NEW PARADIGMS -- INTO THE FUTURE

My last three President’s Messages dealt with Paradigm Shifts — the need to change the patterns, models, standards or rules that are the established processes defining the ways things have been done. In the operation of a metrology lab, an entire company or a government agency (in any part of the world) — changes are needed to more effectively compete in a growing global market.

Making a paradigm shift however, does not imply that there are no rules. Metrologists know more than anyone that procedures must be followed, proper standards used and ongoing results analyzed carefully, in order to know where we have been and where we are going. Making a paradigm shift therefore implies that there are new paradigms. Doing things that have value added to the end result however, should be a key ingredient.

NCSL’s new paradigms are taking shape. A new organization structure begins in 1993 (“The New NCSL Organizational Structure.” NCSL Newsletter, Vol. 32, No. 2, Apr. 1992: page 10). The TQM Committee on Calibration System Requirements is well on the way to having a single U.S. Standard for Calibration Systems Requirements. It should be recognized by all U.S. Government agencies, in addition to being the U.S. basis for international voluntary laboratory accreditation recognition. There appears to be positive movement and attitudes to have NIST as well as metrology labs in the U.S. adopt an ISO Guide on the Expression of Uncertainty in Measurement that will begin to produce a consistent language to help harmonization of measurements within the U.S., as well as with the rest of the world.

A new NCSL video should be ready in the near future. This tape is intended to be used to promote NCSL to prospective new members, or to serve as a tool for existing member delegates to use within their own organizations.

The annual NCSL/NIST management meeting was held on July 31, 1992. In addition to the activities mentioned above, other paradigms in progress that came forth from that meeting are: the formation of the North American Calibration Cooperation (NACC) (similar in function to the WECC in Europe); voluntary laboratory accreditation; and the international harmonization of measurements and units. Mexico is emerging as an active partner with the U.S. in NACC, along with Canada. In order to help this activity in a positive way, NCSL has established a liaison with the Asociacion Mexicana De Metrologia, A.C. (AMMAC). Also introduced at this meeting was a new work item proposal from ISO to change the industrial standard reference temperature from 20 °C to 23 °C for all physical dimensions (see page 10 for more information).

Another super annual conference had some of its own emerging paradigms. In a show of hands there seemed to be about 25% new attendees among the 657 registered attendees. Sessions dealing with ISO 9000, the pharmaceutical industry, and papers that discussed gaining customer input to a lab’s operation all enjoyed full participation. There was an exciting level of activity in the Utility Industry arena and there appeared to be renewed interest in the Petroleum Industry activities. As a result of people getting together to share, some new NCSL Sections may be emerging in places like Alaska and Mexico. Prior to the official conference there was a well attended “how to” workshop for the Region, Section and Area Coordinators.

The high level of activity of the Measurement Assurance Programs around the country, in a variety of disciplines, also received a great deal of interest. This is especially important in light of proficiency testing that may be a part of laboratory accreditation requirements in the future.

(Continued on page 30)
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EDITOR'S MESSAGE--

IMPRESSIONS FROM THE ANNUAL CONFERENCE

It's been four years since I attended the NCSL Annual Conference, and I
was delighted to be in DC this year. We talk a lot about communications
being the life blood of NCSL. It is both our written and spoken communications which keep us connected, and each time you see all your old friends and associates at the conference, one is reminded of that fact.

Some impressions:

1) Biggest conference ever, exhibits sold out, and the highest attendance count too. A
cautious mood in general, but I wouldn't say somber. Most of the people I talked to told stories of cutbacks and layoffs. At least some of the metrology parts of our businesses seemingly have not been hurt too hard yet. In our committee reports, I did find a fair
number of resignations due to cutbacks and in some cases terminations.

But the condition reminded me of the new version of the old cartoon of the suicide victim falling past the 10th floor, answering the guy calling from the window, "How's it going?" The
answer? "Everything's OK so far!" (The new version of the cartoon, has the guy speaking into a cellular phone, with the same words, "Everything's OK so far.")

In discussions with several of our Board officers, I came away with the assurance that our
NCSL operational and financial planning is conservative and taking notice of these negative industry trends happening outside our control.

2) The jobs we in the metrology business now do are broadening and increasing in complexity. Regulations, ISO, toxic materials problems, and a dramatically changing management landscape. I found that many of you are heavily involved in TQM projects,
Dr. Joe D. Simmons, Chief of Calibration Programs, NIST, has received the 1992 William Wildhack Award from the National Conference of Standards Laboratories (NCSL). The award was presented by NCSL Past President Graham Cameron on August 3, during the organization's annual conference in Washington, DC. It is presented annually to recognize outstanding contributions to the field of metrology and measurement science, consistent with the goals and programs of NCSL.

The award was established in 1970 in honor and recognition of William Wildhack, a long-time employee of the U.S. National Bureau of Standards. Mr. Wildhack was not only very instrumental in the founding of the NCSL, but also, through his wisdom, his leadership, his dedication and foresight, he helped shape the organization during its early formative years.

Dr. Simmons was honored for years of contributions to the metrology industry, and his continuing central role in US and international standards committee activity. He has spent his career at the US National Institute of Standards and Technology, most recently as Chief of Office of Calibration Programs. He has been a member of the NCSL Board of Directors, representing the NIST for 5 years.

Dr. Simmons was born in Elberton, Georgia; and has also lived in Tennessee, Ohio, the District of Columbia, and Maryland. He received his PhD in physical chemistry from Vanderbilt University in 1963. He immediately joined the US National Bureau of Standards as a Postdoctoral Research Associate. He then spent 14 years as a Research Physicist in the field of high resolution molecular spectroscopy, 2 years as Scientific Assistant to the Director of the National Measurement Laboratory, and 7 years as Deputy Director of the Center for Basic Standards and Chief of the Length and Mass Division. It was in the latter positions that he served as champion for an NBS-wide initiative to develop new and improved calibration services for our NCSL community.

His current position is responsible for coordinating and administering all of the NIST calibration services performed in some 14 different technical divisions across the Institute. He serves as a central NIST contact point for customer questions related to calibrations and measurement. Joe also collaborates with the NIST Calibration Advisory Group, which sets the priorities for new and improved calibration service development projects funded from various sources.

Joe is an enthusiastic supporter of NCSL activities. He has served as Region 3 Coordinator, Vice-President for Industrial Technology, and the 1988 Conference Chairman. He is now NIST Representative to the Board. His major goal is to improve communications and involvement between NIST and NCSL. He has worked closely with several NCSL Committees, including Measurement Requirements, Government Affairs, Intrinsic Standards, and the new Committee on International Coordination.

Joe's current activity is now heavily focused on the development of a single national standard for calibration laboratories and a NIST/NVLAP calibration laboratory accreditation program. He is also involved in the development of a North American Calibration Cooperation program to build mutual confidence between the calibration accreditation programs of Canada, the United States, and Mexico, and to interact with other regional cooperations such as the Western European Calibration Cooperation.

Joe and his wife Patricia have two sons, John and James. John works for the Frederick City Police Department on a special community policing project. He will complete his Masters Degree in Public Administration at the University of Baltimore this fall. James is an undergraduate student at the University of Maryland in the Engineering Department. Joe pursues a number of hobbies, including gardening, cooking, collecting and tinkering with old cars.

Welcome to the Grand Hyatt, Washington.

Dave Nebel, Tek, and his hard-working staff get busy stuffing the briefcases.

NCSL Business Manager, Wilbur Anson, dons casual clothes to attack all the pre-conference registration details. Being the conference registrar is not the simplest way to earn your living in the month leading up to the event.

Keynote Speaker, Dr. John Lyons, Director of NIST, spells out the challenges faced by our worldwide metrology community in the coming years.

NCSL President Bob Smith, Loral, kicks off the conference.

NCSL spouses and friends gather at the tour buses in the morning to learn more about the nation's capital and the surrounding countryside.
HP's Dave Abell presents some practical ISO 9000 recommendations to a standing-room-only house, revealing great audience interest.

In spite of business conditions, this year's attendance was the highest so far.

At the Monday luncheon, Dr. Joe Simmons, Chief of Calibration Programs at NIST, accepted our annual Wildhack Award (See page 3).

The luncheon is also the venue for the annual NCSL Delegates meeting. This is called as a formal meeting because the nature of our non-profit trade association and by-laws requires an annual meeting of the Member Delegates.

Luncheons are great occasions to meet others working on similar lifework, and to hear a challenging speaker too. One speaker from the Smithsonian covered some NASA history from a technology standpoint. Another reviewed some instrument history.

Gary Davidson, TRW, chairs a forum presentation on the TQM Committee.
It is a little-known fact that the exhibitors finance our NCSL Conference, and we thank them for their support. It must work, because the exhibits were sold out again this year. The exhibits stay active as the attendees come by for "breakfast" each day and coffee breaks. (Upper left) Barb Davis of Tektronix just hears the bad news that the freight elevator has just broken down. Typical panic time on setup day. (Lower left) The Fluke DMM customer research survey/dice roll draws good crowds, and many walk away with a hi-tech present. (Lower right) Your intrepid NCSL Newsletter reporter is only drinking orange juice (honest) and gets the regional lowdown from Gil Uribe, USAF, San Antonio Regional Coordinator.
Don Dalton, Fluke, managed the best-paper evaluation, a complex task at best. He announces the winner as Theodore Doiron with the title, "Gage Block Standards."

Mike Suraci, Lockheed, draws door prizes, and continues this popular annual tradition.

At the annual banquet, President Bob Smith and his wife are flanked by Past-Presidents Graham Cameron (l) and Bill Simmons (r).

Banquet entertainers, Abrams and Anderson, did a great job weaving metrology terminology into their skits. NIST, auditors, ISO, calibration delivery delays, MIL-STD, all took a few good-humored hits.

One skit format used 10 technical terms called up from the audience. This line in a Swedish accent was one result, "Hi, I'm your new ISO auditor, ZENER DIODE." Clever, and funny.

Our elderly gentlemen, the past presidents get together for some self-congratulation that they can still attend the conference.

Dave Frank, U.S. Navy, and his son take a little break in the Grand Hyatt lobby. All that lecture attention and wandering around the exhibits wears one down.

Official photographer, Nina Tisara, slows down long enough to pose for her own portrait.
The regular meeting of the National Conference of Standards Laboratories Board of Directors was held on August 2, 6 and 7 at the Grand Hyatt Hotel, Washington.

All written reports which were received are on file at the NCSL Business Office unless otherwise stated. Verbal reports are indicated.

The President's written report was presented by Robert Smith. Mr. Smith informed the Board that there were 29 new memberships, most of which represented small companies.

The Executive Vice President's written report was presented by James Ingram.

The Immediate Past President's written report was presented by Graham Cameron.

The Secretary's written report was presented by William Doyle.

The NIST Representative's written report was presented by Joe Simmons. Dr. Simmons requested any inputs from the Board on the NIST uncertainty analysis paper.

Gary Davidson reported on the TQM Committee for Calibration Systems Requirements. This committee last met on July 21 & 22, 1992 in Scottsdale Arizona where they reviewed and modified the proposed U.S. national standard which will be based on ISO 10012.1. The committee expects that this proposed standard will be accepted internationally in light of the minor changes made to the document.

Mr. Davidson stated that the committee feels that the ANSI/ASQC M-1 document should be allowed to expire this year. NIST is moving forward in five areas for laboratory accreditation under the NIST NAVLAP. The first area is to be DC Voltage.

The International Measurement Coordination Committee report was presented by Graham Cameron. Graham noted that various U.S. organizations were in receipt of an international proposal to change the reference temperature of mechanical & physical measurements from 20 °C to 23 °C. (See story on page 10.)

An action item was given to Graham to make a recommendation on the direction that the NCSL should take on the change to a laboratory temperature of 23 degrees Celsius.

The Government Affairs Committee report was presented by Jim Ingram. Mr. Ingram informed the Board that no action was required on the part of the NCSL in any congressional activities.

The Vice President of Operations & Marketing report was presented by Bill Simmons.

The Honors and Awards Committee report was presented by Jeff Taylor.

The ASTM Liaison report was presented by Peter Unger. Mr. Unger requested that the NCSL submit a name of an individual to the A2LA to serve as a member of the Accreditation Council. Mr. Unger suggested someone that is presently serving on the TQM Committee for Calibration Systems Requirements.

Graham Cameron presented and nominated the Nominating Committee's candidate, Jeff Taylor, for the two year position of Secretary, beginning 1993. There being no additional nominees, the President called for a vote and Mr. Taylor was unanimously elected.

The Vice President of Calibration Systems Management report was presented by William Quigley. Mr. Quigley informed the Board of the following changes:

a. Hugh Felger will replace Mack Van Wyk as chair of the Equipment Documentation Committee. Mack is retiring from Boeing.

b. The Calibration Interval Committee will be chaired by Dr. Howard Castrup. Frank Butz will coordinate activity on the East Coast.

The Calibration Intervals Committee report was presented by Frank Butz.

The Calibration Facilities report was presented by Frank Bandy.

The Measurement Assurance Committee report was presented by Michael Cruz. The Board applauded the efforts and accomplishments of the Measurement Assurance Committee.

Graham Cameron introduced a special guest, Don Wilson, whose topic was the Canadian quality and calibration programs. (See page 22.)

Graham Cameron introduced a special guest, Roberto Benitez, whose topic was the Mexico National Calibration Program.

The Glossary and Compendium Committee reports were presented by Woody Salyer.
The Biomedical & Pharmaceutical Metrology Committee report was presented by Russel L. Robertson.

The Region 6 Coordinator report was presented by Ronnie Eubanks.

The Region 2, Pittsburgh Section report was presented by Dr. Donald Drum.

The Conference Management report was presented by Chester Crane.

Mr. Crane announced that Dr. Thomas Huttemann will serve as the 1994 Conference Chair and Randall Seefeldt will serve as the 1995 Conference Chair.

The 1992 Conference Service Manager's report was presented by Roland Vavken.

The 1992 Conference Program report was present by Dennis Pinnecker.

The 1992 Conference Exhibits report was presented by Dean Brungart with comments on site selection and exhibits requirements.

The 1992 Conference Door Prizes report was presented by Michael Suraci.

The 1992 Conference Evaluation report was presented by Don Dalton.

The Vice President for Measurement Science & Technology report was presented by Dr. Klaus Jaeger.

The Automatic Test & Calibration Systems Committee report was presented by Dave Nebel.

The National Measurement Requirements Committee report was presented by Dr. Klaus Jaeger. Dr. Jaeger informed the Board that this committee will generate two reports. A short report that will be released in January 1993 and the long report to be released during the first half of 1993.

The Intrinsic/Derived Standards Committee report was presented by Dr. Jaeger. Dr. Jaeger informed the Board that RISP-2 also contains errors and will need to be revised.

The Vice President of Industrial Programs report was presented by Randall Seefeldt.

The Utilities Committee's report was presented by Gary Shuler.

The Medical Instrumentation Committee's report was presented by Randall Seefeldt.

The Equipment Management Forum Committee's report was presented by Randall Seefeldt. This committee plans to re-evaluate its progress and direction.

The Training Resources Committee report was presented by William Sorrells.

Gary Davidson presented a special report on the TQM Committee for Calibration Systems Requirements meeting with ANSI. There was a great deal of discussion about whether or not NCSL was still neutral regarding accreditation responsibility - government or the private sector. Gary pointed out that the direction the committee has taken so far was neutral so far in that both government and private sector are involved with the committee and both provided the same information. There seemed to be concern that any accreditation program must incorporate performance testing which is traceable to national standards as part of the design. There was no official Board position taken at this time. It was generally felt that any position at this time would hamper the committee in developing the single standard. More information will be required such as the pros and cons of private sector and government accreditation as well as development of the requirements of the CASE program. It may be that no NCSL official position will be appropriate.

The International Director report was presented by David Duff.

The Director of Regions 1 & 2 report was presented by Dr. Thomas Huttemann.

The Director of Regions 3 & 4 report was presented by Brian Fitzpatrick.

The Region 3 Coordinator report was presented by Tracy Harper.

The Director of Regions 5 & 6 report was presented by Steven Stahley.

The Director of Regions 7 & 8 report was presented by Robert Smith.

The Director of Regions 9 & 11 report was presented by Don Dalton.

Graham Cameron moved for “The Canadian Region to be given the opportunity to offer a scholarship award for up to $1,000.00 Canadian for the post-graduate metrology course at Sir Stanford Fleming College.” The motion carried.

The NCSL Secretariat's report was presented by Wilbur Anson.

James Ingram presented the Liaison Delegates reports with several being present, presenting their own. Dr. Joe Simmons was appointed as the ASQC MQD (Measurement Quality Division) Liaison Delegate.
Highlights of the Board Meeting

The Measurement Uncertainty Committee’s report was presented by David Abell.

The Multi-Media Committee’s report was presented by Graham Cameron. Graham moved to “Increase the 1992 Multi-Media Committee’s budget from $25,000.00 to $30,000.00 for the development of a Spanish version of the NCSL video.” Motion carries without debate.

Respectfully submitted,  
William F. Doyle  
1992 NCSL Secretary

ATTENDEES

Mr. David Abell  
Mr. Wilbur Anson  
Mr. Franklin Bandy  
Mr. Norman Belecki  
Mr. Roberto Benitez  
Mr. Dean Brungart  
Mr. Frank Butz  
Mr. Graham Cameron  
Mr. Chester Crane  
Mr. Michael Cruz  
Mr. Donald Dalton  
Mr. Gary Davidson  
Mr. William Doyle  
Dr. Donald Drum  
Mr. L. David Duff  
Mr. Ronnie Eubanks  
Mr. Brian Fitzpatrick  
Ms. Georgia Harris  
Ms. Georgia Harris  
Mr. James Ingram  
Dr. Klaus Jaeger  
Mr. J. Wade Keith  
Mr. John Lee  
Mr. John Miche  
Mr. John Minck  
Mr. David Nebel  
Mr. Herb O’Neei  
Mr. Dennis Pinnecker  
Mr. William Quigley  
Mr. Russel Robertson  
Mr. Kevin Ruhl  
Mr. Woody Salyer  
Ms. A. Schumacher  
Mr. Randall Seefeldt  
Mr. Gary Shuler  
Dr. Joe Simmons  
Mr. William Simmons  
Mr. Robert Smith  
Mr. William Sorrells  
Mr. Steve Stahley  
Mr. Michael Surnei  
Mr. Jeff Taylor  
Mr. Roland Vavken  
Mr. John Wehmeyer  

Hewlett-Packard  
NCSL Business Office  
Unified Industries  
NIST  
Conductores Monterrey  
Teledyne Systems Co.  
General Electric A.E.  
Dept. of Natl. Defence  
Teledyne Microelectronics  
Navy Pri. Std. Lab.  
John Fluke Mfg. Co.  
TRW Space & Defense  
Cal Center, Inc.  
Butler Comm. College  
Eli Lilly & Co.  
Otis Eng. Corp.  
Hi-Tech, Inc.  
NIST  
Eastman Kodak Co.  
Lockheed MSC  
Lockheed MSC  
McDonnell Douglas Corp.  
Telogy, Inc.  
Marine Instruments  
Hewlett-Packard  
Tektronix, Inc.  
Hutchinson Tech. College  
Rockwell International  
Hughes Aircraft Co.  
Baxter Health Care  
TRW Space & Defense  
Schlumberger  
NIST  
Navy Primary Std’s Lab.  
Duke Power Co.  
NIST  
Sverdrup Technology, Inc.  
Loral Aeronutronic  
Hewlett Packard  
Datron/Wavetek Co.  
Lockheed MSC  
Lockheed ASC  
Retired  
Eastman Kodak Co.

REFERENCE TEMPERATURE CHANGING?

The ISO/TC3 Committee has added a new item of work to its operation, to study the change of their ISO Reference Temperature from 20 °C to 23 °C.

At the BOD meeting, Graham Cameron reported that NCSL will want to study and discuss the technical and economic results from this potentially-far-reaching proposal. This would call for a change in lab reference temperatures from the traditional 20 °C to 23 °C. Board discussion was minimal because of the tentative nature of the work proposal. Several of the Board members’ companies had seen informal copies of the proposal and considered a few of the ramifications.

We wanted our NCSL members to be aware that the Board is looking further into the specifics of this proposal. As more information becomes available, further actions will be assigned to one of the standing committees to disseminate the proposal and possibly take a member survey to determine the implementation impact.
The 1992 NCSL Workshop & Symposium or "Conference" was again very successful. Held at the Grand Hyatt hotel in Washington DC, August 2-5, 1992, the conference was evaluated by 267 attendees, down from 356 last year. Attendance was about the same as last year with 915 total and 659 registered. The Overall Conference received 104 Excellent and 141 Good scores. This Good-to-Excellent rating is also reflected in other areas of the conference. Figure 1 shows the result of adding the scores from all measured areas together.

**Conference Attendance Profile**

There is strong management representation at the conference (see Figure 2) with 41% of the people marking Management as their job function (last year was 50%). A close second is Metrologist with 30%. These two job classes encompass 71% of the responses. Quality Assurance came in third with 9%.

**Figure 1 Overall Summary**

The number of people attending their first conference was high at 33%. Balancing this was the other extreme where 27% have attended five or more conferences (see Table below). The conference attracts many new people while maintaining appeal to previous attendees.

<table>
<thead>
<tr>
<th>NCSL's Attended</th>
<th>First</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Five or More</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>88</td>
<td>42</td>
<td>29</td>
<td>31</td>
<td>72</td>
</tr>
</tbody>
</table>

Many industry segments were represented at the conference with Government at 28% Electronic Manufacturing at 27%, and Aerospace Manufacturing at 14% (see Figure 3).

**Figure 3 Industries Represented**

**General Conference Ratings**

The Schedules & Organization (arrangements) are what people see first and always get lots of comments and opinions. The evaluation scores were Good-to-Excellent (see Figure 9) but it also received the most least liked comments of the conference (see Figure 5 and Comments section).

Exhibits again this year received high marks (see Figure 13). There was a slight shift in the marks but people still rate the exhibits high.

Hotel Accommodations received high scores with Excellent-to-Good marks (see Figure 18). The central Washington DC location got mixed reviews while the focused single facilities was liked by most.

Food Quality slipped from last year (see Figure 12). The number of excellent scores was less than half that from last year.

People came from all over the world to the conference. Ten percent of the evaluations were from outside the USA and 91% from the USA as shown in Figure 4.
Technical Area Ratings

The technical sessions and presentations, including management topics, are the heart of every Conference and as such get the closest and most stringent critique. The overall Technical Presentations were rated as Good by a wide margin (see Figure 10). The technical areas of the conference received twice as many best liked comments (87) than any other area (see Figure 5). However, the technical areas also received the second highest least liked comments. Technical issues are important to people involved in metrology and opinions are strong.

This year the ratings of the technical areas give a much different picture than last year (see Figure 5). This year the most important emphasis was away from the traditional technical topics towards the changing forces effecting metrology. Last year even though ISO 9000 Certification received the highest rating for needing more coverage, Dimensional, Optics received the highest rating being most important in 10 years. This year, in general people feel that ISO 9000 Certification, Uncertainty Determination, Laboratory Accreditation, SPC and Metrology, Laboratory Automation and Fiber Optics are the areas that need more emphasis in the future.

There were several areas that were not listed on the evaluation form that people felt needed more coverage or would be most important in the future; Education, Medical Instrumentation, Statistics & Calibration Interval and On-Site Calibrations.

There were 61 people who indicated that they would like to be more involved in NCSL. This is a good sign of an active organization.

Selected Quotes from Comments

**Overall Conference: Quotes from "What you liked best":**
- Conference was excellent. Time and money well spent.
- *Continued improvement* - Good Job!

**Schedules & Organization: Quotes from "What you liked best":**
- Evaluation of each presentation. It was well organized.
- *Organization, exhibits, overall technical sessions.*
- *Well organized, no waiting in lines.*
- *Centralized location of all activities.*
- *Smooth running schedule, time to view exhibits.*
- *Accessibility to sessions, exhibits, banquet, presentations.*
- *The schedule was carried out without slippage.*

**Schedules & Organization: Quotes from "What you liked least":**
- Couldn't attend all sessions I would have like to attend.
- *Parallel sessions limited attendance at all topics of interest.*
- *Not enough seating, especially final sessions.*
- *Limited time for special interest groups.*
- *Having to grade speakers instead of just listening.*
- *Changes in schedule and failure to follow time limits.*

**Exhibits: Quotes from "What you liked best":**
- *The interlaced exhibit viewing and technical session schedule.*
- *Chance to meet and see dealers/equipment suppliers.*
- *Exhibits, sharing technical information.*
- *Getting to see new equipment.*
- *Exhibits again were good exchanges.*

**Exhibits: Quotes from "What you liked least":**
- Lack of fiber optic test equipment.
- *Need more vendor participation.*
- *Vendors didn't cover broad range of technologies as before.*
- *Only one exhibitor in dimensional metrology.*

Figure 4 Where people came from in the USA.

Figure 5 1992 - What You Liked vs Disliked
General: Quotes from "Additional Comments":
* Focus on international relations of measurements, standards.
* Support provided by the NIST staff was excellent.
* Good quality applications.
* Good well organized NIST tour.

Technical Presentation: Quotes from "What you liked best"
* Technical sessions and exchange of ideas with others.
* Broad range of information topics and ability to learn more.
* Good technical seminars and ISO 9000 discussions.
* Learned more about metrology state-of-the-art technology.
* ISO 9000 coverage was great.
* Good balance of technical and management, well organized.
* Good mix of technical session and excellent organization.
* Paper presentations, contacts and exchange of information.
* Interfacing with peers and transfer of information.
* Addressed some of my immediate concerns.
* Reports of national labs intercomparisons.
* Biomedical papers, committees & discussions.
* Uncertainty papers - need more.
* Topics on registration and accreditation.
* The Utilities Committee meeting was great.
* TQM coverage.
* The new technology and ideas shared.
* The renowned speakers with good technical information.
* Originality and technical contents of papers.

Technical Presentation: Quotes from "What you liked least"
* Some sessions & presenters lacked preparation and originality.
* Too many papers from vendors not hands on lab personnel.
* Some presenters need to brush-up on the presentations.

Technical Sessions: Quotes from "Need more coverage":
* Education aspects of metrology for customer and workers.
* Third party calibration lab management.
* NRC requirements.
* Industrial hygiene, gas analysis SRMS etc.
* Pharmaceutical issues.
* Issues for small calibration labs. How effected?
* Controlling noise in the laboratory.
* Medical instruments.
* Metrology in communications commercial manufacturing.
* Formal training in metrology.
* Laboratory facilities.

Interaction & Dialog: Quotes from "What you liked best":
* Networking opportunities.
* The contacts made. All of the ISO 9000 information.
* Interface with other people in the field and discuss metrology.
* Managerial and technical discussions. Meeting new people.
* Seeing old friends.
* Interaction among metrology community.
* Possibility to discuss with this 'selected' audience.
* Meeting people with similar problems and concerns.
* Meeting and talking to other people about metrology.

Figure 6 Important Topics
<table>
<thead>
<tr>
<th>Technical Areas</th>
<th>Area of Interest</th>
<th>Needs More Coverage</th>
<th>Most Important In 10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical DC/LF</td>
<td>157</td>
<td>12</td>
<td>23</td>
</tr>
<tr>
<td>Electrical RF/uW</td>
<td>101</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>Magnetics, Dielectrics</td>
<td>29</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Time &amp; Frequency</td>
<td>147</td>
<td>12</td>
<td>15</td>
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Figure 7 Most Important Topics in 10 Years

* Interfacing with peers and transfer of information.
* Exchange of ideas, concepts, etc. in a forum conducive to it.

Location: Quotes from "What you liked best":
* Convenient location, hotel and conference in same location.
* Accessibility to sessions, exhibits, banquet, presentations.

Location: Quotes from "What you liked least":
* Site location.
* Parking costs, food.
* Crowded, no space to sit and relax between sessions.
* Very unsafe feeling. Would not bring my wife.
* Hot weather in August in Washington DC.

Food: Quotes from "What you liked least":
* Lunches, save money, get back to the basics.
* Food better in New Mexico.
* Continental breakfast set-up, lack of table and chairs.

Figure 8 Overall Conference

Figure 9 Schedules & Organization

Figure 10 Technical Presentations
During the BOD meeting, Jeff Taylor's new election as NCSL Secretary is announced. He has worked quietly and competently for years as Honors and Awards Chairman.

Roberto Benitez Chavez of Monterrey, Mexico is new Section Coordinator for that area, and Liaison to AMMAC, their country's metrology association.

Conference Chairman Roland Vavken presents a status report on the Washington event and looks ahead to next year in Albuquerque.

Gary Davidson sports a "press" badge for no known reason.

Bet you can't guess why Bill Doyle is under the table? Simple. He has to set a microphone/tape recorder between tables for three days of transcribed discussions.

Conference VP Chet Crane and his wife behave themselves on the rear seat of the bus, heading for the Board dinner. Now, Chet, this isn't the high school band bus.

More business gets transacted at the Board luncheon. Retiring (but not shy) Dean Brungart leads the discussion.

Graham Cameron leads the singing at the Board dinner. We presume the songs are about metrology and standards? Graham is an accomplished musician.
ACCELERATING THE PHASEOUT*
by James Brinton

The European Commission forwarded proposals to the European Environmental Council in March that would lead to an accelerated phaseout of all ozone-depleting substances, according to Carlo Ripa de Meana, Commissioner of the Environment. Ripa also called for the development of a capture and disposal system for CFCs and related compounds within the European Community.

Based on the work of the UNEP Technology and Economic Assessment Panel, the proposals suggest that production and consumption of typical CFCs, fully halogenated CFCs, halons, carbon tetrachloride and 1,1,1-trichloroethane should be reduced 85% by the end of 1993. A complete phaseout of these substances should occur by the end of 1995. The report also envisions limitations on the production and use of HCFCs, although these are yet to be determined.

The Commission took this action in preparation for the fourth meeting of the Montreal Protocol parties in Copenhagen this year, where the group plans to press for similar cuts in the amounts mandated by the existing Protocol. The Commission is responding to evidence that the 1991 Antarctic ozone hole was as large and deep as those of 1987, 1989 and 1990. In addition, the group noted that ozone depletion continues over densely populated North American and European areas that, for the first time, significantly decreasing ozone levels have been detected at these latitudes during spring and summer.

In light of NASA predictions of forthcoming Arctic ozone holes, the European Community has funded the 4.4-million-ECU European Arctic Stratospheric Ozone Experiment, or EASOE. Results of this study are expected to verify the NASA projections.

Meanwhile, European nations are working internally to cut the use and production of ozone-depleting compounds. Germany (which produces 10% of the world’s CFCs) and the Netherlands are working to completely eliminate CFCs and CFC replacement such as HCFCs by 1993, two years ahead of the EC as a whole.

Norway banned use, import and production CFCs on July 1, 1991, while Finland is pushing for CFC elimination by the end of 1994.

Switzerland plans to eliminate CFC use by 1995, while Sweden ordered a 50% cut in CFC use in 1988 and plans to phase out CFCs entirely by 1995 and halon compounds by the end of 1994. Almost every other country in Europe plans to abide by the Environmental Council’s suggested 1995 cutoff date.

*Reprinted with permission from CIRCUITS ASSEMBLY magazine, May 1992

Hopes Glimmer for Environmental Summit

The European Community’s Ripa has threatened to walk out of the UN Conference on the Environment and Development, scheduled this June in Rio de Janeiro, Brazil, unless the group initiates a North-South dialogue, the conference may end up becoming “a carnival of declarations” he says.

It is believed that Ripa made the threat in order to press the European Community to adopt his accelerated CFC-reduction program, as well as raise taxes on energy and resolve the controversial siting of the planned European Environment Agency.

However, a key reason for his possible withdrawal, and that threatens by European Commissioner Pierre Delors, is the expected refusal of the United States to agree to limitations on its emissions of greenhouse gases.

On the other hand, President Bush announced in mid-March that the nation would voluntary adopt a set of emissions-limiting measures. The limits would include not only CFCs and other ozone-depleting compounds, but also carbon dioxide. The President also announced the formation of a $75 million fund to help developing countries with global warming. Perhaps the Rio Summit will succeed after all.

Degreasers Decrease Solvent Loss

Designed to integrate degreasing into the assembly line of laboratory, the new K&M vapor degreaser units that incorporate a thermoelectrically cooled condenser to contain and distill solvent vapor. The manufacturer, K&M Electronics Inc. (West Springfield, MA), says that solvent loss is less than 0.02 lb./hr. per sq. ft. of surface area.

In addition, the units are fairly compact and require only AC power from a standard outlet. No plumbing is needed, and the only moving part is a cooling fan.

The degreasers were developed by K&M to meet in-house CFC-loss reduction goals. The patentable systems cut chlorofluorocarbon losses at the company’s plant by about 75%.

According to the firm, reduced losses translate not only into reduced environmental impact but also into reduced solvent purchases. In addition, because the degreasers have a “solid-state” design and do not need refrigeration or chilled water, operating costs are reduced by about 75% compared with other degreasing systems. Thus, the company claims that the
degreasers will pay for themselves quickly in reduced operating expense alone.

More information is available from K&M at (413) 781-1350, FAX (413) 737-0608.

Ozone Info On Line

Based on an idea originally fielded at Northern Telecom (Ottawa, Ontario, Canada) in 1990, Ozonet is a joint-industry cooperative program designed to make information about CFC alternatives available on line. The contents of Ozonet's database include:

* reports on existing and new technologies
* published reports of research investigations
* properties data on solvents and other chemicals
* conference and workshop proceedings
* supplier information
* information on national and international legislation
* key contacts in industry, government, industry associations, research institutes, nongovernmental bodies and other groups.

Ozonet is said to be the only single source worldwide for relevant information to assist in selecting and implementing CFC alternatives. It also offers electronic mail services and "bulletin boards" through which inquirers can seek solutions to their problems.

Ozonet data is available through Business Talk software developed by General Electric Information Services (Albany, NY). The interface uses icons for the sake of simplicity. Ozonet resides on GE's global computer network and is said to be accessible 95% of the time from 90% of the world’s business telephones.

Ozonet is being administered by the IPC (Lincolnwood, IL) and Comargus Data Systems (Berlin, Germany). For more information, contact Dave Bergmann, the IPC's director of technical programs, at (708) 677-2850.

Lam Cuts CFCs 85%

Lam Research Corp. (Fremont, CA), which began its CFC-reduction program in April 1989, announced in late March that it had reduced CFC usage to only 9,800 lbs. per year. That's an 85% reduction in three years. Lam was partnered in the effort by Du Pont Chemical (Wilmington, DE).

The reductions were gained through hardware changes and procedural modifications, according to Colin Tierney, Lam's VP-Operations. The effort included conservation and the increased use of alternative cleaning methods.

As a result, Lam won the certificate of merit issued yearly by the Union Sanitary District, the agency responsible for pollution control in the Fremont area.

Court Upholds Du Pont

Early in March, a federal appeals court rejected a plea by environmental activists that Du Pont shareholders be forced to vote on a proposed speed-up of the firm's phaseout of CFCs and related compounds.

Since the Friends of the Earth lawsuit was initiated a year ago, Du Pont has acted twice to accelerate its phaseout, thus narrowing the distance between its position and that of FoE. According to the court, the proposal made by the FoE was so close to the company's revised plan that it "did not raise a significant policy question." As Du Pont's plan now stands, CFCs would be dropped by the end of 1995, as suggested by President Bush in February.

ICI in Joint Venture

Britain's ICI (London, England, U.K.) and Japan's Teijin Ltd. (Tokyo, Japan) have formed ICI Teijin Fluorochernicals as a joint venture to produce HCFCs. By 1993, the new company expects to produce some 5,000 tons of HCFCs yearly in a new plant in Hiroshima, Japan.

Canada Reports on Ozone

In mid-March, the Canadian government began issuing weekly reports on the status of the ozone layer, and Canadians will soon be receiving daily ones. The move is not so much out of concern for the ozone layer, but more out of fear that public alarm may be exaggerated without solid information. In its first report, Canada's environment minister, Jean Charest, stated that ozone levels above the country's western provinces were about 15% below the average for the period of 1960 to 1980 and about 5% below that average for the rest of Canada. Later this year, Canada also plans to begin a series of advisories on levels of ultraviolet radiation.

Alpha Given Award for No-Clean Flux

At the recent Nepcon West show, Alpha Metals Inc. (Jersey City, NJ) was given one of the first Milton S. Kiver Awards for outstanding products in the field of PCB manufacturing equipment and materials. The product cited was Alpha's SM251F no-clean, nonrosin halide-free flux.

SM251F meets both the Bellcore TR-TSY-000078 and IPC-SF-818 standard requirements for flux type L3NC for use in high-reliability electronic circuits. It can be applied using either foam, spray or wave techniques.

Alpha also won finalist plaques for its LR701 no-clean solder cream, WS605 water-soluble solder cream and Hi-Flo bar solder. Contact Alpha Metals for more information, (201) 434-6778.
TACKLING THE CHALLENGE OF REPLACING CFCS*

Alternatives to harmful compounds begin to emerge as the electronics industry responds to legislation.

Government plans to phase out chlorofluorocarbons, commonly known as CFCs, are spawning development of non-ozone-depleting compounds. But so far no universal solution has emerged on the horizon. The field for CFC replacements is now wide open.

The word is getting around: CFCs have become taboo because of their ozone-depleting characteristics. Beginning in July, automobile service stations will be required to recycle Freon, which contains the destructive CFCs. And starting in 1995, the U.S. government will start banning the use of CFCs altogether.

No wonder electronics manufacturers are burning the midnight oil trying to develop CFC replacements. But it is not likely that a universal CFC replacement will emerge anytime soon, according to Wayland Holloway, market development supervisor for CFC replacements at 3M in Minneapolis. "There will be niche solutions for niche markets," he says, suggesting that the field for CFC replacements is now wide open.

3M has just developed one of those niche solutions. The manufacturer of electronic materials, components, and chemicals recently unveiled a series of perfluorinated fluids, designated the Performance Fluids (PF). The fluids have the trade names PF-5050, PF-5060, and PF-5070. The table compares the performance of these fluids to two of the company's CFC compounds, CFC-11 and CFC-113.

Other than the absence of ozone-depleting compounds, these fluids have similar performance characteristics to CFC compounds. They can be used in a number of applications, including thermal management, particulate cleaning, and as a solvent for certain lubricants.

The last application has so far been the strongest; the fluid is used as a solvent for perfluoropolyether surface lubricants that coat magnetic hard disks to prevent disk damage and data loss. According to 3M's Holloway, Hewlett-Packard, Seagate, IBM, and other makers of hard disks have either already switched from CFC compounds to the new lubricant or are considering doing so.

But don't expect 3M's new fluid to find its way into the major application for CFCs in the electronics industry—the cleaning of PC boards. "Circuit boards need a high degree of hydrocarbon solvents, and the Performance Fluids just don't have enough of them to adequately clean the board," says Holloway.

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*Reprinted with permission from ELECTRONIC PRODUCTS, June, 1992.

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TYPICAL PROPERTY COMPARISON FOR 3M PERFORMANCE FLUIDS

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<thead>
<tr>
<th>Parameter</th>
<th>Typical Properties</th>
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<tr>
<td></td>
<td>CFC-11</td>
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<tr>
<td>Basic Formula</td>
<td>CCl₃F</td>
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<tr>
<td>Average Molecular Weight</td>
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<tr>
<td>Boiling Point (°C)</td>
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<td>Liquid Density (g/ml at 25°C)</td>
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<td>Surface Tension (dynes/cm at 25°C)</td>
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<td>Vapor Pressure (PSIA at 15°C)</td>
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<td>Heat of Vaporization (cal/g at boiling point)</td>
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<td>Solubility of H₂O (ppm by wt. at 25°C)</td>
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<td>Flash Point (°C)</td>
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<tr>
<td>Ozone Depletion Potential</td>
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CFCs also been a familiar part of the Freon refrigerant that has used in refrigeration and air-conditioning systems years. Rittal Electronics, a Germany-based enclosure manufacturer with U.S. headquarters in Springfield, OH, hopes to infiltrate this large niche market by using a hydrofluorocarbon-based refrigerant, designated R-134a, in place of the CFCs in a new line of enclosure air conditioners.

According to Rolf Schneider, product manager of climate control products for Rittal, the cost of the new refrigerant is higher than the CFC-based fluids it replaces. However, Rittal will try to sell the enclosure air conditioners with the new refrigerant for about the same price as the old ones, in an attempt to accelerate the conversion toward the cleaner compounds.

Besides eliminating the use of CFCs, Rittal's new air conditioners have been designed to use a smaller compressor than their predecessors. The result: less power consumption and energy use, an additional environmental advantage.

Unfortunately, users looking to use the new refrigerant in their existing air conditioners are out of luck. That's because the hydrofluorocarbons are incompatible with the lubricants
used inside the compressors in existing air conditioners, according to Rittal's Schneider.

Despite the limitations of some of the early CFC replacements, the trend toward replacing CFCs is expected to continue through the end of the decade. "As the market for CFCs and other chlorinated solvents evaporates, the U.S. market for solvent replacements and alternatives growing," says Joseph Castrovilla, an analyst for Business Communications Company, a marketing research firm in Norwalk, CT. A study from the firm titled "Cleaning/Degreasing Solvents: Substitution, Recycling, and Disposal" projects that production of CFC compounds will decline from about 662 million pounds in 1991 to just 50 million pounds by 2000.

At the same time, the study predicts, the market for solvent replacements and alternatives -- which include halogenated, non-halogenated, aqueous, and semi-aqueous solvents -- will increase from $3.16 billion in 1991 to $6.9 billion by the year 2000, a rate of 8.2% annually. Also over the same period, shipments of recycled solvent are expected to grow from $5.6 billion to over $8.8 billion.

THIS IS A POSITIVE PROHIBITION*

The electronics industry is well aware of President Bush's decree to eliminate the use of ozone-depleting compounds by December 31, 1995. These compounds, including chlorofluorocarbons (CFCs), halons, carbon tetrachloride and methyl chloroform, are used extensively in the electronics manufacturing industry as cleaning and drying agents. Furthermore, this schedule is as much as four years earlier than the guidelines set in the London Amendment to the Montreal Protocol (six years for methyl chloroform).

We have reported, in the pages of Electronic Packaging & Production, on the many companies that either have totally eliminated the use of CFCs or have made significant strides to curtail their uses and meet the 1995 cutoff. Looking back at the types of companies reporting their progress -- IBM, AT&T, Motorola, Tektronix, as examples -- the vast majority are large companies with high visibility in the community.

On the other hand, while smaller companies also are moving to rid their operations of ozone-depleting compounds, many are taking a lackadasical, or wait-and-see attitude.

It will not go away; nor is the deadline expected to be extended. The point is you will not be able to purchase these compounds after December 31, 1995.

At present, Du Pont warns there will be no "drop-in" replacement for these products available in the time remaining before phase-out. Replacement technology must be chosen quickly because it most likely will require changes in cleaning equipment or process. To qualify a new process including solutions and equipment takes from six to as long as 24 months, depending on complexity. Add to that the shipping time for production equipment, delivery, installation and run-in, and there's not much time available in the remaining three and a half years, if you delay much longer.

If your company is one of those awaiting a continuance of the deadline, or a closing of the holes in the ozone layer along with an official rebuff of the scientific evidence related to ozone-depleting compounds, you may be out of business come December 31, 1995.

Donald E. Swanson, Editorial Director

Good Afternoon.

I bring you greetings from Canada and the Department of National Defence. It is an honor and pleasure for me to have an opportunity at last to attend one of your Board meetings.

Our Department has supported NCSL for many years, believing as we do in your aims and objectives and recognizing your contribution to the field of calibration. I recall a conversation in Anaheim about three years ago, when I was asked if I could commit a valued Canadian in our Department for three years to perform executive functions in NCSL. The affirmative response resulted in Graham Cameron becoming your Executive Vice-President, then President, and now your Past-President. May I say how proud we were to be able to accept this undertaking, and delighted that Graham was available and willing to undertake this added workload. But not only did it acknowledge Graham’s major contributions as “your Canadian connection”, but also it demonstrated an international side to your organization that is so important in these days. Quite simply, NCSL has been good for Graham and the rest of us in DND; so also has Graham been good for NCSL.

You will recall that we very nearly got together last year when you visited Vancouver. Graham and I looked at both our calendars to see if we could pull two commitments closer together, but to no avail. As a native of that fine city, I was quite disappointed to miss out on the opportunity of welcoming you to Canada and discussing current issues with you. Graham and I then looked for another opportunity and here we are.

I would like to comment briefly on your program which is really doing some very exciting things in the field of calibration. We in DND have been following the developments with considerable interest. The information that appears in your recent Committee News shows an intelligent and well-reasoned approach to standards requirements. Your initiative in seeking to become a standards-writing body is a brave one that shows you are prepared to do whatever you must to meet the customer’s requirement. In addition, you are applying the principles of Total Quality Management, something that we have found very helpful in our quest for improved means of providing Government Quality Assurance services. But you are not doing so blindly, thus you should be able to avoid some of the pitfalls that are encountered when some executives say “Let’s ‘do’ TQM”. Although TQM and Continuous Improvement are valuable principles, it is important that we don’t slavishly follow the principles without applying the lessons learned intelligently and without recognizing that sometimes decisions must be taken without awaiting the achievement of full consensus.

While it will take some time, NCSL has demonstrated leadership and a determination to improve the standards situation. We in Canada are just as determined as are your managers in the Office of the Assistant Secretary of Defense to move in the direction of commercial standards. We are promoting such an approach, even for military procurement wherever possible, both in Canada and here with our contacts at OASD just across the Potomac. I note that you have been successful in pulling together various government and industry groups with the aim of introducing standards that will remove the current “multiple and sometimes conflicting calibration requirements” and I commend you on your determination and your success to date. The multiple and sometimes conflicting requirements are the bane of our existence as we seek to simplify the Government QA process and find ways of minimizing our input to the process, relying instead on the residual skills and competency of the defence industry. For we cannot afford wasted effort any more than can our suppliers. Duplication is a universal concern that is extremely wasteful of resources and a solution must be found—soon. What you are doing is most encouraging and it would appear that the solution is at hand. I would only add that we all must make a special effort to ensure we make maximum use of existing international standards, or be prepared to incorporate into our programs new standards as they are developed. It is my view that we should only consider writing our own if there are significant shortcomings in the international document. Adoption of international standards will be the short-cut to international trade for us all.

It is particularly encouraging to note the very strong North American flavor being exhibited by your board and your members as you move to break down standards barriers between the United States, Mexico and Canada. Your association with Canada’s National Research Council and the Standards Council of Canada, along with NIST and the relevant Mexican organizations clearly shows your desire to “do it right, first time”. Such an approach will be of tremendous value in a global market where we all must be able to compete with no artificial obstacles to rob our industry of those European and Pacific Rim markets.

In closing may I say that we in the Department of National Defence have been very honored to have a Canadian as your President and to have been able to make that contribution to such a dynamic and forward-looking organization. On behalf of all those of us who work with Graham in Canada, may I wish you well in all your future endeavors.

Thank You.
AMMAC
Asociacion Mexicana De Metrologia, A.C.
Ninth Annual Seminar
and
Fourth National Symposium
of Metrology
"In Honor of
Ing. Jorge Z. Borbon Franco"
November 11-13, 1992
Secofi Auditorium
Contact: AMMAC Liaison Delegate, R. Benitez

1993 MEASUREMENT SCIENCE CONFERENCE
ANAHEIM MARRIOTT
ANAHEIM, CA
JANUARY 21-22, 1993
THEME: PROCESS IMPROVEMENT USING MEASUREMENT SCIENCE

TECHNICAL SESSIONS
ISO 9000, M-1 & M-2
In The Decline of The Aerospace & Defense Industry
Acceptable Practices for Laboratory Accreditation in Europe
SPC Software in Metrology
Calibration Process Improvement Using SPC
TQM For Employee Productivity
Electrical MAPS
VXI Bus
D.C. & Low Frequency
RF & Microwave
Measurements in Time
Dimensional MAPS
Mass Metrology
Pressure & Vacuum Metrology
Personal Safety & Environmental Metrology
Tracking Intrinsic Standards for Thermometry
Laser Radiometry
BioMedical Metrology
Cost Reduction Through Automation
Measurement Uncertainty
Measurement Potpourri

TUTORIAL WORKSHOPS
Wednesday, January 20, 1993
Four concurrent Tutorial Workshops will be offered the day before the regular 1993 Measurement Science Program. Each workshop will include morning and afternoon sessions, a luncheon and appropriate handouts.

WORKSHOP A
"The Four Steps to Process Management"

WORKSHOP B
"ITR-90 Temperature Scale and Temperature Measurements"

WORKSHOP C
"Measurement & Characteristics of Frequency Standards and Time Dissemination Methods"

WORKSHOP D
"Screw Thread Standards, Gaging and Metrology"
Contact:
Measurement Science Conference
1280 Bison Ave., Suite B9-530, Newport Beach, CA 92660
or FAX to (714) 863-1723.
For more information call the Register, John Bowman at (714) 863-9031.
COAST QUALITY SYSTEM UNCERTAINTY COURSE

25-29 January 1993, Anaheim, California, following the Measurement Science Conference there.

19-23 July 1993, Albuquerque, New Mexico, preceding the Annual NCSL Workshop and Symposium there.

This course presents the methods of identifying, quantifying, and controlling measurement uncertainties by measurement process controls, using SPC and other statistical tools, as called for by ISO 9004, ISO 10012, and ANSI/ASQC M1 and M2. Some of the new standards require that measurements in quality assurance, design, development, manufacturing, and providing services be controlled as processes; other new standards call for measurement assurance methods as advanced tools for measurement process improvements. The presented methods are ideally suited for becoming integral parts of a total quality management system.

The course is primarily intended for engineers, managers, and senior technicians of standards and calibration laboratories and quality assurance. Attendees will learn to treat measurements as processes, to identify and quantify measurement uncertainties due to random and systematic errors of the processes, to integrate measurement process controls into a quality system, and to set up an internal measurement assurance program.

Course Instructor: Rolf B. F. Schumacher P.E., the USA metrology representative to ISO and to the American ISO 9000 standards committees and one of the main architects of ISO 10012 and the corresponding American National Standards ANSI/ASQC M1 and M2.

Tuition:

$900 per attendee with discounts for three or more. Tuition includes all course materials, including a 300+ pages Handbook and refreshments during class hours. Transportation, meals, and lodging are the responsibility of the course attendees. Purchase orders, Forms DD-1556, or equivalent are welcome. In-house courses available upon request.

For Further Information:

please contact COAST Quality Metrology Systems, Inc., 35 Vista del Ponto, San Clemente, CA 92672-3122. Tel. and FAX numbers are both the same: (714) 492-6321.

Pre-requisite: A good working knowledge of algebra.

ELECTRICAL MEASUREMENT ASSURANCE PROGRAMS WORKSHOP

Nov. 16-20, 1992
San Diego Princess Hotel
San Diego, CA

This 5-day intensive workshop on electrical measurement assurance provides instruction on the design and statistical quality control of calibration systems by staff of the Electricity and Statistical Engineering Divisions of the National Institute of Standards and Technology. Participants learn how to establish and maintain rigorous quality control programs in their own laboratories to ensure the accuracy of electrical measurements. The workshop is oriented toward quality control for d.c. voltage metrology; however, the techniques are applicable to other electrical measurement areas.

Lectures are intermingled with computerized workshops where participants work in small groups to reinforce concepts and understanding. Equipment is set up for participants to obtain data using a calibration design, and these data are analyzed in a later session. Procedures for day-to-day tasks are discussed by example to help participants become better problem solvers, ample time is allowed for questions and discussion of practical measurement problems.

NIST Instructors:

Mr. Norman Belecki, Electricity Division
Dr. Bruce Field, Electricity Division
Dr. Dominic Vecchia, Statistical Engineering Division (Boulder)
Mrs. Carroll Croarkin, Statistical Engineering Division

Registration Fee:

$1100 per person. Registration fee covers an opening reception on Sunday, coffee breaks and lunches each day, lecture notes and reference materials consisting of: NISTIR 90-4272, Selected Publications for the EMAP Workshop, a short test of measurement statistics; and NIST handbook 91, Experimental Statistics.

Registration Information:

Lori Phillips
National Institute of Standards and Technology
A003 Administration Building
Gaithersburg, MD 20899
Telephone: (301) 975-3881
FAX: (301) 926-1630
DESIGNING A REQUIREMENTS DRIVEN CALIBRATION PROGRAM

Course Description:

This five day, forty hour course was written for those companies who:

• Are just beginning a program
• Have an old program that has not kept pace with training in basic metrology.

In addition to the actual calibration technicians and their immediate supervision and managers, the following individuals or groups should be involved in the initial three hour session of each day: (QA and QC, Computer systems, Engineering, Any technical service group).

Course Outline:

Overview Topics -- Total Group -- 15 hours

Four aspects of any program
(Quality, Records, Procedures, and Standards)
Understanding terms and definitions
Regulatory agencies -- FDA, NRC, DOD, ISO 9000
Examples of inspections -- What are they looking for?
Writing your 'quality standard operation procedure' (QSOP)
Errors and Specifications
Writing calibration procedures -- Ref: NCSL’s RP-3
Calibration intervals Ref: NCSL’s RP-1
Environment for the calibration lab and the process -- Ref: RP-7
Role of a computerized data base
Use of personal computers as data taking devices
Inside vs outside calibration agencies
Use of SRMs (Standard Reference Materials)
Change control and deviations
Recall and reverse traceability
Choices for sensor calibration
Training -- Five aspects or resources

Measurement Topics -- Technicians & Their Management -- 25 hours of Basic Instruction and Workshops

Understanding the theory of temperature measurement
Controlled environments -- Relative humidity and dew point
Controlled environments continued -- Clean rooms
Pressure measurements
Vacuum measurements
Weights and weighing
Weight to volume conversions -- Micropipettes
Electrical measurements (+ time and frequency)
DC resistance as a reference for Temp., RH, & DP
Use of personal computers?
Basic internal questions (Writing IQ/OQ books)
Meeting present needs -- Equipment selection

MEASUREMENT UNCERTAINTY TRAINING COURSES

Course Number 9312

March 2-5, 1993
Marina Village, San Diego, CA

Evaluating the uncertainty of measurements is a vital part of Total Quality Management (TQM). Controlling the quality of measurements is an important first step in controlling product quality. As the quality of measuring instruments continues to improve, many organizations are unable to maintain the desired 4:1 accuracy ratio which must be documented using uncertainty techniques to verify that accuracy has not been degraded. This course will provide instruction in evaluating measurement uncertainties.

The concepts learned in this course can also be used very effectively in other situations including: design of experiments; design of measurement systems; pre-test analysis to decide if a target uncertainty can be met; selection of measuring instruments; monitoring and control of measurement systems with control charts; and providing direction on how to improve measurement systems.

These and other uncertainty techniques will be discussed. Students will work practice problems that illustrate real world applications.

Topics Covered (Partial):

* Nature of Measurement Errors
* Variability of Measurements
* Analyzing and Interpreting Data
* Statistics; Mean, Variance, Standard Deviation, Standard Error
* Quantifying Random Uncertainties
* Quantifying Systematic Uncertainties
* Uncertainty Statements
* Control Charts for Measurements
* Propagation of Uncertainties
* Pre-Test Uncertainty Analysis
* Error Budgets
* Analysis of Student Applications

Tuition:

The tuition for each four-day 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.
Training Information


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LIQUID AND GAS FLOW MEASUREMENT TRAINING

Course Schedule:

Liquid Flow Measurement – Feb. 2-5, 1993
Gas Flow Measurement – Feb. 8-10, 1993

Both classes will be held from 8:00 am to 4:00 pm at the:
Marina Village Conference Center
1936 Quivira Way
San Diego, CA 92109

Tuition:

The tuition for each four-day training course is $895 per person. For individuals attending both the Liquid and Gas Flow courses, the total tuition is $1395. The tuition includes all course materials, a comprehensive notebook and refreshments during the class hours.

LIQUID FLOW MEASUREMENTS

Course Number 9313

Course Objectives:

After completing this course, each student will understand the optimum selection and use of liquid flowmeters. In addition, each student will understand how density and viscosity affect liquid flowmeters; each student will also know how to calibrate liquid flowmeters using primary and secondary flow standards.

Topics Covered (Partial):

* Introduction to Flow Measurement
* Flowmeter Theory
* Secondary Instruments
* Fluid Properties
* Reynolds Number Characteristics
* Liquid Flow Measurement Systems
* Fundamentals of Liquid Flowmeters,
  Differential/Pressure, Pilot Tube, Variable Area, Turbine,
  Ultrasonic, Vortex Sheding, Positive Displacement, etc.

GAS FLOW MEASUREMENT

Course Number 9314

Course Objectives:

After Completing this course, each student will understand the optimum selection and use of gas flowmeters. In addition, each student will understand how to calibrate gas flowmeters using primary and secondary flow standards.

Topics Covered (Partial):

* Installation Effects
* Flowmeter Selection
* Advantages and Disadvantages
* Primary Calibration Standards
* Bell Provers, Glass Tube Volume Calibrators, Computer
  Controlled Volume Calibrators
* Secondary Calibration Standards
* Traceability to NIST
* Dynamic Flow Measurements
* Flowmeter Maintenance
* Discussion of Individual Applications

CONTACT: Measurement Technology Company, 12692 Avenida De Espuela, Poway, CA 92064-2535. A tentative registration can be made by phone (619) 451-2274.

Instructor:

Mr. A.C. Catland, President of Measurement Technology Company will be the instructor for this course. Mr. Catland has over 35 years of experience in the design, manufacturing and marketing of measuring instruments, systems and calibration equipment. During the past fifteen years he has developed and conducted measurement training programs and provided consulting services to metrology laboratories and product testing organizations.

THE ENGINEERING AND DYNAMICS OF MEASUREMENT SYSTEMS

Two Short Courses

The longest-running "Show" in measurement history repeats its annual open-registration popular offering for the 32nd year after 265 sponsored programs in 17 countries:

The Engineering of Measurement Systems
March 15-19, 1993

The Dynamics of Measurement Systems:
March 22-26, 1993

Based on the recently developed Unified Approach to the Engineering of Measurement Systems, the programs present a new set of concepts about the design, understanding, engineering, execution, evaluation and analysis of measurement systems. The applications are to the measurement of mechanical and thermal quantities by electrical means.

The lectures are presented at the Bachelor's Degree level although an experienced technician can absorb 75-85% of the first week's material. The courses are aimed at engineers, managers, theoretical analysts, and scientists who must specify tests, perform them or evaluate them, and who need to know the questions to ask about data validity and integrity. Faulty data looks just as believable as valid data but the Unified
Approach provides the diagnostic and design procedures to assure provable Valid Data, by Design and on the First Attempt.

After all, YOU ASK THE MEASUREMENT SYSTEM FOR THE FACTS -- NOT FOR ITS OPINION!

Detailed brochure and abstract of the new Monograph on the subject, from:

Peter Stein, Stein Engineering Services, Inc., 5602 E. Monte Rosa, Phoenix, AZ 85018, tele., and FAX: (602) 945-4603. Registration: $1075 one week, $1975 for both. Held at: Ramada Hotel Valley Hotel, Scottsdale, AZ. Registration list closes March 6, 1993.

MEASUREMENT QUALITY CONFERENCE
November 4-5, 1992
Gaithersburg, MD

Sponsored by:

American Society for Quality Control, Measurement Quality Division, and the National Institute of Standards and Technology.

Conference Description:

The annual Measurement Quality Conference has been established to provide a forum for topics where the interests of metrology and quality professionals intersect, i.e., the quality aspects of good measurements and the measurement aspects of effective quality management.

This first annual Measurement Quality Conference will focus on Measurement Uncertainty, Measurement Assurance, Measurement Quality Standards, and Total Quality Management Case Studies. Highly qualified speakers have agreed to discuss the latest developments in these important measurement areas.

Join us in November and register early to insure your participation. The Measurement Quality Division is growing rapidly. More than 1800 ASQC members have joined the Division in its first year. The capacity of the NIST conference facilities is limited and hotels in the Gaithersburg area are heavily booked during the fall months.

Registration:

$200 per person. The registration fee includes coffee breaks, lunches, reception, and conference proceedings. In order for your name to appear on the participants list, registration must be received by Thursday, October 15, 1992. Refunds for cancellations will not be made after this date.

Contact:

Don Hintz, Treasurer Abbott Laboratories, Dept. 338, Building AP6C, Abbott Park, IL 60064, Phone: (708) 937-8495.

QUALITY MANAGEMENT IN THE LABORATORY
Nov. 2-4, 1992
Chicago, IL
Sheraton Hotel
O'Hare Airport

Through an intensive program of instruction, workshops and small group interaction, you will . . .

* Address topics including laboratory quality concepts, work planning, uncertainty calculations, and QC programs.
* Learn how to develop a quality program that works, complies with international requirements and meets your laboratory's needs, as well as how to document that program in a quality system manual.
* Receive a Certificate of Attendance denoting 2.0 CEUs.

Other subjects covered:

* The people factor — staff motivation and formal job specifications.
* Staff training and development programs
* Laboratory accommodation and environment
* Laboratory equipment management, including calibration
* Laboratory recording and reporting systems
* Test methodology and method manuals
* Purchasing control in the laboratory
* Laboratory quality control, corrective action, review/audit programs
* Preparing a quality manual

Who should attend?

* Presidents and owners
* Laboratory managers
* QC/QA Managers
* Supervisors
* Senior technicians
* Chemists

Payment:

The fee for this 3-day Quality Management in the Lab Course is $1,195, which includes three continental breakfasts and three lunches, as well as refreshments each day. You will also receive a comprehensive course notebook.

Register now!

By Phone . . . Call CEEM at 1-800-745-5565, (703) 250-5900
By FAX . . . (703) 250-5313
By Mail . . . CEEM, P.O. Box 200, Fairfax Station, VA 22039-0200.
A NEW TAPE ON NRC IS AVAILABLE FROM THE NCSL

A new tape "National Research Council of Canada – Measuring Up" describing NRC is available from the NCSL leading library. NCSL Member delegates may borrow this in an English version (Tape #316) or in a French version (Tape #317) by faxing or mailing their request to the NCSL Business Office.

The National Research Council (NRC) is Canada's leading research and development organization, and has a mandate to work in partnership with Canadian industry, universities and community colleges, public agencies, and governments in the fields of science and technology. One of the sixteen NRC institutes, the Institute for National Measurement Standards (INMS) is an important resource for Canadian enterprises. Focusing on metrology, or measurement sciences, INMS provides a full range of services that helps ensure Canada's compatibility, viability, and competitiveness in changing world markets.

CALL FOR PAPERS

1993 NCSL ANNUAL CONFERENCE
ALBUQUERQUE CONVENTION CENTER
ALBUQUERQUE, NM
July 25-29, 1993

THEME: MANAGING QUALITY TO IMPROVE PROFITABILITY

YOU'RE INVITED TO SPEAK

The emphasis of today's companies is shifting from profitability to quality. Companies are discovering that in this ever expanding world market, business is becoming more and more competitive. Customers are no longer choosing their suppliers purely on price, but on the quality of the product and service they provide.

The 1993 Workshop will provide a forum for the exchange of ideas, and a program to provide information on how this renewed emphasis on quality has affected the metrology community.

You are invited to participate in the 1993 Conference, and are encouraged to submit a paper for presentation develop a workshop session in your area of expertise.

TOPICS PAPERS AND WORKSHOPS

* ISO 900
* ISO Guide 25
* Strategic Planning
* Equipment Management
* Quality Standards
* Laboratory Accreditation
* Metrology Education and Training
* Laboratory Automation
* Intrinsic and Derived Standards
* New Trends in Instrumentation
* Advances in Measurement Disciplines
* Metrology for Petrochemicals, Utilities & Pharmaceuticals

DUE DATES

Abstract: January 8, 1993
Paper: April 23, 1993

Abstracts of 200 words or less and completed camera-ready manuscripts should be sent to:

Steven Stahley
Wavetek/Datron
5808 Churchman By-Pass
Indianapolis, IN 46203

Telephone: (317) 782-4601
FAX: (317) 782-4600
Requests for clarification on a number of MIL-STD-45662A requirements continue to come across my desk. Many come by phone. Some by letter. A few come from as far away as Israel. Over 44 percent are tightly focused on a three paragraph cluster of the standard's specifics.

The paragraphs in question have to do with records (5.9), labels (5.10), and subcontractors (5.11). Based on an assessment of a sample of 68 inquiries, paragraph 5.10 is the object of more than 22 percent of all those received. The second most inquired about paragraph is 5.2, which is outside the cluster. As most of us are well aware, 5.2 addresses the 4:1 accuracy ratio requirement. Together, these paragraphs (figure 1) generate almost 59 percent of all MIL-STD-45662A issues raised and brought to our attention for resolution.

The distribution of issues across the total spectrum of requirements also has been looked at. Results are tabulated in figure 2.

One final point: our commitment is to provide a timely response to any concerns users of MIL-STD-45662A may have about its intent. Questions having to do with replies can be addressed directly to me. You can call or write. Here is the necessary information:

Director
U.S. Army Test, Measurement, and Diagnostic Equipment Activity
ATTN: AMXTM-MP (Mr. McElveen)
Redstone Arsenal, Alabama 35898-5400

Commercial Phone: (205) 876-5982
Facsimile: (205) 876-3375

Wesley F. McElveen, Army Agent for MIL-STD-45662A
Exhibitors continued to provide the conference with outstanding displays of new innovative products and services. Many are repeat exhibitors because you continue to support these companies not only at the conference, but also year-round.

Some paradigms that presently exist may still be correct for the present. One such NCSL paradigm is membership. There have been occasional questions about individual membership in NCSL, in addition to the corporate membership structure we presently have. The Board of Directors (BOD) has reviewed this subject and generally feel that in order to be the effective voice that is currently enjoyed by NCSL, membership requirements shall remain as currently constituted. A new 1993 requirement for NCSL BOD participation, does not require that a BOD member continue to be the Member Delegate of an organization after that individual has served two years on the board. This should allow other individuals in an organization to move up and become involved in NCSL, removing one of the arguments for individual membership. In addition, there are more demands that are placed on the sponsoring company once it supports a Member Delegate for BOD participation. Travel expenses, mailings and time spent away from work would be prohibitive on an individual basis.

Special commendation to Dr. Joe Simmons for being selected as the 1992 Wildhack Award recipient. Joe is the NIST Representative to the NCSL BOD and does an outstanding job in that capacity. He is also doing extra super duty on the TQM Committee on Calibration System Requirements. An outstanding choice — congratulations Joe!

This has been a great year for me. I want to thank the Board and all of NCSL for their support.

I think NCSL has new and exciting challenges and the potential to be a leader in promoting better world wide measurement science. The challenge for each of you is to get involved and help direct the effort being made to provide value added paradigms that produce products and services which are useful to you, in addition to improving global harmony in measurements.

As a final note, I want to welcome our 1993 President, Jim Ingram, Lockheed Missiles & Space Co., and ask you to support Jim, as you have me this year.

Robert R. Smith, NCSL President

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Another Company's Spin-off on TQM

By Dave Cross
Head, Laboratory Services
Watkins-Johnson Company, Palo Alto, CA

"TQM? A great idea, but will management support it? Will they get involved?"

We’ve all heard these words from various support groups in our respective companies as they have attempted to implement culture-changing processes such as TQM. Watkins-Johnson Company located in Palo Alto, California, was no exception. What was exceptional, however, was its novel approach to mending the problem.

Picture a meeting consisting of top management, middle management, and employees from the rank and file. Throw in "The Wheel of Fortune" (minus Vanna, of course) and voila! — instant fix.

"The Big Spin," as it has come to be called at W-J, was actually the brainchild of Defense Group Vice President Keith Gilbert. In response to a plea from the Palo Alto Plant TQM Steering Committee to establish a formal review board that would hold managers accountable to TQM principles, Keith suggested a unique twist on the normal practice of conducting such meetings. His idea was to require all managers to attend a quarterly meeting in order to give "...a brief oral presentation outlining the progress and problems in the implementation of Continuous Quality Improvement (CQI) in their organization."

This presentation is made during a two hour meeting that includes top management, all department managers, members of the steering committee, and all team leaders within the plant.

The twist? Each meeting begins with a "Big Spin." A large "Wheel of Fortune" containing each of the department managers' names is spun in order to identify two managers who will be required to make presentations at that meeting. Yet everyone attending is on the "hot seat" and everyone must come prepared.

The meetings are exciting and fun. There is an anticipation in the air caused by uncertainty about whose name will be chosen. But, that anticipation is soon replaced by a perceptible stimulation and energy when the speakers present their reports. After the presentations, there is a lively discussion on TQM matters.

The success of "The Big Spin" has galvanized all of its attendees, and has sparked so many imaginative ideas and so much creativity there is even a plan afoot to start using the meetings to highlight groups that have made exceptional achievements.
The most familiar aspect of metrology is calibration. This is a visit to one of the best calibration and measurement centers around, the TRW Measurement and Computer Resource Center, known as the MCRC. The setting is more like a 100 acre university campus than a traditional plant. The facility employs about 18,000 people who design and build spacecraft, communications and other DOD/NASA systems to very exacting standards. Keeping all of the technical specifications in order is a big job and it falls on the MCRC.

The MCRC is headed up by AI Strand who serves as its Director and Wendell Seal, as its Deputy Director for Technology. AI conceived of an idea that brought together an integrated approach to the test equipment world. Today, the MCRC not only calibrates and maintains measuring and test equipment, but also operates an acquisition department, managed by Bob Lazar, to service customer needs. This keeps the costs as low as possible and provides knowledgeable experts for dealing with suppliers. The Center has three other departments that work to keep the customer satisfied. Gary Davidson heads up the Calibration Service department. These are the hands-on folks that do the calibration, repair and special measurements, both in the lab and on-site.

Steve Phleger manages the Measurement Engineering Department. Steve tells us that his engineers provide full support to Gary's department and are a consulting resource for design and manufacturing organizations. An engineering brochure lists impressive specifications for MCRC capabilities. The engineers are also on tap to help MCRC customers with application procedures and have made some good suggestions for cutting customer costs. Steve described how they treat a test set/set-up as a system instead of a mixture of individual items. Using such techniques, his engineers can cut as much as 30% from the number of items needing calibration.

Paul Chong is manager of the Equipment Services Department. They run a large record keeping system called "EQUATES". Paul also operates a fleet of 9 trucks for pick-up and delivery in addition to an equal number of equipment pools headed by Keith Bentjen, located around the Space Park campus, San Juan Capistrano and San Diego, California. Employees can request almost any general purpose test equipment, all serviced and ready to be put into use.

Al manages the MCRC with a yearly equipment budget of nearly $40,000,000 and about 160 people. Most of that sum goes toward equipment related costs.

The tour really begins with a discussion of how the calibration laboratories work. Gary Davidson is quick to point out that his department is proof that TQM works. They have applied various techniques of total quality management (TQM) and continuous process improvement (CPI) to reduce customer costs.

In the old days, it was common to see a 12 to 14 day turnaround time. Gary states that TQM and CPI techniques greatly cut calibration turn-around time to an average of 5 days (or less). Andre Bell (Commercial Accounts Manager) says that most items are completed in less than 24 hours. He added that the customer's needs come first. There is a feeling everywhere that this organization is really customer oriented.
Touring Our Member Labs

We were surprised to learn that more than 50% of their workload can be done on-site in the customer’s facilities. This really cuts the customer’s down time to as low as a few tenths of an hour. Some complex instruments are done on-site using automated calibration workstations that can cycle through millions of frequencies in only a few hours.

Before really getting under way, we wanted some general information about TRW’s calibration system. Facts like how big it is, how many people work there, size of the facilities, etc. We learned that the laboratories occupy about 20,000 square feet of space, with sixty calibration technicians and ten engineers from the Measurement Engineering Department (MED). They perform about 55,000 calibrations per year covering more than 20,000 different types of equipment. The calibration laboratories have about 6000 equipment items in configuration, including measurement standards. Sounds like a fairly large operation. Someone commented that in a system this big, there must be a lot of recall problems. Gary responded by saying that a lot of thought went into that subject several years ago. As a result of planning and attention to detail, the recall system is ranked among the best in the industry.

It’s time to get under way. We enter an elevator and head underground to what turned out to be a world of high technology. We are pleased to note how bright and clean everything is, including the floors. Andre points out that the floors and bench tops are conductive to dissipate electrostatic charges. He says they even keep after the janitorial service to be sure the floors are not treated with regular wax.

Passing a set of double doors, we make our way down long wide hallways. Approaching a corner, Gary states that this area is the incoming equipment holding room. Expecting to see the shelves full, our group is surprised that they are nearly empty. In response to our puzzled looks, Gary announces, with pleasure, that he is glad to see so few items. It turns out that one of the TRW measures for how well things are going in the calibration business is the number of items that are awaiting service on these shelves. The fewer, the better. It begins to sink in that it’s really a measure of the standing backlog. They even have some formulas worked out that show how much it costs when expensive test equipment stands idle awaiting service. It’s a sort of just-in-time approach for calibration.

Using this formula, TRW figures that by having short turn-around times, the customer can reduce the amount of extra or back-up equipment needed. It works out to about $420,000 dollars per year for each organization-day of turn-around time saved. Our group was impressed and started to realize that turn-around time may be more important than most other calibration costs, including hourly service charges. Andre stated that turn-around time is a major hidden cost that should never be overlooked.

Technical experts John Berg and Ken Krebbs use MCRC designed and built automated workstations to test and calibrate computer controlled synthesizers and sweep generators.

As we enter the DC/Low Frequency lab, we notice that it has its own shielded screen room for very accurate voltage and resistance measurements. It even has a large, obviously heavy steel door that rolls shut. Air bellows in the wall expand to tightly seal the door against nearly all forms of spectral radiation, EMI, RFI, infrared and laminar air currents. (They have another shielded room in the RF/microwave area.) The standards cells are being replaced with new solid state units.

This lab measures and calibrates; DC/AC voltage and current. The lab also measures resistance, magnetism, capacitance and inductance. When asked about traceability documentation for the lab’s standards, Sin Villacorta proudly lead us to wall full of steel double sided rotary cabinets filled with binders of reports for, trending data, uncertainty analysis, NBS and NIST reports of calibration. He showed us NIST calibration reports all the way back to 1978 for an inductor standard.

A view of one of the RF/microwave labs. To the rear is a GPS receiver for distribution of highly accurate time signals. Each lab is hooked to a calibration system network for records, work orders and much more; known as EQUATES

Our next stop is the RF/microwave lab. Wendell Seal joined the tour and stated that this lab was the interim national standard at 44 GHz until NBS (now NIST) developed the
Touring Our Member Labs

All of this technology takes a lot of engineering support. Steve Phleger tells us that MCRC engineers often work directly with TRW program engineers to help ensure that product measurements are traceable to national standards. Whenever the MCRC needs to use an outside source these engineers take a good look at that company to be sure they are capable of meeting MCRC requirements. They work with customers to help ensure that test configurations are calibrated enough to do the job, but not too much. The goal is to apply measurement assurance to keep the costs low.

Rick Ailor is the technical quality guru and manager of the Measurement Assurance System. He works closely with customers to ensure contract requirements are met, particularly all of those Federal regulations. The MCRC has been cited for excellence in its quality systems.

We also learned that some of the labs are self directed. They make all of the routine decisions about running their day-to-day operations; scheduling, priorities, work assignments, vacation time and they even have a say in hiring/firing decisions. Wow, how things have changed from the old days.

COMMERCIAL CALIBRATION

MCRC has a growing program providing services that support space and defense systems, to commercial customers. We asked Gary why a customer would be interested in these services, what's the advantage? He responded that there are several reasons; worldwide recognition, solid reputation among peer companies, and involvement with the emerging standards for calibration. All inquiries are welcomed. No customer is too small or too big. The fast turn-around time is a big plus. Coupled with the on-site program, these extensive capabilities offer a one stop customer-oriented service center with real cost saving opportunities. Kevin Ruhl manages the on-site program.

MCRC is also working closely with companies that are downsizing and find a need for fully qualified services in meeting federal and space regulations. MCRC encourages inquiries from all companies that are faced with this difficult situation. For more information or inquiries, contact Andre Bell at 800-ASK-TRW.

Jeff Raggio examines a wafer in the MIMIC development lab while Randy Fenton operates the analytical computer system.

Mobile workstation going on-site. Also shown is an MCRC designed and built automated counter workstation.
Touring Our Member Labs

Brad Gilson, the expert in electro-mechanics prepares a pressure gage for test and calibration.

Laser optic power from 250 nm to 1100 nm, laser energy, optical pyrometry, photometry, irradiance and fiber optic parameters are also tested and measured by MCRC.

Don Felt, engineer and technician Dennis Frazier set up engineering software (MCRC written) to test and measure load cells.
THE NEED FOR ACCURATE MEASUREMENTS -- TQM

In July 1990, the Senate Appropriations Committee conducted a hearing to resolve difficulties that NASA was experiencing in managing state-of-the-art and complex technologies. These difficulties came under the heading "Recent NASA Setbacks."

Through testimony at the hearing, it became evident that glaring inadequacies were present in the system testing processes employed by NASA and by NASA contractors. This motivated Chairperson Senator Barbara Mikulski to ask the question "did anyone test the testers?" As it turns out, this is a key question in the application of Total Quality Management (TQM) to NASA programs.

Whether a system is engaged in making precise scientific measurements or in testing/managing critical technology, the risks of making erroneous decisions based on measurement results are ever present. These "measurement decision risks" have to be understood and controlled if TQM is to be effective in ensuring that future hardware performs successfully. Nowhere is this more critical than with space-based systems.

THE NEED FOR IMPROVED MEASUREMENT TECHNOLOGY AWARENESS

Controlling measurement decision risks is achieved by employing measurement accuracies that are sufficient for the application in question. Identifying what these accuracies need to be and ensuring their implementation requires the use of sound measurement technology management methods and principles.

The need to verify the accuracy of instrumentation is often not recognized by engineers, physicists, etc. busily engaged in their respective areas of specialization. The standard mindset in most scientific and engineering fields is that measuring systems are "telling the truth."

This belief in the sanctity of measurements is routinely challenged by experts within the field of measurement science or "metrology." In the years following WWII, metrologists have become increasingly aware that most measuring and test systems exhibit significant probabilities for being out-of-tolerance in one parameter or another. To combat this problem, various Government contracting agencies, such as NASA and the DOD, require that measuring and test equipment is periodically calibrated.

Over the last three decades, the experience gained from periodic equipment calibration indicates that around five to forty percent of items submitted for calibration are found to exhibit at least one out-of-tolerance function or parameter.

These are disturbing statistics when it is recognized that current and projected NASA hardware is expected to operate at or near performance envelopes. When end item tolerances are nearly equivalent to test and calibration system tolerances, measurement decision risks become significant. This is especially true if testing or calibrating systems are operating in an out-of-tolerance state. In these instances, the naïve belief that measured values are "true" values can lead to misconceptions that may seriously threaten the success of future NASA programs.

RELATIONSHIP BETWEEN MEASUREMENT ACCURACY AND SYSTEM UTILITY

Picture a system as a collection of interrelated components, modules and subsystems, each expected to function within specified limits of performance. If each element of the system is operating right at nominal, system performance is optimal. If system elements are operating within tolerance but at values other than nominal, system performance is acceptable, but not necessarily optimal. It might be imagined that if one or more elements is operating in an out-of-tolerance state, system performance would be unacceptable. This is sometimes the case, but often not. This is because each set of performance limits normally embodies a "guard band" or "safety margin" which acts as a cushion against system failure. Thus, when some elements are found out-of-tolerance, or when operating conditions are determined to be less than desirable, performance does not necessarily suffer.

In these cases, it may be appropriate to issue "variances" or "waivers" for the nonconforming functions or conditions. Waivers are usually signed off by experienced engineers, technicians or supervisory personnel.

When safety margins are adequate, waivers can be issued with a low risk of compromised performance. Sometimes, however, as was the case the ill-fated Challenger launch, decisions to waive or ignore out-of-tolerance conditions are made on the basis of expediency rather than on a sound technical understanding of risks involved or of the potential consequences.

It is an axiom of the modern technological era that management and even experienced technical personnel ordinarily lack a clear understanding of how nonconforming parameters impact the risk of degraded system performance. Large-scale modern systems are just too complicated to assess using the kinds of "gut feel" judgments that are often behind nonconformance waivers. Without rigorous analytical tools that take into account the relationships between system elements, the measured values of these elements and the
accuracy or "believability" of these measurements, there is no way for NASA management to determine whether systems will perform as intended under less than nominal conditions.

Without these tools there is also a lack of understanding during design and development of how measured parameter values relate to hardware utility during use. This understanding is needed to establish nominal conditions and required component accuracies, to develop accurate templates and molds, and to gear up for production.

Establishing and assessing measurement accuracy is also key to the successful performance of scientific instrumentation packages. The scientific research community is no more immune to the risk of making incorrect decisions based on measurement results than is the design and testing community. Data from scientific instrumentation are relied on to advance our understanding of nature and to help shape the course of future technological and social programs. In view of the fact that space-based scientific systems normally operate in unattended isolation, the need to design appropriate accuracies into these systems and to correctly assess the accuracy of their measurement results is paramount.

THE NEED FOR COMPREHENSIVE MEASUREMENT TECHNOLOGY GUIDANCE

As the foregoing indicates, the application of sound measurement technology methods and principles are vital to the success of future hardware systems. Knowing what to measure, how accurately to measure it and how to evaluate measurement results are essential elements of TQM.

By its nature, TQM involves all levels of system design and development in an integrated and cooperative process. Building measurement technology methods and principles into this process requires that a broad spectrum of technical and management participants to be conversant with these methods and principles.

Unfortunately, measurement technology is not yet an established component of university or other formal education curricula. Consequently, measurement technology methods and principles need to be clearly laid out in a comprehensive documentation that is accessible to NASA personnel, contractors and supporting organizations.

This documentation should cover all elements of measurement technology and should be useful as a guide to establishing systems and procedures that ensure meeting measurement assurance requirements imposed by hardware performance objectives. The documentation should also aid contracting organizations in conforming with NASA testing and calibrations standards and other guidelines.

Such documentation is under development by JPL. Under the direction of JPL Metrology, a team of leading experts in the fields of measurement traceability analysis, measurement risk assessment, measurement uncertainty analysis, measurement reliability analysis, statistical process control and calibration program management have been developing a draft NASA Reference Publication titled *Metrology -- Calibration and Measurement Processes Guidelines*. This document describes the state-of-the-art measurement assurance methods needed to ensure successful performance of NASA space-based hardware.

Although considerable progress has been made to date, further work is needed to expand certain material and to include the results of recent advances in measurement science and technology. Since this technology is in a continual process of evolution, it is expected that the document will need to be periodically reviewed and updated.

EXPECTED BENEFIT

Using the methods and principles described in the Guideline, the accuracy of NASA scientific measurements and the adequacy of test and calibration support to NASA hardware systems can be tailored to meet mission objectives. Through implementation of the Guideline's methods and principles, costs associated with high accuracy test and calibration support profiles will be reduced and measurement decision risks associated with end item performance will be minimized.
Donald Johnson, Director of Technology Services at the National Institute of Standards and Technology, has courted and coped with change throughout his 25-year public service career.

When he began work at the National Bureau of Standards in 1967, Johnson’s experimental physics background placed him at the forefront of the dynamic radio astronomy field. In the mid-1980s he worked at NBS’ National Measurement Laboratory (NML) just as the organization was gaining prominence for its work in such burgeoning fields as environmental measurements, nuclear safeguards and recyclable materials.

In 1988 NBS officials asked Johnson to help the agency in its transition from NBS to the National Institute of Standards and Technology: an organization more focused on helping business make better use of technology.

And last December Johnson became acting director of the National Technical Information Service (NTIS) while maintaining his position at NIST. He immediately began a radical restructuring of that ailing agency in an attempt to correct longstanding deficiencies.

In a series of moves that no doubt have made him unpopular with NTIS’ senior management, he recently eliminated three of the agency’s seven operating units and about 20 jobs that did not fit into the NTIS structure he envisioned. Johnson acknowledged that the past seven months have been stormy ones.

"It certainly has been a struggle because this organization has not experienced a reduction in force in the memory of anyone here—maybe ever," he said. "In this case, the reduction in force is being used as a management tool, and that is certainly new. Of course, there are quite a number of people in senior management positions who are affected negatively by the process." "Our goal really is to reduce overall costs in the organization and reduce our very expensive labor base," he added.

Johnson appears to have been successful. "The organization is, in fact, running fairly smoothly at this point," Johnson said. "We’ve been operating in the black since January, and we have increased our sales over last year’s by an amount about equal to the rate of growth in the scientific and technical information industry in general. That means we have held our own as far as market share," he added.

Johnson said he typically spends three or four days each week working at NTIS and the remaining time at NIST. Twelve-hour days and six-day work weeks are not unusual, he added. At NIST his responsibilities are many. He is in charge of most of the agency’s programs that provide services directly to industry. Johnson’s organization produces, manufactures and sells reference materials on standards; runs NIST’s technical library; and manages NIST’s calibration services, laboratory accreditation program and technology-transfer programs. In addition, Johnson is responsible for coordinating international standards and operating the agency’s state weights and measures programs.

Johnson, a native of Tacoma, Wash., came to NIST in the late 1960s after receiving his doctorate in experimental physics from the University of Oklahoma. "I worked for several years in radio astronomy," he said.

"During that period, radio astronomy was really blossoming. The United States was clearly the world leader in that area of scientific endeavor, and the National Bureau of Standards was the primary source of spectral data that was the basis of most of the discoveries. It was an extremely exciting time," Johnson said. "We were busy in the laboratory carrying out experiments to confirm observations and actually participating in telescope observation sessions gathering the data."

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Someone You Should Know

Johnson entered an NBS management training program in 1976 and spent two years on the staff of the bureau’s director doing “all kinds of staff studies and support for the director,” he said. After that he became deputy director for programs at NML, a lab that handled all of NBS’s physics, chemistry and basic standards activities. In 1982 the lab director retired, and Johnson took over as head of NML.

Transition From NBS to NIST

As Congress readied the omnibus trade bill for passage in 1988, NBS officials realized that the agency would face immediate and extreme changes. The NBS director called on Johnson to help develop plans to transition the organization from NBS to NIST. Johnson said his specific role was to design a framework for the NIST programs dealing with advanced technology, manufacturing technology centers and state weights and measures. “My role has been to help frame the new ideas and carry out the initial conceptualization of new projects,” he said.

Last August Robert White, Undersecretary of Commerce for Science and Technology, asked Johnson to put together a task force to determine how to strengthen NTIS’ finances and management. Johnson said NTIS, an agency that operates as a business and does not receive appropriated funds, had been suffering from constant internal problems and was operating at a loss during the latter part of the 1980s. After a few months, he presented his findings to senior Commerce officials.

“Much to my surprise, that wasn’t the end of it,” he said. “I was asked if I would come down here and take over the management of NTIS on an interim basis. I am trying to help NTIS through a transition into a new style of operation.”

“I think I was brought in here because I have been a senior federal manager for a long time, and I have managed fee-for-service programs,” Johnson added. “So I know what you can and cannot do in this sometimes restrictive system. I also have a fairly well-established track record for creating new things.”

Part of Johnson’s plan to improve NTIS centers on automation. This fall agency officials will buy new computers and begin training the staff to use them, he said. Because NTIS gets no appropriation, Johnson’s first mission is to stabilize the agency’s finances and generate enough revenue to cover the costs of purchasing computer equipment. He said he plans to publish a computer modernization plan in August.

Johnson said his immediate automation plan focuses on applying the latest commercially available technology to NTIS’ business operations. He said the agency will switch to a distributed systems architecture using local-area networks and independent subsystems exchanging information with each other. For example, the agency’s order-taking and inventory control processes would be integrated to produce automated billing. The billing system, in turn, would feed into the accounting and financial tracking systems.

Next: Data Networks

Johnson also would like to see the agency use data networks to disseminate scientific and technical information within the next five years. But he said such a plan would have to wait until NTIS officials figure out how to best use technology to deliver information and how to build a customer base. “The question for us is: How does one structure the cost of information to recover costs and put the information in the appropriate format?”

Johnson said he does not know how much longer he will work at NTIS. “I would say three to six more months,” he said. “My involvement here will necessarily have to decrease because of my responsibilities [NIST]. I can’t juggle two balls at the same time and put in a full week at both places.”
INDUSTRY MEETINGS

Measurement Science Conference, Jan. 21-22, 1993
Anaheim Marriott, Anaheim, CA
CONTACT: Chet Crane, (310) 574-2027

REGIONAL MEETINGS SCHEDULE

REGION 1

October 8, 1992
Raytheon, Waltham, MA
CONTACT: Brian Gurney, (508) 459-9480

REGION 2

Philadelphia Section, October 29, 1992
Ketema, Inc.
CONTACT: Gary Foster, (215) 822-2929 x2403

Pittsburgh Section, November 17, 1992
Holiday Inn
Pittsburgh Intl. Airport, Pittsburgh, PA
CONTACT: Don Drumm, (412) 287-8711 X352

Upstate New York Section, October 20, 1992
Rochester, NY
CONTACT: Joe Maciag, (716) 687-4689

REGION 3

October, 1992
John Hopkins Applied Lab, Laurel, MD
CONTACT: Tracy Harper, (410) 787-5387

REGION 4

Huntsville Section, October 7, 1992
Holiday Inn Research Triangle Park, Huntsville, AL
CONTACT: Dwight Whitaker, (205) 464-4810

Central Florida Section, November 18, 1992
Orlando, FL
CONTACT: Jeff Willey, (407) 423-6215

REGION 5

Northern Ohio Section, November 1992
CONTACT: Tom Powis, (216) 526-2911

Michigan Section, December 3, 1992
CONTACT: Joe Kosel, (313) 942-5179

REGION 6

West Section, September 17, 1992
Doubletree Hotel, Aurora, CO
CONTACT: Delirdre Lavallee, (303) 449-5841

Central Sect.-Dallas/Ft. Worth, November 4, 1992
John Fluke Mfg. Co., Inc., Carrollton, TX
CONTACT: Clyde Orrison, (214) 995-5032

South Sect.-Dallas/Ft. Worth, January 13, 1993
NASA, Houston, TX
CONTACT: Gilbert Uribe, (512) 925-6104

REGION 7

November 12, 1992
Apple Computer
CONTACT: Joe Siecinski, (415) 694-2345

February 11, 1993
Applied Materials
CONTACT: Joe Siecinski, (415) 694-2345

May 13, 1993
Hewlett Packard
CONTACT: Joe Siecinski, (415) 694-2345

REGION 8

LA/Orange County Section,
CONTACT: David Collins (714) 945-2317

San Diego Section, May 19 & Oct. 20, 1993
CONTACT: Wayne Benda, (602) 794-4483

Phoenix/Tucson Section, October 29, 1992
CONTACT: Wayne Benda, (602) 794-4483

LA/Valley Section, November 18, 1992
CONTACT: Wayne Benda, (602) 794-4483

LA/Valley Section, June 16 & Nov. 17, 1993
CONTACT: Wayne Benda, (602) 794-4483

REGION 11

Kansas City Section, October, 1992
CONTACT: Leon Barnes, (816) 997-5480

Twin Cities Section, October 1992
CONTACT: Rick Brilon, (612) 892-4271

Chicago Section, October 7, 1992
Hewlett Packard, Rolling Meadows, IL
CONTACT: Ed Bellinder, (708) 705-0500

St. Louis Section, October 8, 1992
CONTACT: Glenn Thompson, (314) 537-6794

REGION 12

12th Annual Canadian Workshop & Symposium,
Nov. 18-19, 1992
Sir Sandford Fleming College, Peterborough, Ont.
CONTACT: Duane Brown (613) 925-5934
THE HISTORY OF GIDEP
By: Ken Edwards

Editor's Note -- I thought this narrative history of GIDEP from its inception in 1959 was very informative. We've reprinted it with permission from the GIDEP Newsletter. Readers with an interest in GIDEP membership or deliverables, should call the GIDEP office at (714) 273-4677.

The following article on GIDEP History outlines some of the major events that have occurred in IDEP/GIDEP since the program's inception and is not intended to be an "all inclusive" listing of "all" events.

GIDEP began in 1959 as the Interservice Data Exchange Program (IDEP). IDEP was created by mutual agreement of the three Military Services (Army, Navy & Air Force) in an effort to reduce duplicate testing being conducted for the Military Services by various contractors on the same parts/components/materials, often by the same contractor. At its inception, IDEP covered only the Ballistic Missile portion of U.S. defense programs.

Initially, IDEP consisted of one Data Interchange -- the Technical Data Interchange, with an office of management at the Army (Redstone Arsenal, AL), the Navy (Corona, CA) and the Air Force (Space Systems Division, El Segundo, CA). The government administration of the IDEP program was through a Policy Board which consisted of one command level individual from each of the sponsoring agencies. The primary purpose was to exchange test data and related parts information on parts, components and materials between government activities and ballistic missile contractors. As the information needs of the U.S. defense industry changed, IDEP was expanded to include all types of data and information. The primary concept of IDEP/GIDEP has always been to "have the data waiting for the user -- not the user waiting for the data."

In 1963, the Navy's Component Reliability History Survey (CRHS) program was merged with IDEP. The CRHS program exchanged test documentation and information on high reliability parts/components utilized by the various ballistic missile programs in the military. In 1964, the Navy's Guided Missile Data Exchange Program (GMDEP) was merged with IDEP. GMDEP exchanged reliability and test information on parts/components used in the Navy's missile programs. Both of these Navy programs, operating out of Corona, CA, strengthened IDEP by making more data available to participating companies and government activities.

In 1965, the National Aeronautics and Space Administration (NASA) requested to join IDEP to further support their data needs for space application parts. In 1966, NASA began to issue ALERTs on parts/components/materials that did not meet space requirements. The NASA ALERTs were the start of the IDEP ALERT system and soon, many IDEP participants were also exchanging ALERT information.

In 1966, the Department of National Defence, Canadian Military Electronics Standards Agency (CAMESA) also requested to join IDEP to exchange data among Canadian industry and government activities and the United States. With approval granted by the U.S. Department of State, Canada was allowed to participate.

With the addition of NASA and CAMESA, the IDEP program name was changed to the Intergency Data Exchange Program, retaining the acronym IDEP. At the same time, the scope of data for the IDEP program was changed to accept data on all missile and aerospace programs.

In 1968, the National Conference of Standards Laboratories (NCSL), due to budget constraints, requested IDEP assume collection and distribution of the massive hard copy calibration file maintained at Vandenberg Air Force Base. IDEP accepted this challenge, processed and microfilmed the data for distribution to participants, and added the second data interchange to IDEP, the Calibration Procedures Data Interchange.

In 1970, each of the three service IDEP Offices were consolidated, by agreement of the Joint Logistics Commanders (JLCs), as the Government-Industry Data Exchange Program (GIDEP). The JLCs requested the Navy assume the overall program management of GIDEP. The first Program Manager for GIDEP, Commander McPherson, was located in the office of the Naval Material Command, Washington, D.C. Since 1970, GIDEP has had several Program Managers, all serving with distinction, and each adding his own unique contributions to the growth of the program. Currently, in 1992 as this article is being written, the GIDEP Program Manager is located in the office of the Assistant Secretary of Navy (RD&A) Product Integrity.

During the 1960's, the Navy established a Secrariat for Electronic Test Equipment (SETE) at the New York University, Long Island, New York, as a project to improve Naval test equipment. In 1973, the Navy decided to move the Project SETE to Corona and place it under GIDEP along with the Calibration Procedure Data Interchange. In 1976, SETE was merged with GIDEP and the name of the interchange was changed to the Metrology Data Interchange.

Also during the 1960's, the Navy began a program to collect and analyze reliability data at the Fleet Missile Systems Analysts and Evaluation Group (FMSAEG), Corona, CA. The data was collected, catalogued, analyzed and published in a series of books known as the Failure Rate Data (FARADA). The FARADA data summaries became widely used throughout the defense and aerospace industry. FARADA was an interagency program supported by the Army, Navy, Air Force and NASA. The FARADA program merged with GIDEP in 1973. At that time, the name was changed to the Reliability-Maintainability Data Interchange.
In 1973, GIDEP initiated its first retrieval program by remote terminal device. The first program was very limited in scope and accessibility. The remote terminal retrieval program has changed over the years to evolve to the present LOOK Retrieval System.

In 1974, the ALERT system was established as a separate data interchange within GIDEP and became known as the Failure Experience Data Interchange.

Also, in 1974, GIDEP established a limited exchange of information with the International Exchange of Authenticated Electronic Component Performance Test Data (EXACT) program located in Europe. This exchange continued for approximately eight years, but, was discontinued due to technology transfer issues.

In 1975, the Air Force implemented its Defective Parts and Components Control Program (DPCCP) as a method of enforcing ALERT utilization through the Air Force activities and contractors. The DPCCP program is implemented by MIL-STD-556 and several Contractor Data Requirements List (CDRL) Data Item Descriptors (DIDs).

As GIDEP continued to grow and expand, other data of immediate interest to the GIDEP community was added. Through GIDEP's participation in the National Conference of Standards Laboratories, interest grew in metrology data. In 1977, the National Bureau of Standards Laboratories, now known as the National Institute of Standards and Technology (NIST), designated GIDEP as a repository for NBS data on standards and calibration. GIDEP is an additional outlet for distribution of certain NIST information and documents.

In 1978, GIDEP started an initial exchange of data with the Aeronautical Depot Maintenance Industrial Technology (ADMIT) program. The data which was made available was of limited value and usage to GIDEP participants. This exchange was discontinued in 1982.

In 1982, a prototype Ship Systems Data Bank (SSDB) was developed for the Naval Sea Systems Command by the GIDEP operations Center. After the prototype system was developed, NAVSEA was unable to obtain funding to continue the project.

As the importance of energy and energy exploration increased, the Department of Energy (DOE) joined the GIDEP. Many of the same industries which had been involved in GIDEP because of the space and weapons systems programs, now looked to GIDEP as a source for information exchange on energy. In 1981, the selected DOE data was added to GIDEP. DOE data in GIDEP now covers the areas of development and production of parts, materials, components and related energy subjects for solar, wind, fossil fuel, oil and nuclear energy.

In 1884, a two year pilot program of the Value Engineering Data Storage and Retrieval System (VEDISARS), was initiated by direction of the Office of the Undersecretary of Defense. The data base was created to encourage the use of hundreds of previously accepted value engineering or cost reducing actions by other activities. The VEDISARS program was terminated because of value engineering program organizational changes and lack of funding.

In 1989-1990, the GIDEP Operations Center, in cooperation with industry based National Electronic Component Quality (NECQ) Assessment System, established a prototype Correlated Device List (CDL) data base for government and industry use. The NECQ-CDL project in GIDEP has been held in abeyance because of problems related to the economy, recession and down-sizing of the defense industry.

In 1988, the Department of Defense Inspector General (DoDIG) was asked to review GIDEP to determine its effectiveness and to recommend changes to improve its viability. Results of their survey highlighted the need to modernize the GIDEP system to increase its responsiveness, and to focus on information vital to the nation's interest which would decrease the cost of systems acquisition. As a result, the Program Manager, with the support of the GIDEP sponsors, briefed the Joint Logistics Commanders and recommended an aggressive program for the acquisition of equipment and software for a state-of-the-art imaging and data retrieval system. The new system will advance GIDEP's original objectives of "having the data waiting for the user - not the user waiting for the data."

As the technological world of information changes, so will GIDEP. The information needs of tomorrow will be different than those envisioned when the IDEP program began in 1959 and those of the GIDEP program today. Some of the most recent changes in GIDEP's retrieval techniques are evidenced by the development of the new modernization program, EDAIS (Electronic Document Automated Information System). Under the new program, GIDEP will be shifting to a "paperless society" where data will be stored total text in an electronic data base and retrieved electronically at the participant activity.
HIGHLIGHTS OF THE THREE COMMITTEES ARE:

The NMRC survey is being compiled by Laurie Baker and the second recommended practice for Intrinsic Standards has been printed and mailed under the direction of Richard Pettit. Also the MAPs are continuing under Mike Cruz, with interesting results being presented at the Conference.

AUTOMATIC TEST CALIBRATION

Submitted by David Nebel

Work is continuing on the Calibration Software Catalog. A workshop on ATE was organized for this year’s Conference.

MEASUREMENT ASSURANCE PROGRAM

Submitted by Mike Cruz

Youden Plot software has been purchased. Mr. Doug Sugg (NWAC, Corona, CA) is currently developing templates and standard operating procedures for the software. This software will be made available to all NCSL round robin participants through this committee.

RF power round robin three is completed and round four will begin this fall. Ten laboratories are participating. Mr. Clyde Orrison (Texas Inst.) is the POC. He can be reached at (214) 995-5031.

The humidity/dew point round robin is well on its way using two different types of standards. The Standards have been sent to NIST and three laboratories have completed their measurements. Two laboratories are waiting to do their measurements. The final measurement will be done at NIST to close out the round robin. The round robin is estimated to be completed by this fall. This group is planning a second effort after determining which one of the two standards will be most suitable to use. We are looking for a donor for the chosen standard to be used for the next round robin. Contact Mr. Miguel Cerezo (JPL) at (818) 354-2236.

The ARFTG MCP is continuing their round robin efforts with vector analyzers. They now have added 2.4mm connector type to their list of standards. The 7mm set is going abroad to Great Britain, Australia, Belgium, and Canada. The 3.5mm set is going to Australia. The 2.4mm set will start a round robin this fall.

Points of Contact:

Type-N Pat Nolan (Lockheed, 408-756-2144)
7mm Clyde Orrison (Texas Instruments, 214-995-5031)
3.5mm Dave Hopping (HP, 707-577-4029)

2.92mm Ed Daws (Wilton, 619-7927833)
2.4mm Ken Wong (HP, 707-577-2616)

The gage block round robin in the Twin Cities area will begin in August and plans to be completed by this fall. There are ten participants. The POC is Mr. Rick Brion (Rosemount, Inc.) at (612) 892-4271.

The resistance round robin in the Twin Cities area has received their standards and has begun the round robin. The first laboratory has completed its measurements and they are now being returned to the host laboratory. The “Star” configuration is being used in this effort. They are anticipating completion of the round robin by this fall. POC is Mr. Terry Blankston, (612) 378-4469.

Mr. Bruce Adams (Minnesota Department of Public Service, Weights and Measures Div.) reports that 2 mass round robins were completed in October, 1991. Round robin A consisted of 7 participants plus NIST using mass standards supplied by Rice Lake Weighing Systems. Round robin B consisted of 8 participants plus NIST using mass standards supplied by Troemner. Mass standards used were 5 Kg/m, 20 gm and 100 mgm. There are plans for a second round robin starting approximately September, 1992. Contact Mr. Dave Dikken at (612) 639-4010 for more information.

The thread gage round robin is close to completion according to Mr. Jack Edison (Beckman Instruments). The round robin, consisting of NIST and 15 participants, started in October, 1991, and should be finished in September, 1992. Thread gage standards used are 5-55 UNF, 1/4 – 28 UNF, 1/2 – 20 UNF and 3/4 – 20 UNF. The two sets are now at Navy Gage and Standards Lab in Pomona with four more labs left to participate in the round robin. Jack Edison can be contacted at (714) 773-7746.

The West Coast gage block round robin is to start in September, 1992. The material has been ordered. Contact Mr. Brian Comroy (Toledyne Instruments) for more information at (818) 886-2211, extension 2523.

Five labs have completed the ball plate round robin that began in April, 1992. Dr. Steven Phillips (NIST, Gaithersburg, Precision Engineering Division) reports the effort began with 12 participating laboratories and now six more laboratories are interested in the round robin. The standard used is a custom-built 1/4 m by 1/4 m ball plate. The round robin should be completed by April, 1993. Inquiries may be made to Ms. Karen Murden (NIST) at (301) 975-3789.

NATIONAL MEASUREMENT REQUIREMENTS

Submitted by Laurie Baker

With the assistance of Wilbur Anson, NCSL Business Manager, copies of the NMRC survey were distributed during the first part of May to the NCSL member delegates who
would normally rely upon NIST for calibration services. Also in May, an article was prepared for Test and Measurement World and submitted to Tony Anderson. The article, soliciting inputs from interested organizations that are not allied with NCSL, should appear in the August issue.

Response to the survey for the past two months is minimal; however, sufficient data has been acquired to develop a pattern of NIST service usage and to reveal common problems among the responders.

For the NMRC workshop at the annual conference in Washington, the individual subcommittees will present a summary of their analysis of the data. We will encourage all in attendance to complete their questionnaires and submit them to the committee even if they do not use NIST services, as negative data is as important as positive. Reasons for not using service may encourage NIST to examine the causes.

**INRINSIC & DERIVED STANDARDS**  
Submitted by Dr. R.B. Pettit

During the last quarter, the committee reviewed and approved the final draft of the Triple Point of Water Cell Recommended Intrinsic/Derived Standard (RISP). The draft was submitted to the NCSL Board of Directors at their May meeting and was approved with only minor revisions. This RISP was published and distributed to all NCSL members in July. In addition, Al Clark of NIST, Gaithersburg, MD has replaced Joe Simmons on the committee.

A workshop on Intrinsic/Derived Standards was held at the NCSL meeting in August. This workshop will discuss current aspects of the committee's activities aimed at developing Intrinsic/Derived Standard Recommended Practices. The following talks were given:

1. Richard B. Pettit, Sandia National Laboratories  
   Status Report on the NCSL Intrinsic/Derived Committee
2. Paul D. Levine, Lockheed Missiles and Space Co., Inc.  
   Practical Realization and Measurement of the Water Triple Point
3. John Ball, U.S. Army, Redstone Arsenal  
   Army Intrinsic Standards Initiative
4. Allen Clark, NIST, Gaithersburg  
   What Really is an Intrinsic Standard?

A committee meeting was held at the NCSL Conference in Washington, D.C.

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**VP EDUCATION & TRAINING**  
Charlie Sides

E&T milestones and outstanding action items are complete; however, no progress has been accomplished regarding support to Tony Anderson for publication of an article in Test & Measurement World on the need for formal metrology/measurement science education.

With regret, I must announce the resignation of Dr. Chuck Dale as Chairman of the Education System Liaison Committee. I have followed up on Chuck's recommended replacement.

**TRAINING RESOURCES**  
Submitted by Bill Sorrells

Quarterly activity of the Training Resources Committee has been somewhat limited due to company workload. I have accomplished a few milestones.

1. We are beginning to receive some feedback on the quality, availability and timeliness of the training material in the library. A survey letter is sent with each item loaned from the library. The users of the material are requested to complete the survey. We should, after some samples begin to make recommendations on material which should be either eliminated or at least provide a cautionary note in the Training Information Directory.

2. I have requested a separate area for the Training Resource Committee on the NCSL BBS. I propose to use this area to:
   a. Supply a bibliography of metrology related literature. I hope to have users of the BBS to add to this list with good reference material titles.
   b. As a means of discussing training requirements and needs in an open forum.

**TRAINING INFORMATION DIRECTORY**  
Submitted by Dave Lorenzen

We have been active on the 1993 edition of the Training Information Directory. Although conflicts have prevented our committee from a face to face meeting, we have been communicating by telephone and are making plans for our activities leading to the next publication. Our annual solicitation letter to training course sponsors will be in the mail next week.

**PERSONNEL TRAINING REQUIREMENTS**  
Submitted by Rich Hyman

Rich was unable to provide a written report. He reported verbally that no activity has transpired during this reporting period.

**EDUCATION SYSTEM LIAISON**  
Submitted by Dr. Chuck Dale

It is with great regret that I must resign my position with the NCSL. However the College has a change in administration.
Committee Reports

and the new administration does not feel it can honor all of the commitments of the previous administration.

* * * * * *

**VP INDUSTRIAL PROGRAMS**
Randall Seefeldt

**BIOMEDICAL & PHARMACEUTICAL METROLOGY**
Submitted by Russ Roberson

The committee scheduled meetings and sessions at NCSL 92 Conference.

**MEDICAL METROLOGY**

Appointed John Miche, Marine Instruments, Chairman.

**EQUIPMENT MANAGEMENT FORUM**
Submitted by Paul Chong

Conference Sessions:

1D A Process Management Approach to the Acquisition of USAF Measurement Standards by Major Steve D. Doherty, USAF.


3D Object Cataloging, Communications and Asset Management System by Charlie Motzko of Electro Rent Corporation.

4D ISO 9000 and EMF by Rick Allor of TRW Space & Defense.

EMF Steering Team Status:

Another sign of the changing economy and it's not over yet. The following subcommittee members have been lost due to layoff or job reassignments: Dee Ayre, Warren Hagemeier, Dale Kemper, Robert McFarland, Ron Oakes and Lee Washington.

I intend to schedule an EMF Steering Committee meeting in the September-October time frame with those who can travel and invite others to participate. My agenda will include "where do we go from here?", '93 NCSL Program and Long-Range Plan.

**UTILITIES**

Gary Shuler presented report at BOD meeting.

The committee is scheduled for meeting at NCSL 92 Conference.

**PETROLEUM INDUSTRY METROLOGY**

Have contacted several candidates for chair and will be appointing in near future.

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**VP CALIBRATION SYSTEMS MGMT**
William Quigley

Frank Bandy, Chairman of Laboratory Facilities Committee (32.0), is bringing this committee back up to speed and also monitoring Environmental Issues and related regulations for impact on our profession.

Requested that Mack Van Wyk, Equipment Documentation Committee (33.0) Chair, provide the Secretariat with Test Equipment Operations and Maintenance manual RP in Word Perfect 5.1 format. Mack and his committee have been performing a super job on this RP!

Wade Keith has recruited 4 new and 1 returning members for the Calibration Systems Committee (34.0). He is working to structure the salary survey for 1992 to include his bench marking initiatives. Wade reported on his activity to the board.

I am pleased to report that Dr. Howard Castrup has agreed to chair the Calibration Intervals Committee (35.0). Frank Butz informed me that due to business pressure he could no longer devote the time required of a committee chairman. Frank will report on the past quarters activity in person to the board.

No report was received from Leroy Britian of the Laboratory Evaluation Committee (31.0). This committee has a good synergy with the TQ Committee on Calibration System Requirements & I plan to work on some integration of activity in the next quarter.

**LABORATORY FACILITIES REPORT**
Submitted by Frank Bandy

Received package from previous Committee Chairman on 07 May. Floppy disks received with draft of RP-7. Editing of RP-7 will begin when new disks are received.

Submitted "Electrical Utility Selection" article for NCSL Newsletter along with several articles from trade magazines concerning the pending elimination of CFCs and HCFCs used for lab cleaning and fire suppression.

**EQUIPMENT DOCUMENTATION COMMITTEE**
Submitted by Mack Van Wyk

The committee met on May 12-13 at Hewlett-Packard in Englewood, Colorado. Greg Burnett was our host.
I am pleased with the progress we achieved toward our goal of developing a recommended practice for test equipment operation and maintenance manuals. We added the missing sections, and reviewed and edited the entire document. The document is complete except for an example operation and maintenance manual. Look for a draft copy of the RP in July.

The next meeting of the Equipment Documentation Committee will be at the 1992 NCSL Workshop and Symposium in Washington, D.C.

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TQM COMMITTEE ON CALIBRATION SYSTEMS REQUIREMENTS

The TQM Committee on Calibration Systems Requirements met on July 21-22, Scottsdale, Arizona. There were 26 attendees representing government and industry.

CHAIRMAN'S REPORT

Gary Davidson reported the status on NCSL becoming an ANSI standards writing body, and the status and plans for the panel session at the annual conference. He also relayed concerns expressed by Rolf Schumacher who was unable to attend the meeting. Rolf opposes the committee's proposed standard where it goes beyond I.S.O. Guide 25 and overlaps ANSI/ASQC M1. The committee's current position is that ANSI/ASQC M1 should be allowed to expire at the end of this year.

ASSESSMENT OF INTERNATIONAL ACCEPTANCE

Joe Simmons and Peter Unger provided a current perspective on acceptance of our standard by the international community. All aspects are positive.

NIST/NVLAP & A2LA STATUS

Joe and Peter provided an update on the progress of accreditation activities respective to the committee in their organizations. Joe reported that a public meeting will be held by NVLAP to review accreditation for DC Voltage — probably late in August — has to be advertised in the Federal Register.

REVIEW OF PROPOSED U.S. NATIONAL STANDARD

The June 22, 1992 version of the committee's standard was reviewed in a workshop format. This draft standard is in the format (based on and largely verbatim) of I.S.O. Guide 25, General Requirements for the Competence of Calibration and Testing Laboratories, I.S.O. 10012.1, Calibration System Requirements, and EN45001, General Criteria for the Operation of Testing Laboratories. This draft standard is in three parts:

Part I gives the general requirements for the competence of calibration laboratories in accordance with ISO/IEC Guide 25.

Part II gives additional requirements for an accredited calibration laboratory in accordance with EN45001.

Part III gives the quality assurance requirements in accordance with ISO 10012.1 (direct overlap with ANSI/ASQC M1).

The committee had three versions of Part III to consider: Option 1 was based on MIL-STD-45662A with modifications submitted by Frank Flynn, Option 2 was based on I.S.O. 10012.1, Calibration System Requirements, Option 3 was based on MIL-STD-45662A with modifications by Joe Simmons and Ralph Johnson. To maintain international comparability, Option 2 was selected. The committee then worked on "Americanizing" Part III using the principles of consensus development. Joe Simmons will prepare a new draft incorporating the changes developed by the committee.

STATUS REPORTS FROM THE AGENCIES

Robert Burdine (NASA), Wes McEleaveen (Army), Frank Flynn (Air Force), Peter Strucker (Navy), and Ray Conchieri (DLA) gave a status report related to the committee's work within their respective agencies. Ray Conchieri also provided an update on the latest DOD policy on third party. Ralph Johnson reported for DOE and Gary Davidson provided updates from Tony Mendiola (NRC), Mike Schneible (FAA), and William Hummer (FDA). All are still supportive and working the issues within their organizations. It is worthy to note that where the FDA was originally opposed to recognizing calibration laboratory accreditation, they are now exploring the issue which may result in a positive outcome for recognition.

Wes McEleaveen also commented on FAR Part 10 that deals with the use of industry standards in lieu of MIL-STD's.

SMALL BUSINESS PERSPECTIVE

Barbara Tzur-Jenks reported on the data she collected regarding concerns of calibration laboratories that fall in the small business category.

The primary concern was that accreditation will become a de facto requirement (won't be optional), and will price them out of business. She raised the possibility of an assistance program for small business like some other countries have done, and a payment plan. She also expressed concern that the small business sector was not aware of what was happening in this arena and that we need to do a better job of education. Barbara projected the possibility of a two tier system - large companies that have and small companies that won't. Joe Simmons reported that there was already a precedence for a payment plan within NIST. There was no course change which developed out of the discussion — largely due to the fact that much of what the committee is doing is being driven by outside sources (international market place, etc.). No actions resulted from the discussion, however, the
Committee Reports

The committee is sensitive to the issues and will appreciate Barbara’s further input.

**AFFECTED RPs**

Bob Smith presented a table of NCSL RPs that are affected by this committee’s actions.

**SUPPORT OF ACCREDITATION PROGRAM DEVELOPMENT**

There was insufficient time to cover this subject at the meeting. This will be a future agenda item.

**CONFERENCE**

A general session was held at the 1992 NCSL Workshop and Symposium, August 6, 1992. The two hour session was chaired by Gary Davidson and panelists included:

- Robert Burdine – NASA
- Peter Key – NAMAS/WECC
- Richard Pettit – Sandia (representing DOE)
- Joe Simmons – NIST
- Peter Strucker – Navy
- Peter Unger – A2LA
- Peter Yurcisin – ANSI

Each panelist made a five to ten minute presentation and then the floor was given the opportunity to provide comments and ask questions. The session was well attended and discussion was lively.

**ANSI/ASQC M1 MEETING**

The ANSI/ASQC M1/M2 writing group met on August 6, 1992. After a lot of debate on the documents and their future, Gary Davidson made a motion the ANSI/ASQC M1 be allowed to expire at the end of this year, and be held in abeyance, and until its mission can be fully defined. The motion carried, however, a quorum was not present. Rolf Schumacher, chairman, is supposed to present the issue to the rest of the committee for a full vote.

**ATTENDEES**

Leon Barnes
Robert Burdine
Ray Conchieri
Gary Davidson
Jack Ferris
Michael Flora
Frank A. Flynn
Dan Harper
Ralph Johnson
Peter Lacy
W.G. Turk Levy
Wesley McElveen
Dennis Pinnecker
Bill Quigley
Carl Quinn
Richard Randall
Geery Reeve
Joe Simmons
Bob Smith
Doug Smith
Bill Sorrells
S. Wayne Stiefel
Peter Strucker
Barbara Tzur-Jenks
Peter Unger
Bob Weber
Leon Barnes – Allied Signal Aerospace
Robert Burdine – NASA
Ray Conchieri – Defense Logistics Agency
Gary Davidson – TRW Inc.
Jack Ferris – Consumers Power Co.
Michael Flora – YSI Inc.
Frank A. Flynn – AGMC/MIL(2)
Dan Harper – Tektronix, Inc.
Ralph Johnson – Sandia National Labs.
Peter Lacy – Wiltron
W.G. Turk Levy – Sandia National Labs.
Wesley McElveen – U.S. Army TMDE Activity
Dennis Pinnecker – Rockwell International
Bill Quigley – Hughes Aircraft
Carl Quinn – SIMCO Electronics
Richard Randall – GE Electronics Service
Geery Reeve – NIST
Joe Simmons – NIST
Bob Smith – Loral Aeronautic
Doug Smith – Abbott Laboratories
Bill Sorrells – Hewlett-Packard
S. Wayne Stiefel – NIST/NVLAP
Peter Strucker – Naval Warfare Assessment Center
Barbara Tzur-Jenks – Brylen Technologies
Peter Unger – A2LA
Bob Weber – Lockheed Missiles & Space Co.

Gary M. Davidson, TQM Committee Chair

Editor’s Note: Some attachments are available from the author.

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The NCSL Measurement Assurance Program (MAP) committee will meet at Measurement Science Conference (MSC).

Jan 21, 1993
5-7 P.M.
Anaheim Marriott
Room TBD
POC: Mike Cruz, Chairman
(619) 545-9705
NCESL PRESIDENT BOB SMITH DISCOVERS ANOTHER NATIONAL MEASUREMENT SYSTEM

In the April 1992 NCSL Newsletter, I discussed some Paradigm Shift challenges, one of which had to do with being pro-active in helping the U.S. to convert to the Metric System, and be more in line with the rest of the world, and have a single world wide measurement system.

Hang on to Your Hats!

There are other systems in use. One is the "Country System". My sister, Jackie Waitley from Iliff, Colorado sent me the following article, in which her friend Gary Hodgson describes the system in use in Northeastern Colorado as well as other cattle and farming areas.

"The Country System"
by Gary Hodgson

There is a movement across the country to change the way we measure, weigh and calculate things. It seems that the American way of using acres, gallons, inches, pounds, and such is too confusing to the rest of the world. All the other guys, you see, are using hectares, meters, liters and grams to figure things out.

I suppose this is kind of confusing to most people, but to some of us it's not a big deal. If you live on a farm or a ranch or around livestock, you're already used to having a different system to weigh and measure.

For years livestock people have used a system of weights and measures different from the American or the metric system. For lack of a better name I'll call it the "Country System." I have used the "Country System" for years. Most of you have too, you just didn't know it. Right here in the heart of America we developed our own unique set of measurements.

Our system is based on several different units. First is the gallon. No, not the gallon you know based on four quarts. Our gallon is based on a three pound coffee can. These usually red containers are the basis for our volume measurement in the "Country System." They don't hold a traditional gallon but the coffee can is our standard unit of measurement. When anyone feeds a gallon of grain to their horse, you can bet it's a three pound coffee can full.

Now the problems start. The next measurement is five gallons (used by people with pigs or lots of horses) . . . but there are six three pound coffee cans in a five gallon bucket. Then there's our standard unit of weight measurement . . . the flake. This is a portion of a bale of hay universally recognized in the "Country System." The number of flakes in a bale vary according to the machinery used to bale it, moisture content and other factors, I'm told. However, describe feeding the bucket calves in flakes of hay and anyone from the country will understand. This unit has been rather confusing lately with the advent of the big one ton hay bales!

Finally, our area measurement is the ground needed to run one cow on pasture. Called the cow unit, ranchers sell by it, pastures get rented, evaluated and traded based on it. A cow unit, however, can vary from less than one acre on a farm in Greeley, Colorado to about 160 acres in parts of Utah.

I hope the National Bureau of Standards, the people who standardize our weights and measures, have preserved a three pound Folgers coffee can, a flake of North Park grass hay and a cow unit in Roswell, New Mexico. There is an entire industry which considers these units to be internationally understood. Keep your grams and centimeters, just go throw my horse two flakes of hay and half a gallon of grain please.

The Weather Channel Calendar, Wednesday, July 8

Not to be outdone, the Weather Channel has a thermometer for which I hope NIST is maintaining artifact standards.

"Use a cricket for your thermometer."

Count the number of cricket chirps in 14 seconds and add 40. This will give you the temperature at ground level in Fahrenheit. The temperature may be 2 to 3 degrees warmer up around your head. The chirping of crickets seems to be influenced or regulated by the air temperature.

Robert R. Smith, 1992 NCSL President

HOW WILL U.S. COMPANIES BE AFFECTED BY THE LAW THAT MANDATES GOVERNMENT CONVERSION TO METRIC USAGE BY 1992?

"The law passed by Congress states that government agencies must use the metric system by 1992 in conducting business except where "such use is impractical or is likely to cause significant inefficiencies."

Those companies that sell any type of product or service to the government should begin plans to convert to metric system usage so they can supply metric goods and services by the 1992 deadline.

This means that government contractors also should alert their vendors (of parts, components, containers, raw
materials, etc.) that their vendors should prepare to furnish those commodities to metric system measurements by the date the government contractor plans to begin metric production.

Exporters now are required to follow metric-system-usage requirements of the internationally approved Harmonized Tariff System (HTS) in all dealings with U.S. Customs. The European Community (EC) also states that, by 1992, it is barring entry (into the 12 EC nations) of products manufactured to non-metric standards.

Companies that do not deal with the government (and do not manufacture parts, components, or other goods for government contractors or for export) probably will not be affected for some time by the government and EC requirements to go metric. However, the firms not involved in any way with providing goods to the government or to overseas customers should investigate the following:

* Determine whether any of the vendors that now supply them with parts, raw materials, or other items also may be producing these items for government contractors.

* If these vendors also service government contractors, consider the possibility that these vendors will find running two production lines too costly (running one production line for metric goods and another for inch-pound products). Also consider that these vendors can incur additional expenses, with two production lines, due to mix-ups in parts, wrong machine settings, other human errors, and the extra warehousing costs when stocking metric and inch-pound sizes of the same products.

* Decide whether there is a probability that these vendors eventually will go to solely metric production, then monitor this possibility, and be prepared to include a transition to metric in your own company’s future plans.

We invite you to join the U.S. Metric Association so you can keep up with metric developments via its bimonthly newsletter that goes to all members. (An envelope with 52 cents in stamps on it will bring you a sample copy of the newsletter.)

** NOTICE **

USMA MEMBERS WITH COMPANY/AGENCY MEMBERSHIPS

Those with individual membership not included may obtain this organization’s guidelines for companies considering conversion to metric usage by requesting it from:

USMA HQ
USMA, 10245 Andasol Ave, Northridge CA 91325

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** FLUROPOLYMERS DEVELOPED FOR ELECTRONIC CIRCUIT BOARDS **

Researchers at the Naval Research Laboratory in Washington, D.C., have developed a processable fluoropolymer resin used in circuit boards that require a low dielectric constant and high glass transition.

Some of the advantages of this fluoropolymer are a dielectric constant below 3.0 over a wide frequency range; a glass transition temperature as high as 240 °C; a processability comparable to conventional prepreg resins; an excellent reinforcement wetting attributed to low surface tension of liquid resources; a curing similar to conventional epoxies; and a very low moisture sensitivity.

The most obvious and immediate markets for the fluoropolymer are electronic printed circuit and composite component board manufacture in which the low-dielectric constants would enhance the performance and the high glass transition temperatures would aid construction.

From the U.S. Navy Technology Transfer Fact Sheet.

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** INFORMATION SYSTEMS **

By: Barry Charbonneau

Reprinted from the GIDEON Newsletter

The following is a listing of commercial and Government information systems which will be published periodically
in the GIDEPE Newsletter. These information sources could
provide GIDEPE representatives or their organizations with
invaluable information when researching ALERTs, DMS
cases or day to day transactions. The information provided
varies from reference numbers, part numbers, National Stock
Numbers, descriptors, specifications, standards, data sheets,
cross-reference and procurement information.

The use of these systems is cost effective, as most are CD
ROM based or provide Modem access, and save considerable
research time. In many cases they will replace the
requirement for maintaining a library of hard copy
information or the use of a microfiche reader to access
information. The costs for these systems vary depending on
options and equipment required. The information base for
most of these systems is obtained from the DLA (Defense
Logistics Agency), therefore many of these systems are similar
in nature and content and individual requirements will dictate
which system is most suitable for your organization.

This initial listing will be updated as more systems become
available. If you have additional information which can be
added to this listing, please contact Barry Charbonneau, 7C,
NDHQ Ottawa, Canada, phone (613) 992-7311, FAX (613)
992-9138.

Government Sponsored Systems (No Cost)

MOMS — Microcircuit Obsolescence Management System,
2400 Baud modem access. Naval Avionics Center
Indianapolis, Indiana. (317) 351-4991 or DSN-369-4991
(data) (317) 353-7695 (voice) John McCoy.

DESC BBS — Defense Electronics Supply Center, Dayton,
Ohio. 2400 Baud modem, Mil Specs, Mil Standards, Qualified
product lists, (513) 296-6046 (data).

Commercial Information Systems

CAPS — Cahners Publishing provides data sheets, cross
reference specifications, price availability, upgrades, generic
listings tech. for most microcircuit and semiconductor
manufacturers. Optical disk based (approx. 40 disks).
Contact Cahners at 275 Washington St., Newton,
MA 02158-1630. Phone (617) 558-4960, (800) 245-6696, FAX (617) 630-
2168.

ILS — Inventory Locator Service, 2400 Baud modem access,
provides most DLA information with description, price
quotes and overhaul info. 3965 Mendenhall Road, Memphis,
TN 38115. Phone (901) 794-4784.

USA INFO — USA Information Systems provides most DLA
based information with specially information relating to Zip
code, locations, manufacturers and distributors information
and much more. CD ROM system with three disks. 1092
Laskin Road, Suite 208, Virginia Beach, VA 23451. Phone
(313) 879-4681.

IHS — Information Handling Services products include
Haystack, VSMF, DOMS. DLA based information in CD
ROM or modem access. IHS also handles the VSMF product
line on video reels or CD ROM. Inverness Business Park, 15
Inverness Way East, Englewood, CO 80112. Phone (303)
790-6600.

PARTSMASTER — Partsmaster information and format is
similar to USA Info Systems and Haystack with CD ROM
and modem access. 1200 Quince Orchard Blvd, Gaithersburg, MD 20878. Phone (800) 638-8094.

TACTECH — TACtech is exclusively used for tracking
microcircuit obsolescence and will load and track all
microcircuits used in assemblies or systems, providing
periodic outputs whenever a microcircuit is in danger of being
discontinued. TACtech will provide alternate sourcing.
22700 Savi Ranch Parkway, Yorba Linda, CA 92686. Phone
(714) 974-7676, FAX (714) 921-2715.

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THE SECOND ANNUAL BAY AREA
QUALITY CONFERENCE

Oct. 28-30, 1992

Red Lion Inn
San Jose, CA

Transformational Quality
* Visionary leadership
* Global partnership & delighted customers

Western ASQC Conference
* The continuing Journey to Total Quality Mgmt.
* Including dinner & CEO panel discussion.

CONTACT: Hot Line, (408) 980-7470
NIST PRODUCES NEW STANDARD FOR COORDINATE MEASURING MACHINES

The Precision Engineering Division has produced a standard to be used for the probe evaluation of coordinate measuring machines. It consists of a 6-mm carbide ball, which has been tested for roundness, mounted in a stainless steel holder. The absolute diameter of the ball is also provided, which allows the user to test for probe lobbing.

The standard is being evaluated as a potential artifact to be sold through the Standard Reference Materials Program. It was exhibited in the NIST Calibration booth at the Quality Show in Chicago, April 28-30.

Contact: Ralph Veale, (301) 975-3520

FUTURISTIC CRANE NOW READY FOR APPLICATIONS

Strong, agile, and jack-of-all-trades when equipped with the right tools, a novel robot crane developed at NIST is ready to be put to work – on Earth or even another planet. Unlike standard cranes, the NIST device can lift more than five times its weight and precisely maneuver loads over a large working volume. Suspended by six cables from the center of its octahedral frame, the crane's triangular platform moves about six axes. It rigidly retains its position, even when tilted at angles. As a result, loads are remarkably stable. The crane features a "Stewart platform," named for the English engineer whose 1965 design of a mechanical platform has served as the basis for the aircraft simulator. Researchers envision many applications for the versatile technology – conventional construction, deep-sea drilling, cleanup of toxic and radioactive waste sites, and even extraterrestrial exploration and construction. Several mobile and stationary prototypes have been built to demonstrate the crane technology's capabilities to potential users. For more information, contact James Albus, B124 Metrology Bldg., NIST, Gaithersburg, MD 20899, (301) 975-3418.

NIST ALGORITHM TO BE USED IN IEEE STANDARD

At a recent meeting, the Waveform Measurements and Analysis Committee (TC-10) of the Institute of Electrical and Electronics Engineers’ (IEEE) Instrumentation and Measurement Society adopted a sine wave curve-fitting algorithm developed by the Electricity Division as a replacement for an existing method incorporated in IEEE Standard 1057, “Trial Use Standard for Digitizing Waveform Recorders.” The new algorithm, the work of division members Donald R. Flach and T. Michael Souders, was selected because it converges with fewer iterations than the present method and is simpler to implement in software as a result of its use of high-level matrix operations. When the algorithm operates on data records containing only one or two sine-wave periods, it converges with dramatically fewer interactions than the original algorithm.

In related action, the committee determined that following completion of the revisions to Standard 1057, it would undertake a comprehensive rework and expansion of the IEEE Guide to Waveform Recorder Testing, to be issued by the IEEE Standards Board as a companion to Standard 1057. Souders is chairman of TC-10.

CONTACT: Barry A. Bell, (301) 975-2419

- 50 -
A NEW STAGE MICROMETER FOR SCANNING ELECTRON MICROSCOPY SRM 484H

The electrodeposition group, in cooperation with the Standard Reference Materials Program is producing a new standard to calibrate the magnification on an SEM. This new micrometer differs from the old standard (still available) in that the smallest line spacing is now 0.50 µm, whereas the older standard has 1.0 µm as the finest spacing. The standard is made by electrodepositing very fine lines (layers) of gold between relatively thick layers of nickel. Certification of the line spacing is conducted on an SEM equipped with a laser interferometric measuring system.

CONTACT: Elaine Soltani, (301) 975-6408.

"RECIPE" FOR STANDARD DIPOLE ANTENNA AVAILABLE

Companies and laboratories testing products for electromagnetic (EM) compatibility will be interested in a new publication that describes and diagrams a spherical dipole radio-frequency antenna designed by NIST researchers as a standard EM source. The antenna effectively determines the accuracy of measurement systems used to quantify unintentional EM emissions from a variety of electronic products and devices. The publication, Standard Spherical Dipole Source (NIST TN 1351), describes the theoretical basis and the design considerations of the NIST antenna. It contains circuit descriptions and construction details, including numerous circuit diagrams. TN 1351 is available for $26 (print) and $12.50 (microfiche) prepaid from the National Technical Information Service, Springfield, VA 22161, (800) 553-6847. Order by number PB 92-187020.

CONTACT: Fred McGehan (Boulder), (303) 497-3246

1992 ANNUAL DIRECTORY OF ACCREDITED LABS AVAILABLE

U.S. manufacturers, exporters, construction engineers, building owners, users of computers and telecommunications equipment, and procurement and regulatory officials will be interested in the 1992 Directory of Accredited Laboratories (NIST SP 810), which lists approximately 1,000 domestic and foreign laboratories that are accredited by the NIST National Voluntary Laboratory Accreditation Program (NVLAP) for specific test methods as of April 1, 1992. The current fields of testing are acoustical, asbestos fiber analysis, carpet, commercial products (paint, paper, plastics, plumbing, and seals and sealants), computer applications, construction materials, electromagnetic compatibility and telecommunications, ionizing radiation dosimetry, solid fuel room heaters, and thermal insulation. The labs are listed alphabetically, by field of testing and by state. Send a self-addressed mailing label to: NVLAP, Rm. A162, Bldg. 411, NIST, Gaithersburg, MD 20899, (301) 975-4061, FAX: (301) 926-2884.

CONTACT: Roger Rensberger, (301) 975-2762

WORKSHOP TO EXAMINE NEW MIXED-SIGNAL TEST STRATEGY

For many electronic components and instruments, it is not physically or economically feasible to undertake exhaustive testing of all possible performance parameters. Previous efforts to develop shortened test regimens have shown varied results. However, a new NIST technique shows much promise as an abbreviated method that provides both economy and accuracy in mixed-signal device testing. NIST will examine these testing strategies, already being implemented in production line tests of integrated circuits, at a workshop Dec. 1-3, 1992, in Gaithersburg, MD. The workshop is intended for engineers, calibration lab managers and others interested in improving test efficiency for analog or mixed-signal products. The workshop will introduce a small set of practical mathematical tools, emphasizing implementation using commercial software rather than mathematical development. Cost of the three-day workshop is $750. For more information, contact T. Michael Souders, B162 Metrology Bldg., NIST, Gaithersburg, MD 20899, (301) 975-2406, FAX: (301) 926-3972.

CONTACT: John Henkel, (301) 975-2765

STATE TECHNOLOGY TRANSFER PROPOSALS SOUGHT

Approximately $600,000 is being offered by NIST to state agencies starting programs to improve the competitiveness of small and medium-sized businesses through the application of new technology. According to an Aug. 3 Federal Register notice, NIST invites proposals in any of three general types of technology assistance: a coordinated technology extension program to assist businesses in identifying appropriate new technologies; a new technology assistance or industrial modernization service to help businesses apply new technologies; or a program to help businesses take advantage of services provided by one of NIST's seven regional Manufacturing Technology Centers. NIST will contribute a one-time award of up to $100,000 (covering up to 50 percent of the start-up funds) for each project selected. Proposals must be received by Sept. 17, 1992. For more information, contact Gale Morse, Technology Services, A345 Physics Bldg., NIST, Gaithersburg, MD 20899, (301) 975-3086.

CONTACT: Michael Baunt, (301) 975-2763
HAVE YOU HEARD? NEW NOISE STANDARD DEVELOPED

NIST has created a new portable standard to evaluate the accuracy of phase modulation (PM) and amplitude modulation (AM) noise measurement equipment at 5, 10 and 100 megahertz, as well as the noise floor (minimum level of noise) for such devices. The new standard should benefit both companies that make equipment for calibrating noise measurement equipment and industrial laboratories (such as those in the aerospace industry) that conduct these calibrations. Previously, calibration equipment had to be sent to NIST for accuracy and noise floor evaluation, or users had to rely on a manufacturer's specifications. Comparisons of measurement systems in different laboratories using commercially available oscillators as transfer standards were limited to a typical repeatability of plus or minus 3 decibels. The accuracy of the portable standard for both PM and AM noise is plus or minus 0.14 decibel. Additionally, the temperature coefficient is less than 0.02 decibel per Kelvin and the stability is less than 0.4 decibel over one year. A patent is pending for this new standard. A paper, number 35-92, describing the standard is available from Jo Emery, Div. 104, NIST, Boulder, CO 80303, (303) 497-3237.

CONTACT: Fred McGehan (Boulder), (303) 497-3246

"HOW-TO" GUIDES AVAILABLE FOR SHOP AUTOMATION

Machine shops and other small manufacturers can learn about assessing equipment needs, evaluating computer-aided design programs and implementing new automated technology from three new publications from NIST's "Shop of the 90s." The guides are In-House Machine Tool Evaluation (NISTIR 4772), An Evaluation Tool for Wireframe CAD Software (NISTIR 4813), and Implementation of a CAD/CAM System for Small Machine Shops (NISTIR 4810). Advice and information presented are based on experience gained during modernization of the NIST machine shop and field work with Baltimore's Ray V. Watson Co. Also available is a summary (NISTIR 4786) of the first three years of "Shop of the 90s" programs helping the nation's 125,000 small job shops automate with existing, affordable technology. While supplies last; single copies of the guides and project summary are available at no charge by writing the Shop of the 90s, Rm. 136, Shops Bldg., NIST, Gaithersburg, MD 20899. Multiple copies are available from the National Technical Information Service, Springfield, VA 22161, (800) 553-6847. Order NISTIR 4772 by number PB 92-164664, NISTIR 4813 by number PB 92-181113, NISTIR 4810 by number PB 92-181098, and NISTIR 4786 by number PB 92-172774.

CONTACT: Mark Bello, (301) 975-3776

RF/MICROWAVE MEASUREMENTS SUBJECTS OF PAPER

Electrical engineers will be interested in a new paper updating the current status of precision radio frequency (RF) and microwave measurements. It summarizes the principles and present status of microwave measurements in scattering parameters, noise and power. Topics covered include calibration methods for automatic network analyzers, on-wafer MMIC (monolithic microwave integrated circuit) measurements, microcalorimeters and other methods of high-accuracy measurements for power, and various radiometric techniques for noise measurements. The paper contains an extensive bibliography for those wishing information in more depth. For a copy of the paper, which was published in a special issue of Metrologia (May 1992) prepared for the 1992 Conference on Precision Electromagnetic Measurements held June 9-12 in Paris, France, contact Jo Emery, Div. 104, NIST, Boulder, CO 80303, (303) 497-3237. Ask for paper number 25-92.

CONTACT: Fred McGehan (Boulder), (303) 497-3246

NEW CHAMBER DEVELOPED FOR EMC TESTING

NIST is developing a new chamber for testing electromagnetic compatibility, vulnerability or shielding effectiveness that combines the transverse electromagnetic (TEM) cell with the mode-stirred chamber. The frequency range of testing is from 1 kilohertz to 18 gigahertz. The facility consists of an asymmetric TEM cell (1.01 meters by 1.2 meters by 2.98 meters) with two cavity mode tuners, configured as a TEM transmission line-driven, mode-stirred chamber. Taken separately, the TEM cell and mode-stirred chamber have certain limitations in frequency; the TEM cell is limited to frequencies below a few hundred megahertz while the mode-stirred chamber is restricted to frequencies above this level. By developing a single facility, the testing can be done over the combined frequency ranges, saving both time and money. A paper discussing the facility's design, advantages and limitations for use, and the theoretical basis for its operation is available from Jo Emery, Div. 104, NIST, Boulder, CO 80303, (303) 497-3237. Ask for paper 21-92.

CONTACT: Fred McGehan (Boulder) (303) 497-3246

NEW INSTRUMENT MEASURES HIGH TEMPS AT HIGH SPEED

A new NIST high-speed pyrometer (an instrument for measuring extreme heat) is available for researchers and engineers needing quick and accurate readings of very high temperatures. The portable pyrometer can measure temperatures between 1500 °C and 4000 °C at a rate of 10,000 times per second with an accuracy of plus or minus 5 °C to
SUMMERTIME TO STRETCH FOR AN EXTRA SECOND

Americans will savor a little more summer this month when the world's timekeepers gave us an extra second. At precisely 23 hours, 59 minutes, 59 seconds UTC (Coordinated Universal Time) or 7:59:60 p.m. EDT on June 30, 1992, one second was added to the world's time in order to keep super-accurate atomic clocks in step with the Earth's rotation. In the United States, this correction was made in atomic timekeeping systems at NIST in Boulder, CO, and the U.S. Naval Observatory in Washington, D.C. It marks the 17th "leap second" that has been inserted into atomic clocks since 1972. Usually, the seconds are added on December 31; the last time a second was inserted on June 30 was in 1985. The correction is needed because the Earth is a poor "clock" compared with modern atomic clocks. The Earth's rotation is only constant to about one-thousandth of a second per day, while atomic clocks have an accuracy of on-billionth of a second per day.

CONTACT: Fred McGehan (Boulder), (303) 497-3246

LAB ACCREDITATION PROGRAMS GUIDE AVAILABLE

The Directory of Professional/Trade Organization Laboratory Accreditation/Designation Programs (NIST SP 831) is designed to help officials in commerce, industry and government locate private sector laboratory accreditation and similar programs for the testing of products and services. The guide lists 48 private-sector organizations that accredit or designate more than 9,000 labs and other entities to assist professional societies, trade associations and related certification bodies in carrying out their responsibilities. Fields of test include acoustical, vibrational, biological, mechanical, medical, metrology, non-destructive, optics and photometry, and thermal. Copies of SP 831 are available for $7.50 prepaid from the Superintendent of Document, U.S. Government Printing Office, Washington, D.C. 20402-9325, (202) 783-3238. Order by stock no. 003-003-03144-5.

CONTACT: Roger Rensberger, (301) 975-2762

REPORT EXAMINES HOW MEASURING DEVICES AFFECT FLOW

Orifice plate flowmeters are among the most common flow measurement devices used in the natural gas and chemical processing industries. With billions of dollars in revenue dependent on accurate flow metering, the Gas Research Institute has sponsored a number of NIST studies evaluating different aspects of orifice plate measurement techniques. The most recently published study determined that certain types of flow conditioners provide better flow measurement...
CONTACT: Collier Smith (Boulder), (303) 497-3198

NEW FASTENER WORKSTATION DEBUTS

A productivity boost of 300 percent and longer tool life are among the benefits expected from installation of a NIST flexible computer-integrated workstation at the Portsmouth (N.H) Naval Shipyard. Adapted by NIST and shipyard personnel with help from the Brown and Sharpe Manufacturing Co. and Johnson Gage Co., the workstation makes high-precision bolts and other fasteners for U.S. submarines. These parts, made from hard-to-machine alloys, must meet demanding specifications as failure risks the loss of vessels and crew. The automated workstation features a NIST-developed process-control system that adjusts the machining process to compensate for tool wear, temperature-caused changes and other machining errors. Error-compensation software keeps parts within the Navy's specifications for safety-critical fasteners, reducing defect rates to almost zero. This technology can be applied to most machine tools and manufacturing operations. For more information, contact Don Blomquist, B106 Sound Bldg., NIST, Gaithersburg, MD 20899, (301) 975-6600.

CONTACT: Mark Bello, (301) 975-3776

CONSORTIUM TO DEVELOP CERAMIC MACHINING DATA

Ten manufacturers that produce or use components made from silicon nitride and silicon carbide are joining NIST in a program to develop machining data and guidelines to improve grinding processes for advanced structural ceramics. The consortium will focus on cost-effective production. Machining information will be developed in two phases. The first calls for consortium members to machine test bars using in-house procedures and then send specimens to NIST for characterization and testing. During the second phase, test bars will be ground in accordance with a detailed plan that specifies grinding wheel type, grinding fluid, wheel surface speed and other conditions. Finished specimens will be tested by NIST for surface quality and fracture strength. Fracture surfaces of selected samples will be examined for critical flaws and probable sources. Two federal research groups are co-sponsoring parts of the effort, and a university is participating in theoretical studies of the machining process. For information, contact Said Jahanmir, A329 Materials Bldg., NIST, Gaithersburg, MD 20899, (301) 975-3671.

CONTACT: Roger Rensberger, (301) 975-2762

FREQUENCY CALIBRATIONS USING LORAN-C EXPLAINED

For companies needing very accurate frequency calibrations at low cost, using the U.S. Coast Guard's LORAN-C long-range navigation system may be the answer. A new paper from NIST explains the system and how it can be used for automated frequency calibrations. LORAN-C is the world's most accurate ground-based radio system, producing a frequency "good enough to meet the requirements of nearly any calibration laboratory," the paper reports. LORAN-C consists of 20 networks of stations (all broadcasting on 100 kilohertz) covering most of the United States, Canada, Europe, the North Atlantic, the Central and West Pacific, and the Philippines and Japan. The NIST paper discusses types of receiving equipment, how to use a certain receiver pulse as the reference frequency, creation of an automated frequency calibration system, and the expected performance from LORAN-C. For a copy of paper 34-92, contact Jo Emery, Div. 104, NIST, Boulder, CO 80303, (303) 497-3237.

CONTACT: Fred McGehan (Boulder) (303) 497-3246

NEW BIOSSENSOR CONSORTIUM SEEKS MEMBERS

Biosensors are small electronic devices that use biological molecules (such as enzymes, antibodies, antigens or nucleic acids) to detect a specific substance. Industry and government scientists are teaming up to hasten the development of advanced biosensors that could change dramatically the laboratory analysis of medical, environmental and industrial samples by the end of the century. More than a dozen companies are joining NIST in the Consortium on Advanced Biosensors (CAB). To meet CAB's goal of fostering biosensor development and commercialization, the consortium will support generic research projects to solve the common problems biosensor producers face. The new organization will hold its first membership meeting Oct. 1, 1992, at the Marriott Hotel, Dulles Airport, Reston, VA. For more information, contact Howard Weetall, Biosensor Technology Group, A353 Chemistry Bldg., NIST, Gaithersburg, MD 20899, (301) 975-2628, FAX: (301) 330-3447.

CONTACT: Linda Fritts, (301) 975-4403
SEVENTEEN SELECTED FOR BALDRIGE AWARD SITE VISITS

Teams of quality experts will visit 17 companies during September as part of the application process for the 1992 Malcolm Baldrige National Quality Award. A total of 90 companies applied for the award, which honors U.S. companies having outstanding quality management systems. Teams composed of five or more members of the award's Board of Examiners will visit each of the 17 companies. These include seven manufacturers, five service companies and five small businesses. During a site visit, team members verify information in the company's award application. They also interview employees and corporate officers, review pertinent records and data, and clarify issues or questions that may have arisen during earlier examinations of the application. Award winners will be selected in October.

CONTACT: Jan Kosko, (301) 975-2767

STANDARDS NEEDS ON DIAMOND FILMS CITED

Foremost among conclusions from a recent NIST workshop on diamond films is the need to characterize methods so that experimental data, measured at different sites by different workers, may be meaningfully compared. At the meeting, producers and potential users of diamond films made by chemical vapor deposition methods, focused on two technical topics: measurement of thermal conductivity or thermal diffusivity for heat dissipation applications, and measurement of mechanical properties of diamond for cutting tools. Researchers gave presentations on topics relevant to commercial applications, and companies described their needs for standards. The workshop was held in response to a recommendation in a NIST report assessing diamond technology in Japan (Workshop on Characterizing Diamond Films, NISTIR 4849) that called for increased information exchanges among members of the U.S. diamond community. NISTIR 4849 is available for $19 prepaid from the National Technical Information Service, Springfield, VA 22161, (800) 553-6847. Order by number PB 92-205426.

CONTACT: Roger Renzberger, (301) 975-2762

NEW DIGITAL SIGNAL GENERATOR COMPLETED

The Electricity Division has completed the final step in software and hardware development of a prototype digital signal generator that will be used as the source for a reference-level inductance bridge and for various power and energy measurement systems supporting formal NIST services. The resolution of the new generator is ±1 part in 100 million in frequency.

CONTACT: Barry A. Bell, (301) 975-2419

IEC WORKING GROUP ON TEMPERATURE SENSORS MEETS AT NIST

The major purpose of a meeting at NIST of members of the Working Group of Technical Committee 65 of the International Electrotechnical Commission (IEC) was to adopt new reference functions and tables for letter-designated thermocouples and for industrial platinum resistance thermometers (IPRTs). The new reference functions and tables for thermocouples are based on the International Temperature Scale of 1990 (ITS-90) and cover the temperature range from -50 °C to 1768.1 °C (the melting-point temperature of platinum). The adoption of these functions and tables for thermocouples and IPRTs for IEC standards by this working group is the first of several such voluntary standards for science and industry that well-known standards-writing organizations will produce as a result of new ITS-90-based results.

CONTACT: Billy Magnum, (301) 975-4808

RUSSELL YOUNG RECOGNIZED BY VACUUM SOCIETY FOR INVENTION OF BASIS OF TUNNELING ELECTRON MICROSCOPE

Russell Young, retired NIST scientist and manager, now an active NIST fellow, is to be awarded the 1992 Gaede-Langmuir Award of the American Vacuum Society "for his invention of the Topogaphiner, an instrument which led to the development of the scanning tunneling microscope." Russell Young conceived, built, and reported the device in the 1960s.
Building a similar device, scientists of IBM-Zurick subsequently obtained a patent on the tunneling microscope and the Nobel Prize in Physics.

CONTACT: Theodore Vorburger, (301) 975-3493

GOLD-PLATINUM THERMOCOUPLES: A NEW HIGH-STABILITY, HIGH-ACCURACY INDUSTRIAL TRANSFER STANDARD

Scientists in the Process Measurements Division recently completed a study of the stability of gold-platinum thermocouples to determine their applicability as accurate and rugged secondary reference thermometers, and as transfer standards at temperature up to 1000 °C. This effort includes the determination of a new highly accurate reference function based on the International Temperature Scale of 1990. This type of thermocouple will be useful for measuring and controlling temperature in semiconductor production, for determination of the efficiency of gas turbines used by electric utilities, for aerospace applications, and for general laboratory and industrial use.

CONTACT: George Burns, (301) 975-4817

EDITOR’S MESSAGE

(Continued from page 2)

adding to your workload. Yet, the central focus of most TQM projects is getting data and taking action. Who else better qualified to take data?

Incidentally, as often happens, I had an informal lunchroom discussion with Dave Cross of Watkins-Johnson Company of Palo Alto, which revealed a clever TQM management technique they use to get middle management involved in walking around and keeping up with what their troops are doing, on a current basis. I asked Dave to write it up and his management agreed to pass it along to us. (See page 30)

3) I also heard in a number of discussions that many of you are getting outside your labs, either looking for other workloads, or pitching your company’s capabilities. Certainly your unique knowledge of measurement science inside your company is an asset that other functional areas should be using, production engineering, qualification testing on parameters like EMI and other.

4) Technology. I sat in on many papers of new technologies. NIST was out in force with impressive insights to new technologies such as quantum-well devices with nanometer dimensions, scanning tunneling microscopes, etc. Dave Braudaway’s new lab at Sandia had some exceptional environmental planning, and he sounded like he would share their thinking for people putting in new installations. The Livermore Labs CMM machine using a bellows-vacuum-path for the laser was innovative. There certainly are many things for NIST and the other international labs to look forward to as communications and semiconductors and superconductors and all those techy systems and devices keep up their inexorable forward pace.

WORDS TO LIVE BY

I wish I could credit the speaker from the Conference who said these words, but the name escapes me. If you recognize yourself here, I will credit you next time. The context had to do with the fact that ANY plan is better than no plan.

If you plan, you’re planning to succeed.

If you fail to plan, you’re planning to fail.

Which reminds me of my old biz school prof who gave us these magic words, having to do with the same context:

Something beats the hell out of nothing! (Which I may have told you before, but at my advancing age, we start repeating ourselves. The concept still applies.)

GOODBYE, (SORT OF) DEAN BRUNGART

Well they just roasted and toasted Dean Brungart at his retirement party in Los Angeles last month. After a lifetime of contribution to our metrology community in organizations like NCSL and MSC and PMA and others, Dean retires from his long-term employer, Teledyne Systems, and goes off to a well-deserved slower paced life.

But NCSL managed to keep a string on Dean, so that he will continue in a smaller, but crucial role managing the NCSL exhibits for the annual conference. We’ll all miss Dean’s counsel in the Board deliberations, but luckily will see him once a year.

John Minck, Editor
A2LA LIAISON REPORT

The May 1992 issue of A2LA News is available for further information on recent activities.

An outline of the Association’s recently established program to register reference materials suppliers and certify their products is available.

Registering Suppliers to the ISO 9000 Standards

The American Association for Laboratory Accreditation (A2LA) has developed a program to certify reference materials. The program consists of three aspects:

1. ACCREDITED LABORATORIES: Data used to verify that the reference materials meet the EPA/A2LA specifications must come from a laboratory that has been assessed to meet the requirements of ISO/IEC Guide 25 on laboratory competence, verified by a reference laboratory which meets the same requirements.

2. REGISTERED SUPPLIERS: The ability of the suppliers manufacturing operations to meet ISO 9001 or 9002 quality standards is determined.

3. CERTIFIED PRODUCT: Data packages from the suppliers for each lot of material for which they seek certification are analyzed to determine if the lot meets the specifications.

What is involved in ITEM 2, “REGISTERED SUPPLIERS”?

Registration is the process of providing a formal recognition that a reference material supplier’s quality system meets the ANSI/ASQC Q91 or Q92 (ISO 9001 or 9002) standard and applicable EPA/A2LA product specifications (RM 01 for neat materials, RM 02 for Synthetics, and RM 03 for natural matrix materials). To date, all suppliers have elected to be assessed against ANSI/ASQC Q91 which contains a design and after sales servicing elements as well as production elements. (Ed Note: Get details from A2LA)

Peter Unger, A2LA Liaison Delegate

OIML LIAISON REPORT

The International Organization for Legal Metrology is a treaty organization with 49 Member Nations and 36 Corresponding Member Nations. “Legal Metrology” means any metrology, in one or more of these nations, or of states within these nations, which is the subject of legal regulation. Member Nations have accepted by treaty the moral obligation to adopt OIML Recommendations in place of existing local or National regulation. The objective is to harmonize regulations between nations (and with other international standards organizations such as ISO and IEC) and thereby facilitate commerce, etc. A subsidiary objective is to permit the acceptance by nations of approvals, such as pattern approvals, performed and issued by other Nations; that is, to establish a regional and global basis for legal metrological control. The work of OIML can be regarded as the preparation of model regulatory laws for measuring instruments. These are directly conveyed into or are influential in the formulation of regional standards, such as those of the European Economic Community and the European Free Trade Association.

My Own Activity with respect to OIML

The Agency having responsibility for United States activity with regard to OIML is NIST. I am a consultant for the relevant officer of NIST. In particular I have ongoing responsibility for a Recommendation (now in Third Draft) on Medical Electrical Thermometers, and a Recommendation on Quality Assurance for the Initial Verification of Measuring Instruments (now in the First Draft), which is harmonized with the ISO 9000 Series and other relevant International Standards. I have also a general advisory responsibility, and in this role I attended a meeting of the International Committee of Legal Metrology in Paris in October last year, as I have in prior years.

French is the official, English the de facto, language of OIML publications. Thus an additional obligation of a U.S. communicant is to provide, from the deliberations of multinational working groups, accurate and precise English texts.

A portion of my responsibility is to counsel U.S. manufacturers regarding OIML standards and activities. It may be noted that I have never had questions from NCCL members. This suggests that members are in general either not in the field of legal metrology, or else are not adequately aware of OIML activities. I have tried to remedy the latter contingency by publications in the NCCL Newsletter, but would welcome suggestions from the Board and others about how to increase awareness of our members whose products and services are, somewhere in the world, subject to official control.

OIML Activity Since My Last Report

At the Committee Meeting in Paris in October 1991, four new Recommendations were approved, including the revision of R76 on Nonautomatic Weighing Systems.

It was reported that the OIML Certificate System, which permits a manufacturer to take many steps toward pattern
approval in his own country which may be accepted in lieu of
further testing by other countries, has been adopted for
National use in Belgium, Czechoslovakia, Denmark, France,
Germany, Hungary, PR China, The Netherlands, Norway,
Romania, Spain, Sweden, the United Kingdom and the
U.S.S.R.

The United States is a principle participant in working groups
on pollution measurement. These are listed in Notes 1
through 4. (Ed Note: write to author)

The Ninth International Conference of Legal Metrology will
meet from 2 to 6 November in Athens-Vouliagmeni, Greece,
and will consider two categories of Recommendations for
sanction. These are listed in detail in Notes 5 and 6. (request
from author)

Henry Sosman, Liaison Delegate

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INTERNATIONAL MEASUREMENT COORDINATION

A great deal of activity is underway in the North American
arena which was reported at CPEM 92 and I anticipate will
be reported to the board by Joe Simmons.

The national organizations involved in these developments
have made excellent progress.

I plan to discuss plans, charter and leadership for this
committee in the near future and will have a more concrete
proposal for the October board meeting.

Graham Cameron, Committee Chair

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PMA LIAISON DELEGATE REPORT

The Precision Measurements Association held its annual
meeting on Wednesday, September 9 at Gustav's Jagerhaus in
Anaheim, California.

The PMA electronic bulletin board has been installed on a
bigger, faster computer to correct some maintenance
problems and allow for greater use. Claude Fourroux, PMA
Secretary, is the prime architect of this system.

Dean Brungart will be honored by friends and colleagues at a
"roast" at the Calabasas Inn on the evening of August 20.
Dean has served PMA for more than 25 years.

Glenn E. Rasmussen, NCSL/PMA Liaison Delegate

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ASTM LIAISON REPORT

The ASTM Committee E36 on Laboratory and Inspection
Agency Evaluation and Accreditation met on June 16-17,
1992. The major issue discussed was the subcommittee ballot
to adopt ANSI/IEEE Guide 25 as a replacement for ASTM
E548-90. The subcommittee resolved the comments and
approved it for main committee ballot. Robert Gladhill of
NIST is the subcommittee chairman managing this ballot
process.

The Committee discussed how best to aid and advise all other
ASTM Technical Committees in the preparation of specific
criteria standards, correlation and consolidation of similar
standards prepared by these committees, and promote
cooperation between these technical committees in the areas
of common interest. A guide for developing specific criteria
is needed.

A subcommittee ballot was addressed on the guide for good
automated laboratory practices. The committee concluded
that further revision was needed on the document before
proceeding with a main committee ballot.

The Committee agreed to invite ILAC to hold its committee
meetings of 1993/94 in the United States, perhaps in
conjunction with the planned ASTM E36 symposium on
laboratory accreditation to be held in Fort Worth in the fall
of 1993.

John W. Locke, Liaison Delegate

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AMERICAN PHYSICAL SOCIETY LIAISON REPORT

The American Physical Society together with the American
Institute of Physics and the American Association of Physics
Teachers is planning to move from the present facilities in
New York City to College Park in Maryland (near the
University). Preliminary plans call for the official move into
the new facility in September, 1993.

K.B. Jaeger, Liaison Delegate

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LIAISON REPORT, NATIONAL CONFERENCE ON
WEIGHTS AND MEASURES

The 77th Annual Meeting of the National Conference on
Weights and Measures was held at the Stouffer Nashville
Hotel in Nashville, Tennessee, July 19 through 23, 1992. In
attendance were 316 delegates and 134 guests for a final
attendance of 450. The NCWM membership year 1991-92
ended with 3,466 members. Forty-two states were
represented plus the District of Columbia, Puerto Rico, and
the U.S. Virgin Islands. Not represented this year were
American Samoa, Guam, Louisiana, Mississippi, Montana, Nevada, North Dakota, and Wyoming. We had several international delegates this year. There were two delegates from Germany and one from the United Kingdom. Representatives from Canada participated as delegates as well as technical advisors to the committees of the NCWM.

Allan Nelson (CT) assumed the chairmanship of the Conference and Allan's theme for the year is "Excellence through Standards." Dr. John Lyons, NIST Director and President of the National Conference on Weights and Measures, gave a keynote address to the General Session and discussed the essential role of weights and measures [legal metrology] in the Global Marketplace.

U.S. -- Canada Harmonization

The NIST Office of Weights and Measures has been actively working with the Canadian counterpart to our weights and measures on harmonization of legal metrology issues. The need for harmonization between the United States and Canada derives from the need for U.S. manufacturing sectors to be able to sell their products anywhere in the world. Ideally, if they could manufacture their products to the same legal metrology standards across national borders, the number of identically performing products manufactured could be increased, perhaps reducing the manufacturing costs per unit.

Petroleum Subcommittee of NCWM

The subcommittee's mission statement, goals, and a work plan have been developed. The subcommittee is scheduled to hold its first meeting this fall.

Mission Statement

The Petroleum Subcommittee will serve as the focal point in the NCWM on laws and regulations issues relating to petroleum and motor fuels. It will provide advice and technical guidance to the Laws and Regulations Committee on issues that come before the Conference and provide a forum within the NCWM for States with motor fuel programs.

Goals and Work Plan

The NCWM has established the following priorities and goals for the subcommittee:

* Update and expand the Uniform Motor Fuel Inspection Law to recognize the needs of State programs in regulating and testing alternative motor fuels and petroleum products.
* Update and expand the Uniform Motor Fuel Regulation to reflect current test procedures and standards for motor fuel and petroleum products.

* Update the NCWM recommendations for a Basic Motor Fuel Testing Laboratory.

* Establish a forum for NCWM participation in the development of standards and test methods in cooperation with the American Society for Testing Materials and other organizations.

* Establish close relations with consumer and other State, local and Federal agencies involved in related issues.

If you would like to receive information on participating in the work of the Petroleum Subcommittee please contact Richard Whipple, NIST Technical Advisor, on (301) 975-3990.

Trainer Certification

The Conference adopted the Education Committee's two voting items relating to the certification of NCWM National Training Program (NTP) trainers. The first item establishes a voluntary national certification program for trainers based on criteria that was published in the Committee's Interim Report and amended at the Annual Meeting. The second item requires any trainer who is included on the NCWM Trainers List to be certified. Trainers who are currently on the List will have 1 year in which to obtain certification in order to be retained on the list. The Education Committee will develop a Certification Program application form and instruction for completing the form, which will be distributed to State weights and measures offices and trainers on the Trainers List.

State and Industry Metrologists Meet

State and industry metrologists met during the 77th annual meeting of the National Conference on Weights and Measures.

The primary concerns of the metrologists dealt with requirements of the international standards, such as ISO 9000, as they relate to State and industrial laboratories. It is apparent that the State laboratories must address and be able to at least meet these requirements when audited if they are able to continue to serve industry. As pointed out in a presentation by Georgia Harris to the conference, support of industrial calibration requirements has replaced regulatory support as the primary function of many of the State laboratories. In order to help define the program needs in this area, the group requested and was granted funding from the Executive Committee to establish a NCWM task force to establish guidelines for both State and industrial laboratories that will clarify what is needed to meet ISO recommendations. It is expected that this guide will help laboratories to prepare for updated certification requirements that will be in the new laboratory handbook (NBS Handbook 143) that will comply with ISO Guide 25.
Other topics discussed included laboratory control chart and standard surveillance procedures, sources of volumetric uncertainties, petroleum safety issues, and compressed natural gas test procedures. The metrologists and other interested conference members toured SGS Control Services petroleum laboratory and also discussed legal, scientific, and industrial metrology in Germany with Dr. Manfred Kochsiek of the Physikalisch-Technische Bundesanstalt (PTB). Presentations were also made by Sartorius Balance Company on precision mass calibration and air buoyancy corrections using their line of mass comparators and by Mettler/Toledo on their research to detect and define a fifth force which theoretically influences the Newtonian gravitational equation.

ISO 9000 Task Force

Objectives

To develop a guide to assist States (laboratories) in meeting ISO 9000 and Guide 25 recommendations. (And registration if they wish.) The guide will enable laboratories to develop their programs to meet the additional quality system and proficiency requirements. The current program follows an earlier version of ISO Guide 25. New technical criteria for NVLAP accreditation will be consistent with the latest ISO Guide 25 and 9000 recommendations; criteria established for private calibration laboratories and State laboratories will be the same. The guide will include:

1) An overview of the registration procedures including a typical time line, contacts, and estimated costs of the complete initial and ongoing process.

2) List of "critical" elements evaluated during a pre-audit and ISO 9000 audit as well as explanations or interpretations of what is needed. A review of ISO Guide 25 with recommendations.

3) Results of a State laboratory "pre-audit". Noted deficiencies will be discussed and remedial recommendations will be made. The participating State will provide documentation as to what preparations were required prior to the pre-audit.

The ISO 9000 Task Force has set a goal of developing a draft product by the NCWM Interim meeting.

** State laboratories have been receiving numerous requests from their customers to become ISO 9000 registered and to comply with the recommendations. Technical criteria in the current Program Handbook follows an earlier version of ISO Guide 25.

Safety Task Force

In August 1989 an NCWM Safety Task Force was established to study the issue of safety in the weights and measures environment and to make recommendations to the NCWM concerning ways in which the issue might be addressed by the weights and measures community as a whole. The Final Report of the Task Force was published July, 1991 and contains material directly relating to the metrology laboratories. This report is available through the Office of Weights and Measures at NIST (301) 975-4004. A copy is provided with this report and one will also be forwarded to Roger Hickey, NCSL Committee Chair.

OWN/NVLAP Development of Laboratory Accreditation in Mass and Volume

Working with the National Voluntary Laboratory Accreditation Program (NVLAP), the Office of Weights and Measures is in the process of duplicating and updating the State Standards Program in the areas of mass and volume to meet the needs of private industry and other governmental laboratories.

In support of its mission to promote uniform standards of measurement throughout the country, the National Institute of Standards and Technology (NIST) received funding from Congress in 1965 to provide new standards of mass, length, and volume and the equipment needed to perform calibrations in these measurement areas to State weights and measures laboratories. This program, called the [New] State Standards Program was established at NIST and to maintain the validity of these standards and to assure that the standards are used properly, NIST also trains State metrologists in the test procedures used in the NIST laboratories, and conducts a voluntary accreditation program for State weights and measures laboratories.

The approach that is used for laboratory accreditation was established by the Office of Weights and Measures over 25 years ago and was endorsed by the 1983 National Conference on Weights and Measures. The Office of Weights and Measures at NIST has proposed the addition of accreditation programs for State laboratories in the areas of Grain Moisture and Petroleum Quality Testing since they have been requested by the State Weights and Measures agencies.

Reference Publications:

The Office of Weights and Measures publishes documents which specify the requirements for laboratory accreditation. Additional handbooks with laboratory procedures and guidelines contain standard operating procedures to ensure accuracy and consistency in making measurements. Evaluation criteria and certification requirements are detailed in the following publications:

1. NBS Handbook 143, Program Handbook (currently being updated).


3. NIST Special Publication 791, Description of Laboratory Program and Directory.

Georgia Harris, NCWM Liaison

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LIAISON REPORT, A.M.M.A.C.

Objectives

The Asociacion Mexicana De Metrologia, A.C. (AMMAC) was established on July 12, 1988 as a non-profit association with the following objectives:

* Collect and disseminate the knowledge of the measurement science.
* Promote the research work of the metrology laboratories.
* Maintain a membership of scientists, technicians, teachers and people related to metrology activities.
* Support the development of measurement systems and provide technical assistance to the industry in its calibration programs.
* Strengthen the Sistema Nacional De Calibracion, SNC, (National Calibration System).
* Maintain a continuous training program in metrology.

Services

EDUCATION

* Training workshops
* Annual seminars

TECHNICAL ADVICE

* Metrology standards
* Development of measurement methods
* Calibration recommended practices for M&TE

PUBLICATIONS

* Quarterly magazine "Ed La Metrologia"
* Bimonthly bulletin

DOCUMENTS

* Metrology Bibliography
* Collection and dissemination of standards, methods, guides and general publications in metrology

Roberto Benitez, Liaison

*******

SELDEN W. MCKNIGHT

1928 -- 1992

We received word at press time that Selden McKnight had died Sept 13, 1992, after a valiant fight with cancer. Selden was best known to us of NCSL for his years of work as Director of Metrology for the US Air Force at Newark AFB, Ohio. That assignment lasted from 1979 to his retirement from the USAF in 1985.

Selden was born in Chicago, and moved with his parents to California when he was 15 years old. He received his BS in Industrial Engineering from UC Berkeley, and joined the North American Corp in Los Angeles. He then moved to work for the USAF at McClellan AFB in Sacramento, working in Maintenance and Logistic Management for almost 20 years.

In 1979, he was promoted to the Director of Metrology at Newark AFB, to assume worldwide responsibility for Air Force calibration and metrology management programs. His vision for metrology influenced NCSL member companies because of the major USAF contracts through the years. Selden served as the USAF technical representative on the Tri-Service Calibration Coordinating Committee which, among other things, made DOD funding decisions for the National Institute of Standards and Technology. NCSL maintains a liaison with the CCG because of their strategic activities. In 1984, he assumed Chairmanship of the NCSL Calibration System Management Committee.

In 1985, he retired from the Air Force, expecting to move back to his beloved California, but instead joined Hughes Aircraft in Tucson, as Metrology Manager. In 1990, he moved back to Ohio to work for EGG, a DOE contractor in Mound, Ohio.

Selden was a quiet man, and we always enjoyed his company along with his wife, Lavina (Vi), at the regular Board meetings and Annual Conferences or MSC. He leaves 8 children. I knew Selden, both for his NCSL work, and as a customer of Hewlett-Packard Co. We always found him to be the total metrology professional, with a grass-roots and common-sense knowledge of the job to be done, and a management style which promoted the development of his middle-management team.

John Minck, Editor
The summer session of the NCSL South Section Region VI was held on 8 July 92 and was hosted by 3M at their Austin, TX center.

The meeting was opened at 9:30 A.M. by NCSL South Section Coordinator Mr. Gilbert Uribe.

Host Mr. Daniel Garza II from 3M, welcomed the attendees and outlined activities for the session. He then introduced the first speaker, Mr. Warren Johnson, the 3M Austin Center Plant Manager.

Mr. Johnson's presentation discussed the various 3M divisions located at the Austin center and included information regarding the facilities, grounds and environmental features.

Mr. Clyde Orrison from Texas Instruments, Inc. of Dallas, TX discussed the benefits of using the Measurements Comparison Program to establish a point of reference for measurements where a standard four times as accurate as the unit under test is not available. Mr. Orrison explained the program by using the testing of the HP-8478B Thermistor as an example.

Mr. Ronnie Eubanks from the Otis Engineering Corporation of Carrollton, TX and Region VI Coordinator of the NCSL spoke about NCSL policies regarding member company advertisements, NIST standard developments, specific item calibration being studied, and NCSL training materials available to members.

Lunch break from 12:00 P.M. to 1:00 P.M. A deli-style lunch was served in the conference area.

After lunch, Mr. Tom Kimbrell from Texas State Tech College in Amarillo, TX discussed the training program offered at his college in the field of Metrology.

Mr. Wayne Cummings from John Fluke Manufacturing of Dallas, TX discussed the meaning and scope of ISO 9000 on both national and international levels.

At 3:00 P.M. Mr. Uribe handed out door prizes to the attendees. The top prize, a hand-held Fluke Meter donated by Mr. Wayne Cummings from John Fluke, went to Mr. Fred Funkhouser of 3M. Ten other attendees received cups, koozies or sachels from NCSL.

At 3:30 P.M. Mr. Uribe expressed his thanks to the attendees for their participation. A special thanks went to 3M and Mr. Daniel Garza II, for hosting the meeting and providing lunch. A tour of the 3M facility was then offered by Mr. Jay Marti of 3M.

**ATTENDEES**

<table>
<thead>
<tr>
<th>Attende</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Rosalyn Garcia</td>
<td>Kelly AFB, TX</td>
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<td>JoAnn Gonzalez</td>
<td>Kelly AFB, TX</td>
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<td>Lenny Lentschuke</td>
<td>Professional Testing</td>
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<td>Don Dunavant</td>
<td>Southwest Research Inst.</td>
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<td>Jim Patterson</td>
<td>Southwest Research Inst.</td>
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<td>Steve Williams</td>
<td>Professional Testing</td>
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<td>Michael Tidwell</td>
<td>IBM</td>
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<td>Jim Meeks</td>
<td>Fluke</td>
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<tr>
<td>Wayne Cummings</td>
<td>Fluke</td>
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<tr>
<td>Blake Carpenter</td>
<td>Kelly AFB, TX</td>
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<td>Alexander Brune</td>
<td>Kelly AFB, TX</td>
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<tr>
<td>Clyde Orrison</td>
<td>Texas Instruments, Inc.</td>
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<td>Charles Garrison</td>
<td>EMCO</td>
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<td>Christine Barrera</td>
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<td>Bill McDonald</td>
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<td>Bob Cummings</td>
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<td>John Stewart</td>
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<td>Terry L. McGee</td>
<td>Southwest Calibration Service</td>
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<td>Ron Bickers</td>
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<td>Bob Roberts</td>
<td>Mentor</td>
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<td>Dale Ryder</td>
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<td>Tom Kimbrell</td>
<td>Roth Development, Inc.</td>
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<td>Peter J. Stemmermann</td>
<td>Roth Development, Inc.</td>
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<td>Luis Maldonado</td>
<td>3M</td>
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<td>Daniel Garza II</td>
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<td>Warren Johnson</td>
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<td>Jay Marti</td>
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<td>Fred Funkhouser</td>
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<td>Jim Thiessen</td>
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<td>Binh Duong</td>
<td>3M</td>
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<td>Cheryl Poling</td>
<td>3M</td>
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<td>Ronnie Eubanks</td>
<td>Otis Engr. Corp.</td>
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<td>Ed Gorton</td>
<td>Intermedics, Inc.</td>
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<tr>
<td>Kyle Shelton</td>
<td>Dow Chemical</td>
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<td>Manuel Silva</td>
<td>Coleco, Inc.</td>
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<td>Ned Martin</td>
<td>3M</td>
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The summer Region 7 Meeting was held at Tektronix in their Santa Clara, California office on July 9, 1992. Forty-three members and guests attended the meeting.

The meeting was called to order by Joe Siecinski, Region 7 coordinator. The attendees introduced themselves by their name, company and title.

Ed Tong from Hewlett-Packard was introduced as the first speaker. Ed discussed the ISO 9000 audit process. Ed has been through the BSI auditor training and is a lead auditor. Ed went through the entire audit process from application to accreditation and follow up audits which included how the audit team functioned and addressed conforming and non-conforming discrepancies. Ed then held a question and answer session.

The next speaker was John Miche who discussed Bayesian Calibrations philosophies. He discussed a paper that he has written on Bayesian methodologies. John also gave a demonstration on uncertainties.

After John’s presentation, we broke for lunch.

A group photograph was taken after lunch.

After lunch and pictures, Jim Ingram gave us an update on changes in the NCSL operations and organization. He went over new changes in positions, requirements and committees. Jim took some time afterwards for questions and answers.

Our next speaker was Carrie Cabek from Underwriters Laboratories (UL). She presented a video on ISO 9000 that gave a background, description and typical audit. She then gave a background on how UL will be involved with ISO 9000. She then gave a background on how Europe is set up for SO and how all the different agencies fit in. She emphasized that ISO audits will be according to ISO not MIL-STD or Guide 25 unless referenced to those standards in your quality manual or process flow.

Tektronix then presented their auto calibration system, provided a demo on the system and went through a calibration that showed the flexibility of the system. Arthur Andrews of Tektronix gave a tour of the facility.

Next meeting is tentatively set for November 1992.

ATTENDEES

John Milburn Applied Materials
Jim Ingram Lockheed
Joe Rivas FMC Corp.

Wen Lu IBM
Colin Holmes Tektronix
Ed Tong Hewlett-Packard
Allen Anglin Abbott Labs
Bob Picock Hewlett-Packard
Fred Espenhade Signetics
Martha J. Lis Apple Computer
Don Dowell Raytheon
Robert Bahr Self
Charles Balkon IBM
Dave Abell Hewlett-Packard
Mel Johnson Wavetek
Steven Pease Telogy
John Miche Maring Inst.
Debbie Cabusas Watkins-Johnson
Margaret Trader Watkins-Johnson
Joe Siecinski Hewlett-Packard
Tom Daniels FEI Microwave
Alex Suchy Nat’l Semiconductor
Ivo Wafer Teknet
Carl Quinn Simco
Gilbert Perez Wiltron
Malcolm Gregory Wiltron
Ron Black Tektronix
Dale Crites Fluke
Bill Highchew Intertyme
Walt Fiakowski IBM
Sedlacek James LLNL
Nitin Patel Tektronix
Martin Gibbs Hewlett-Packard
Dave Hipping Hewlett-Packard
David Daellenbach LLNL
Dennis Sanchez Lockheed
Larry Hermawan Hewlett-Packard
Anthony Rodriguez Tektronix
Arthur Andrews Tektronix
Robert C. Lucena LLNL
Carrie Cabek UL

Forty-three members attended the Region 7 summer meeting at Tektronix in Santa Clara.
June 17, 1992
Calabasas Inn
Calabasas, CA
Claude Fourroux
LA/Valley Section Coordinator

The Spring meeting of the NCSL Region 8 LA/Valley Section was held at the Calabasas Inn., Calabasas, CA, June 17, 1992. There were 51 members and guests representing 33 companies and government agencies in attendance. A continental breakfast was hosted by GE Electronic Services.

Claude H. Fourroux, Section Coordinator is currently recovering from surgery and was unable to attend. Brian Conroy opened the meeting at 8:15 A.M., and conducted the rest of the workshop. Bud Haymaker assisted with reservations, sign-in and receipts at the door, and with the Calabasas Inn.

Nathan H. Gluck, Deputy Director LA County Weights and Measures presented a brief history of legal weights and measures in the United States and internationally. Enforcement of these regulations are at the county level with oversight by the state agency. Legal Metrology is equally important, but completely separate from MIL-STD and ISO requirements.

Jim Carlton, MDI Manager, GIDEP Operations. Corona CA provided a progress report on the transfer of the GIDEP database from microfiche to on-line computer access. Data Loading is currently in progress, with full system testing to begin in July, and system operation expected by the end of the year. For complete information about GIDEP, or hardware and software requirements to access the database, call Jim Carlton at (714) 273-4677.

ISO 9000 Panel Discussion with the following panel members:

- Gary Davidson of TRW Space and Defence
  (310) 812-1388

- James P. O'Neill of National Quality Assurance, USA
  (508) 635-9256

- Richard Randall of GE Electronic Services
  (404) 246-6237

- Bill Quigley of Hughes Aircraft
  (602) 794-1042

The discussion focused on three areas of concern. What is the compatibility of MIL-STD and ISO requirements? How to transition from present systems to ISO compliant systems? What to do now and when to change?

First, MIL-STANDARDS and ISO requirements are very compatible. Stay within your success and add ISO requirements, which are mostly documentation, as required.

Second, registration and accreditation procedures and agencies are still being developed and have not been solidified nor approved. There is no clear path yet. Implementation documents and government approval are expected in 1993, with implementation to follow.

Third, now is the time to read and become familiar with these documents. Learn what is needed. Do the things now that make sense to your business. As for registration and accreditation, do it when your customer contracts impose it.

An excellent source of information and references is a white paper "ISO 9002 Registration For Calibration Laboratories" by Richard Randall, available through the NCSL Business Office or GE Electronic Services. Also, see page 12, in the April, 1992 Newsletter.

As we broke for lunch, we looked for the photographer to take the traditional group photo. Lots of photographers, but no camera. Sorry, no photo this time.

Woody Salyer, Schlumberger Technologies and Glossary Committee Chairman, provided a progress report on the NCSL Glossary to serve as a means to standardize terminology. The glossary is currently being reviewed in draft form, and will be presented to the Board in August for review and approval. After publication, the Glossary will not be the "last word", but is meant to serve as a guide to terms. And of necessity, there will be updates and revisions.

Member Delegate Time. Comments, questions and suggestions for the November workshop:

- ISO implementation is still a puzzle to many people. Continue discussions and information sessions.

- Status report on U.S. standard.

- How do Continuous Process Improvement (CPI) and Total Quality Management (TQM) concepts apply under ISO?
* Copies of the new NCSL Glossary.

* Report by Rolf Schumacher on the November ISO meeting in Australia.

* Benchmarking -- cf labs, lab management, inventory control, etc.

* Status report on GIDEP Services on-line system.

* Uncertainty statements vs 4.1 calibration ratios.

* How many links should be there be in the traceability chain?

* How do these things apply to the small lab? What's the same? What are the differences?

Chet Crane, Teledyne Microelectronics and NCSL VP Conference Management, provided a brief look at the new NCSL organizational structure. The new Board will provide better representation for the member companies and better continuity for long term projects. For a detailed description of all the changes, see page 10 of the April, 1992 Newsletter.

ATTENDEES

Barbara Tsur-Jenks
Bob Jenks
Rolf Schumacher
James Giles
Fred Schaeffer
Robert W. Stromquist, Sr
Robert W. Stromquist, Jr
Ted A. Hagstrom
Rick Randall
Bill Graves
Mike Buckner
Jim Carlson
Gwen Nguyen
Gene Kozloff
Rubin Claudio
Rick De La Cruz
Earl Amano
Bob Geesaman
Bill Quigley
Larry Du Pauchard
Louis J. Reimer
Dale Laube
John Neman
Douglas Enny
Nathan H. Gluck
Emil Hazarian
Roy Uemura
Juan Gonzalez
Edgar Brown
Ken Halford
George Greyhek

Brylen Technologies
Coast Quality Metrology
Data Tape, Inc.
Delco Electronics
Electrical STD Repair Service
Electrical STD Repair Service
Ge Electronic Services
GE Electronic Services
GIDEP Operations Center
GIDEP Operations Center
Gillette Company
Gillette Company
Hughs Aircraft
Hughs Aircraft
Hughs Aircraft
Hughs Aircraft
Hughs Aircraft
ICC Instrument Co.
ICC Instrument Co.
International Transducer Co.
John Fluke Mfg.
LA County Weights & Measures
LA County Weights & Measures
LA Dept. of Water & Power
LA Dept. of Water & Power
LA Dept. of Water & Power
Litton Data Systems
Micro Metrology Services

James P. O'Neill
Glen Rasmussen
Hohn Kim
Thomas Herdering
Karlof I. Fenyesi
William Ferguson
Quenton Koon
Bud Haymaker
Joe Revilla
Woody Salyer
Leon Steffy
Paul Keep
Richard Allvadio
Ron Boring
Chet Crane
Ira J. Vasseline
Brian Conroy
Jim Doyle
Dean Brungart
John Stork
Gary Davidson

National Quality Assurance
Northrup
Pacific Scientific
Parker Metal Bellows
Photo Research
Quality Control Company
Rockwell Rocketdyne
Rockwell Rocketdyne
Rockwell Rocketdyne
Schlumberger
Scope Tek
Simco
Sonotec
Statham, In. Mark IV Industries
Teledyne Micro Electronics
Teledyne Systems Co. Inc.
Teledyne Systems Co. Inc.
Teledyne Systems Co. Inc.
Teledyne Systems Co. Inc.
Temperature Std's. Lab.
TRW Space & Defense

May 14, 1992
Best Western Hotel
Fridley, MN
Rick Brion, Twin Cities Section Coordinator

The NCSL Region 11 Twin Cities Section Meeting was hosted by Onan Corporation with the help of Gary Kloss. The meeting was originally scheduled at the Onan facility, but due to the overwhelming response, the people of Onan were kind enough to make arrangements for the meeting at the beautiful Best Western Hotel located in Fridley, MN. We had a great turnout with a total of 79 individuals in attendance. Our average attendance is between 40 and 60 people, so this was an exceptionally large turnout.

The meeting was opened by Rick Brion, the new Twin Cities Section Coordinator, who discussed the agenda for the day. Next, Gary Kloss, Larry Day, and Woody Nelson gave an informative talk about Onan and the products Onan builds. This included a very interesting slide presentation.

The first guest speaker was Guy Grant of 3M company. Guy gave an interesting and informative presentation regarding the implementation ISO-9000, specifically ISO-9002 "Quality Systems-Model for Quality Assurance in Production and Installation." Guy thoroughly discussed eight key steps to obtaining ISO 9000 registration:

* Evaluation of existing quality procedures against ISO requirements

* Identification of corrective action needed to conform to the requirements
After the meeting ended we were bussed back to Onan, where we had the opportunity to tour their facility.

The photo is of a very hungry group about to devour the complimentary meal provided by Onan, pool side, at the Best Western Hotel.

**ATTENDEES**

Guy Grant  
Ralph Brandenburg  
Ron Rockson  
Gary Furman  
Bob Barz  
Gaylord Gross  
Gary Kloss  
Dan Novak  
Serna Lamin  
Frank Schultz  
Chuck Zettergren  
Bob Henken  
Sam Fiske  
Travis Harrington  
Harold Dodge  
Douglas Burch  
Curtis Scheible  
Gary Trepczyk  
Mitch Johnson  
Gary Martz  
Paul Mraz  
Kris Weiske  
John Gislander  
Mark Bucheger  
Jeffrey Otto  
Harold Albrecht  
Richard Van Gilder  
Hillard Schuette  
Gregg Wills  
David Dikken  
L. Peter Gillen  
Brian Roepke  
Dick Weber  
Steve Bjerstedt  
Nat Hudson  
Judy Kingsley  
Brad Grams  
Odel Jacobson  
Robin Paul  
Sue Thompson  
Larry Roden  
Earl Stallmann  
Jerry Seaway  
Jerry Biscoe  
Mary Chilinski  
Judy Driver  
Bill Martin  
Bill Droge  
Doug Erickson  

3M  
Kato Engineering  
Honeywell-Military Avionics Div.  
Alliant Techsystems, Inc.  
Alliant Techsystems, Inc.  
Onan  
Alliant Techsystems, Inc.  
3M  
Northeast Metro Tech College  
Northeast Metro Tech College  
3M, Wahpeton, ND  
DiBar  
Rice Lake Weighing Systems  
Rice Lake Weighing Systems  
Medtronic Inc.  
Medtronic/Bio Medicus  
McNally Ind.  
Cardiac Pacemakers  
St. Jude Medical  
St. Jude Medical  
Onan Corp.  
Onan Corp.  
3M  
Tonka Tech Lab  
Hutchinson Technical College  
Hutchinson Technical College  
3M Menomonee  
State of MN  
Hutchinson Technology, Inc.  
Hutchinson Technology, Inc.  
3M Co.  
3M Co. Cal Lab  
Alliant Techsystems, Inc.  
RMT, Inc.  
RMT, Inc.  
RMT, Inc.  
RAECO  
C.P.I.  
C.P.I.  
Honeywell  
Honeywell  
3M Co.  
3M Co.  
OTC  
Martin Inst. Co.  
Control Data  
Control Data
The first technical speaker, David Korpi, Vice President, Engineering for Sierra Instruments, gave an excellent presentation on “Achieving Accurate Gas Flow Meter Calibration.” David was responsible for the development of Sierra’s Series 100 Cal-Bench Automated Primary Gas Flow Calibration System.

The second technical speaker, Ann Dorn, Product Manager/Engineer for Nicolet Instruments, gave an informative presentation on high resolution digitizers, specifically the Nicolet System 500 and their next generation products. In the system 500, each card is a digital storage oscilloscope. The system runs in the Microsoft Windows environment.

The third and final speaker, Bob Myers from Fluke’s Marketing Department in Everett Washington, gave a talk on the traceability of AC/DC transfer standards, specifically the Fluke Model 5790.

A tour of the facilities followed the presentation.

I would like to thank everyone who was involved in this meeting. I would especially like to thank Gary Hoffman, Don Dedinas and the Fluke Manufacturing Company for their outstanding hospitality. The next meeting will be in October.

Dave Walters, Chicago Section Coordinator Region 11

ATTENDEES

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
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<tbody>
<tr>
<td>Stan Chytia</td>
<td>The Nutrasweet Co.</td>
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<tr>
<td>Frank Clayton</td>
<td>Torkelson Assoc</td>
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<tr>
<td>Don Dedinas</td>
<td>John Fluke Mfg. Co., Inc</td>
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<td>Anne Dorn</td>
<td>Nicolet Instruments</td>
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<td>Gary Drasch</td>
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<td>Mike Eastham</td>
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<td>Stan Fabinski</td>
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<td>Ken Hawblitz</td>
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<td>Gary Hoffman</td>
<td>John Fluke Mfg. Co., Inc</td>
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<td>Dennis Ketner</td>
<td>Woodward Governor Co.</td>
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<td>Kenneth Kern</td>
<td>Siemens Gammasonics</td>
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<tr>
<td>Darrell Klein</td>
<td>G.D. Searle</td>
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2. NCSL is designing a training program for the Directors and Regional Coordinators.

3. This was the last meeting that Art Vogt and Dave Walters will be officiating. Art will be replaced by Herb O’Neil (Hutchinson Vocational Technical Institute – Hutchinson, MN) and Dave by Ed Bellinder (John Fluke – Palatine, IL).

The meeting was hosted by Gary Hoffman, from the John Fluke Mfg. Co. A list of the 34 attendees is attached.

The opening remarks were made by Art Vogt.

1. The primary topic was the 1992 NCSL Workshop & Symposium to be held at the Grand Hyatt Hotel in Washington D.C., August 2-6.

April 22, 1992
John Fluke Mfg. Co.
Palatine, IL
Dave Walters
Chicago Section Coordinator
Thirty-four memore and guests attended Region 11 Chicago Section Meeting at John Fluke Mfg.

Art Vogt gives opening remarks at Region 11 Chicago Section Meeting.

David Korp provides insight into accurate gas flow measurements.

Ann Dom updates group on high resolution digitizers.

Bob Myers discusses traceability of AC/DC transfer standards.

Ken W. Kulinski
Jack B. Leedom
Joseph McIntyre
Lloyd N. Mayfield
Bob Myer
David Nemeth
Dave Pacchini
Robin Paul
Mark A. Pierce
Dan Schreiber
Richard Spears
Howard Stabenow
Marcial Villaverde
Arthur R. Vogt
Dave Walters
Tom Valtch
James F. Williams
Ben Ziemann

Hewlett-Packard
ITT Research Institute
Shure Bros. Inc.
John Fluke Mfg. Co., Inc.
Micro Switch Div./Honeywell
Pacchini Metrology
RAECO
The NutraSweet Co.
ITT Research Institute
Simpson Electric
Micro Switch
Siemens Gammasonics
ITT Research Institute
Commonwealth Edison
The Nutrasweet Co.
Woodward Governor Co.
Micro Switch Div./Honeywell

April 15, 1992
Buena Park Hotel
Buena Park, CA
Dave Collins
LA/Orange County
Section Coordinator

On April 15, 1992 Region 8 held its semi-annual Los Angeles/Orange County Section Seminar and Workshop at
working on a new calibration standard which is hopefully acceptable to all U.S. agencies and recognized internationally. The basis of the document will be from three documents presently being used: MIL-STD-45662A, EN45DD1, and ISO 25.

Since our delegate to the board meeting was unable to attend our get together, the delegate's report was given by Robert Smith, President of NCSL. The report was a summarization of the report on NCSL Board Meeting found in the April issue of the NCSL Newsletter.

The meeting was closed.

**ATTENDEES**

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<td>Interstate Electronics</td>
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<td>Rockwell International Corp.</td>
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<td>International Rectifier</td>
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<td>Parker Hannifin Corp.</td>
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The next presentation, also presented by Mr. Pinnecker, was concerning the recent activities of NCSL in the area of CALIBRATION SYSTEM REQUIREMENTS, NCSL is
The sixteenth San Diego Section Seminar and Workshop was held at the San Diego Mission Valley Hilton. The meeting was conducted by Roger McCoy (DALFI) with nineteen persons in attendance. Four interesting sessions were held. Mr. James Carlton (GIDEP Operations) provided information relative to the operation and goals of the GIDEP Organization located in Corona, CA. Mr. Doug Erny (John Fluke Mfg. Co.) led a very informative discussion/session on the status of the various ISO standards and what we might expect to see in the near future. Mr. Tom Kasner (DALFI-CMSS) gave a presentation on laboratory management software, both in lecture/discussion and computer generated video examples. Mr. Gary Davidson (TRW) closed the meeting with a discussion on a single standard approach toward laboratory accreditation.
some of the specific requirements of the ISO 9000 standard and the application of two commercial software packages to ensure compliance to these requirements.

Automated Calibration Of DSO's – Sid Blachford, Marketing Manager, Tektronix. Sid opened his presentation by contrasting the calibration methods for the three different categories of oscilloscopes: manual analog, programmable analog and digital storage. The remainder of his talk centered on the methods used at Tektronix to calibrate digital storage oscilloscopes in a manufacturing environment.

Commercial Scope Calibration – Sid Blachford, Marketing Manager, Tektronix. In his second presentation of the day, Sid discussed Tektronix's philosophy in oscilloscope calibration and presented a commercially available system to support that calibration philosophy. He also discussed the recent changes in oscilloscope technology and traceability criteria (MIL-STD-42662A and ISO-9000) driving the calibration requirements.

TOURS

The group was invited to attend one of two tours at the Tektronix, Beaverton facility.

ATTENDEES

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ted Barber</td>
<td>Boeing</td>
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<tr>
<td>Derek Porter</td>
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<td>Charles Sides</td>
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<td>Jerry Allgood</td>
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<td>Dwane Linschied</td>
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<td>David Ross</td>
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<td>Martin Hennessy</td>
<td>STC Submarine Systems</td>
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<td>Tom Clardy</td>
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<td>Gary Trapp</td>
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<td>Jan Johnson</td>
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<td>Duane Froebber</td>
<td>ESI</td>
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<td>Garry Wade</td>
<td>Micro Systems Engineering</td>
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<td>Dave Miller</td>
<td>Precision Instruments</td>
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<td>Sid Blachford</td>
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<td>Don Buhler</td>
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<td>Al Carauone</td>
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<td>Ken Futomick</td>
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<td>Wayne Linschied</td>
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<td>Greg Wood</td>
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<td>Paul Land</td>
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<td>Tektronix</td>
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NEXT MEETING

The next Region 9 meeting date is set for Nov 17, 1992. Check with Dave Agy for location.

STICKER ON PAGE
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<td>Corporate Met. Ctr., Bldg. 23, FL 4</td>
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<td>83.0 Steve Stahley (Regions 5 &amp; 6)</td>
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<td>85.0 Don H. Dalton (Regions 9 &amp; 11)</td>
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1992

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