiration. Congratulations Sir!

STQC ESTABLISHES NEW ETDC AT AGARTALA

A new Center viz. Electronics Test & Development Center (ETDC) has been established at Agartala as a subordinate office, under STQC Directorate of Department of Electronics. This center will provide basic test, calibration, training and consultancy services to the industries/users. Mr. S. Maiti (NCSL member delegate) is looking after the activities of this new centre as Director-in-charge.

NEW NCSL MEMBER DELEGATES APPOINTED

Mr. Raju, NCSL India Region Coordinator, has appointed the following new member delegates (NCSL) to represent their labs.

Mr. A. Deobhakta         ERTL(E) Calcutta
Mr. B. Basavaiah        ETDC Bangalore
Mr. S. Maiti            ETDC Guwahati

Mr. B. K. Srinivas, Sr. Engineer, BHEL has been appointed as the new member delegate to represent BHEL Bangalore in place of Mr. R. G. Phadke, who is the NCSL Bangalore Area co-ordinator.
STQC PARTICIPATES IN MEETINGS OF INTERNATIONAL ELECTRO-TECHNICAL COMMISSION

Mr. J. S. Raju, DG (STQC) & NCSL India Regional coordinator, represented India at the Annual General meetings of the International Electro-technical Commission (IEC) held at Dresden, Germany during 12-20 Sept 96. These meetings included the council meetings comprising of the national committees of all the member countries, committee of action & meeting of various technical committees of IEC. These meetings reviewed the status of international standardisation activities undertaken by IEC and its impact on industry/users and identified future programmes of work & priority.

DG (STQC) also attended meeting of Working Group of the International Safety Certification Scheme (IECEE) operated by IEC at Geneva from 23-25 Sept 96. The working group deliberated on expansion of this scheme as full certification scheme facilitating international acceptance of products certified under this scheme by respective National Certification Body (NCB). STQC Dtc. (NCSL Member) is already approved as NCB and five of its labs as CB approved labs for testing & certification of electronic products under this scheme.

TATA ELECTRONIC DEVELOPMENT SERVICES AWARDED ISO 9002

STQC Directorate has gained prominence as a registrar of ISO 9000 certification. More than hundred industries have been audited and certified by STQC to ISO 9000 series so far. It is a pride that the STQC certification scheme (SQ scheme) has been accredited by the RVA, Netherlands. Recently Mr. Tata Electronic Development Services (TEDS), Bangalore was awarded ISO 9002 certificate by STQC Dtc. The certificate was presented to Dr. Homi Sethna, Chairman, TEDS by Mr. J. S. Raju. This is the seventh Tata unit to be certified by STQC under ‘SQ’ scheme.

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TRAINING COURSE FOR INDIAN AIR FORCE PERSONNEL

STQC - Philips EMT Institute, at Electronics Niketan has conducted a special course on “Electronics Manufacturing Technology” recently for Indian Air Force personnel. The course inaugurated by Air Commodore P.C.F. Rautella was attended by 20 Air Force personnel and was well appreciated. More such courses are being planned to be conducted.

TATA ELECTRONIC DEVELOPMENT SERVICES AWARDED ISO 9002

STQC Directorate has gained prominence as a registrar of ISO 9000 certification. More than hundred industries have been audited and certified by STQC to ISO 9000 series so far. It is a pride that the STQC certification scheme (SQ scheme) has been accredited by the RVA, Netherlands. Recently Mr. Tata Electronic Development Services (TEDS), Bangalore was awarded ISO 9002 certificate by STQC Dtc. The certificate was presented to Dr. Homi Sethna, Chairman, TEDS by Mr. J. S. Raju. This is the seventh Tata unit to be certified by STQC under ‘SQ’ scheme.

LAL C. VERMAN AWARD FOR KAUL

Mr. C. L. Kaul, Director ETDC Mohali has been selected for the 12th Lal C. Verma Award in recognition of his services & distinguished contribution in the field of “Standardisation in Electronics and Telecommunication.” The award would be presented during the 28th midterm symposium of the IETE during 2nd week of April 1997. Congratulations!

NEW TRAINING CENTRE AT ELECTRONICS NIHETAN IN- AUGURATED

NCSL member ERTL(N) has established a new training centre located at Electronics Niketan, New Delhi. It was inaugurated with the beginning of the sixth batch of DOEACC ‘O’ level computer course on 15th July 1996. The Centre was inaugurated by J. S. Raju, DG (STQC). The function was presided over by Mr. A. K. Datta, Director ERTL(N) & NCSL Delhi Area coordinator and the key note address was delivered by Mr. T. C. Gupta, Executive Director, DOEACC society. This training centre will cater to the training needs in the field of computers and also help supplement the growing training demands of the industries faced by ERTL(N).

ENTREPRENEUR DEVELOPMENT PROGRAMME IN MECHANICAL WORKSHOP PRACTICES

ETDC Jaipur (NCSL member) has organised an Entrepreneur Development Programme (EDP) in Mechanical Workshop Practices for the first time. This eight-week programme sponsored by Directorate of Industries, Govt. of Rajasthan was started on 17th July 96. Successful participants will be registered by DIC as entrepreneurs. The EDP programmes conducted by the lab are appreciated by the participants and by the sponsors.
Implementation of ISO-9000 Quality System

Textiles Committee, an NCSL member is now rendering consultancy service in implementation of ISO-9000 Quality Systems, Eco Testing and Eco-Auditing with the largest number of manpower available in the related areas having basic qualification in Textiles. As of this date, 90 officials of this Institute have been trained in matters related to ISO-9000 by BSIQA (UK) and RWTUV (GERMANY). The consultancy package includes:

- Periodical visits on mutually agreed dates by a dedicated team of officials till the stage of level of Certification.
- Conducting programmes for creating awareness among the employees at all levels.
- Guiding in documenting the work instructions (WI), Standard Operating Procedures (SOP) and Quality System Manuals (QSM).
- Imparting in-house training on Statistical Techniques and on Internal Quality Audit for a duration of 4/5 days each.
- Conducting pre-assessment (consultancy audit) by trained, qualified and experienced auditors.

A model manual in respective field worth Rs. 4000/- is given as a complementary copy.

Textiles Committee has also produced video films on ISO-9000 and 9001 Quality Systems, Process of ISO-9000 Certification, Quality Policy, Contract Review, Document Control and Internal Audit. The films are in English and of duration of about 20 minutes each.

MODEL MANUALS, comprising an Apex Manual, Standard Operating Procedures and Work Instructions, meant for Spinning, Weaving, Wet Processing, Apparel units, Handloom units have also been prepared by the committee. These manuals address each elements of ISO-9000 standards and are easy to adopt by any unit wanting to implement ISO-9000 Quality System.

Textile Committee also conducts regular ISO seminars at different places in India. In-house Statistical Technique training programmes and Audit training programmes are also offered by the committee. Those interested in availing any of the aforesaid services, please contact:

Secretary
Textiles Committee
‘Crystal’ 79, Dr. A.B. Road
Worli, Mumbai - 400 018
Tel. No : 022-4935349/4933420/4968679
Fax : 022-4964521, 4933420, Gram TEXFUND

ERTL(N) BAGS A CONTRACT

Electronics Regional Test Laboratory (ERTL) North, Delhi, an NCSL member has bagged a prestigious calibration contract from a reputed National Petroleum Industry. The contract was awarded after stiff competition from competitors which involved calibration of more than 1000 Test & Measuring Instruments on-site.

ANNUAL FOUNDATION DAY OF SPI CELEBRATED

The Annual Foundation Day of the STQC Philips EMT Institute (SPI), a dedicated institute for providing training on Electronics Manufacturing Technology (EMT) was celebrated on 16th Nov, 1996. Mr. J.S. Raje, NCSL India Region Co-ordinator was the Chief Guest. The function was also attended by Air Vice Marshal PK. Ghosh, Gp. Capt. Sen and IAF personnel undergoing training at the institute. The function was inaugurated by Mr. A.K. Datta, Sr. Director, ERTL(N). The institute has conducted 30 training courses and trained more than 250 persons during its one-year existence. The institute can provide state-of-the-art training in the field of EMT for any organisation not only in India but also from the neighboring countries.

COURSE ON INFORMATION TECHNOLOGY FOR OFFICE AUTOMATION

ERTL(N), Training Centre (NCSL Delhi Area Co-ordinator) conducted a special course on IT for Office Automation. The programme was attended by 17 participants. The course covered both theoretical as well as hands-on session, which evoked good response from the participants. Seminar on this topic was conducted for the first time by ERTL(N).

CONSULTANCY SERVICES

ERTL(N), Delhi has provided consultancy to a private calibration laboratory namely Yadav Metrological Laboratory and assisted them in their efforts to achieve the coveted Laboratory accreditation from National Accreditation Board for Test & Calibration Laboratory (NABL), a national accreditation scheme operated in India by Department of Science & Technology, Govt. of India. Yadav Metrological Laboratory is the second lab to be accredited by NABL based on the guidance provided by ERTL(N).
# NEW NCSL MEMBERS

## REGION 1
- **CONTECH - RTI**  
  Middlesex, NJ 08846  
  Delegate:  
  Anthony E. Yackovich  
  (908) 560-0702

- **Split Ballbearing**  
  Lebanon, OH 45036-2677  
  Delegate:  
  John F. Mohla Jr.  
  (603) 448-3000 x5458

## REGION 2
- **Sharp Ivers-Lee Corporation**  
  West Caldwell, NJ 07006  
  Delegate:  
  Ricardo A. Falconer  
  (201) 575-3997

- **Defense Contract Mgmt. Command**  
  Philadelphia, PA 19145-7699  
  Delegate:  
  Joseph McCarthy  
  (215) 737-5921

- **Bayer Corporation**  
  Pittsburgh, PA 15205-9741  
  Delegate:  
  John M. Tully  
  (412) 777-4578

- **Yuasa-Exide, Inc.**  
  Reading, PA 19605  
  Delegate:  
  Wallace M. Dobbins  
  (610) 208-1663

- **Centtech Services Corp.**  
  Conshohocken, PA 19428  
  Delegate:  
  Wayne C. Merritt  
  (610) 941-9160 x123

## REGION 3
- **Naval Aviation Depot Ops. Ctr.**  
  Patuxent River, MD 20670-5449  
  Delegate:  
  David T. Ruff  
  (301) 342-4951

- **Motorola MOS 15**  
  Research Triangle Park, NC 27709  
  Delegate:  
  Jerry L. Eldred  
  (919) 685-3161

## REGION 4
- **W.A. Brown Instruments, Inc.**  
  Orlando, FL 32803-3132  
  Delegate:  
  James D. Whidden  
  (407) 648-9862

- **Quality Systems, Inc.**  
  Fort Lauderdale, FL 33339  
  Delegate:  
  Dean S. James  
  (954) 565-9062

- **ComAlloy International, Inc.**  
  Nashville, TN 37211  
  Delegate:  
  Lonnie White  
  (615) 333-3453

- **Tennessee Dept. Agriculture**  
  Nashville, TN 37204  
  Delegate:  
  Thomas W. Smith  
  (615) 360-0158

## REGION 5
- **Rockwell Guidance Rep. Ctr.-Newark**  
  Heath, OH 43056-6117  
  Delegate:  
  Jerry W. Stricklett  
  (614) 788-4686

- **Precision Technical Services, LLC**  
  Indianapolis, IN 46241  
  Delegate:  
  James Graham  
  (317) 487-2378

- **Pharmacia Hepar, Inc.**  
  Franklin, OH 45005  
  Delegate:  
  Michele T. Washing  
  (513) 746-3603 x244

## REGION 6
- **University of Colorado at Denver**  
  Denver, CO 80217  
  Delegate:  
  James C. Gerdeon  
  (303) 556-2781

- **Omnipoint Corporation**  
  Colorado Springs, CO 80907  
  Delegate:  
  Thomas Robirds  
  (719) 473-3293

- **R&R Instrumentation, Inc.**  
  Aurora, CO 80011  
  Delegate:  
  Joel R. Stritzel  
  (303) 364-5325

- **Industrial Instrument Works, Inc.**  
  New Orleans, LA 70123  
  Delegate:  
  Scott Martinez  
  (504) 733-8355

## REGION 7
- **VLSI Standards, Inc.**  
  San Jose, CA 95134-2006  
  Delegate:  
  J. Jerry Prochazka  
  (408) 428-1800 x123

- **ARGOSystems, Inc.**  
  Sunnyvale, CA 94088  
  Delegate:  
  Jerry Papenfluss  
  (408) 737-2000 x8530

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<th>Boulder/Denver Section (313)</th>
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<td>Hewlett-Packard Co.</td>
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<td></td>
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<td></td>
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<td>Menlo Park, CA 94025</td>
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<td>(415) 462-5162 FAX(415) 462-5113</td>
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<td></td>
<td>Tucson, AZ 85734</td>
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<tr>
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<td>(520) 794-4483 FAX(520) 794-5658</td>
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<td>011-45-4599-1275 FAX:011-45-4281-5810</td>
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<td>NMI Van Swinden Laboratorium</td>
<td>Schoenakerstraat 97</td>
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<td>P.O. Box 654</td>
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*DEFINITIONS OF ACRONYMS OF LIAISON ORGANIZATIONS

A2LA American Association for Laboratory Accreditation
AIA Aerospace Industries Association
AMMAC Asociacion Mexicana de Metrologia
(Mexican Association of Metrology)
ANSI American National Standards Institute
APLAC Asia Pacific Laboratory Accreditation Cooperation
ASQC American Society for Quality Control
ASTM American Society for Testing and Materials
CORM Council for Optical Radiation Measurements

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<tr>
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<table>
<thead>
<tr>
<th>Issue Date</th>
<th>In Mail</th>
<th>To Printer</th>
<th>Last Editorial to Editor</th>
</tr>
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<tr>
<td>Apr. 97</td>
<td>1 Apr. 97</td>
<td>15 Mar. 97</td>
<td>1 Mar. 97</td>
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<tr>
<td>Jul. 97</td>
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<td>15 Jun. 97</td>
<td>1 Jun. 97</td>
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<tr>
<td>Oct. 97</td>
<td>1 Oct. 97</td>
<td>15 Sep. 97</td>
<td>1 Sep. 97</td>
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<tr>
<td>Jan. 98</td>
<td>1 Jan. 98</td>
<td>15 Dec. 97</td>
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January 27-29, 1997
Lake Tahoe, NV

April 21-23, 1997
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July 27-31, 1997
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Atlanta, GA
(in conjunction with 1997 NCSL Conference)

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