A Very Eventful Year

After many discussions over the past several years, I am very pleased to announce that Dr. Andrew Wallard, Director Designate for the Bureau Internationale des Poids et Mesures (BIPM), has accepted an appointment to the NCSLI Board of Directors as the BIPM Representative. NCSLI has long had an informal relationship with BIPM, but we believe that this formal relationship will be beneficial to both organizations. It should make NCSLI more effective in developing innovative solutions to the problems faced by the international measurement community.

Dr. Wallard has been a strong supporter of NCSLI, and has contributed significantly to the success of our annual conference.

continued on page 17
Metrology in the Warmth of the California Winter Sun

The Measurement Science Conference
Tutorials, NIST Seminars, and Interesting Guest Programs
Anaheim Convention Center and Disneyland Hotel
Anaheim, CA
January 21-25, 2002

Theme: "Turning Measurement Science Information into Knowledge"
Conference website: <www.msc-conf.com>
Contact: MSC (909) 648 2775
See page 55 for more conference details

EDITOR'S MESSAGE

And now, a word of explanation about the Editorship

Most of you readers know that I have been editing this newsletter since the late 1970's, just after I completed my year as Past President. One of the reasons I have done it so long is that I love the publishing business, the smell of printer's ink, and—I guess my ego is showing—I like to see the results of my work when the publication comes off the press.

For more than 17 of those years, the time I devoted to the job was as an industrial volunteer, just like all of NCSLI's active members, supported by my employer, Hewlett-Packard Co. It was a synergistic relationship—co-dependent is too strong a word—since I feel that Hewlett-Packard got as much value as it gave. I have an interesting example of the value of this close collaboration.

Continued on page 19
Dr. Clark Hamilton, NIST, Boulder, 2001 Wildhack Award Winner

Dr. Hamilton has achieved international recognition for his exhaustive work on the Josephson Array Voltage Standards. He joined the staff at NIST in 1971, and became an NIST Fellow in 1987. Previous to the Wildhack, he has received many other honors. In 1997, he was awarded the IR100 for infrared detectors, and in 1987, for the Josephson Arrays. He received two U.S. Dept. of Commerce Gold Medal Awards for his work on superconducting ICs, using Josephson devices, and many more.

In 1995, he was inducted into the IEEE Fellow ranks, and received their Electrotechnology Transfer Award. He has authored 71 publications and holds 5 patents. Editor's Note: One might wonder when he had time to work on the array technology?

The Wildhack Award was established in 1970 in honor and recognition of William Wildhack, Sr., a long-time employee of the U.S. National Bureau of Standards, now the National Institute of Standards and Technology. Wildhack was not only very instrumental in the founding of the NCSLI, but also, through his wisdom, his leadership, his dedication and foresight, he helped shape the organization during its early formative years. The award carries an honorarium and includes a bronze and silver medallion bearing the likeness of Wildhack. This year's recipient is the 26th individual to be so honored.


(See the next page for Dave Abell's presentation text)
THE WILDHACK 2001 CITATION

Dave Abell

I'll get to introducing our honored guests on the podium in a minute, but first, I've got a pop-quiz for you.

What do the Cosmic Explorer Satellite, the cell phone in your pocket and the California power crisis all have in common with our 2001 Wildhack Award honoree?

The Cosmic Explorer Satellite determined that the cosmic microwave background spectrum is that of a nearly perfect blackbody. This observation matches the predictions of the hot Big Bang theory extraordinarily well, leading to its acceptance and strong support. The satellite and its delivery into orbit relied on highly accurate traceable measurements.

The cell phone in your pocket wouldn't work reliably with base station systems unless its power and frequency transmission characteristics were precisely calibrated—once again to traceable parameters.

And that California energy crisis, those of us who paid the bills hope that the measurement of the megawatts transferred were made accurately. Energy costs are calculated based on instruments with traceable parameters.

Well, the common thread in all of these examples is that they undoubtedly relied on traceable precise DC measurements at some point. Among other things, our award recipient has made significant contributions to the measurement of DC voltage in his professional career. William Wildhack, Sr., would be very proud of our choice to receive this high honor in his name.

Let me tell you a bit about the award. In 1961, William Wildhack, along with two others, conceived of an association to join standards laboratories together in the U.S. It was Wildhack who chaired the organization committee, developed the bylaws and the committee structure, and secured the then U.S. National Bureau of Standards support for what since has grown into the NCSL International.

Started in 1970, the William Wildhack Award is the highest award of NCSL International, and is given to an individual or group of individuals. The purpose of the award is to recognize outstanding contributions to the field of metrology. The award carries an honorarium of $1500, a bronze medallion in a trophy setting, and a silver medallion, both of which bear Wildhack's image.

The recipient is chosen by an advisory committee made up of myself, the Immediate Past President, and four advisors.

We're honored to have his son, William Wildhack, Jr, his wife Martha, and their daughter Elizabeth, here today to assist our President, John Ragsdale, in the presentation of the award.

Let me tell you a bit about our 2001 Wildhack Award Winner.

Dr. Clark Hamilton received his B.S. degree in electrical engineering from Union College, Schenectady, NY in 1966 and the M.S. and PhD degrees from the University of Rochester in 1968 and 1971. Since his thesis research leading to a Ph.D. in Electrical Engineering, Dr. Hamilton has conducted research on fundamental properties of the Josephson effect and on applications of superconductivity to electronics and measurement science. He has worked to develop high-speed switches, analog to digital converters, counters, and radiometers. However, he is best known for developing a practical Josephson Array Voltage Standard that is automated and computer controlled and for his highly successful efforts to transfer this revolutionary technology to the national and international metrology communities.

Within several years after the prediction of the Josephson effect by Brian Josephson in 1962, national standards laboratories had already begun using an intrinsic voltage standard based on the AC Josephson effect for maintaining the DC volt. These early Josephson voltage standards were very difficult to use since they relied on a single or a few junctions connected in series.

By 1985, Dr. Hamilton and his co-workers had demonstrated the stable operation of a one-volt array designed and fabricated in their laboratory and had developed a practical one-volt Josephson array voltage standard. By 1987, the U.S. Legal Volt was being maintained by a Josephson voltage standard using an array of Dr. Hamilton's design for which he also designed the current biasing system and the cryogenic probe. In 1988, he produced an array which would output voltages of 10 volts or more.

Clark helped many people develop these arrays, working hard to disseminate his knowledge and this technology. Here are some comments from Dr. Klaus Jaeger:

"It was only with Clark's efforts that we [at Lockheed-Martin] established the first Array Josephson Junction system at the 1.0 volt level outside any NMI at the end of 1986. He managed to spend a week in our facility setting up the system, training us, and guiding us towards future standards work in the DC voltage area. We now had, for the first time, the most important parameter in metrology, intrinsically available in our facility. It proved to be a most fruitful interaction between the Lockheed-Martin facility in Sunnyvale, CA and NIST-Boulder."

At the present time there are seventeen 10-volt Josephson array voltage standards in North America, the vast majority of them set up using Dr. Hamilton's arrays, advice, equipment recommendations, operating procedures and software. He has provided comparable assistance to many other installations throughout the world and has been diligent in transferring his technology innovations to industry. Dr. Hamilton also helped develop the NCSL RISP-1 "Josephson Voltage Standards."

Now retired after a 28-year career with NIST, Dr. Hamilton and his wife, Sue, run their own business, VMetrix, which provides hardware, software and consulting services for Josephson Voltage Standards. By the way, their complaint department is run by their dog, Cinder. Clark is also a Scientific Advisor to Hypres, Inc. and works with High Precision Devices, Inc.

Please join me in congratulating Dr. Clark Hamilton, the recipient of the NCSL International 2001 William Wildhack Award.
I'm also really impressed with the turnout here—it's no secret we are in difficult economic times, tight budgets and all. But the fact that you're here is really good news. It means your companies think this is an important event. I think it's vital to have conferences like this; it's the way we get things done. And you'll see that I believe NCSLI has a really strong role to play in the new economy, very consistent with the theme of your conference.

It's no secret that there are lots of layoffs going on in the technical parts of our industry. But it's also great to know that if something bad befalls us, that there may be another place for us. [Cartoon on screen; It says, "Laura, you're late for work," and she looks at her watch and says, "by 12 seconds," then she thinks, "I hate it when people with engineering degrees get into retail."] So there may be other careers for us engineers.

Editor's Note: I tried to get copyright permissions to reproduce the two comic slides, but was unsuccessful.

My boss, and the CEO of our company, Ned Barnholt, spoke recently at a Bear Stearns Technology Conference, held around the show, Semicon West. It's the big annual semiconductor show, and as you know that industry goes through some real nosebleeds, and they're in one of those right now. The main thing about that business is it behaves like a sine wave—you always go through zero at maximum velocity—whether you're going up or down.

Anyway, Ned shared with them some gallows humor, which I thought, in turn, I might share with you. Here are some characteristics of how you can tell if you've hit the bottom of the business cycle.

1) You can tell if the CEO moves his desk from the corner office to the ledge,

2) You will find the CFO joining the running poker game on the manufacturing floor,

3) You note that several astute Wall Street analysts have issued buy recommendations for your company, because they know your orders cannot conceivably go any lower,

4) Your earnings guidance to the street are now being done by the Psychic Network, and finally,

5) Your top sales people are qualifying for the PGA tour.

So, watch for those things.
Actually, Alan Greenspan, of the U.S. Federal Reserve Board, is
going to have another meeting in a few weeks, and I thought since
we have so many measurement experts in this crowd, and it’s clear
we have a statistical sample, I thought it’d be kind of fun to see when
you all think there’s going to be a turnaround.

So let’s have a show of hands—let’s do this in two quarters each—
how about those that think the summer and fall will see a turn
around? [no hands] Oh, this isn’t good. How about winter, spring
time next year? Well, we’ve got a few brave souls. Wouldn’t run out
and buy, though. How about next summer or fall? A few more. How
about never? [lots of hands]. Oh no!

You probably heard about the tulip mania in Holland? Turns out in
the 1630’s tulips began being traded—some of the early investors in
Yahoo would have been proud at how that worked. At one point, pre-
mium tulips were going for more than buying a house on the Grand
Canal in Amsterdam. At the height of the mania even third-rate tulips
were being traded in taverns, by folks, at more than a decade of earn-
ings than their previous shopkeeper/labor role. It harkens back to the
day trading and dot-com thing we just went through. But not to
worry, the tulip business has a four billion dollar annual turnover
now, and employs ninety-thousand people, so dot-coms will redeem
themselves and we’ll get on with our lives.

Agilent and NCSLI

So, let me get back to the main talk here. HP and Agilent have had a
long and rewarding relationship with your organization. HP was a
founding member organization in 1961. Two years ago, as Agilent
separated from HP, we brought thirty-three NCSLI memberships
over with the new organization. Breaking up HP was a big deal, split-
ting off Chemical, Healthcare and mostly test and measurement, (an
eight-billion-dollar chunk) from the main HP, which was about fifty
billion dollars at the time. We had to separate legal entities in over
120 countries. We had to parse out over eleven thousand patents to
the two companies. Break up over two thousand IT applications. And
all that time, business revenues were going through the roof. But that
was a year ago. Now, it’s sort of going through the basement.

One of the things I know some of you had anguish and angst about,
is that we did not get to keep the HP name, and I can tell you that
creating a new corporate name these days is really a big deal. Turns
out you’ve first got to find a name that hasn’t been used, and also hasn’t
been used by something dot-com, which is another whole set
of issues. You’ve got to find a name that’s got the right connotation
for your organization and products, and also one that works politi-
cally-correctly in most parts of the world.

I’ll mention one false start, we had a name that wasn’t really serious,
but it was something that got tried on this test of international accept-
ability. It was just an abbreviation of our past name. It was “Hew-
Pac.” As we tried that around the world, we found out a hew-pac in the
U.K. is an air-sick bag. So it didn’t seem like that was quite the
right thing to do.

As you know, we eventually fabricated a name, Agilent, and I was at
an organization meeting in Japan, where we were introducing our
new company to a lot of our customers. We probably had four hun-
dred Japanese customers in the audience. It was one of those busi-
ness-card-exchange deals with lots of things to discuss. About four
of us were on a stage, like this, and I’m standing next to a fellow from
the U.S. Embassy, who’s also going to speak.

I had memorized the first four or five lines of my talk in Japanese,
after which I was going to finish in English. I’m really kind of wor-
ried about this because it’s a sort of white-knuckle event anyway. I
have enough trouble with English. Just as I’m walking up to the
podium, a man from the U.S. Embassy, leans over and whispers,
“you know, the word agilent in Japanese means food seasoning com-
pany.” Well, that pretty much took me all out of synch, and every-
thing got said in English.

Anyway, we’ve had the good fortune to be very close to NCSLI over
the years. As you know, your good friend, John Minck, was NCSLI
President in ’76-77, and about ten years later he received the
Wildhack Award. He began editing your newsletter at that point, and
he’s continued with that since he retired from our company in 1995.
But, we, at Agilent, are pleased to continue to sponsor his work. John
couldn’t be here today, but he does send his regards.

In 1990, David Packard won the Wildhack Award and of course, in
2000, our Dave Abell, has been President and now Immediate Past
President.

Kudos to NIST and NCSLI

Before going on, I’d like to acknowledge and congratulate both NIST
and NCSLI. It’s been a century for NIST. You’ve been the anchor,
you’ve been a touchstone—we’d not be where we are today in our
multiple industries without you. We’ve had a strong relationship with
NIST over the last sixty years. In the Cesium beam flying clock early
work there was serious collaboration, and more recently RF and
microwave power sensors and of course vector network analyzers—
a lot of involvement there.

Agilent’s Len Cutler was involved in frequency and time develop-
ments, and has chaired one of the NIST visiting committees. Doug
Rytting led a committee to promote microwave standards to the
Department of Commerce and Congress in the 80’s and has been
very involved in vector network analysis technology. Now, he’s
involved in non-linear network analysis in that area—trying to do
what we did in the 80’s and open it up to the world, while having
NIST play a key role in that. Len and Doug both send their congratu-
lations and warm regards to you all.

Also, congratulations for NCSLI’s fortieth anniversary. You’ve taken
very strong leadership roles over the years, more recently with the
ANSI on Z540 and now with 17025 in association with ASQ and
ASTM. But more importantly, I’d like to send along my appreciation
for the steps you’ve done to put the “International” on the last part
of your name. International is a really important thing for many of us.
My business is a 24-hour affair. Over sixty percent of my business is
outside the United States.

My world goes like this. One example, my technical teams collagen
rate with customers in the Nordic area for advanced research and
central labs work. For the same customer, we engage operations in
the U.S., where there may be a product line headquarters doing pro-
duct concepts. Then we’ll deal with another company in the same food
chain in Taiwan where the actual design might be done, then move to
China or Malaysia for manufacturing and the product itself might
show up in Australia or Argentina, requiring installation or service
testing.
We must be globally connected. And, clearly, this global economy concept is a really big deal for Alan Greenspan, and I think it’s a big deal for all of us in this industry. If you’d like to get more insight, a quick read is Thomas Friedman’s “Lexus and the Olive Tree.” It does a nice job of explaining just how globally connected we really are.

**Challenges for All**

Today, my remarks are going to be mainly focused around electromagnetic measurements. Our company is also very involved in optical as well as life sciences. I realize there is a wide range of technology interests here in the audience. You have a rich set of technology domains represented—automotive, mechanical, chemical, life sciences—the list goes on—and you have a really rich, diverse membership. But I’d like to emphasize the thought that the wireless world and ubiquitous wireless connectivity is going to really impact all of us in everything we do and everyplace we go.

That brings me to today’s issues. We recognize that 17025 has been well accepted around the globe. That’s a very technically-challenging standard that requires detailed measurement uncertainty analysis, and it works well on simple artifacts that are a few steps removed from national metrology institutes. But, as you’ll see through my talk, it gets much more complicated, and doesn’t work all that well for the more complex instruments such as the network analyzer or even high frequency LCRRs. Impedance data we deal with are much more in vector complex number quantities and not in scalar or DC values. It gets to be quite a challenge for us.

Over the years, we’ve had this evolution of a paradigm in traceability, from a series of traceable elements in physical calibration standards, into the 80’s, with the four-to-one test accuracy ratios, and now, today, with 17025 and Guide 25. Both recognize the chain of calibration values, that are really well described in formal statistical language, and the people side, with the technical officer, and the need for the credibility and process descriptions.

We’ve come a long way, and a lot of very good work has gone into this academic foundation. But I would encourage you to really take a leadership role in helping us attain more practical examples of how to apply 17025.

Another challenge I’d issue is the work that I know is under way in terms of getting the mutual recognition of accreditation worldwide. This is a critical thing for those of us who deal with technology around the world. I know you’re working on it—I know it’s highly complex—it’s a hard problem—it goes from fundamental definitions of things all the way up to, frankly, the politics and legal processes of your countries.

But I encourage you to push forward on this because I think we will end up with legal molasses in the gears here if we’re not careful. We do appreciate how complicated this is. Agilent has already accredited over 21 labs to Guide 25 or 17025. We’re right now struggling with how soon, or if we should be moving to 17025 compliance specs on all our new products. As you can imagine, we have a lot of new products that “are built on platforms from the past,” and it’s pretty complicated to part from the past and move to the future. Frankly, it would be helpful to have a grandfather clause.

We do see lots of changes ahead, and I’d like to share some of those with you, because I think these are some issues that you’re all going to have to deal with. First of all, our customers are much more metrology-focused today. What’s going on is that people are trying to improve their end product confidence by pushing test back down the manufacturing chain, with much more standards impact, much more required precision. What they want to do is increase the confidence of their end product. Yet, they’d like to be able to pull out test costs from the end product and increase their yields. So that’s underway. That’s one force.

In addition to this economic force there’s a lot of technology force doing the same thing, pushing more integration, more complexity back down the chain. So between those two forces, things get pretty complicated in our industry.

For example, we have a customer that is putting more than twelve hours of test into a lower-level component. Sounds a little crazy, right? The particular product is a very sophisticated base station amplifier. Because they’re doing things like that, they’re expecting specific data points, specific points of calibration, relevant to their task and not just standard box instrument specs.

There are big economic issues at stake here. If you are testing, for example, a handset, you don’t want to be throwing away or reworking a good handset. By the same token it’s a consumer business, and you cannot afford to get a poor quality product out in a consumer’s hands. So you really walk this fine line to be economically competitive, and, at the same time, be able to have the right product in the marketplace. In that particular product category, output power is one of many specs that gets tested. You want to push the upper limit on output power because you want more connectivity—we all deal with these dropped calls—it’s a direct function of RF power.

Also, for voice quality, you want adequate power there. At the same time you want the bare minimum amount to accomplish this other function, because there’s the whole issue of battery life. The more RF power output, the less time your battery lasts—a key selling feature for the product. Also, there are continuing concerns over health effects as well as cell splash over and interference. We deal with +/- 0.25 dB types of measurements in RF power on these cell phones and they can actually change power levels every 1.25 milliseconds so it’s a big measurement challenge.

All that ends up pushing back a lot of complexity in our instrumentation. I’ve got a couple of examples here, to see what happens in 17025 as we get into these very complex measurements. Clearly, 17025 is great on gauge blocks and DC things but it gets very complicated for much of our line. This slide (on next page) shows the measurement equation for the new Agilent E8254A Microwave Synthesizer Source. And that’s just one parameter on this box which requires such a calculation. And those of you in the front, can probably see that there’s a plus sign that’s supposed to be a minus. [laughter] It’s complicated!

The next slide shows an example of how we’re trying to co-mingle physics and software together, to be able to deal with these really complex architectures. By decomposing the basic capabilities we’re trying measure into more fundamental elements, and being able to do on-the-fly uncertainty measurements and calculations, we are able to substitute instruments at the lower hierarchy, and modularize
The Annual NCSLI Conference

this software in a way that we can bring along the uncertainty analysis as we go. It’s a work in process, but could be extremely important in our future measurement mix.

E8254A Microwave Synthesizer Source

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Measurement & Uncertainty Decomposition

Editor’s Note: I didn’t intend to make these equations readable, only to show their complexity. Contact Dave Abell for actual copies.

So where is all this headed? I’d like to paint a little picture for the future, and give you some idea of what we’re going to have to deal with. There’s a lot of spectrum crowding, which pushes the technology up in frequency bands. The higher frequencies do give us the opportunity for broader bandwidth and more information and communication. This naturally brings along issues of standards and calibration as we go higher in frequency. People are talking about 100, 200, 500 GHz. It also introduces issues of using optical devices to generate microwave (actually mm-wave) signals, issues of interfacing to devices-under-test under these extremely high frequency conditions. We often don’t have standard connectors and sometimes it’s over-the-air, non-galvanic sorts of connections. Lots of issues.

Moore’s Law meets Maxwell’s Equations (and Maxwell wins)

On the other side of our world, in high-speed digital electronics, we just introduced a 40 gigabit, parallel bit-error-ratio tester. Eighty and 160 is not far behind. This raises lots of issues around what we refer to internally as “Moore meets Maxwell.” Gordon Moore’s (of Intel) well-known postulate, where IC computing power doubles every eighteen months, really delivers great benefits, through both lower cost and higher speed. But for those of you who enjoyed your Maxwell equations in electromagnetic field theory classes, you know both those concepts are colliding.

A lot of things that were 1’s and 0’s at low computing frequencies, are now mixed up with analog (RF/microwave). All kinds of microwave and RF effects are going to end up in high speed digital bit streams and those are going to be continuing challenges for our industry. In fact, we arranged some years ago, for some of our digital designers to attend some microwave training courses in our microwave divisions.

On the spectrum availability issue, it’s very limited, and that is creating opportunities for very clever and creative ways to transmit information in a given bandwidth, using all kinds of fancy modulation techniques. Because of that, people no longer want to use CW signals to test their stuff, because it doesn’t mean anything. We’re being pushed into real signals, real operating conditions. Digital modulation and modulated signals many times look just like noise. They’re “bursty,” you’ve got to do a lot of averaging, with a lot more emphasis on non-linear circuits and measurements. A lot of power and phase measurements are really not so much absolute but relative in many cases. So, we have lots of measurement-theory issues with the limited spectrum.

Wireless Technology Takes Over

Another challenge, which reveals an interesting way that will change the way we work and live, is that I think there is going to be a proliferation of sensors. Wireless devices are going to play a very prominent role in our homes and in our environment. Even today, in some parts of the world you can buy a Coke from a Coke machine and put the charge on your wireless bill. That’s just one peek at the future, and there’s no reason we can’t be instrumenting a large part of the world’s ecosystem with sensors which feed data back to central record-keeping. With everything getting connected, you can imagine serious turmoil in standards, and all the people and legal entities getting involved in such a revolution.

We refer to the people entering our business, in order to take advantage of wireless technology, as “wireless wannabe’s.” They see economic benefits, but they don’t bring much perspective or understanding of the technology, nor the concept of measurements and standards. This represents a great opportunity and a challenge for us of the metrology community, to provide the education and training to help those folks take advantage of the ubiquitous wireless connectivity, that forms their business models and the products they plan to offer the world.

We’re also going to see a big blurring of lines between what was traditionally hardware and what was traditionally software. A lot of us built our careers on analog measurements and the traditional measurement science involved. The new roles that digital hardware, through DSPs (digital signal processors) and software algorithms are playing today is absolutely amazing. More functions are being imbedded in instruments or outboard computers in our customer’s systems. As more IT gets built into test execs and applications, and the explosive power of computing technology drives the next ten years, we’re going to see some very, very big differences in how we go about our jobs.

Until now, much of the world’s standards activity has been built around much more simple functionality. Going forward, if we’re not careful, industry might well outpace where we’re at, in terms of (thankfully) bringing adult supervision to metrology and standards processes, and how we interact with one another, between compa-
Some Trends in T&M

So what are we doing about it? Well, we're working hard on it, I'm not sure we're moving the rock as much as we need to. We're trying to design instruments be more robust, more capable, trying to take advantage of software and DSP technology to shape and contour circuitry to be much more in an ideal state. We're also doing much more frequent internal checks and adjustments and alignments, to take some of the time and temperature drifts out of their operation, and provide more on-the-fly reference accuracy functions. We try hard to bring the instruments into a more ideal state, meet the published specifications for longer periods.

Secondly, we're looking for creative ways to solve some of the measurement complexity. For example, we have taken some of the good work you all have done in three-oscillator tests for phase noise from the standards labs—which under the best of conditions requires once a year lots of adult supervision—out onto the high volume manufacturing floor. Many of our signal sources are as good as you can get, and it's very difficult to find test sources that are 10 dB better, to measure them with. Using three-oscillator techniques and adaptive calibration processes, we're able to look at each individual instrument's greatest error points and determine the biggest impact on error correction.

Another area is working on measurement models. For example, one of the really tough measurements in the cellular industry is what's called adjacent channel power [ACPR]. ACPR looks at adjacent channels and makes sure you don't have a lot of inter-channel spill over, a very difficult measurement to make. We're developing test models to use more traditional measurement data to infer what that desired measurement is.

But all the while we push these important things forward, there are significant challenges that continue to exist. Therein lies the root and the importance and the theme of your conference in terms of what role will you play in the new economy. With things getting more complex, I think you must play a very important role in providing the underpinning and foundation for a lot of work that goes forward.

I'll leave you with a couple more comments. Globalization is here. I would very much encourage you, as I mentioned earlier, begin to harmonize your efforts globally. It is crucial to get mutual recognition and mutual accreditation a reality. If you don't, it's going to make for sand in the gears of progress. Recognize that industry is expecting more of you. Increase your impact economically by the role that you play. Metrology is going to be a major enabler of advanced technology and the impact that has on our lives. I'd encourage you to go beyond your cost center roots, and really engage with your business management, to make a difference; make a contribution, because I think it's there to be had.

Even in my business, until a few years ago, we used to think we were in the "test and measurement" business. This has a strong connotation of being viewed as a cost, so why would anyone want to test? That's a cost. We have both internally and with our customers tried to move to a new paradigm. We're seeing ourselves in a partnership role, to enable our customers to accelerate their technologies to market. We want to provide that early measurement insight, so you don't do so many design cycles. That early insight which insures your design has a lot more performance integrity.

We used to throw designs out of the lab, over the wall to manufacturing—we used to fight about it in our cafeteria meetings, right? But, now, you may send it "over the wall" six thousand miles away, maybe to an outsource assembly company, that isn't part of your company. You must design for product integrity, and once you have it in production, you must make sure that design quality shows up in quality-out-the-door. These are major issues; it's all about time-to-market, time-to-profit, and I fundamentally believe that your unique knowledge and science and your job role can make a difference to your company.

Recognize that metrology is not about simple, low-level parametric things anymore. The industry has gone way beyond that. It's all about applications. You need to find ways to get a metrology underpinning under that, to be able to make sure we're on solid footing as we go forward as an industry.

Finally, proliferation. All kinds of folks who know nothing about this are going to end up in our industries bringing their things along and it's going to require a lot of effort on our parts to make sure what we have as an industry we're proud of. It's clear to me as I got ready for this talk and read a lot of the literature and saw the exhibits last night that my piece of this, my world is a very narrow slice of what's represented in the audience today. A whole other set of challenges and issues—it's pretty clear to me you will play a key role in the future of the new economy. You can make a big difference, and when all else fails, we know there's always a role for people with measurements skills. [cartoon on screen, slide shows a sign painter in the front office, finishing a sign of the "U.S. Department of Precise Measurements," which, of course, imprecisely runs off the right end of the wall.]

Thanks again for having me today. Best of luck with your conference. You play a fundamental role in the world ahead, and I just want to wish you all the very best and congratulate you again on your 100 and your 40-year celebrations. Thank you.

Questions:

1) Is the example you gave, one of complex uncertainty analysis?

Byron: Yes it is. That's an actual product, just recently introduced. We've got a bunch of people off stuffing their picks in this area. You can see it's really complicated. Yes, we have active work going on.

Dave: All of those equations were real, by the way. What's happening is we're trying to build within the instrument, enough in the test system software side, to understand what its measurement uncertainty is. It's requiring a different look at the architecture for test software than we've traditionally had.

2) Could you expand a little bit more on mutual accreditation?

Byron: As we move around the world, there are differences of interpretation around 17025, and you can end up really complicated. You build something in Germany and sell it in China or the U.S., and you get all these issues about where is it traceable to, and is it the "real?" 17025? The sooner we can get to the point where one country's 17025 is like all the others, the sooner we get to mutual recognition. We've got tons of bright people working on issues like that, which add no value to the industry. The sooner we can get everyone on the same page, and get common acceptance around the world, the sooner we will see a really supercharged industry.
NCSLI President John Ragsdale kicks off the 40th Anniversary Conference in Washington, D.C. with a warm welcome to attendees from all over the world.

Keynote Byron Anderson, V.P. of Agilent Technologies, challenges the attendees to create truly global processes and standards to take advantage of our new measurement technologies.

Then there’s the whole matter of registration of hundreds of attendees who gather in time for the Sunday reception. Does this look like a professionally-run conference, or what? Waiting for the crowds at the Sunday arrival and reception, with Joan Wilshire, of the Business Office in the colorful NCSLI T-shirt, making a final check.

The food line at the Sunday night arrival reception surely beats the company cafeteria, doesn’t it?

On Saturday and Sunday, exhibitors arrive to set up. Craig Gulka presides at the laptop, while Dave Nebel (1 rear) and Ramona Soar (back to camera, right) help customers with setup logistic questions.

At the daily luncheons, much networking takes place. Here, Byron Anderson (1) gets his honorarium (a free lunch) for flying across the country to give the keynote. He discusses current 17025 issues with John Ragsdale and Jerry Hayes.
Scenes from the Annual Conference

Dave Abell (l) and John Ragsdale (r) look on as Wildhack winner Dr. Clark Hamilton examines his award medallion. A modest honorarium goes with the award, which in no way reflects the enormous contributions Dr. Hamilton has made to Josephson Array technology. William Wildhack, Jr. (second from r), son of our Founder, presented the award.

NCSLI thrives on the voluntary efforts at the region and section level. Carol Hackert (r) recognizes some regional heroes, and notes that our section meetings are ranked as one of the biggest value-added components of NCSLI membership. (l-r) Miguel Cerezo, LA Valley; Tom Wunsch, Region 6; Lloyd Baker, Region 5; and Jack Shuler, Region 4.

A celebratory handshake for the signing of the NACLA/NACC Memorandum of Understanding. (l-r) John Ragsdale, Rich Kayser, signing for NIST; Stephen Cross, signing for SCC; Stephen Cross, signing for SCC; Canada; Donald Heirman, President of NACLA; James Lusztick, NRC; Canada; Samuel Castellana, signing for ema; and Tony Anderson. Actually John and Tony didn’t sign.

The team which revised RISP-I gets some deserved recognition under the NCSLI flag. (l-r) Yi-hua Tong, NIST; Larry Tarr, U.S. Army; Bob Kupferman, Santa; Clark Hamilton, Maltrix; John Ball, U.S. Army; and Dave Deaver, Fluke.

Y.P. Harry Moody (r) presented a well-deserved honor to this peripatetic team of Accreditation Experts, who traveled to NCSLI region and section meetings all over the U.S. (l-r) Carroll Brickenkamp, NIST; Dave Agy, Fluke Corp; Ernest Garner, NIST retired; Roxanne Robinson, A2LA; and Peter Unger, A2LA.

The Two-Temperature, Two Pressure RISP Award is presented, with gratitude, to Chuck Ehrlich, NIST; Bob Hardy, RH Systems; John Ball, U.S. Army; and Klaus Jaeger of Jaeger Enterprises.
Scenes from the Annual Conference

And finally, an award for the USNMRC Report. Sherrill Ditmehn, NIST-reti-reed, Dick Pettit, Sandia, Roy Chesman, Morry Gee, and Chester Franklin. These regular National Measurement Requirement surveys are invaluable for focusing NIST program initiatives. Thanks to you all.

The Washington Hilton, scene of many speeches by Presidents of the United States, features a "Hall of Presidents," with formal presidential portraits in a long corridor. NCSLI created a walk of its own Past President's photos, here showing Charlie Johnson, Boeing, one of our original founding fathers. Charlie was Chairman in 1962-63, and said he truly enjoyed being invited back for our 40th.

Mike Suraci and Joan Wilshire from the NCSLI Business Office go over some conference details. Mike is surely the unsung hero for this massive anniversary celebration, since he stepped in, more than a year ago, to take overall responsibility for the conference. It was Mike's persistence that resulted in tracking down many of our past presidents, such as Charlie Johnson and Harvey Lance.

The largest gathering of NCSLI Past Presidents ever assembled. I am sorry I missed getting to the conference and seeing all those old friends.

Dr. Karen Brown, Acting Director of NIST, ceremonially presents President John Ragsdale with a plaque commemorating NCSLI's 40th year anniversary.

This year's Conference Director, Ramona Saar, and her volunteer team, deserve a tremendous round of applause for a terrific job, well done. No one can know the stress of this job unless they have done it. And, most don't do it more than once. By the way, Ramona's husband, Bill, a web/graphics designer, with Do-it.com, was responsible for our 40th anniversary logo. And we can guess that he also assisted Ramona in many other ways during the year-long organizing job.
Some of our attendees from the Far East caucus in the lobby. We appreciate all our international attendees, and the extra investment in time and money they commit. It just confirms our global reach.

Good food and good entertainment make for a memorable evening, as some Irish dancers kick up their heels.

There’s nothing like a twilight cruise to work off the stresses of all those technical lectures and snap quizzes. The cruise was the venue for the International Dinner this year. Good choice.

Yes, this is tough duty. Can we assume that most of the conversations were measurement assurance and quality oriented?

When one thinks of harbor cruises, Washington, DC, is not the first city that comes into mind. But the Potomac River is wide and eminently viewable.

President John Ragsdale starts cutting the 40th anniversary birthday cake. Is there a written standard for getting 1000 equal pieces?
Scenes from the Annual Conference

John Ragdale's daughter, Jennifer, is enjoying her trip to Washington, at the banquet night reception. Did this convince her to become a metrologist, John?

This scene brings a lump in my throat. How many dozens of shows did I organize in my 37 years with HP/Agilent? I never counted, but it must have been a hundred. When you've got equipment that must work, it is never a relaxed time, but when the show opens, the results are well worth the stress. When customers arrive and fill the booth.

Entertainment by the Washington group called Capitol Steps is decidedly politically incorrect, which is appropriate for our Nation's Capitol. We wonder if our international friends could comprehend our pleasure in finding humor in our country's politics?

“Old Presidents never die, they just hang around.” Past President Gary Davidson stuffs the booth for Charlie Motzko and Klaus Jaeger's consultant companies.

Ace photographer Frank Bandy relaxes with an old Air Force buddy, Gerry Blossom from Bell Laboratories, before returning to more conference duty.

Carol Singer Lehman, Publisher of Cal Lab Magazine, makes a pitch for advertising in her booth. I'm pleased that Carol runs technical articles on metrology in her magazine, since in this NCSLI Newsletter, I have to spend most of my space on operational news. If you have publishable technical articles, contact her.
Scenes from the Annual Conference

Organizations, large and small, find the NCSLI exhibit floor a friendly place to talk with customers, starting with the Sunday night reception, before and after technical sessions, and coffee breaks inbetween. They find a metrology-focused group.

Two more KEY people in this great conference success were Tom Huttemann (NCSLI Meeting Planner), and Cheryl Haydel of the Hilton Hotel staff.

I didn't know metrologists had time to practice or play golf.

A very well-attended Board meeting is always abbreviated at the conference. Yet, it doesn't appear to me that these people are very tired from their full week of activities.

President John Ragsdale hosts the Board dinner. One Board meeting to go and Charlie Matsko takes over in January. It's been a long, eventful week.

Graham Cameron, probably our only 17025 musically-accredited NCSLI member, sings for his dinner at the Board Dinner. Love that shirt.

Finally, although inexplicably we couldn't find any photos of the event, Mike Suraci's always-popular door prize extravaganza drew a big crowd and sent many prizes home with guests.
COMMENTS FROM A FOUNDING FATHER REGARDING THE CONFERENCE & THE COMMEMORATIVE NEWSLETTER

To: Mike Suraci, Conference V.P.
From: Charlie Johnson, NCSLI President 1962-63

As you know I was somewhat reluctant to go to your 40th anniversary conference in Washington, D.C. However, I must say that it was extremely pleasant and I enjoyed every minute of it. You and the entire Organization treated me like a King; it could not have been better. I was impressed with the growth of NCSLI into a very mature professional organization.

When we started this organization 40 years ago, I do not believe that any of us would have forecast the growth and maturity that has occurred. I was surprised at the amount of foreign participation in the conference. It is truly an international organization.

The exhibits and displays were quite a surprise, too. I never envisioned that aspect of NCSLI. The number of simultaneous in-depth papers being presented and the large attendance shows the strength of this Organization. You and your organization make me proud to be one of the founding fathers. You have taken this organization and guided it to what it is, a truly International Professional Organization.

Before all is forgotten, I would like to say a few words about the preamble to NCSLI. In the late 1950s, the Bureau of Standards was concerned that it was not properly supporting the United States industry, and had only fragmentary information as to what support industry needed from NBS. They then formed eight or nine people from the Bureau into a group and made a tour of U.S. industry. As a result of this tour, the Bureau asked a few of us to serve on an Advisory Committee to the Bureau, for the purpose of giving them some guidance as to the measurement capabilities that they should be developing and providing to industry.

I’m not sure I can recall the total composition of this committee, but it included Lloyd Wilson, Charlie White, Jerry Hayes, Andy Woodington, Shaill Richardson, Bill Amy, Orville Linebrink, Bill Wildhack, Harvey Lance and myself. This Committee operated for about two years and it was this Committee that developed the framework of NCSLI. We struggled with how we could form an organization that could be supported by, and participated in, by the National Bureau of Standards. It was Bill Wildhack, working with the legal staff at the Bureau, that came up with the idea of calling it a Conference.

Again, many thanks for the wonderful experience, and if I’m invited I would like to attend your 50th anniversary.

And some confirmation from Jerry Hayes:

Regarding the pre-history of NCSLI, the way Charles described it was on target to the best of my memory. NBS wanted to get better interaction with their “customers” and their needs. As one of the customers representing the Navy and DOD, I was concerned that NBS didn’t have the capability and sophistication needed to assure the development and deployment of the newer technology, and its applications for such weapon systems as the Polaris missile. I got involved, to make NBS aware of our needs and to urge them to improve their “product” and responsiveness. Not too long after, the Navy was able to send funds to NBS for work on specific measurement standards projects.

The Air Force was also instrumental in funding and getting the electronic calibration segment of the NBS’s Boulder Labs established. Boulder served as the Air Force’s primary lab until such time as it could establish its own capability at the Newark, OH, AFB site. That was a pretty exciting time for all of us metrologists, who worked together to build a metrology infrastructure in the U.S. to meet the needs of government and industry.

NBS and NCSLI (and some hefty DOD, DOE (AEC) & NASA contracts and metrology requirement specifications) were the lead vehicles to achieve that goal. Perhaps that explains my fervor in opposing anything that detracts from a strong, continued U.S. presence, competence and capability in metrology, and in supporting anything that enhances and maintains it where there is a need.

40th Anniversary Video Celebrates our Birth and Accomplishments

A special 40th Anniversary video entitled, "NCSLI-40 Years of Progress," was prepared and distributed to all NCSLI 2001 Conference attendees. The 25-minute video highlighted key activities over the 40-year history of the organization. The video was professionally prepared by Vision-Sound Communications, under the direction of Chase Roberts.

Most of the archives of NCSLI were opened to provide Roberts with materials for preparation of this outstanding video history. There were special interviews of Past Presidents. Copies of the CD are being mailed to all NCSLI Member Delegates. If you don’t get your copy soon, or would like additional copies, contact the Business Office.
BEST PAPER AWARDS

Invited Paper

SESSION 3D
Dr. Jorge Torres Guzmán
Centro Nacional de Metrología (CENAM)
Querétaro, Mexico

“Pressure Standards Comparison within the InterAmerican Metrology System (SIM), up to 100 MPA”

Applied Paper

SESSION 7A
Paul S. Wright
National Physical Laboratory,
Teddington, Middlesex, UK

“Methods for the Calibration of Flickermeters”

Quality Management Paper

SESSION 7B
Wolfgang Richter
Physikalisch-Technische Bundesanstalt (PTB)
Braunschweig, Germany

“Accredited Calibration Laboratories as Multipliers in the Traceability Chains for Chemical Measurements”

Technical Paper

Also given the Allen V. Astin Award for “Best Overall Paper”

SESSION 8E
Steve Phillips
NIST
Gaithersburg, MD USA

“A Careful Consideration of the Calibration Concept”

Full information & text of the paper can be obtained from the 2001 Conference CD

PRESIDENT’S MESSAGE (continued from cover)

over the past several years. He is currently Deputy Director and Chief Metrologist at the National Physical Laboratory in the United Kingdom, and will assume his duties at BIPM early next year. For more biographical information on Dr. Wallard, please refer to the April 2001 issue of the NCSLI Newsletter, in the article beginning on page 19.

In other late breaking news, Dr. Arden L. Bement, Jr. has been nominated by the Bush Administration to become the next Director of the National Institute of Standards and Technology (NIST). Dr. Bement is currently a Distinguished Professor of Engineering, and Head of the School of Nuclear Engineering, at Purdue University. He joined Purdue in 1993, after a impressive 39-year career in industry, government and academia. Some positions that he has held are: Vice President of Science and Technology for TRW, Inc.; Deputy Under Secretary of Defense for Research and Engineering; Director, Office of Materials Science, DARPA; Professor of Nuclear Materials, MIT; Manager, Fuels and Materials Department and Metallurgy Research Department, Battelle Northwest Laboratories; and Senior Research Associate, General Electric Company.

Dr. Bement has served as Chairman of the NIST Visiting Committee and as Chairman for the Commission for Engineering and Technical Studies of the National Research Council. He also served as a member of the National Science Board, the National Science Foundation, the Board of Overseers for the Malcolm Baldrige Quality Award, as a member of the Space Station Utilization Sub-committee and the Technology Advisory Committee of NASA, and is a member of the National Academy of Engineering.

He received an Engineer of Metallurgy Degree from the Colorado School of Mines, a Master of Science Degree from the University of Idaho, and his Doctorate Degree from the University of Michigan. He also holds a Doctorate Honoris Causa in Engineering from Cleveland State University. For an insight on Dr. Bement’s perspective of NIST, and its future direction, please read the text of the speech that he delivered at the NIST History and Reunion Day celebration, that was part of the week-long activities celebrating the Centennial Anniversary of NIST this past March. The text of his speech begins on page 43 of this Newsletter.

This year’s conference was a great success, with 1180 attendees from 34 countries, including 20 NCSLI Past Presidents. Mike Suraci, V.P. of Conference Management, and Ramona Saar, Conference Director, and their teams did a superb job producing a high-quality conference. The conference keynote speaker was Byron Anderson, senior vice president and general manager of the Electronic Products and Solutions Group of Agilent Technologies. Mr. Anderson’s speech followed the conference theme, “The New Economy, What Role Will Metrology Play?”

Mr. Anderson emphasized that complex instruments, currently under development, and those that will be developed in the future, will
require challenging new methodologies to accomplish their calibration and traceability. He explained some of the new test architectures that are currently being developed at Agilent Technologies. He then pointed out that in the future, measurements will require the melding of the physics of the parameter with sophisticated algorithms and software architecture, to bind the application together in achieving the desired level of measurement uncertainty. Mr. Anderson closed his address by challenging the attendees to focus their contributions in measurement science, not only on the academic challenges of making increasingly more accurate measurements, but to broaden their focus to include how they contribute to the success of their businesses in an expanding global marketplace.

Dr. Clark Hamilton was the recipient of the 2001 William A. Wildhack Award, for his fundamental research on the properties of the Josephson effect, that led to the development of a practical Josephson Array Voltage Standard. Dave Aebi, NCSLI immediate Past President, was assisted by the late Dr. Wildhack’s son, William Wildhack Jr., in making the presentation to Dr. Hamilton. Mr. Wildhack’s wife, Martha, and his daughter, Elizabeth, also participated in the presentation ceremony.

Other conference highlights included the signing of a Memorandum of Understanding (MOU) between the North American Calibration Cooperation (NACC) and the national metrology institutes from the United States (NIST), Canada (NRCC), and Mexico (CENAM). It also included the accreditation recognizing bodies from the United States, the North American Cooperation for Laboratory Accreditation (NACL A), the Standards Council of Canada (SCC), and the Enitdad Mexicana de Acreditacion (ema). Readers should take note that NACL A has replaced the National Voluntary Laboratory Accreditation Program (NVLAP) as the accreditation recognition body for the United States.

An Agreement of Cooperation was also signed by NCSLI and the Brazilian Society of Metrology, represented by Dr. Mauricio Frota, President of the Brazilian Society of Metrology. This agreement commits both organizations to explore common interests, share information, and promote each organization’s activities. Dr. Frota presented an absolutely stunning plaque to NCSLI in commemoration of this event. The plaque is a mosaic made from the natural stones and minerals found in Brazil. This plaque now hangs in a prominent place in our Boulder office.

We organized a number of special activities to celebrate the 40th anniversary of NCSLI and the Centennial anniversary of the National Institute of Standards and Technology. The entire day Thursday was devoted to reflecting on the past accomplishments of NIST, and gaining insight on its direction for the future. Another first for NCSLI was our ability to award Continuing Education Units (CEU’s), through the Sinclair Community College, to conference and tutorial attendees. NCSLI will also be able to award CEU’s to attendees at future Region and Section meetings.

In other news of interest from the Board of Directors meeting, held in conjunction with the conference, the Board is restructuring the NCSLI organization. The major changes deal with the elimination of the VP. Publications, and the creation of a VP. of Marketing, that will focus on membership recruitment and retention, publicity, and benchmarking activities. The former VP. of Operations and Marketing will become the VP. of Operations, and will focus on Business Office management, publications oversight, ANSI Secretariat duties, and the publication of the NCSLI Newsletter.

Other changes resulted in several committees being assigned to different Operations V.P. areas, in order to more evenly distribute workloads. We also renumbered the Divisional organizations to align their structure with International Regional Metrology Organizations.

On Sunday afternoon, the Division V.P.s conducted a workshop for the Region/Section Coordinators that was very informative and attended by the largest number of coordinators that I can remember ever attending such a session. Topics discussed were the new section in the Region/Section Coordinator’s Guidebook that describes the duties of the New Member Coordinator for each Section, how to plan and conduct effective meetings, and how to use the resources of the NCSLI Business Office and the Board of Directors when planning meetings.

During this session, the schedule for the Uncertainty Analysis workshops for the coming year was shared with the Region/Section Coordinators. Beginning in fall 2001 and followed in the spring of 2002, there will be Uncertainty Analysis Workshops conducted in 8 locations around the United States. The dates and locations are listed below, so please make plans to attend one of the workshops in your geographic area. For more information regarding the exact location, please contact your Division V.P. or your Region/Section Coordinator.

### 2001

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
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<tr>
<td>October 3</td>
<td>Seattle, WA</td>
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<td>October 4</td>
<td>Salt Lake City, UT</td>
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<tr>
<td>October 10</td>
<td>Chicago, IL</td>
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<td>October 11</td>
<td>Patuxent River, MD</td>
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### 2002

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<tr>
<td>April 4</td>
<td>Heath, OH</td>
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<td>April 10</td>
<td>Madison, WI</td>
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<tr>
<td>April 11</td>
<td>Huntsville, AL</td>
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In closing with my last President’s Message, I would like to thank everyone who has been responsible for making this a successful and productive year for NCSLI. I have thoroughly enjoyed my term as President, and am grateful for the guidance and support that I received from so many competent and caring individuals.

John Ragsdale
President, NCSLI International

EDITOR’S MESSAGE (continued from inside cover)

In the mid-70’s, I became aware of a NCSLI committee study, which estimated that our nation was devoting 22 million hours annually to the calibration of instruments. One detail of that intensive study was a listing by manufacturer and model number, of the average calibration time for each instrument. By sharing this statistical information, members could compare their calibration efficiencies with the industry averages. But, for me, it hinted at the unintended consequences that equipment manufacturers sometimes inflict on their customers.

For instance, for several decades, HP had sold tens of thousands of the legendary HP 608-series, a VHF signal generator, whose excellent performance was described by only 1/2 page of specifications. When the HP 8640-series solid-state replacement was introduced, it had 2-1/2 pages of specifications. So, while the new product had better performance, and did many things better, and the specs gave a far more comprehensive picture of that performance, the real consequence was that most calibration labs were required to devote several times more hours to each annual calibration process.

From my contact with NCSLI members/customers, I also heard of cases where contracts were written so tight, that cal labs were mandated to test, even for trivially-unimportant specs like the nominal 600-ohm impedance spec of the modulation input for a signal generator. Our HP production line at the time used the motto, “If you spec it, you check it.” Knowing that our own production test times were driven by extra-comprehensive specs, this led to the conclusion that our own test times were inflated for the same reasons.

All of this knowledge led me to propose a strategic plan for grouping our new HP product specifications into two tiers, hard specs and soft specs, or what would later be called supplemental characteristics. The hard specs were intended to be crucial to the primary performance of any product, and received 100% testing at production test phase, and were fully warranted. But the supplemental characteristics were inherent design features, which provided useful application information, but were not technically-central to applying the instrument. In the example given, the 600 ohms came from a termination resistor (1% tolerance) at the modulation input.

Along with other T&M manufacturers, I pushed for this plan to be studied and approved by one of the NCSLI committees of the time, and received welcome acceptance. This yielded a two-fold advantage, manufacturers saved test time and allowed lower prices, and cal labs, the world over, saved considerable test time each and every year thereafter. It was truly win-win, and what I think is an excellent example of proper cooperation in a trade association. I’m proud of that program.

So, in 1995, when I retired from HP, now Agilent Technologies, after a 37-year career, I asked for Agilent support to continue with the NCSLI Newsletter editing job, and was granted a modest stipend for the past 6 years. Recently, Agilent made that support a bit more formal, providing the support in the form of an Industrial Sponsorship of the NCSLI Newsletter Editing Function. Nothing else changes.

This would also be a good place to review my editing policies. In the first place, the NCSLI Newsletter Editor job is more like a compiler, since virtually all the text material comes from you members; committee reports, regional minutes, liaison status, and most everything else. So my editorial influence is pretty minimal. In spite of that, I put my editorship under the same rules followed by all industry trade magazines, where the editorial function is totally partitioned from their advertising functions.

For several decades, I bought Agilent product advertising in pages of the leading RF/microwave magazines of the day. The operating policies of all those magazines were very clear, there was zero connection between our purchases of advertising and the way their editors treated us for product stories. We called it the equivalent of the “separation of church and state.” And, although we don’t take advertising revenue, I do try to maintain a totally impartial position on editorial matters.

So, I wanted to assure everyone that I will continue editing for as long as the current NCSLI President wishes. I loved the episode of the popular TV drama, West Wing, where the minions of the White House staff repeat, “I serve at the pleasure of the President.” As do I.

But, it’s still fun for me to take the annual phone call from our incoming President, who gingerly hopes that I will please continue on as NCSLI Newsletter Editor? And I remind him that I have prepared a standing letter of resignation, just in case anyone upsets me. I’m just kidding, of course, but it does usually give us a good laugh, and starts our relationship on a light and friendly note, as in most of NCSLI. Although, one of these years, the new President may call my bluff.

John Minnick
Editor
At the 40th Anniversary Conference Luncheon, President John Ragsdale honored the NCSLI Past Presidents. A committee with a bit of a whimsical slant, prepared some tongue-in-cheek awards, recalling some key accomplishments and memorable foibles. He presented plaques to recognize the occasion.

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Affiliation</th>
<th>Citation</th>
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<tbody>
<tr>
<td>1962 - 1963</td>
<td>Charles Johnson</td>
<td>Boeing Corp., Seattle, WA</td>
<td>“Recognized as the most senior Past President attending the 2001 Conference”</td>
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<tr>
<td>1965 - 1966</td>
<td>John Van de Houten</td>
<td>Aerojet, Sacramento, CA</td>
<td>“Recognized as the 2nd most senior Past President attending the 2001 Conference”</td>
</tr>
<tr>
<td>1969 -70 &amp; 70 -71</td>
<td>Jerry Hayes</td>
<td>Navy Metrology Engineering Center, Pomona, CA</td>
<td>“Perpetual consultant to all who followed and for always being willing to help”</td>
</tr>
<tr>
<td>1971 - 1972</td>
<td>Frank Dyce</td>
<td>Martin Co., Orlando, Fl.</td>
<td>“The Past President who was the quickest to move out of the Metrology field.”</td>
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<tr>
<td>1972 - 1973</td>
<td>Ralph Barra</td>
<td>Westinghouse, Baltimore, MD</td>
<td>“Company loaned him to NBS after his presidency”</td>
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<tr>
<td>1974 - 1975</td>
<td>J. David Mitchell</td>
<td>Rockwell Intl., Anaheim, CA</td>
<td>“Recognized as the Past President with the most memorable handshake”</td>
</tr>
<tr>
<td>1975 - 1976</td>
<td>J. Michael Suraci</td>
<td>Lockheed, Houston, TX</td>
<td>“Most active Past President and holder of the most positions”</td>
</tr>
<tr>
<td>1977 - 1978</td>
<td>Laurel Axtier</td>
<td>Beckman Instruments, Fullerton, CA</td>
<td>“Only Past President preferring BEER as his beverage”</td>
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<tr>
<td>1978 - 1979</td>
<td>Ron Kidd</td>
<td>Microwave Associates, Boston, MA</td>
<td>“Remembered for hosting a great New England Clambake after the Cape Cod Board Meeting”</td>
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<tr>
<td>1982</td>
<td>Dean Brungart</td>
<td>Teledyne Systems Co., Northridge, CA</td>
<td>“Remembered as a Great Exhibits Chairman”</td>
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<tr>
<td>1983</td>
<td>Hartwell Keith</td>
<td>TRW, Redondo Beach, CA</td>
<td>“Remembered as being the most quiet achiever among the Past Presidents”</td>
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</table>
1984  George Rice  
Rockwell I nd., Anaheim, CA  
"Recognized as the first NCSLI Officer to testify before the House of Representatives"

1985  Pete England  
General Dynamics, Pomona, CA  
"Remembered for spearheading the NCSLI Automatic Test Equipment effort"

1986  H. Bryan Werner  
Westinghouse, Pittsburgh, PA  
"Only Past President to hold an NCSLI Board Meeting in cold Pittsburgh, Pa."

1986 - 87  Ed Nemeroff  
Datron Systems, Stuart, FL  
"Collector of the most NCSLI Frequent Flyer miles"

1988  Gary Davidson  
TRW, Redondo Beach, CA  
"Remembered for spearheading NCSLI's Equipment Management Forum"

1989  Del Caldwell  
Navy Metrology Engineering Ctr., Pomona, CA  
"Recognized as a Long Range Planning Advocate and 45662/2540/17025/10012 Guru"

1990  William Simmons  
Sverdrup Technologies, NASA Stennis, MS  
"Always Helping, Always Faithful—a Conference Stalwart"

1991  Graham Cameron  
Dept. of Defence, Ottawa, Canada  
"First International President, and most talented singer in NCSLI"

1995  William Doyle  
U. S. Instrument Rentals, Dallas, TX  
"Recognized as the only NCSLI President from Texas, and his frequent cigarette breaks"

1996  Anthony Anderson  
Guideline Instruments, Lake Mary, FL  
"The only Past President with an English accent"

1997  Kevin Ruhl,  
TRW, Redondo Beach, CA and McDonald Douglas, Huntington Beach, CA  
"The only Past President to change companies while in office"

1998  William Quigley  
Hughes Aircraft Co., Tucson, AZ  
"Only NCSLI President from Arizona"

1999  Dr. Klaus Jaeger  
Lockheed Missiles & Space, Sunnyvale, CA  
"The only NCSLI Past President with a PhD."

2000  Dave Abell  
Agilent Technologies, Santa Clara, CA  
"The 1st President who had divine help, wife is a minister"
METROLOGY CALENDAR

NCSLI MEETINGS
August 4-8, 2002
NCSLI Workshop & Symposium
Town & Country Resort, San Diego, CA
CONTACT: NCSLI Business Office, (303) 440-3339
FAX: (303) 440-3384
e-mail: info@ncsliinternational.org
website: ncsliinternational.org/conference

INDUSTRY/GOVERNMENT MEETINGS

10th Intl. Metrology Congress
October 22-25, 2001
Saint-Louis, France
Information: www.metrologie2001.com

Applied Measurement & Inspection Technology
October 23-25, 2001
Detroit, MI
Sponsor: Society of Manufacturing Engineers
Contact: 1-800-733-4763
<www.sme.org/training>

Measurement Science Conference
January 23-25, 2002
Anahiem, CA
CONTACT: John Bowman, (714) 847-7380
e-mail: john.bowman@fluke.com

5th Intl. Symposium Fluid Flow Measurement
April 7-10, 2002
Washington, DC
CONTACT: George Mattingly, (301) 975-5939
FAX: (301) 975-6286
e-mail: gmattingly@nist.gov

REGION MEETINGS

REGION 3
Region 3 Meeting, October 11, 2001
NAWCAD, Patuxent River, MD
CONTACT: Kevin Abercrombie, (301) 342-1654
FAX: (301) 342-0920
e-mail: abercrombiek@navair.navy.mil

REGION 6
Gulf Coast Section, November 8, 2001
NASA, Stennis Space Center, MS
CONTACT: Allen Bare, (228) 688-1844
FAX: (228) 688-3079
e-mail: Allen.Bare@ssc.nasa.gov

REGION 8
Utah Section, October 4, 2001
Salt Lake City, UT
CONTACT: Bernard Morris, (801) 763-1600
FAX: (801) 763-1010
e-mail: bernard_morris@hartscientific.com

REGION 9
Region 9 Fall Meeting, October 3, 2001
Seattle Design Center, Seattle, WA
CONTACT: Chris Quach, (206) 762-2515
e-mail: cquach@nwccl.com

REGION 10
Japan Area Annual Meeting, November 22, 2001
Tokyo Metropolitan Ohta-ku Industrial Plaza
Ohta-ku, Tokyo, Japan
CONTACT: Kazumi Hayakawa
e-mail: kaz.hayakawa@fluke.com

REGION 11
Madison WI Section, October 24, 2001
Covance, Madison, WI
CONTACT: Don Navis, (608) 242-7962
e-mail: don.navis@covance.com

Chicago Section, October 10, 2001
S&C Electric Co., Chicago, IL
CONTACT: Tom Waltrich, (847) 270-2600
FAX: (847) 270-5559
e-mail: thomas_waltrich@baxter.com

Kansas City Section, October 17, 2001
Boeing, Wichita, KS
CONTACT: Marion Foster
e-mail: marion.foster@wichita.boeing.com

Twin Cities Section, October 25, 2001
Inver Grove Heights Community Center, Inver Grove Hghts, MN
CONTACT: Terry Conder, (651) 736-4331
FAX: (651) 736-7325
e-mail: tmconder@mmm.com

REGION 12
Canadian Region Fall Meeting, September 27-28, 2001
National Research Council, Ottawa, ON
CONTACT: Jim Mullins, (613) 226-7920 x230
FAX: (613) 226-8185
e-mail: jimullins@pyleneelectronics.com

Please send Metrology Calendar additions and corrections to the NCSLI International Business Office,
(303) 440-3339 FAX:(303) 440-3384, or E-mail to info@ncsliinternational.org
CHECK WEBSITE FOR UPDATES www.ncsliinternational.org/events/
MEASUREMENT SYSTEM SHORT COURSE

Texas Christian University
March 11-15, 2002

Cost: $1450

A New Incarnation for the Popular Peter Stein—Arizona Spring Training Measurement System Course

Following 40 years of successful education of industry professionals with his Measurement Systems Short Courses in Arizona, Peter Stein has handed over the course management to one of his associates, Dr. Patrick Walter, at TCU. The course will be offered this year in Fort Worth, and one month earlier, in March 2002. Professor Walter notes that this is the only national continuous education program in existence, in Measurement Systems Engineering, in a university setting.

The MSE Short Course offers today's engineering professionals a proven method to understand, design, interpret and use measurement systems for testing and control applications. NCSLI readers will recall Peter Stein's challenge to his students: to recognize that measurements give you numbers, but if you don't understand and appreciate the exquisite subtleties of sensor characteristics and instrumentation black holes, you will never get real data. Data is the desired, correct, and definable measurement result, which allows the user to put confidence in the whole measurement process.

Contact:

Texas Christian University
Office of Extended Education
TCU Box 297076
Fort Worth, TX 76129
817 257-7132
<http://www.mse.tcu.edu>
GLOBAL NEWS

Ed Nemeroff, V.P.

SIM

SIM, the Inter-American Metrology System, held its annual meeting at the Radisson Deauville in Miami Beach Florida, September 15-21. NIST was the host NMI this year, and NCSLI participated. I represented the organization at the General Assembly and other events. I also assisted NIST in the arrangements, program and exhibits. All NCSLI conference exhibitors were invited to participate.

Membership Committee Meeting

I attended and participated in the NCSLI membership committee meeting, June 3 & 4, 2001 Atlanta, GA, to represent international issues. We developed a series of inserts for the new member package.

NCSLI Conference

I presented a formal paper in the international track, “The Role of MAS-Q in Global Trade.” We also reenacted the signing of the agreement of cooperation between NCSL International and the Brazilian Society of Metrology. A plaque was presented by the President of SBM to the President of NCSLI, to commemorate the event.

Following the conference, I will be heading to Kazakhstan and Kyrgyzstan—a new metrology and standards program for USAID.

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BRAZIL REPORT
Maurocio Nogueira Prota

The Brazilian Society of Metrology, organization serving as the NCSLI Region Coordination for Brazil, also serves as the Brazilian representation to IMEKO, the International Measurement Confederation. Founded in 1958, IMEKO is a non-governmental federation of 35 Member organizations individually concerned with the advancement of measurement technology. Its fundamental objectives are the promotion of international interchange of scientific and technical information in the field of measurement and instrumenta-

tion and the enhancement of international cooperation among scientists and engineers from research and industry.

IMEKO is essentially a forum for advancement in measurement science and technology, having consultative status with UNESCO and UNIDO. It is one of the five Sister Federations within FIACC (Five International Associations Coordinating Committee), further consisting of the International Federation of Automatic Control (IFAC), International Federation for Information Processing (IFIP), International Federation of Operation Research Societies (IFORS), and International Association for Mathematics and Computer Simulation (IMACS).

Following an open tender, competed for by different nations, Brazil, through its representation of the Brazilian Society of Metrology, was elected to organize and host the 2006 IMEKO World Congress, a major international event in Metrology every three years, traditionally bringing together over 2000 participants from about 50 nations. The next IMEKO World Congress will be organized by the Croatian Metrology Society, in Dubrovnik. The last one was held in Vienna, on Sept. 2000.

Acting as an enthusiastic Region Coordination for NCSLI in South America, the Brazilian Society of Metrology has issued a strong invitation to NCSLI, to transfer to Brazil the annual Conference and Workshop, defending the philosophical thesis that only a single World Congress should be organized, bringing together all possible efforts and contributions.

The fundamental concept behind the warm invitation made by the Brazilian Society of Metrology, inviting NCSLI to serve as a co-sponsor of this World Metrology Olympics, is that this would be an unique opportunity to make clear to the world of metrology the complementary mission of all existing organizations involved in metrology, clearly emphasizing to suppliers and demanders of metrology that we all embrace a common universal cause that we all trust.

Having plenty of time, the final decision is now before the NCSLI Board of Directors.
Gary Hysart  
NRC/INMS Representative’s Report

INMS Strategic Planning Project

As noted in previous reports, INMS has for some time been working on a program of renewal and revitalization of metrology for the Institute and for the country. This initiative is aimed at developing and implementing a comprehensive national strategy for dealing with strategic issues facing Canada, in metrology and national measurement standards, including: policy development, capital infrastructure, human resources, new technology developments and needs, and strategic research.

The project is moving along well, with regular weekly meetings of the Strategic Planning Steering Committee and discussions between INMS staff and the consultant organization aimed at identifying and quantifying the impact of the Institute’s activities on the stakeholder community. Many concurrent activities are looking at the nearing deadlines and amongst the accomplishments are the renewal of the INMS Mission and Vision statements along with the reaffirmation of the Institute’s strategic goals.

International Activities

The importance of national metrology institutes in the reduction of technical barriers to international trade has led to the creation of several metrology-related cooperations under regional trade agreements. Examples are the North American Cooperation, in Metrology (NORAMET) and the North American Calibration Cooperation (NACC), under NAFTA, and the Inter-American Metrology System, supporting the development of the FTAA. INMS is a member of and plays a leading role in these cooperations, and in about 150 related international committees and global bodies such as the Comité international des poids et mesures (CIPM). A key element in these activities is the international comparison of measurement standards and services.

In October 1999, the Director General of INMS and his counterparts from 37 other countries signed a CIPM-sponsored Mutual Recognition Arrangement aimed at achieving “mutual recognition of national measurement standards and of calibration and measurement certificates issued by national metrology institutes” (NMIs). Since then, INMS scientists have participated in measurement comparisons with other countries and in regional and global forums where calibration and measurement capabilities are reviewed, for inclusion in a publicly-available database that has been set up as a result of the MRA. Each inter-NMI comparison requires several years to plan, implement, document and establish equivalence. INMS participated in the planning or implementation of some 51 such comparisons in pursuit of the MRA aims during 2000-2001.

In addition, INMS was involved in the planning or implementation of some 12 comparisons under the auspices of the Inter-American Metrology System (SIM) which promotes and coordinates a program of measurement comparisons in support of the establishment of the Free Trade Area of the Americas (FTAA). Following completion of the comparisons, an extensive international review process takes place to determine which calibration and measurement capabilities can be included in the CIPM and/or SIM database.

During 2000-2001, as a result of such reviews, INMS calibration and measurement capabilities in electricity and length metrology were added to the CIPM database indicating recognition by the NMIs of all our major trading partners. Other fields are in the final stages of review and are expected to be added during 2001-2002.

It has been estimated that INMS spends about Can$1.6M per year on international activities. This includes salary, travel, and purchase of equipment. This is an increase over previous years, and has occurred at the expense of other supporting activities. Nevertheless, the CIPM MRA and other trends mean that even more expenditure will be needed in the foreseeable future.

In addition to these activities on the technical level, INMS researchers have been heavily involved in international committees that have helped to develop the MRA and related procedures. For the first part of 2000-2001, INMS provided the SIM representative on the Joint Committee of Regional Metrology Organizations and the BIPM (known as the JCRB). INMS also provides the NORAMET representative on the SIM Technical Committee. These activities have enabled us to protect and enhance Canada’s interests by direct involvement at the highest level.

CLAS Activities Report

As noted in the last INMS report to the Board, the full evaluation of the Canadian laboratory accreditation system by APLAC and NACC for compliance with the relevant requirements of ISO/IEC Guide 58 was completed in May 1999. There were some delays in Canada’s signing of the APLAC MRA, due to some loose ends that needed tidying up. SCC has now signed both the APLAC MRA and the ILAC MRA for Canada. This means that the SCC/CLAS program for the accreditation of calibration laboratories has been confirmed as being equivalent to those of the other accreditation agencies signatory to these arrangements.

This is an enormous step for Canadian exporters, in that it eliminates the need for retesting or recalibration of Canadian goods by importing countries. Along with the signing of the CIPM MRA, this goes a long way towards implementing a level playing field for service and manufacturing industries wanting to compete in the global marketplace.
CLAS recently completed the draft final report on an interlaboratory comparison that it led on ac voltage and ac-dc difference. This was a North American Calibration Cooperation ILC and nine laboratories participated, from Mexico, the USA, and Canada. This was a complex, difficult ILC, made more complicated for those preparing the final report, by the fact that not all labs were accredited to measure all the points and some used different equipment than stated in the instruction. This made the analysis of the results quite difficult and thus took longer than normal to complete.

The program started in April 1999 and was completed in November 2000. The draft report was completed in July 2001. In other ILC activities, two CLAS labs participated in an APLAC ILC on capacitance. The measurements were completed in May and the results of the Canadian participants look excellent, although the final report from APLAC will not be available for some time. CLAS is also doing a frequency ILC amongst accredited Canadian cal labs and we are awaiting the start of a NACC ILC on thermometry. So these are busy times indeed for the accredited cal labs.

As noted above, the CLAS program is very busy at this time, not only with ILC activities but also with at least fifteen cal labs in various stages of the assessment process. In addition, eight of the accredited cal labs are going through the re-assessment process that takes place every two years following accreditation. As in the past, many of these labs are expanding their scopes of accreditation during re-assessment, with most of this extension activity driven by client demand. The CLAS program is finalizing the staffing process for an additional lead assessor or, in CLAS language, a CLAS Technical Advisor.

**Ionizing Radiation Standards at INMS**

The objectives of this group are to do research and development related to the measurement of ionizing radiation and to provide services such as calibrations, consultation and training to our client communities (medical physics, in cancer radiotherapy, radiation protection, international standards, industrial, and NRC users of radiation).

The program covers standards and measurement techniques related to: exposure and air kerma in low energy x-ray and 60Co beams; absorbed dose to water in 60Co beams and in electron and photon beams from linear accelerators; radioactivity; neutron fluence and dose equivalent; absorbed dose to tissue in a beta-ray field and Fricke dosimetry. As well, the program includes the development of Monte Carlo techniques for the simulation of electron and photon transport in materials and the development of dosimetry protocols for use in cancer radiotherapy clinics.

The section is equipped with X-ray generators, two 60Co therapy units, radioactive sources, three 3-ray sources, a hot lab for producing radioactive sources, and a 35 MeV electron linear accelerator. The X-ray generators provide stable beams of X-rays at constant potentials from 10 kV to 300 kV. Exposure rates from 100 pA/kg to 60 μA/kg (about 1 mR/h to 15 R/min) can be selected, covering both protection and therapeutic levels. 60Co beams are standardized in terms of exposure, air-kernel, and absorbed dose. 60Co exposure rates between 400 nA/kg and 300 μA/kg (100 mR/min to 80 R/min) are available. Coincidence and anti-coincidence absolute counting equipment allow the standardization of Radioactivity, including 3+, V-, and γ-decay, and electron capture.

Standard radioactive neutron sources of Am-Be are available for the calibration of instruments. The electron linear accelerator is a 35 MeV high-current short-pulse machine. The accelerator can be run up to 50 MeV unloaded and can sustain an average current of 60 μA at 35 MeV. A low energy "pretzel" magnet placed between sections makes available the full electron current at energies between 5 MeV and 12 MeV. At the end of the accelerator, a conventional 2-magnet steering system provides electron beams with well-known energies. A variety of targets, beam flatteners, collimator systems, scattering foil systems, beam current monitors, and beam steering systems allow a wide variety of clinical accelerator beams to be simulated. The accelerator can also be run with currents averaging less than a single electron per pulse. In addition to the provision of electron and photon beams for dosimetry, the electron linear accelerator is available to outside users.

**NRC Licenses New Radiation Dosage Calculation Software to MDS Nordion**

A breakthrough in the long-term investment in radiation therapy research at the National Research Council of Canada has resulted in the licensing of new technology to MDS Nordion, that will significantly improve the speed and accuracy of radiation therapy treatment for cancer patients. This agreement is the result of innovative research and a progressive approach to the commercialization of technology at NRC. Its medical and economic benefits will be felt both at home and around the world.

**The Challenge to Improve Radiation Treatment.** The use of both electron and photon radiation in the treatment of cancerous tumours is a well-established practice. Once a physician has located and determined the size of a tumour in a patient, a clinical medical physicist develops a treatment plan for the use of the 60Co unit or linear accelerator that delivers the radiation. One of the more critical elements of the treatment planning system is the calculation of precise radiation dose distribution, so that the dose to the tumour can be maximized while the dose to healthy tissue is minimized.
Until now, the only calculation methods available fast enough for use in the clinic were not very accurate due to the fact that they involve several approximations. Techniques that offered superior accuracy were simply too cumbersome and time-consuming for routine use.

An innovative solution. The Monte Carlo Simulation technique, while extremely accurate, is one such method of calculation that was too slow. It is a general solution technique based on random sampling, that is applied to a variety of numerical problems, from estimating traffic flow to calculating insurance risk. Dr. Iwan Kawrakow, a researcher at NRC’s Institute for National Measurement Standards (INMS), has managed to tailor this generic technique to suit the specific requirements of the radiation clinic.

Dr. Kawrakow joined NRC in 1996, with a background in high-energy physics and medical physics from the University of Leipzig/Germany, “to participate in the world-wide recognized research activities of the IRS group.” His focus shifted back to radiation treatment planning only in the last year, when it became apparent during discussions with MDS Nordion that the time for a clinical implementation of Monte Carlo simulations had come.

Thanks to improved sampling of multiple scattering events and the use of variance reduction techniques, Dr. Kawrakow’s Monte Carlo based software package is an astonishing 100 times faster than previous Monte Carlo approaches were at solving the problem of correct dose distributions. It is extremely accurate, works in minutes instead of hours; and it does not require an inordinate amount of computational power to run.

“The knowledge gained in those first three years at the NRC helped improve in many ways the algorithms, crucial to this breakthrough, that were developed with a colleague at the University of Leipzig,” he added. “It is always the case in science, that applied science and technology transfer only exist because of the ideas and knowledge created by basic scientific research. It is very satisfying to know that the results of this work will provide an important tool in the process of radiation treatment of cancer patients.”

Getting the Technology to the Clinic. Companies in the medical technology industry expressed interest as soon as news of Dr. Kawrakow’s innovation was released. Among them was MDS Nordion Inc. As a Canadian company with a major international presence in the field, NRC recognized MDS as an ideal candidate for a potential agreement to bring Dr. Kawrakow’s work to clinic floors around the world. All too often, the arrangement of licensing agreements can be a cumbersome process. However, NRC’s business development experts, MDS representatives, and Dr. Kawrakow and his colleagues in the Radiation Standards Group at INMS were an efficient, flexible, determined team. Plus, the Group’s knowledge of the industry in general proved to be the key to establishing a fair value for the technology.

A Very Profitable Agreement. The successful licensing of Dr. Kawrakow’s elegant software to a Canadian company with international exposure like MDS ensures that markets around the world will be penetrated. The technology will keep MDS at the forefront as providers of radiation treatment planning systems and could improve their market position overall. This is a recipe for profit as well as growth, and all that attends it. The team of Dr’s Kawrakow and Dave Rogers of INMS, Clement Langenmeyer of NRC’s Business Development Office and William J. Dickie of MDS Nordion were recently recognized under the prestigious Canadian government Federal Partners in Technology Transfer program for exceptional work in the transfer and commercialization of technology.

Benefits to NRC include the satisfaction of getting the results of excellent research to the marketplace where it can do most good. As stated by Dr. Arthur Carty, President of NRC, “Not only will the application of the research help fuel economic growth in Canada, it will greatly enhance the accuracy of dose calculations for radiation therapy, and thereby help doctors provide better health care for cancer patients.” In addition, NRC will enjoy a revenue stream over the next six years well in excess of Can$1M that will continue to fund ongoing research by Dr. Kawrakow and the Radiation Standards Group. Until very recently, virtually all work done by the Radiation Standards Group was shared with a wide variety of users free of charge. It is because of this wide use of NRC’s free, but slower software, that the market for the new product exists today.
REbORTS FROM THE REGIONS

June 20, 2001
Dayton T. Brown, Inc.
Bohemia, NY
Don Bansen
New York City
Section Coordinator

The NCSLI Region 2, New York City Section, Spring meeting was held on June 20, 2001 at Dayton T. Brown, Inc., in Bohemia, New York. Gil Lipper, Vice President of Advanced Technical Marketing, made welcoming statements and introductions. Host, Chuck Girotkowski, Quality Manager at Dayton T. Brown, Inc., welcomed all attendees and briefly discussed the services offered at Dayton T. Brown’s various divisions, including: Technical Communications, Test Systems, Precision Sheet Metal Fabrication and an A2LA and NVLAP accredited Engineering and Test Lab.

Randy Fowler, of the Fluke Corporation, gave a presentation on the importance of the calibration of power quality measurement devices. With so many changes occurring in the electrical power industry, there is an increased need for quality monitoring and traceable measurements. Randy gave several good examples illustrating why it is so important to have fully-calibrated, traceable power monitoring equipment. He mentioned that there are various power monitoring instruments and discussed the equipment available to calibrate them.

Doug Lynde, of On Time Support, gave a presentation on how to combine process calibration and metrology. Doug talked about the process industry, how to support process instrumentation, and the standards that calibrate them. He discussed some new products that will enhance and improve how process calibrators can store custom procedures and test instructions, and upload fully-traceable test results to a home station.

Randy Fowler, of the Fluke Corporation, was back again to give a presentation on how to estimate measurement uncertainties. Randy explained that all uncertainties are estimates, based on probability theory, curve-fitting techniques, and experience. He defined Type A and Type B uncertainty types and the various stages of uncertainty analysis, as well as giving an introduction to statistical analysis.

The meeting concluded with a door prize raffle and thank you gifts for the presenters.

Attendees:
Blanca Calderon - Aeroflex Laboratories
Patrick Craig - Norcross Instruments
Steve Croy - Exploit Calibrations Laboratories
Don Champion - Underwriters Laboratory
Camilo DeSalvo - MIL-STD/EDO
James Dickow - Fluke Corporation
Randy Fowler - A.H. Electronics
Steve Griffin - Fluke Corporation
Andrey Hazan - A.H. Electronics
Steven Hesty - Exploit Calibration Laboratories
Gil Lipper - Advanced Technical Marketing
Doug Lynde - On Time Support
Bob Moorell - Advanced Technical Marketing
Steve Pasicz - Symbol Technologies
Joseph Rehm - Aeroflex Technologies
William Rasmussen - A.H. Electronics
Paul Zicker - Brookhaven National Laboratory

Although Don didn’t identify the attendees in the picture, two of the seated men look like they might be long-lost twins.

May 2, 2001
Lockheed Martin Information Systems Center
Orlando, Florida
Ray Minchin
Central Florida Section Coordinator

The Region 4 Central Florida Section of the NCSLI held their spring meeting on May 02, 2001, at Lockheed Martin Information Systems Center in Orlando, Florida. The management and staff of Lockheed Martin Metrology Laboratory sponsored the meeting. Ray Minchin, Manager of Lockheed Martin Metrology Laboratory, welcomed the attendees to the facility.

Thomas C. Brown and Paul J. Reese, Metrologists at the Kennedy Space Center Reference Standards Laboratory, have developed a spreadsheet that calculates ITS-90 coefficients, and generates tables of temperature vs. resistance values. To perform ITS-90 calibrations on platinum resistance thermometers, resistance measurements of a PRT are made at known temperatures using “fixed point” standards. A set of “coefficients” must be generated, based on these measurements, for use with the functions specified by ITS-90 (re: NIST Tech Note 1265).

Computer programs are necessary to generate these coefficients, and to compute temperature and resistance values based on these coefficients. These programs are most often generated locally or purchased from companies specializing in thermometry. The spreadsheet format offers many advantages over conventional high-level computer programs, and the results have been verified by NIST to within 0.15 mK.
Ray Gil, Ametek Test and Calibration Instrument Division, Largo, FL

Ray presented a paper entitled "Calculating Measuring Uncertainty, A Practical Approach." Ray's presentation provides insight into the definitions and explanations of metrology terms and definitions. Ray provided examples and an explanation of Repeatability, Reproducibility, Standard and Combined Standard Uncertainty, Expanded Uncertainty, etc.

Ray explained his experience with reporting uncertainty calculations using Microsoft Excel spreadsheet applications. He presented samples of his Excel spreadsheets, showing the format and how they automatically calculated his uncertainties by just entering the measured value.

Jesse Morse—U.S. Service Manager, Fluke Corporation; ANSI/NCSLI Standards, Accredited Writing Committee—174

The entire accreditation process was explained in detail, beginning with the review of the laboratory and what would be required to bring it into compliance, to a final positive accreditation decision. Additional topics discussed were ISO/IEC 17025, proficiency testing and on-site assessment. This presentation generated the most questions from the members.

Bill Wightman—SE Regional Sales Manager, Instrumentation, Fluke Corporation:

Bill presented a paper on Automated Thermocouple Batch calibration using a Dry Block calibrator. He provided an overview of Dry Block Calibrator Basics, including an overview of the theory of operation, physical construction, and benefits compared to other types of heat sources. Bill provided in-depth comparisons of different types of heat sources, comparing the Stability, Radial Errors, Axial Uniformity, Stem Effect, and Insertion Loss. He also provided an overview on Automatic Batch Calibration, and explained the benefits of the Automatic Batch Calibration compared to alternative methods.

The Automatic Batch Calibration allows control of all equipment associated with the calibration, controlling the calibration parameters such as temperature set points, stabilization criteria, and tolerance limits. The Automatic Batch Calibration also provides a method of recording the results to a data base or independent file, while also calculating uncertainties and verifying the standards in use. Bill reviewed the typical components of an Automatic Batch Calibration and gave an overview of the MET/TEMP software package.

Karl Reuning—Datum, Basic GPS Time & Frequency Course 101 for Calibration.

Karl presented a detailed explanation of Global Positioning System's 24 satellites in six different orbits above Earth and how positioning is performed by using any four of the satellites. GPS is a ranging system. GPS Time is monotonic, and unlike the Universal Coordinated Time, GPS does not get corrected or compensated.

GPS Time is calculated. Both GPS and UTC are Atomic-based time standards.

Karl explained how the International Bureau of Weights and Measures (BIPM) is the world standard for Time, which is called Universal Coordinated Time or UTC. BIPM also maintains the Hz.

Karl explained how the Atomic Time scale does not match the earth's rotation and must be re-synchronized to line up with the earth and the Sun twice a year. The USAF, at Falcon AFB, in Colorado, maintains the GPS Clock. The US Navy Observatory in Washington, is their keeper of Time in the U.S. The USNO monitors each satellite daily for GPS-UTC Offset and sends the corrections to the USAF at Falcon AFB, CO. USAF then uplinks the new values to each satellite. NIST is the keeper of Hz in the U.S. Karl discussed applications for GPS equipment, antenna locations, environmental factors, and tractability to National and International standards.

Ray Minchin, as host and Manager of the Lockheed Martin Metrology Laboratory, explained the various programs and functions that the Metrology Laboratory is responsible for. Ray discussed the programs in Orlando as well as responsibilities in Ft. Worth, LaMesa Mexico, and our Commercial Services division. Ray Minchin toured the group through the various Metrology Laboratories at the facility, and answered questions related to capabilities and uncertainties within the differing disciplines.

I would like to give special recognition and thanks to Gary Bailey, Director, Product Assurance and Manufacturing, and Bart Hyres, Manager, Test Assurance, who sponsored this conference. Their support and the encouragement of both Calibration Services and Lockheed Martin's involvement with NCSLI International is the primary reason our Metrology team continues to develop and grow to meet the stringent demands of our customers.
June 28, 2001
The Meeting Place
San Marcos, TX
D. Keith Scoggins
South Texas Section Coordinator

The NCSLI Region 6 South Section summer meeting was held on June 28, 2001 at The Meeting Place in San Marcos, Texas. The meeting was hosted by Mel Herr, Central Region Sales Manager from Transcat Corporation. Keith Scoggins, the South Section Coordinator and Supervisor of the Metrology Laboratory at the South Texas Project Nuclear Operating Company, conducted the meeting.

Opening comments were made by Keith Scoggins, to welcome everyone to the meeting, and also to request feedback on the types of presentations attendees would like to see in future section meetings.

The first presentation of the morning was by Roxanne Robinson, Vice President of A2LA. Roxanne explained the benefits of accreditation and how important accreditation will be in the future, for all calibration laboratories. She also described the importance for a calibration laboratory to be engaged in an inter-laboratory comparison program.

The second speaker was Keith Bennett, Quality Assurance Manager from Transcat. Keith disclosed the process of accreditation from a laboratory’s point of view. He explained what his company had to endure to obtain their accreditation, and how he felt that it was worth the pain.

The next speaker was Steve Simkins, Eastern Regional Sales Manager from Thermal Polynetics Incorporated. Steve’s presentation was on the fundamentals of liquid flow measurements and how ultrasonic flow devices can be utilized for accurate flow measurements. He also described several different types of flow measurement technologies; DFD—Dual Frequency Doppler, TTF—Transit Time Flow measurements were only two.

Lunch was provided by our hosts Transcat, and Mensor Corporations. After lunch, Chris Grachanen, from Compaq Computer Corporation, demonstrated his latest version of “Uncertainty Calculator” and “Tolerance Calculator.” Both are shareware programs developed by Chris to determine calibration system uncertainties and tolerances. Both software programs are available from Chris, at no charge, and can also be downloaded from the Internet.

After Chris’s presentation, Doug Lynde, President of On-Time Support, gave a presentation of a new product his company has developed. The product is “Process Trak,” and can be used with calibration software programs to document field calibrators to provide reverse traceability from the field instrument to the laboratory standard. Doug feels that this product will assist process plants in complying with ISO requirements.

The last speaker of the day was Warren Gilchrist, Senior Metrology Technician from Texas Utilities Electric Company, Comanche Peak Nuclear Station. Warren’s presentation was on how a pneumatic balance could be used to make very accurate mass measurements for primary and master pressure sets, piston assemblies, and other mass elements.

The meeting concluded and the next meeting was set for January 2002 in Houston.

A tour of the Mensor Corporation facility was provided to attendees.

Audience:
- Keith Scoggins
- Keith Bennett
- Mel Herr
- Scott Griffin
- Richard Crenn
- Steve Simkins
- Chris Grachanen
- Walter White
- Derek Barkman
- Doug Lynde
- Warren Gilchrist
- Wayne Cummings
- Lisa Walker
- Bob Tollerger
- Glen Wildman
- Geoff Payne
- Sam Camacho
- Peter Sternermann
- Will Wright
- Dan Bates
- Ron Smith
- Dave Sanders
- Darrell McGee
- Walt Hill
- David Fisher
- Robb Lambros
- Jon Cervenak
- David Garcia
- Bill Smith
- Jim Groveswood
- Erik Medini
- Bill Stone
- Lito Perez
- Guy Ferran

REGION 7
June 26, 2001
Lockheed Martin Corp
Sunnyvale, CA
Guy Fleming
Region 7 Coordinator

On June 26th, 2001, NCSLI Region 7 held its spring meeting at the Lockheed Martin Metrology lab located in Sunnyvale, CA. This meeting was hosted and conducted by Guy Fleming, of Lockheed Martin Technical Operations. Guy opened the meeting by introducing the agenda and presenters and outlined a few housekeeping rules. Once the 40 attendees introduced themselves, the meeting went into full swing.

The first presentation was made by Dennis Sanchez, QA Manager of Lockheed Martin Metrology Service Laboratories, relating lessons learned from converting a Metrology Laboratory system from ANSI/NCSLI Z540-1-1994 to ISO/IEC 17025. The presentation included one interpretation of the major differences between the two Standards and pointed out pitfalls encountered during the transition and included discussion of a third-party GAP analysis performed on the Lockheed Martin Technical Operations Metrology system.

The second presentation was made by Dr. Klaus Jaeger, President of Jaeger Enterprises. Klaus presented a short overview of the Dimensional Workshop that had taken place at NIST in June of this
year. In addition to the overall overview of that workshop he showed the slides he had presented during the workshop consisting of two parts: a) Overview of NCSLI activities with regard to uncertainties and accreditation and b) comments regarding accreditation and uncertainties, a personal view.

The third presentation was made by Richard Roddis. Richard is the national sales manager at Fluke. Richard gave us a lot of insight to using long scale dmm's in a very cost effective manner that will allow ease of automation, increased efficiency, excellent substitutes to traditional standards and low maintenance cost. A must for any metrology lab!

A co-host lunch was held in the adjacent cafeteria that allowed each attendee to interact with his fellow metrologists. Pictures were taken and then back to the agenda.

The fourth presentation was made by Charlie Motzko. Charlie is NCSLI's executive vice president. Charlie gave us all a good reason as to why the NCSLI is such an excellent organization to belong to. Charlie went over the current affairs and activities NCSLI is involved in and the importance of needed support especially in the area of the international community.

Our final presentation was made by Dr. Brian I. Lee, manager of the Anritsu metrology lab for US operations. His presentation was titled “Metrology Lab-Science or measurement? Or Business?” Based on Brian's experiences with the National lab and Agilent Technologies he shared many experiences with the real life issues all of us face as metrologists.

In summary, the meeting went very well and proliferated a lot of communications between the various members on issues that we all struggle with on a daily basis. My thanks to all individuals that made this a special event and taking time out from their busy schedules.
The entire group got involved in discussing the topic, “Hey! Where is Your NIST Number?” Wayne Benda introduced the topic with statements on the subject by NIST and NCSLI. (See URLs: <http://www.ncslinternational.org/met-news/nist_numbers.pdf> and <http://www.nist.gov/traceability/>.) This turned out to be a burning issue with our group.

The problem is not that NIST numbers are hard to get. The problem is that auditors are only interested in NIST numbers. As one attendee put it, “We provide a tremendous service to our company in assuring precise measurements, to have an auditor only interested in the NIST number? The third party auditor went away with $3K-$6K and only asked for NIST numbers. It was not worth the money we paid.” Other comments were, “It makes you wonder if you can trust vendors who are certified,” and “I used to sweat audits, but now I do not.” Our conclusion was that we agree that traceability is not a NIST number, but our auditors are not up to speed on the technical aspects of traceability.

Chris Durkin played the new NCSLI Video before we took a break.

The group discussed progress on the Phoenix/Tucson Interlaboratory Comparison (ILC). This was the third time we have discussed this topic. At the time of this meeting no round robin had been started.

The group reviewed NCSLI RSP—1: “Josephson Voltage Standard.” This was the first time we had no suggestions for improvement of one of the NCSLI publications. Good Job, Klaus and committee.

The Phoenix/Tucson section had two things for our “Input to NIST.” One is that we agree with NIST’s “Traceability Policy” (from “Hey…” discussion above), and we would like to get more immediate word back if standards we send to NIST are broken. One of our members received a voltage standard back from NIST with the back of the case broken. A phone call to NIST informed him, “It arrived that way.”

During the group’s “I Have a Problem, What is Your Solution?” session, we solved problems on how to keep records of calibration but failed to solve problems with non-intrusive flow measurements (We did recommend some leads to possible solutions.)

The Phoenix/Tucson section adjourned after drawing for door prizes (supplied by NCSLI.)

Post Script: In addition to hosting our NCSLI meeting at Orbital, Corin and personnel at Orbital stayed late to give us a tour of the Orbital facility. Our deepest appreciation and “thank you” goes to the good people at Orbital Sciences Corporation.

Attendees:  
Mike Tschepke  
Michael Bair  
Wayne  
Corlin Cowcher  
Chris Durkin  
John Ellingson  
Anacost Garcia  
Buck Halloran  
Jonathan L. Hoad  
Oubashid Islam  
Karl G. Jenkins  
David Lapley  
Greg Pearce  
Mike Searle  
Glen Short Jr.  
Jean Smith  
Bill Speth  
Daniel Tomlinson  
Brent Truesdyke  
Michael J. Walton  
Israel Zepeda

Honeywell  
DH Instruments  
Benda Raytheon  
Orbital  
Roaming Buffalo Consulting  
Belden Communications  
Honeywell National Calibration  
APS  
Honeywell  
Honeywell  
Motorola TEF  
Motorola TEF  
DH Instruments  
Raytheon Missile Systems  
Washington Calibration  
Fluke  
Motorola TEF  
TMS  
APS-PVNGS  
Texas Instruments
STANDARDS POLICY
Anthony Anderson, V.P.

National Cooperation for Laboratory Accreditation (NACLA)

I attended the NACLA Board of Directors meeting in St. Louis in early July. The focus of the meeting was the continued initiative to achieve financial independence by the end of 2002. A new fee structure for recognized Accrediting Bodies was adopted and goes into effect on October 1, 2001.

The new fee structure takes into account the maintenance of the recognition process and the annual surveillance and two yearly reassessments that are required as part of NACLA’s recognition process. Other initiatives have been implemented to encourage more membership in NACLA, with work on new promotional and informational documents regarding NACLA and the NACLA process.

NACLA has approached the International Cooperation for Laboratory Accreditation (ILAC), with a view to the US economy becoming an ILAC-recognized region of which NACLA would be a part. This approach is being attempted, following the unsuccessful formation, with Canada and Mexico, of a North American Region for Laboratory Accreditation Cooperation. However, should the US approach be accepted by ILAC, the ability for Canada and Mexico to join at a later date, or any other country wanting to align itself with North America, will be welcomed by NACLA. By taking this approach, NACLA would not have to become part of one of the other existing regions such as the Inter America Laboratory Accreditation Cooperation (IAAC) or the Asia Pacific Laboratory Accreditation Cooperation (APLAC), to become recognized by ILAC.

I would like to acknowledge Larry Yates, our NCSLI membership chair, who worked with me to put together the arguments for a US/North American region, that were recently presented at an ILAC Executive meeting in London.

At the NCSLI Cincinnati Board of Directors meeting, the Board was unanimous in supporting the US belonging to a separate ILAC region, hopefully one day including all of North America. This is the position of the US laboratory community, which NCSLI represents. One of the key issues in the laboratories’ support for NACLA is that NACLA is the only cooperation in the world that brings all parties in the accreditation process, Accreditors, Laboratories, Governments and Specifiers, together in one organization, with an equal voice. Should NACLA have to join one of the other regional cooperations, only Accreditors would be full members.

Lab Accreditation Forum

The inaugural U.S. Forum on Laboratory Accreditation will be held in the Washington, DC area, on April 8 and 9, 2002. The event will be sponsored by NACLA and will conclude with this organization’s Annual General Meeting.

The following are some of the subjects that will be addressed in the course of the two days:

- Latest developments in ILAC
- Implementation of 17025
- ISO Guide 58/ISO-IEC 17011
- Assessor training and requirements
- Measurement uncertainty
- An update on NACLA
- Labs’ perspective on accreditation
- Latest in proficiency testing

The Planning Committee for the Forum is composed of three members of the NACLA Operations Council: Mary Saunders, of NIST, Chair; Mike Olson, of the U.S. FDA; and Bill Wagner, of the Performance Review Institute. The Laboratory Accreditation Forum will be held at a hotel in the Washington-Baltimore region.

International Laboratory Accreditation Cooperation (ILAC)
Laboratory Accreditation Liaison Committee (LLC)

There have been no meetings of the ILAC LLC this quarter. However, I did attend the ILAC Public Affairs Committee (PAC) meeting on July 9, 2001, which was held in Washington. The committee is constantly addressing the issues regarding accreditation acceptance and how to promote the benefits. The reluctance to accept accreditation by government agencies, regulators and specifiers, continues to cause redundant audits of laboratories, not just in the US, but also in other countries.

Several informational documents are being prepared by the committee to promote accreditation to all the parties involved. These documents are being specifically targeted to different groups highlighting the benefits of the accreditation process in their area of interest. After approval by the ILAC Executive, the documents will shortly be available on the ILAC Web Site, <www.ilac.org>.

At the Cincinnati Board meeting, I reported the possibility of there being a revision of ISO/IEC 17025:1999 standard to harmonize section 4.2 of the standard, Quality System, with the new ISO/IEC 9000:2000 Quality Standard. Following a discussion of the Board, it was decided we should present the NCSLI position on this issue through our stakeholder membership in ILAC.

I prepared a letter for the NCSLI President, John Ragsdale, to send to the ILAC Chairman asking that ILAC represent us to ISO/CASCO with the position that the new standard not be revised at this time. Unfortunately, ISO/CASCO has ignored requests that the Standard not be revised and has appointed a working Group, WG-25, to carry out the work.

The next meeting of the ILAC LLC will be on Tuesday October 30, 2001 in Kyoto, Japan, during the 2001 ILAC General Assembly meeting.
NCSLI Committee Activities

U.S. GOVERNMENT AFFAIRS
Mike Suraci

**********

MEASUREMENT SCIENCE AND TECHNOLOGY
Richard Pettit, V.P.

Activities:

I continued discussions on possible ways for NCSLI International to expand its support of proficiency testing, with NCSLI Measurement Comparison Programs Committee Chair, Jim Wheeler, Tony Anderson, Dave Nebel and Chuck Ellis, NAPT.

AUTOMATIC TEST & CALIBRATION SYSTEMS
Scott Sowerby

The NCSLI Automatic Test & Calibration Systems committee held a meeting on August 1st, in conjunction with the conference in Washington D.C. Participation was heavy.

The committee is currently focusing on reviewing our current published goals through 2005. It was recognized during the meeting that many concerns facing the laboratory community today should be considered. Committee members are now considering an open specification for the transport of metrological data, virtual instruments, uncertainty analysis and computation via software, as well as validation and verification issues for software.

Our next meeting is scheduled for October 16, 2001 (via teleconference and NetMeeting). Contact Scott Sowerby at 219-428-6093 or <scott.sowerby@verizon.com> to obtain more information.

MEASUREMENT COMPARISON PROGRAMS
Jim Wheeler
Al Teruel

Conference Meeting Report

Our meeting was conducted as an open forum discussion panel. All participants were given the floor to introduce themselves, the company they represent, and to voice their MCP interests and issues important to them. The following is a summary of the discussions.

Several participants came to better understand the process of getting involved in specific ILC’s at both the national and international levels. They were informed that page 25 of the July, 2001 NCSLI newsletter, contained a table with current and proposed ILC’s and the point of contact for each measurement discipline. Past participants of ILC’s helped answer the “how to” questions.

Anonymity of laboratories on ILC reports was a topic of concern. It was stated that international ILC reports required labs to be identified with their measurements. The question “Should we be headed in that direction with our ILC’s?” was posed. What are the pros and cons? Some discussion ensued with no conclusive direction.

Concern about the process of delivering standards (artifacts) between labs during ILC’s, and maintaining integrity of calibration characterization was mentioned.

Laboratories that are accredited through A2LA must meet proficiency test requirements in all major parameters every 4 years. With the large scope of competency of some calibration labs, is this possible to accomplish in this timeframe? Should not the accreditation body be responsible for providing this type of support if it is a requirement?

The issue of dollar amounts to labs participating in ILC’s was discussed. It was mentioned that the only cost to the laboratory was the overhead to run the required measurements and mail artifacts to the next participating lab.

The last Josephson Junction 10-V ILC was very much appreciated by all participants. The only drawback was that the final results took longer than expected. The interim report that was sent out was a great idea and was successfully used to satisfy an ILC requirement for proficiency testing. It was requested that interim reports be available and part of the process for all ILC’s.

It was mentioned that artifacts used in ILC’s are in short supply. The idea of resource pooling was addressed. The Navy Mid-Atlantic Regional Calibration Center volunteered some assets to be shared for ILC use. The idea of creating a list of volunteered assets came up. Maybe a web page under the MCP Committee could list available assets with POC and company information.

Request for the following to be added to the NCSLI MCP web page:

I. Show all past ILC results.
II. Status of current ILCs and stages as shown in the 6 steps of RP-15 Appendix B—Checklist for interlaboratory comparisons.
III. Table of available artifacts for ILC use with corresponding company and POC information.

Main Committee Report

NCSLI is reviewing how it can best help members with ILCs.
NCSLI needs ILC coordinators to step up to the plate to lead ILCs in measurement areas to help labs gain accreditation.

The MCP committee meeting was held Tuesday at NCSLI in the Jefferson East Room of the Hilton Hotel. Al Teruel <TeruelAT<navaiz.navy.mil>>, MCP Committee Co-Chairman, led the meeting. Al is a Mechanical Engineer in the Metrology Engineering competency at the Navy Primary Standards Laboratory. Al is also the proficiency manager for the Joint Naval Audit Certification Team. Minutes of the meeting and an attendee list can be found on the MCP Committee web page at <www.ncsliinternational.org>.
Jeff Gust (Verizon) had an organizational meeting for Resistance ILCs. There are both 1 Ohm and 1 MOhm ILCs in the planning stages. See the table below for Points of Contact for each. Jeff’s meeting notes are also found below, and at the NCSLI MCP web page listed in the preceding paragraph.

Dr. Dick Pettit (Sandia National Laboratories) and I are continuing to work with Dr. Bob Waters, NIST, on a national ILC Internet database. A paper was presented at MSC 2001 in Anaheim titled “U.S. National Comparisons Database to Support Traceability.” Dr. Waters helped to develop the International Comparison Database (ICDB) that can be seen at: <http://icdb.nist.gov>.

To paraphrase Bob’s abstract “In order to link data that support traceability within the U.S. to the ICDB, NIST is working with NCSLI International and others to develop a U.S. National Comparisons Database (NCDB).” Such linkages involve measurements, calibrations, measurement comparisons, and efficiency tests that involve a hierarchy of standards and standards laboratories, ultimately linked with those used in international comparisons. I would like to organize a working group of 3 or 4 past NCSLI MCP coordinators to help develop criteria to evaluate information and data for this new Internet database. Please e-mail me if you are interested.

Larry Nielsen <lenielsen@home.com> and the NCSL Accreditation Committee completed a final draft RP on Accreditation. In the section on proficiency testing there is a discussion on the differences between MAPs, Interlaboratory Comparisons and proficiency testing. Contact Larry for a copy of the draft.

The next Josephson Junction ILC will begin in January, 2002. Fluke will provide the Zener artifacts. It was suggested at NCSLI Toronto that in addition to having Canada and Mexico participate, other NMs in the Americas like Brazil and Argentina would be invited to participate if willing and able. Dave Deaver (Fluke) agreed to provide help with customs issues in countries where Fluke has representation. Other topics discussed were: goals of next ILC, procedures to be used and job assignments. The New JJ Team will be Dave Deaver, Clark Hamilton, Stu Kupferman, Bill Miller and Barry Wood. Thanks to Klaus Jaeger for providing this information.

<table>
<thead>
<tr>
<th>Measurement Discipline</th>
<th>Range</th>
<th>Point of Contact</th>
<th>Phone No.</th>
<th>E-mail Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass</td>
<td>1 Kg</td>
<td>Jim Ross (Quality Control Services)</td>
<td>(503) 236-2712</td>
<td><a href="mailto:Lab@qc-services.com">Lab@qc-services.com</a></td>
</tr>
<tr>
<td>Dimensional (Steel and Chromium Carbide)</td>
<td>0.25, 0.5, 0.75, 1.0, 2.0 and 4.0 inches</td>
<td>Brian Foitz (Rockford Calibration Service)</td>
<td>(815) 877-0880</td>
<td><a href="mailto:Brian@the.calibration.solutions.com">Brian@the.calibration.solutions.com</a></td>
</tr>
<tr>
<td>Helium Leak</td>
<td></td>
<td>Pat Abbott (NIST)</td>
<td>(301) 975-4838</td>
<td><a href="mailto:patrick.abbott@nist.gov">patrick.abbott@nist.gov</a></td>
</tr>
<tr>
<td>Vector Automatic Network Analyzers (VANA)</td>
<td>Supports 2.4 mm, 2.92 mm, 3.5 mm, GPC-7, 7.16, Type N Connector Types</td>
<td>John Cable - Coordinator (Honeywell FM&amp;T)</td>
<td>(816) 997-4361</td>
<td><a href="mailto:jecable@kcp.com">jecable@kcp.com</a></td>
</tr>
<tr>
<td>Southern California and Arizona regional ILC group: Dimensional, Electrical RF, Mass/Force, Temperature, Electrical LF, Flow, Mechanical, Time/Freq, Humidity, Pressure/VAC and Pipettes</td>
<td>Various</td>
<td>Louis Reimer (ICC Instrument Company)</td>
<td>(714) 540-4966</td>
<td><a href="mailto:louisR@iccinstrument.com">louisR@iccinstrument.com</a></td>
</tr>
<tr>
<td>NIST National Internet ILC Database</td>
<td>Various</td>
<td>Bob Watters (NIST)</td>
<td>(301) 975-4122</td>
<td><a href="mailto:robert.watters@nist.gov">robert.watters@nist.gov</a></td>
</tr>
<tr>
<td>(Josephson Junction) DC Voltage (Start in 2002)</td>
<td>10 VDC</td>
<td>Dave Deaver (Fluke)</td>
<td>(425) 356-5094</td>
<td><a href="mailto:deaver@lc.fluke.com">deaver@lc.fluke.com</a></td>
</tr>
<tr>
<td>Ultra Violet (Proposed)</td>
<td></td>
<td>Tom Larason (NIST)</td>
<td>(301) 975-2334</td>
<td><a href="mailto:thomas.larason@nist.gov">thomas.larason@nist.gov</a></td>
</tr>
<tr>
<td>Resistance</td>
<td>POC</td>
<td>Jeff Gust (Verizon)</td>
<td>(219) 428-6504</td>
<td><a href="mailto:jeff.gust@supply.gte.com">jeff.gust@supply.gte.com</a></td>
</tr>
<tr>
<td></td>
<td>1 ohm ILC Coordinator</td>
<td>Tom Powis (Broadview Inst.)</td>
<td></td>
<td><a href="mailto:tp1@earthlink.net">tp1@earthlink.net</a></td>
</tr>
<tr>
<td></td>
<td>1 Mohm ILC Coordinator</td>
<td>Jason Tang (Boeing)</td>
<td></td>
<td><a href="mailto:jason.x.tang@boeing.com">jason.x.tang@boeing.com</a></td>
</tr>
<tr>
<td>Vibration (Proposed)</td>
<td></td>
<td>Brian Conroy (Litton Guidance and Control)</td>
<td>(816) 886-6872</td>
<td><a href="mailto:conroyb@littongcs.com">conroyb@littongcs.com</a></td>
</tr>
</tbody>
</table>
Committee News

The NCSLI Mass ILC is underway. Jim Ross (Quality Control Services <Lab@qc-services.com>) would like to hear from you if you are interested in participating in the Mass ILC. Jim’s phone number is (503) 236-2712. Two 1-kg artifacts will be used in the ILC. Quality Control Resources will do the analysis. Jim reports that Quality Control Services is the pivot lab for the WRAP 100 g to 1-mg round robin. Jim plans on comparing the results of this new NCSLI Mass ILC with that of the NIST Mass Group after the NCSLI ILC is completed.

Louis Reimer, ICC Instrument Company, <louisR@iccinstrument.com> (714) 540-4966, ext 400, is coordinating the efforts of a Southern California and Arizona regional ILC group. Louis reports that on October 27th at the NCSLI regional meeting held at Verizon (GTE) we discussed and solicited for interested parties to participate in a local Round Robin Program. The series of ILCs will address secondary as well as working standard artifacts on a quick turnaround basis. To avoid using daisy chain distribution and streamline the process, most of the participants are choosing level one and two. Level One: Public: All aspects of the ILC, including associating participants with final results, are public. Level Two: Confidential: Participants are public, but data results are confidential.

We currently have 13 companies within the Southern CA and one in Arizona that will be involved. Of the 13 companies, we have 6 coordinators that will compile data for specific disciplines. We are in need of 5 additional coordinators for the following: Dimensional, Electrical RF, Temperature, Mechanical and Time/Freq. Disciplines included are: Mass/Force, Electrical LF, Flow, Humidity, Pressure/Vacuum and Pipettes. The number of interest for each discipline is: Dimensional 6, Electrical RF 2, Mass/Force 4, Temperature 4, Electrical LF 6, Flow 3, Mechanical 2, Time/Freq 3, Humidity 4, Pressure/VAC 5, Pipettes 2 and Other 2.

Brian Foltz, <Brian@hecalibrationsolution.com> (815) 877-0880, is the technical manager at Rockford Calibration Service. He is coordinating a gage block ILC. The sizes of the blocks are 0.25, 0.50, 0.75, 1.00, 2.00, and 4.00 inches. The results will be reported to all who participate, with level 2 confidentiality per RP-15; all labs given a code to identify their results. After completion of the study the blocks will be returned to NIST for re-certification. The ILC will be limited to 15-20 participants in order to complete the study in no more than 8-9 months. Assisting Brian with the data analysis is Gordon Scantum, Regional NCSLI Director. A second set of chromium carbide blocks is also part of the ILC thanks to Starrett.

Brian Conroy, Litton Guidance and Control, is interested in starting a round robin in Vibration. Brian’s email address is <conroyb@litongcs.com>. His phone number is 818-886-6872.

Fred S. King <fking@kelilabs.com>, QA Manager at Kimball Electronic Laboratory Inc., is interested in participating in future ILCs in measuring Gage Blocks, and DC resistance.

Tom Larason, NIST, <thomas.larason@nist.gov> announced the need for a new UV ILC. Tom coordinated a UV ILC in the early 1990s.

John Cable, Allied Signal, <jcable@kcpt.com>, coordinates the IEEE Microwave Theory and Techniques ARFTG round robins in support of automatic network analyzers. The following connector types are supported in the round robin effort. Thanks to John Cable for providing this information. Note the new 7-16 connector.

ARFTG MCP ILC Points of Contact

2.4 mm connector, Bart Schrijver, Agilent Technologies. Phone (707) 577-2495, FAX (707) 577-5464, e-mail <bart_schrijver@agilent.com>

2.92 mm/K connector, Gilbert Perez, Anritsu. Phone (408) 778-2000 ext. 4950, FAX (408) 778-4010, e-mail <gperez@nmg.us.anritsu.com>

3.5 mm connector, Phil Yates, JPL. Phone (818) 393-3705, FAX (818) 534-8153, e-mail <pyates@jpl.nasa.gov>

GPC-7 connector, Yeou-Song (Brian) Lee, Anritsu. Phone (408) 778-2000 ext. 4976, FAX (408) 778-4010, e-mail <brian-ys.lee@anritsu.com>

7-16 connector, Greg Burns, Northrop Grumman. Phone (410) 765-7331, FAX(410) 765-7370, e-mail <burns.john@postal.esdd.northgrum.com>

Type 'N' connector, John Cable, Honeywell FM&T. Phone (816) 997-4361, FAX (816) 997-3803, e-mail <jcable@kcpt.com>[ARFTG MCP Com.Ch.]

Let me know what you would like to see from the MCP committee on the web page <www.ncsliinternational.org>. One suggestion would be to have examples of ILCs available. Craig Gulka helped me put a MCP Committee database of past committee articles on the server. It can be sorted by measurement area. It can be found under Highlights on the left-hand menu screen.

For more information about the committee contact me at (619) 545-9705, FAX (619) 545-9861 or <wheelerjc@navair.navy.mil>.

Resistance ILC Meeting Notes

Jeff Gust

Editor's Note: This ILC organizing meeting is reported as a process example — and to encourage other volunteers to step up with their own proposals.

The following people attended the meeting at the NCSLI Conference, in order to represent their corporation’s interest in participating in an Interlaboratory Comparison, or to observe the meeting:

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Accredited (VIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jeff Gust</td>
<td>Verifin</td>
<td>Y</td>
</tr>
<tr>
<td>Jason Tang</td>
<td>Boeing</td>
<td>Y</td>
</tr>
<tr>
<td>Warren Lewis</td>
<td>Sandia National Labs</td>
<td>Y</td>
</tr>
<tr>
<td>Tom Diven</td>
<td>Lockheed Martin</td>
<td>Y</td>
</tr>
<tr>
<td>Murilo Kauff</td>
<td>Sandia National Labs</td>
<td>Y</td>
</tr>
<tr>
<td>Karl Kivens</td>
<td>Process Instruments</td>
<td>N</td>
</tr>
<tr>
<td>Del Krupp</td>
<td>Tektronix</td>
<td>N</td>
</tr>
<tr>
<td>Audley Haynes</td>
<td>A.H. Electronics</td>
<td>N</td>
</tr>
<tr>
<td>Leonard Gaffey</td>
<td>Wyle Labs</td>
<td>N</td>
</tr>
<tr>
<td>Jim Crane</td>
<td>Keihley Instruments</td>
<td>N</td>
</tr>
<tr>
<td>Dave Ingles</td>
<td>NRC</td>
<td>N</td>
</tr>
<tr>
<td>Tom Powis</td>
<td>Broadview Inc.</td>
<td>Y</td>
</tr>
</tbody>
</table>

The following people were unable to attend the meeting, but had contacted the meeting coordinator prior to the meeting, expressing interest in participating in a resistance ILC.
The meeting coordinator briefly discussed the need for the ILC's to be conducted in accordance with ISO Guide 43, using the guidance of NCSL RP-15. The group discussed the endeavor of conducting an ILC that would be acceptable in meeting the proficiency test requirements of Accreditation Bodies, and would be published at an NCSLI or MSC conference, and eventually in the U.S. National Comparisons Database.

The ILC meeting was conducted using guidance from NCSL RP-15, appendix B.

1. Determine the need for an ILC
   a. Select the ILC Parameter or process
      - The meeting was organized to develop an ILC for the parameter of DC resistance. The need for the ILC was to demonstrate technical competency to Accreditation Bodies, or to understand and improve the participating laboratory's process.
   
2. Determine tentative range of values
   - Each meeting participant was polled as to what range that they would like to participate in for the ILC, and further discussions ensued. It was the consensus of the participating meetings that two separate ILCs would tentatively be developed. The Laboratories that were accredited with a small uncertainty for resistance parameters expressed a need to perform an ILC that was not either 1 ohm or 10 ohms, because they had demonstrated proficiency for these parameters previously. This group of laboratories agreed to develop an ILC for the measurement parameter of 1 Mohm.
   - Some meeting participants that were more oriented to industrial level calibrations expressed an interest to participate in a key reference quantity, such as one ohm. It was agreed by the group to develop a second ILC for the measurement parameter of 1 ohm.

3. Establish tentative uncertainty goal
   - The 1 Mohm group wants to develop an uncertainty goal that would challenge all of the participating laboratories, and a tentative goal was to measure a 1 Mohm artifact with a total measurement uncertainty of 1-5 ppm.
   - The 1 ohm group wanted to develop a goal that more meets the needs of working level laboratories, so an uncertainty goal of approximately 15 ppm was tentatively established, a goal that can be met by measuring the artifact with a high accuracy DMM, therefore the participant would not require a resistance bridge.

d. Develop a list of potential participants
   - The potential participants were comprised of the meeting participants, and those who expressed interest prior to the meeting. Those that did not participate in the meeting will be given the opportunity to participate in either of the ILC's tentatively developed. However, it is anticipated that most of them will opt for the 1 Mohm ILC. This would potentially put the 1 Mohm ILC at 17 participants, and therefore the group decided that this would be the maximum allowable number of participants in this ILC (in order to keep the total time of the ILC within reasonable limits).
   - Many meeting participants also expressed interest in participating in the 1 ohm ILC, because it involved a different measurement process, but it was agreed by the group that it would be better for the metrology community to advertise and encourage participation of this ILC by working-level labs. The group agreed to advertise availability of participation in the 1 ohm ILC in the next NCSLI newsletter.

c. Form an organizing committee
   - the tentative organizing committee was to be comprised of the individuals who attended this meeting.

2. Organize the ILC
   a. Recruit Participants
      - See notes above on this subject
   
b. Develop goals and objectives based on preliminary parameter, range, and target uncertainty information
   - The goals of the 1 Mohm ILC will be to successfully measure two 1 Mohm artifact resistors with a very low level of measurement uncertainty. The group discussed using an L&N 4050 and either a Fluke 742-1M or a Guildline 9334, so each lab could measure an artifact where temperature corrections were critical to a successful measurement, and an artifact where it was not as critical. Two artifacts would allow for Youden plotting of results, and would also provide back-up if one artifact became damaged or unstable during transport. The basic measurement design was tentatively agreed to be a modified petal design, where a maximum of three labs would measure the artifact, and then it would be sent back to the pivot lab for verification.
   - The goals of the 1 ohm ILC will be to successfully measure two 1-ohm artifact resistors with a high accuracy DMM that typically represents best measurement capability for an industrial-level calibration lab. One of the resistors will require temperature correction, and one will not. Other aspects of this experiment will be similar to the 1 Mohm experiment noted above. Measurement design will also be a modified petal design.

c. Establish formal organization
   - We are not ready to complete this step. A charter must be formalized as the first step of this process, which clearly defines what will occur in the ILC. Tentatively the key contacts are as follows
Committee News

1 Mohm ILC
Coordinator: Jason Tang
Data Processor: Warren Lewis
Pivot Lab: Sandia National Labs

1 ohm ILC
Coordinator: Tom Diven
Data Processor: Dilip Shah
Pivot Lab: Process Instruments

INTRINSIC & DERIVED STANDARDS
John Ball

The Intrinsic and Derived Standards Committee (IDSC) continues to be active, with international participation. The meeting at the July 2001 NCSLI International Conference was attended by more than 20 participants.

The committee is particularly proud, this year, of Clark Hamilton, who was honored with the 2001 Wildhack Award. Dr. Hamilton is leader of the IDSC’s Josephson Voltage Standard RISP working group.

Three former and current IDSC / working group members wrote an excellent paper, “Issues in Purchasing and Maintaining Intrinsic Standards,” that was published in a recent issue of Cal Lab magazine (November/December 2000). The authors are Dick Pettit, Chuck Ehrlich and Klaus Jaeger. This paper deserves to be read by all considering the application of intrinsic standards.

Currently, two Recommended Intrinsic/Derived Standard Practices (RISPs) are in process to the NCSLI International Board of Directors: a significant revision of the Josephson Voltage Standard RISP and a new RISP, Two Temperature Two Pressure Humidity. The authors and contributors listed below were recognized at the 2001 conference

RISP Working Group Authors and Contributors:

“Two Temperature Two Pressure Humidity,” author: Robert Hardy, RH Systems

Contributors: Dean Alexander, Army Primary Standards Laboratory; John Ball, Army Primary Standards Laboratory; Charles Ehrlich, NIST; Klaus Jaeger, Jaeger Enterprises; Robert Romero, Sandia Primary Standards Laboratory

“Josephson Voltage Standard,” author: Clark Hamilton, VMetrix

Contributors: Yi-hua Tang, NIST; Barry Wood, NRC; Larry Tarr, APSL; Jack Wang, NIST; Stuart Kupferman, Sandia PSL; John Ball, APSL; David Deaver, Fluke; Michael Kelley, NIST

Two other working RISP working groups continue: Triple Point of Argon and Gold-Platinum Thermocouple.

The IDSC includes two independent working groups that remain very active and productive: the Pressure Working Group, led by Ruben Salazar, and the Temperature Working Group, led by David Allen. Both groups met at the 2001 NCSLI Conference.

The Pressure WG is developing an addendum to RISP 4 and a cross-ﬂoat uncertainty analysis, in addition to addressing mass correlation, performance testing before calibration, check standards and alternative proficiency testing approaches. With the participation of Canada, this WG has international representation.

The Temperature Working Group asked the IDSC to evaluate the appropriateness of SPRTs as subjects for RISP development. The significance and wide application of SPRTs, combined with the fact that no other organization is engaged in producing a recommended practice for their application would seem to make them an appropriate subject for this committee. The WG was authorized to proceed with consideration of the SPRT RISP.

The WG also tentatively proposed abolition of RISP 2, and its replacement by ASTM standard E 1750-95, “Standard Guide for Use of Water Triple-Point Cells.” This issue will be considered by the members and discussed at the next meeting, which is scheduled for the Measurement Science Conference, in January 2002.

CONSENSUS STANDARDS
Tom Diven

Tom Diven has a first order of business to recruit new members for the Committee and to review and revise the committee’s current Goals and Objectives.

U.S. MEASUREMENT REQUIREMENTS
Jeff Walden

A letter was prepared for John Ragsdale’s signature and has been sent by John to Rich Kayser, NIST. The letter suggests continued interaction between the USMRC and NIST on the recently published US National Measurements Survey Results.

The USMRC met at the 2001 NCSLI Conference on Wednesday, August 1, 2001. The committee discussed the following topics:

• Work with the NCSLI Business Office on establishing a link on the NCSLI website to the NMRC survey.
• Investigate the formation of a bulletin board/forum and investigate automated (e-mail) response to web visitors.
• Review and improve the current survey form.

CANADIAN MEASUREMENT REQUIREMENTS
Les Peer and Lorraine Yeomans

The committee did not meet at the 2001 NCSLI Conference. However, the committee will initiate another survey as the NRC have expressed their interest in ongoing surveys as one of many ways used to assist them in maintaining the quality of their services.

CHEMICAL METROLOGY
Thomas Quimet

The Chemical Metrology Committee (CMC) held a meeting July 30, 2001 at the Washington Hilton and Towers, Washington, DC in conjunction with the 2001 NCSLI International Workshop and Symposium.
The first order of business was to review notes of 3/6/01 CMC meeting held in New Orleans, LA in conjunction with Pittcon 2001. The notes from the meeting including action items were reviewed as well as the goals and objectives of CMC for 2001 and beyond.

The committee then discussed having a joint workshop at Pittcon 2002 with CITAC (Cooperation on International Traceability in Analytical Chemistry). Dr. Wolfhard Wegscheider, Chairman of CITAC, and Tom Oumet are working together to make this event successful. For more information on CITAC, visit the website at <http://www.vtt.fi/ket/citac/>.

The 7 papers in the area of chemical metrology presented at the two sessions of 2001 NCSL International Workshop and Symposium were well received. I would like to personally thank each presenter for his or her contribution and to the success of this event.

NIST organized a tour of the Gaithersburg site, in conjunction with the Workshop & Symposium, held on Friday August 3, 2001. The tour included several stops in the Chemical Science and Technology Laboratory. Thanks very much to Ernest Garner and Sharrill Dittmann for their hard work in setting up and hosting this superb event.

The remainder of the meeting consisted of an open forum, as planned, identifying needs of the chemical metrology community and planning a path forward. The following needs were identified.

- Increase attendance/participation at CMC meetings
- Discussion regarding the definition of "Primary Standard" was again mentioned. Dr. Wolfgang Richter pointed out that it is defined in the International Vocabulary of Basic and General Terms in Metrology (VIM) prepared by BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, OIML in 1993. The related term "Primary Method" has been defined by the CIPM-CCQM in its fourth meeting, 1998 (report available from BIPM).
- Formation of working groups to address chemical metrology issues, e.g. inter-laboratory comparisons, proficiency testing, etc. Working group leaders must be identified; your help is needed. See addendum for one possible working group.
- Invite regulatory agencies (FDA, EPA, USP, EP) to participate with CMC
- Identify answers to the question: "What can this committee do for you?"

The following action items were identified to address the current needs.

- NCSLI/CMC, with CITAC, will have a joint workshop at Pittcon 2002. An NCSLI board member will give a 20-30 minute presentation discussing the charter and goals of NCSLI/CMC to the analytical community for the purpose of drawing interest and increase participation in this committee.
- CMC will make a request to NCSLI to display its booth at Pittcon 2002.
- The committee will plan two sessions for the NCSL International Workshop and Symposium to be held in July 2002 in San Diego, CA.

It was decided by CMC to hold the next meeting in conjunction with Pittcon 2002 during the week of March 17-22 in New Orleans.

INDUSTRIAL PROGRAMS

Steven Stabney, V.P.

Several of the Industrial Committees met during the Conference.

UTILITIES COMMITTEE

Kent Crow

The Utilities Committee meeting was held on July 31, 2001, in conjunction with the 2001 Annual Workshop & Symposium. There were 25 attendees representing electric utilities, vendors, and NIST. At least 5 more people arrived for the meeting but did not stay due to lack of space. The turnout was tremendous; we'll need to get a bigger room in San Diego. Subsequent discussions with people who weren't in attendance revealed 2 reasons: they either believed "formal membership" in the committee was a requirement, or they were unaware of the meeting schedule. Hopefully I can do a better job of getting the word out in the future.

The next Utilities Committee meeting will be held during the Measurement Sciences Conference in Los Angeles on Tuesday January 22, 2002. Meeting hours will be approximately 0800-1600. Larry Nielsen, SCE, has once again offered to host the meeting at SCE's Calibration Labs at 7300 Fenwich Ln, Westminster CA. Again, anyone interested in metrology in the utility business (nuclear power, fossil power, gas, water, etc) is invited to attend. I request that attendees RSVP to myself <kcc2@pge.com> or Larry <larry.nielsen@sc3.com>. Additionally, proposals for agenda items (presentations or discussion items) should be forwarded to Kent Crow as early as possible.

Jeffrey Brown, of Progress Energy CP&L's Brunswick Plant, gave a presentation on their experiences with metrology process improvement and benchmarking. Jeffrey emphasized the importance of carefully selecting companies to benchmark, as well as developing a well thought-out plan. He also pointed out that not all benchmarking requires on-site visits; a lot of information can be gathered over the phone and via email or written correspondence. Jeffrey presented an idea to the committee about holding a 1-2 day session. The consensus was that this could be done at the 2002 conference in San Diego on Thursday and/or Friday. Jeffrey will propose an agenda for this meeting to Kent Crow for distribution and consideration by the committee members.
Dr. John Rumble, Jr., Acting Chief of Calibration Services at NIST, gave a presentation on NIST's future direction. According to John, NIST's challenges for the future are responding to the "new" while maintaining the "current." Some of the improvements that are being developed include paperless PO's, order tracking via the Internet, and continuing the movement of measurement capabilities to industry. We thank John for finding time in his busy schedule to speak with us.

In the ongoing effort to revise RP-10, Bill Hinton volunteered to head up the effort with the assistance of Larry Nielsen. The approach will be for Bill and Larry to provide a draft revision for distribution and comment. We hope to have this revision ready for submittal after our January MSC meeting.

A proposal for forming sub-committees was pulled off the agenda due to lack of time. Based on the feedback I received subsequent to the meeting, there appears to be a great deal of interest in setting up Standards Labs and On-Site Labs sub-committees. I will make a proposal to committee members via email in the near future of a draft charter for each of these. I will also be looking for volunteers as sub-committee leaders.

The meeting was opened to discussion that included requests for equipment sources and calibration capabilities. As seems to occur at all of our recent meetings, a passionate discussion ensued, concerning calibration support for nuclear utilities and the burdensome overhead involved with maintaining qualified suppliers lists. While NUPIC audits have helped to reduce this overhead in recent years, the time required to approve a new calibration facility is still too long. There are discussions in progress to try to obtain the NRC's approval for us to use accredited labs, but they have progressed slowly. Hopefully we can continue to make progress in this area, as it seems to be a high priority for all in the nuclear power business.

I would like to encourage everyone in the utility industry (nuclear power, fossil fuel power, gas, water, etc.) to get involved with the Utilities Committee if you might benefit or have something to contribute. I would also like to see some international representation within the committee. We've received inquiries from Ontario Hydro and others outside the US but I'd like to see more participation from outside the US. A new perspective is always welcome. The easiest way to do this is to send names and email addresses to <kev@pge.com>. We have had many spirited and productive discussions via email in the past 3 years and I'd like to see our email forum continue to grow.

Thank you all in attendance in Washington DC and I hope to see you in January.

**Dimension Committee Meeting at SME**

The NCSL-International Dimensional Committee will hold a meeting, October 25th, in conjunction with the SME Conference in Detroit. (See info on page 22) Jim Salsbury will host the meeting, 7:30 to 9 AM.

**TESTING LABORATORIES**

**TBD**

We were given the opportunity to have someone represent NCSLI, and attend a meeting of the ACIL (American Council for Independent Testing Laboratories) EMC committee being held in conjunction with the IEEE conference in Montreal CA Aug 13th to the 17th.

**DIMENSIONAL GAUGING AND MEASUREMENT AD-HOC COMMITTEE**

**TBD**

A meeting of the NCSL International Dimensional Gauging and Measurement Ad-hoc Committee was held at the IDW2001 Workshop in Knoxville, Tennessee. There were 16 people present, including John Ragsdale and Steve Stahley, the Vice President for Industrial Programs and related committees.

Dennis Swyt, from NIST, made a presentation on a project he would like to see the committee take on, involving documenting alternate traceability paths that Manufacturers could take, other than back to NIST. He made a good pitch for his proposal, but the general consensus was that this is much too difficult a task for this committee to tackle as its first project.

Side discussions I held with Jim Salsbury brought forth a possible project that the committee could start as their initial project. Jim suggested that we put together a RISP or RP that gave several examples of Uncertainty Budgets for all of the different Dimensional Measurement disciplines. Jim is willing to help Chair the committee if we start with something such as this. After talking to representatives from several accredited labs present, it was felt that it was possible to accomplish this task by next Spring.

This committee met again in D.C. at the NCSLI conference and also plans to have on-going communications on this project between now and then.
EDUCATION AND TRAINING
Dave Nebel, V.P.

TRAINING RESOURCES
TBD

I am still seeking a new committee chair. If any one would like to volunteer, please contact me.

TRAINING INFORMATION DIRECTORY
Paul Hansen

The directory continues to be updated on a regular basis on the web. If you have any inputs, please contact Paul directly.

PERSONNEL TRAINING REQUIREMENTS
Hong Rosson

No report this quarter.

EDUCATION SYSTEM LIAISON
Terrelle Wilson

We recommended the award of scholarships to three schools. The awards will be published after approval at the Board of Directors meeting.

During June 2001, I was able to conclude a partnership with Sinclair Community College, which will allow NCSL International to award Continuing Education Units (CEU’s) for participation in The Annual Workshop and Symposium, Tutorials, and Region/Section Meetings.

CEU’s will be awarded beginning with the Workshop and Symposium and the associated Tutorials this year. Specifics for receiving certificates will be announced during general sessions and instructions will be posted on the Workshop and Symposium Bulletin Board.

I am continuing discussions with the college to determine what additional training they may be able to provide to the membership of NCSL International. As progress is made, I will keep the web page for training updated. If you have suggestions, comments, or questions, please contact me directly.

CANADIAN EDUCATION AND TRAINING LIAISON REPORT
Graham Cameron

A general discussion of Metrology Education and Training took place at the Institute for National Measurement Standards / National Research Council of Canada, when the NCSL Executive met with the Institute’s management team in April.

We discussed the need to identify and provide greater visibility of metrology courses offered in Canada.

During a visit to the Quebec City area, I met with the professor responsible for metrology education at l’Université Laval and obtained descriptions (in both French and English languages) of the course material, which is offered in the French language.

NCSLI continued its support to Fleming College of Peterborough, Ontario, for:

- Academic excellence in Measurement Science course,
- Academic excellence in Engineering Analysis course and
- Excellence in Applied Computing and Engineering Sciences (ACES) Applied measurement-based projects.

I provided speaking notes to the Fleming staff member who made these presentations, since I had a conflict and could not attend the June Award ceremony.

In less than a year, Fleming will open a 50,000 square foot technology wing, which ACES will share with another centre. The wing will house seven laboratories, a 150-seat lecture theatre, three 50-seat “smart” classrooms and a boardroom.

I plan to work closely with the National Research Council and the Standards Council of Canada in identifying metrology courses at various levels and providing the measurement-dependent community, including the NCSLI organizations, with current descriptive material.

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DOCUMENTARY STANDARDS APPLICATIONS
John Wehrmeyer, V.P.

LABORATORY EVALUATION RESOURCES
David Dikken
James Crane

Due to a very heavy workload, David has passed the baton as the Chairman of the Laboratory Evaluation Resources Committee to James Crane of Keithley Instruments. David’s efforts in organizing the work to write a handbook on Measurement Uncertainty is greatly appreciated and we all wish David the best in his future endeavors. We welcome Jim as he takes on his new role in leading the committee. Thank you, Jim, for accepting this important role.

LABORATORY FACILITIES
David Braunaway
Doug Cooper

There has not been much activity in the Laboratory Facilities Committee during the second quarter. The committee met at NCSLI in Washington at the symposium. They planned to discuss possible ways of verifying laboratory system control operation.

David has responded to requests through ISA and IEEE I&M for information on Standards Laboratories with reference to RP-7 and RP-14. In addition, David has responded to some questions and comments in regard to typographical errors and terminology used in RP-7.

The current work under consideration is review of the possibility of preparing an RP on the initial and periodic verification of environments in new laboratories. In concept, this would insure a uniform basis for evaluating the environments achieved and should be reflected in a more thorough understanding of specifications.

Work is underway by Doug Cooper, the committee co-chair, to prepare an article on some laboratories installed around the world.
METROLOGY PRACTICES

Dr. Howard Castrup

The committee continues to work toward revision or development of RPs for calibration interval analysis, measurement decision risk analysis, SPC and Bayesian methods, and metrology decision support analysis.

The following summarizes our activities and objectives.

Calibration Intervals:

The subcommittee is continuing development of administrative guidelines for interval analysis and methods for setting parameter calibration intervals. In addition, research on instrument level and parameter level calibration intervals is ongoing. The subcommittee chair, Don Wyatt of Diversified Data Systems, is working on data management models that will optimize the collection of data and the management of recall cycles.

Measurement Decision Risk Analysis:

Updates of material appearing in NASA Reference Publication 1342 have been completed and will be provided to the subcommittee chair, Karl Haynes. Karl and I will strategize further development and the presentation of material in a draft RP.

SPC Methods:

Subcommittee chair Ricardo Nicholas of Boeing Defense & Space Group is continuing to manage development of a Metrology SPC RP. New software tools have emerged in the past few years that are accessible to small as well as large labs. A review of this software will be discussed at the next committee meeting.

Decision Support:

The subcommittee chair, Derek Porter of Boeing Commercial Airplane Group, has been continuing his efforts to identify decision support guidance in existing NCSLI RPs. References to this guidance will be included in a draft RP for Metrology Decision Support.

Other:

A software application has been procured that will facilitate developing RPs with mathematical content. This software will be distributed to the subcommittee chairs.

The Committee met in conjunction with the 2001 NCSLI Workshop & Symposium to review progress and to plan future activities.

ANSI/NCSLI WRITING COMMITTEE

Jeese Morse

The audit by ANSI is essentially complete. All records have been reviewed by ANSI. Only a few minor issues remain to be addressed to close out the process.

The current activities of the committee will be reported on in detail during the special session of the symposium.

ACCREDITATION RESOURCES

Larry Nielsen

The most recent meeting was held on Tues. July 31, at the Washington Hilton and Towers Hotel, as part of the NCSL International 2001 Workshop and Symposium in Washington, DC. Since the last meeting, work continues on the four projects identified by the committee as near and longer-term deliverables to the general membership.

Laboratory Accreditation

On May 30, the final draft of RP-16, Practical Guide to Achieving Laboratory Accreditation was distributed to the writing group for a final round of review and comments. A corrected copy was distributed and discussed at the meeting. Comments and suggestions from attendees were incorporated during the week of August 13, and the corrected final draft was submitted to the Documentary Standards VP on August 24 for transmittal to the Publications VP, as the first step in the publication process.

Preliminary indications from the Publications VP are that RP-16 will be reviewed by the Board of Directors prior to the October board meeting and will be placed on the agenda for a vote at that time. Following editorial corrections by the Oversight Committee, publication should follow by January, 2002. Thanks to all that contributed to this effort.

Laboratory Capabilities

Jim Jenkins of Quanetec is serving as the primary author for revision of RP-9, Calibration Laboratory Capability Documentation Guidelines. Jim presented the second draft during the meeting and provided copies to attendees.

The current goal is to produce a round of review comments by Sept. and to have a final draft prepared by next winter’s meeting in Anaheim, CA. Jim’s work so far offers an excellent multiple choice, non-prescriptive approach to this subject.

Web Site Development

Our long-term goal is to develop an interactive Accreditation Resources page with information and links to resources similar to the current 161 committee (Training Resources) page. Start-up on this project has been delayed due to the on-going efforts on RP-9 and -16, and now due to changes under consideration by the Board of Directors that may affect the entire NCSLI website. We expect an update on this project following the October board meeting.

Seminars & Tutorials

Ken Parson added to his popular series of tutorials on laboratory accreditation at NCSL International 2001 Workshop and Symposium with a day-long session on “The Accreditation Process According to ISO/IEC 17025.” Although Ken couldn’t attend the committee meeting, he indicated that the day-long session was well-attended and that this type of forum continues to be popular with conference attendees.

The next meeting will be held in conjunction with the 2002 Measurement Science Conference, January 24-25, 2002 at the Disneyland Hotel in Anaheim, CA.
NCSLI NEWSNOTES

A NEW DIRECTOR FOR NIST

Dr. Arden L. Bement Jr. has been nominated by the Bush Administration, to become the next Director of NIST. We have obtained a copy of the text of a speech he delivered this past March, at the NIST History and Reunion Day, that was part of NIST's Centennial Celebration. We felt this futurist talk will give our members some insight into his thought processes and how he will direct NIST.

One Hundred Years of Excellence and Still Improving ... A View From the Outside*
A. L. Bement, Jr.

It is a privilege to participate in this centennial celebration and to pay homage to those who have made NIST great over the years. While 100 years may seem like a long time to some, there are those in the audience who remember some of the early pioneers and who have built a strong and diverse science base here in the Institute over much of its history. This process of growth through scientific diversity will be critically important if NIST is to successfully address the complex national problems of the future.

To be invited as an outside speaker at this event is like being recognized for a lifetime achievement award. I have had the privilege of serving NIST continuously, over the past 20 years, in a variety of advisory capacities during the tenure of four of its 11 former directors. If one were to ask me why I would want to serve NIST for such a long period of time, I would have a number of ready answers.

First and foremost is the founding charter of the Institute, which established NIST as the nation's first physical science laboratory to serve U.S. commerce through measures and standards. Over its history, NIST has assisted the private sector in the orderly introduction of new products into the world marketplace. This mission has attracted the advisory services of a long line of eminent scientists and engineers, and I am honored to be counted as one of them.

Secondly, NIST remains a young organization, which has the ability not only to think "out of the box" fundamentally but also "out of the beltway" in its outreach. I believe it is able to stay young and natural through its extended networks of active collaborations and a long-standing practice of attracting top internships from universities. NIST has a long tradition of adapting to changing environments by focusing on customer needs. This ability to remain at the cutting edge through continuing interaction not only is demonstrated by the many prestigious awards won by NIST scientists but also by the number of Nobel Prizes won by others that NIST scientists have enabled. In these respects I believe NIST is now and always has been at the pinnacle of federal research laboratories.

Thirdly, the credibility of NIST as an independent, unbiased, agency in the service of the nation strikes me as paramount. NIST has served the nation well not only as an unbiased arbiter and standards setter in matters related to public safety and commerce, but also as a "honest broker" in advancing national technology leadership. One can find numerous examples of these roles throughout NIST's history. One that strikes home with me is the appointment of Lyman Briggs as Chairman of the S1 Committee under the Office of Scientific Research and Development throughout the Manhattan Project to oversee the procurement of materials for the practical demonstration of nuclear fission. Lyman Briggs' leadership in atomic energy was continued by his successor, Edward U. Condon, who played an important role in shaping the McMahon bill that established the Atomic Energy Commission under civilian control.

Another example of NIST's credibility as an independent technology broker within government is the role assigned to it by the U.S. Congress in the 1988 Omnibus Trade and Competitiveness Act to help rebuild the competitive edge of U.S. industry through advanced technology developments. These new roles were assigned recognizing that the U.S. was living in a global marketplace in which technology was playing an increasingly important role.

During the 1980s, there existed a bifurcation between domestic and international commercial interests within the Department of Commerce. Furthermore, there was a growing recognition that technology advances were paramount for sustained national economic development and that the root of America's problem was not in scientific discovery but in bridging the gap between the laboratory and the marketplace—the so-called "Valley of Death."

Entrepreneurs found the 1980s to be an extremely frustrating period. The high cost of capital in the U.S. made R&D investments more costly than in most other countries in the world, especially Japan. Foreign investors were eager to exploit U.S. technologies, putting at risk their commercialization in the United States. The loss of dual-use technologies that served both civilian and military needs was of special concern to Members of Congress. By establishing the Malcolm Baldridge National Quality Award Program, the Advanced Technology Program, and the MTC, the U.S. Congress was essentially placing its faith in NIST to become government's effective champion for improved competitiveness through greater focus on quality, the precompetitive development of advanced civilian technologies, and the widespread adoption of best manufacturing practices.

* Delivered at NIST History and Reunion Day, National Institute of Standards and Technology, March 5, 2001
My final reason for wanting to serve NIST is that it conscientiously asks advice from a broad group of experts. Serving on a NIST advisory panel is a true learning experience. The sense of accomplishment that one gets in seeing one's advice put into action is too often missing in advising other government organizations. I also find it satisfying to review NIST programs that reflect NIST's customer-oriented approach by addressing the interests and advice of the private sector.

In reviewing the centennial book "NIST at 100, Foundation for Progress," anyone associated with NIST can take justifiable pride in the large numbers of dramatic achievements made over the years and their benefits to the nation. Present assessments of NIST's programs show that the technical merit and mission relevancy of NIST's work are very high. Furthermore, the Visiting Committee on Advanced Technology gives the Institute high marks for applying the Baldrige principles to its management and operations and for going further than most government agencies in measuring program impacts under the Government Performance and Results Act. These and external assessments show that benefits from the Malcolm Baldrige National Quality Award Program, the Advanced Technology Program, and the Manufacturing Extension Partnership far exceed federal investments.

One would expect on the face of these achievements that the Administration and Congress would reward NIST with budgets that grow at the rate of new markets, new measurement challenges, and international standards activities. That this hasn't happened clearly indicates that NIST is not as visible nor as appreciated as it should be. One cannot assume that the beneficial ways in which NIST impacts the private sector are well understood by top leaders in industry and government. While Members of Congress may have implicit faith in science and the value of NIST, they probably don't fully understand how the process works or the extensive networking that NIST must do to fulfill its mission. They will have to be informed simply, often, and in many different ways.

Therefore, a continuing challenge for future NIST directors will be not only to communicate the benefits from NIST programs to its stakeholders but also to inform the Department of Commerce Secretariat of the consequences to the nation of under-funded NIST budgets. In this respect vision and leadership skills will count for more than administration skills.

It also seems clear that opportunities for new NIST programs are sapping support in services for established core industries. Decision makers in government can have the same herding mentality as venture capitalists; that is, they pay attention to what is highly visible, "hot" and "exciting." They may even see that much of what NIST does is "housekeeping" science without understanding the importance of difficult challenges involved in relatively small programs. I discovered in DARPA that a few, highly visible achievements enable a balance among essential program elements.

William Phillips' Nobel Prize in Physics already has raised NIST's perception among government leaders. However, a few "home runs" in solving major national needs, such as those that illuminate NIST's history, will continue to be critical in the future.

There is also a realistic side to budgeting and adapting to change that will require continuing resource reallocations across all of NIST's operating units. Getting "buy-in" for priority setting, reallocation processes and decision criteria will be essential to affect change in any organization. This "buy-in" can best be established through a "bottoms-up," institute-wide, strategic planning process that will provide the NIST strategic plan, as recommended by the VCAT.

I found the recent VCAT annual report to be extremely interesting in that many of the problems that existed 10 years ago, when I chaired the Committee, still exist today. For example, while NIST's laboratory work continues to be good and is getting better, the Boulder Laboratories continue to degrade and are in need of major renovation. The Building and Fire Research Laboratory still lacks sufficient external advocacy, and retention of top talent continues to be of concern given the temptations of the private sector.

The new NIST Director will not be without challenging problems to solve. However, the new Advanced Chemical Sciences Laboratory and the soon-to-be-constructed Advanced Measurement Laboratory are testaments to NIST's past leadership and vision. These buildings are coming on line none too soon to address advances in quantum computing, nanoscale devices and sensors, combinatorial chemistry methods, and DNA diagnostic and analysis chips, among many other exciting technological advances. John Lyons and his facilities staff deserve our gratitude for defining and defending these projects during the critical stages of OMB review and approval.

I would now like to return to the NIST programs authorized in the 1988 Omnibus Trade and Competitiveness Act. I can remember being present when the Advisory Committee briefed Secretary Baldrige on a national quality award program. I doubt that anyone present could have envisioned the dramatic impact that program would have on the American system of management. Today the Baldrige principles guide the administration of our schools, academic institutions, and hospitals and can now be considered universal.

I can think of no other program managed by NIST in recent years that has had so sweeping and decisive an impact on our society. Everyone associated with this program has admired Curt Reimann for his leadership during the program's formative years. Harry Hertz and his staff are also to be applauded for promulgating his legacy of leadership.

There is a lesson to be learned from the history leading to a national quality award program, however. American industry emerged from World War II as world leaders in quality engineering and control. During the 60s and 70s, American industry vacated the field and essentially ceded global quality leadership in the interest of "planned obsolescence," a term not even used or even talked about anymore. Factory shutdowns and the loss of major markets in the 70s and 80s refocused our sights on quality as a competitive weapon and it was this painful reawakening that led to the establishment of the Malcolm Baldrige National Quality Award Program.
This brings me to the Advanced Technology Program, which probably qualifies as the most maligned and misunderstood program in NIST’s history (and I even include the battery additive program). One would be hard pressed to find any other among the plethora of federal programs involving industry-government partnerships that has been more praised by those who understand the processes of innovative risk-taking and more damned by those who don’t. The program has been independently praised by both the VCAT and the ATP Advisory Committee, and will soon be addressed by a report of The National Research Council. These reports deserve the attention of Secretary Evans and his new management team. Managing a program such as the ATP is not for the faint hearted. NIST has been served well by a dedicated staff that has continually improved the program while under siege. One would be hard pressed to find more dedicated stewards than George Uriano and Marc Stanley.

Yet there are those who believe that the ATP has served its purpose and that the competitive forces that existed in the 1980s no longer exist. To those I would argue that the raid on U.S. generated technologies is just as intensive today, that it is just as hard to preserve U.S. innovations for commercialization in the U.S., that it is even harder today for U.S. companies regardless of size to be first in the global marketplace, and that the chances of becoming “blind sided” by “fast followers” outside the U.S. are even greater today because of ever-shortening lead times. Throttling back the ATP could be another case of “vacating the playing field” when we are ahead, only to pay a higher price later on.

Looking to the future, I have tried to think about some marvelous scientific and technological developments that would require NIST’s leadership. Forecasting the future is best done in the minds of children who are not encumbered by experiences of the past. I am reminded of Ed Land’s (Polaroid) daughter who launched a whole new market by asking her father: “Daddy, why can’t I see the picture now?” Similar questions come to mind:

- Why can’t we have artificially-augmented senses that give us the best-combined capabilities of the animal world?
- Why can’t we have agents in the blood that inhibit the formation and deposit of plaque?
- Why can’t we have an artificial thymus that sends genecoded messages to cancer cells to cease and desist?
- Why can’t we have a self-regulated metabolism?
- Why can’t we have implant sensors that monitor our metabolism, our blood composition, and our body’s self-repair mechanisms?
- Why can’t we have control systems that respond to our thought patterns?
- Why can’t we have cyber sports that are more exciting and more self-motivating than televised professional sports?
- Why can’t we have low-cost, photovoltaic roof shingles that provide, store, and transmit energy from the sun?

...and the list could go on.

In closing, I challenge each of you to work toward taking NIST to the next level of greatness and to help assure that the perception of NIST in the minds of policy makers comes up to its reality. Also, I encourage you to think critically about how you can better leverage your work through interdisciplinary collaborations across the Institute. Such leveraging needs to be intellectual and geographic as well as economic. The challenge for NIST is the same as for all other sectors of our society, namely, “How can we get more bang for the buck?”

Since NIST is the “keeper of the Malcolm Baldrige keys,” it is in an excellent position to use these principles to help get us to the next level of greatness. These principles will serve you well until a better set comes along. I hope that in looking back after NIST’s bicentennial, your successors can say that the second hundred years were even more exciting and meaningful than the first hundred years if that’s at all possible.

That is a destiny that I wish to all of you.

Thank you.
NIST NEWS

GRANT WILL HELP ADVANCE NATIONAL STANDARDS STRATEGY

The American National Standards Institute will use a recently awarded $500,000 annual grant from NIST to support international standardization and conformity assessment activities, influencing international trade and regulations, and to help advance the aims of a recently-adopted U.S. National Standards Strategy (NSS).

In line with key objectives of the NSS, including work to “improve processes internationally to more closely reflect our [United States] principles and vision” and to “provide an outreach program to show those outside the United States the value of U.S. technology, standards and processes,” ANSI says it will allocate NIST grant funds to initiatives such as outreach and education. Monies also will be used to identify opportunities to ensure that U.S. technology, standards and standards-development processes receive fair consideration from other nations and regions.

Education initiatives will include training sessions for U.S. participants in standards bodies such as the International Organization for Standardization and the International Electrotechnical Commission, and for representatives of developing nations with the United States. ANSI also will provide training to acquaint other nations with the U.S. standards and conformity assessment system. Another activity will help standards personnel in developing countries acquire the skills and knowledge necessary to host the secretariats (or administrative headquarters) of committees that develop standards for international use. The Western Hemisphere and Asia-Pacific region will be the primary focus of these efforts.

The NSS, which was developed by public and private-sector representatives of the standards community under ANSI’s leadership, was approved on August 31, 2000. Contact: Walter Leight, NIST Office of Standards Services, (301) 975-4010.

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NEW DIVISION TO EXPLORE MAGNETIC TECHNOLOGY

NIST has formally organized the Magnetic Technology Division within the Electronics and Electrical Engineering Laboratory. The new division develops and disseminates measurement technology for industries concerned with magnetic information storage and superconductors for power applications.

Research areas include magnetic calibration standards, high-density and high-speed magnetic recording, magnetoresistive sensors and memory elements, magneto-optic and inductive magnetometry, recovery of data from damaged or erased recording media, scanned-probe microscopy, micromechanical systems and electromechanical properties of and standards for superconductors.

The new division can be reached at (303) 497-5477.

RADAR CROSS SECTION STANDARDS DEVELOPMENT

NIST and the Naval Air Warfare Center at China Lake are involved in a cooperative research program to develop new radar cross section (RCS) calibration artifacts to improve RCS measurements at Department of Defense ranges. As part of this effort, NIST manufactured a precision set of cylindrical standard targets that will be used to characterize the China Lake static outdoor RCS measurement range from 2 to 18 GHz. Similar cylinder sets have been used by the Air Force Research Laboratory and other RCS ranges to calibrate their systems. The diameters of the NIST cylinders range from 3.75 to 9.00 inches, and their heights range from 1.75 to 4.2 inches. All the dimensional tolerances were determined to be ±0.001 inches.

This cylinder set is the first in a series of improved artifacts that will be manufactured at NIST to support the cooperative RCS standard research program with China Lake. The current objective of the research is to improve calibration data quality by improving data acquisition and data analysis techniques. The standard cylinders will be made available to any domestic RCS facility at cost. Contact: Lorant Muth (303) 497-3603, <muth@boulder.nist.gov>

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THIRTY-SEVEN TRY FOR NATION’S TOP HONOR FOR EXCELLENCE

Teams of specially trained examiners will carefully scrutinize 37 U.S. organizations during the next six months to determine which will receive the 2001 Malcolm Baldrige National Quality Award, the nation’s most prestigious award for excellence. The group includes seven large manufacturers, four service companies, eight small businesses, 10 education and eight health care organizations.

As part of the process, these organizations submitted a written application answering more than 100 questions on leadership, strategic planning, customer and market focus, information and analysis, human resource focus, process management, and results. Questions include: “How do senior leaders communicate values, directions and expectations to all employees?” and “What is your overall strategic planning process?”

Results are considered the most vital indicator of success for any organization. To evaluate results, questions for businesses include: “What are your current levels and trends in key measures/indicators of financial performance?” Questions for education organizations include: “What are your current levels and trends in key measures/indicators of student learning and improvement in student learning?” And, results-oriented questions for health care organizations include: “What are your current levels and trends in key measures/indicators of health care outcomes, health care service delivery results and patients’ functional status?”
Organizations passing an initial screening this summer will be visited by a team of examiners in the fall to verify information and to clarify issues and questions. Each applicant receives at least 300 hours of review and an extensive feedback report, highlighting strengths and opportunities for improvement.

Winners of the 2001 award are expected to be announced in November and receive the award from President Bush and Commerce Secretary Donald Evans in a ceremony at a later date. For more information on the Baldrige National Quality Award, go to <www.quality.nist.gov>.

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ADVANCED RADIOMETER CALIBRATED AND DELIVERED TO NASA

Staff from PL’s Optical Technology Division recently completed a radiometric calibration of an advanced spaceflight instrument for NASA. The instrument, Scripps-NISTAR (NIST Advanced Radiometer), was developed to fly as part of the NASA Triana mission, which will view Earth from an L1 orbit (the Lagrange libration, or a neutral gravity point between the Earth and the Sun) about 1.5 million kilometers from Earth. From there, an imaging camera and NISTAR will have a continuous, full, sunlit view of the Earth. NISTAR includes three active cavity electrical substitution radiometers for absolute irradiance measurements, and one silicon photodiode.

To properly simulate a sunlit Earth in the calibration laboratory, NIST researchers used PL’s SIRCUS (Spectral Irradiance and Radiance Responsivity Calibrations with Uniform Sources) facility. A tunable laser was fiber-optically coupled to an integrating sphere, which then served as a uniform diffuse source of tunable monochromatic light, and the geometry was designed to provide the required 0.5-degree field of illumination. The NISTAR instrument’s optical responsivity and other characteristics were measured using a wide variety of laser wavelengths in the range 488 nm to 850 nm (blue, green, red, near-infrared). During these tests, the NISTAR instrument was in a space-simulating thermal vacuum chamber, viewing the SIRCUS light through windows. This was the first time that the SIRCUS facility was used for an instrument in such a chamber. The results show that various adverse radiometric effects from using windows and translating the fiber-optically coupled sphere are minimal, and the resulting calibration uncertainties are below 1 percent.

The NISTAR instrument was delivered to the NASA Goddard Space Flight Center and is ready for integration with the remaining spacecraft components for the Triana. To obtain additional information about the Triana mission, or to view the spacecraft’s integration and testing phase, visit http://trianaweb.gsfc.nasa.gov/. Contact: Joe Rice (301) 975-2133, <joe.rice@nist.gov>

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SERIES OF GUIDES TO EU DIRECTIVES

Three newly issued NIST guides to European Union (EU) directives on machinery, low-voltage equipment and electromagnetic compatibility can help U.S. manufacturers carry out the steps necessary to demonstrate compliance with the EU-wide requirements and gain unfettered access to the 18-nation market.

The easy-to-use introductory references are designed to acquaint businesses and government officials with the directives’ essential requirements and their relationship to other EU product safety laws. Each one lists the types of products covered by the particular directive (as well as those that are excluded) and addresses issues regarding the treatment of components incorporated into market-ready products. In addition, the guides explain the hierarchy of EU, international and national standards that might be used to satisfy the directives. Each contains the text of the relevant directive and a list of applicable EU harmonized standards.

Intended to foster the free movement of goods among nations that make up the European Economic Area, the laws are among the more than 20 “new approach” directives approved by the EU’s governing body since 1992. Products that comply with relevant directives merit the required “CE mark”-kin to a passport for products marketed in Europe.

The directive on low-voltage equipment, such as appliances and power tools, is designed to prevent electrical hazards to people, pets, livestock and property, while the machinery directive aims to ensure the safety of industrial equipment. The electromagnetic compatibility directive applies to a wide range of products and is intended to prevent electrical and magnetic disturbances that can undermine the performance of other products and systems.

The new publications are available at NIST’s conformity assessment web site at <http://ts.nist.gov/ca>. They are the first in a series of NIST-commissioned guides on selected EU new approach directives. The series is being developed with the Commerce Department’s International Trade Administration. Contact: Mark Bello (301) 975-3776, <mark.bello@nist.gov>.

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MUTUAL RECOGNITION AGREEMENT FOR LEGAL METROLOGY TESTING OF LOAD CELLS

Clayton Teague, Zeina Jabbour, and Tom Bartel of the Manufacturing Engineering Laboratory hosted Manfred Kochsiek, vice president of Physikalisch-Technische Bundesanstalt (PTB) at the German National Metrology Institute on a visit to the Manufacturing Metrology Division’s (MMD) mass and force measurement facilities. The primary purpose for Kochsiek’s visit to NIST was to negotiate a bilateral mutual recognition agreement between Germany and the United States for National Type Evaluation of load cells. The chairman of the National Conference on Weights and Measures (NCWM), the director of the NIST Office of Standards Services (OSS), the chief of the NIST Office of Weights and Measures (OWM), and other NIST staff accompanied Kochsiek.

During this visit, NIST and PTB reached a verbal agreement on recognition of the technical work performed in the respective force laboratories based on intercomparison results. The formal agreement is in development with NCWM through the NIST OSS and OWM. During the visit to MMD, Tom Bartel provided a tour and overview of the MMD National Type Evaluation Program (NTEP) and International Organization of Legal Metrology (OIML) measurement facilities and procedures. Contact: Zeina Jabbour (301) 975-4468, <zeina.jabbour@nist.gov>.
PRELIMINARY COMPARISON RESULTS OF NANO3 LINE SCALES SHIPPED

In a meeting held at Bureau International des Poids et Mesures (BIPM) in June 1998, the Consultative Committee for Length (CCL) and Working Group on Dimensional Metrology (WGDM)-7 decided to conduct preliminary comparisons for five different types of artifacts. Among the five different artifacts were Nano3 Line scales.

Fourteen national laboratories around the world participated in this comparison with Physikalisch-Technische Bundesanstalt (PTB), Germany, acting as the Pilot Laboratory. These comparisons will help to establish the degree of metrological equivalence between the participating nations. The Nano-Scale Metrology Group of the Precision Engineering Division completed measurements for this key international comparison of line scales and sent the final measurement reports to PTB. Two 280-mm scales, one Zerodur and one quartz, were measured on the NIST Line Scale Interferometer (LSI).

These scales were manufactured by Heidenhain Co. for the Pilot Laboratory PTB and were shipped around to the participating laboratories in a precision shipping container, which was equipped with temperature, humidity, and shock sensors; the outputs from these sensors were recorded by the on-board data logger. Contact: William Penzes (301) 975-3477, <william.penzes@nist.gov>.

'OVERTURNING TOMORROW'S SMART WORKPLACE'

Researchers at the National Institute of Standards and Technology (NIST), in cooperation with U.S. information technology companies, are prototyping the office of the future and developing the infrastructure that will one day make it a reality.

The NIST Smart Space Laboratory is a simulated work environment where software and hardware are blended to give people unprecedented levels of access to computers. One project uses audiovisual technology to allow computers to participate in a meeting. An array of microphones in the system can identify which person is speaking by voice patterns and then transcribe what he or she says. Video cameras also can be incorporated to continually scan the room for a visual record of the proceedings.

In another project, a person speaks to a computer to access stored information or the Internet. If a voice identification program gives the okay, the computer lets the person through.

The NIST Smart Space Laboratory makes use of numerous aspects of pervasive computing—the convergence of computers, wireless devices, sensors that "see" and "hear," and the Internet so that people use their machines in a natural, unobtrusive way. The smart office research focuses on how machines and sensors can work together in an office environment that soon may help to overcome the challenges involved in integrating such tools into a cohesive network. Contact: Philip Bulman, (301) 975-5661, <philip.bulman@nist.gov>.

OPTOELECTRONICS TO IMPROVE OUR LIVES

For more than three decades, the National Institute of Standards and Technology (NIST) researchers have helped make measurements and develop standards for the industry that combines electronics and optics—including lasers/offset use in products and services. Examples include modern telephones, compact discs, laser printers, and medical diagnostic equipment.

The market for optoelectronics components reached $70 billion in 2000; lasers alone accounted for $8.8 billion in sales that year. Obviously, a booming industry such as this has a strong need for reliable and cost-effective measurements. In fact, it is estimated that between 10 and 30 percent of the cost of producing an optoelectronic component is attributed to measurements, including those that support the manufacturing process and those that support product specifications.

The first NIST primary standard for laser measurements was developed in 1965. Today, the agency maintains seven primary standards for measuring laser power and energy. NIST also is involved with the optical communications industry at the very beginning. Its work on the characterization of optical fiber began in 1976, just as telephone companies around the world were beginning to test optical communication systems in the field. Over the years, NIST has developed a series of standards to help this industry flourish.

Today, NIST maintains the broadest range of measurement capabilities of optoelectronics of any national measurement laboratory. In some areas, it is the only laboratory able to provide traceability, and it makes those services available throughout the world. Contact: Fred McGehan, (303) 497-3246, <mcgehan@boulder.nist.gov>.

FOR THE TIME OF YOUR LIFE, CALL NIST

The National Institute of Standards and Technology has lots of different ways to satisfy your need to "really know what time it is":

- If you have one of those radio-controlled clocks or watches that automatically sets itself, NIST's WWVB radio station in Colorado is now back on the air at a full 30 kilowatts of power after an extended period of reduced strength while a broken antenna was repaired.
- Shortwave buffs can tune into WWV and WWVH, broadcasting time signals around the clock on frequencies between 2.5 and 20 megahertz. This includes time announcements, standard time intervals, marine storm warnings and Global Positioning System status reports.
- Time broadcasts also can be heard on the telephone for the price of a long-distance call. The two numbers are (303) 499-7111 for a simulcast of WWV in Colorado and (808) 335-4363 for WWVH announcements from Hawaii.
- Surf on over to <www.boulder.nist.gov/timefreq/service/time-computer.html> where you can get free software and instructions on using the Internet Time Service or our Automated Computer Time Service to synchronize your computer clock to NIST time.
- Finally, check out <www.time.gov>; it will show you the time according to NIST-F1, one of the world's most accurate atomic clocks.
NEW WEB RESOURCES FOR DIMENSIONAL METROLOGY

Two new web pages <http://patapsco.nist.gov/mcl/div821/> are now available from the Precision Engineering Division to perform calculations commonly required by engineers and metrologists who are involved in ultrahigh accuracy length measurements. One web page calculates the index of refraction of air, which is needed to determine the wavelength of laser light in air. (This wavelength serves as the basic unit of length when performing high-precision distance measurements based on interferometry.) The second web page calculates the magnitude of elastic deformation of surfaces in contact under force. This deformation must be taken into account in all high-accuracy length measurements when surfaces are probed mechanically.

The refractive index of air is computed from atmospheric conditions (air temperature, pressure, and humidity) using either the Edlen or Ciddor equations (the two equations most commonly used to determine air refractive index). The usual version of the Edlen equation was modified to make it more accurate for non-laboratory conditions, such as high air temperature and humidity as might be encountered on the shop floor.

The deformation calculation web page will allow a user to correct for elastic deformation at the point of contact between a mechanical probe and part. This correction is essential when submicrometer accuracy is desired. Currently, the web page performs the computation for the seven most common types of contact geometry (for example, a sphere in contact with a plane or two crossed cylinders). Additional geometric cases will be added in the future. Contact: Jack Stone (301) 975-5638, <jack.stone@nist.gov>.

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NEW FITTING ALGORITHM FOR SHAPE-SENSITIVE LINEWIDTH METROLOGY

Is a scanning electron microscope (SEM) image of a semiconductor line produced by a rectangular line of width $w$, or by a non-rectangular line of different width $w'$? When the lines are less than 100 nm wide and nanometer-scale accuracies are the goal, distinguishing between the different possibilities is crucial to linewidth metrology. Manufacturing Engineering Laboratory (MEL) scientists are implementing a scheme to make distinctions that are based upon matching measured images to a library of images corresponding, as determined by Monte Carlo model calculations, to a variety of line shapes and widths.

Matching images to the library will be done in three parts:

- a model function that computes the expected image for a given set of parameters that describe the state of the instrument and the width and shape of the line,
- a residual function that determines the difference between this model image and the one actually observed, and
- a non-linear least-squares fitting algorithm that adjusts model parameters to determine the best match, as judged by minimizing the sum of squares of residuals. The new system has several improved capabilities compared to the system in place late last year:

- It can fit entire images (not merely single line scans) in a single fitting operation. This allows one to realistically require instrument parameters to be fixed for the whole image, instead of varying from line to line.
- It can fit any number of line features per line scan. This means it can handle the industrially important case of dense lines, instead of only isolated lines.
- Parameters can be "pinned." A pinned parameter is given a fixed value that is not varied for fitting purposes. This provides a convenient way to use calibration data determined from an independent measurement. For example, if the instrument’s beam diameter, brightness, and contrast are known independently, these can be pinned to their known values, leaving sample geometry as the only thing that can be adjusted to produce a fit. Contact: John Villarrubia (301) 975-3958, <john.villarrubia@nist.gov>.

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REFERENCE MATERIAL 8091 DELIVERED TO OSRM

A supply of more than 50 artifacts of Reference Material 8091, a new scanning electron microscope sharpness artifact, was delivered to the Office of Standard Reference Materials (OSRM). The tiny tower-like structures of the etched silicon were generated as a plasmas-etching artifact commonly referred to in the industry as “grass.” The fine-grained structure can be used to determine the image sharpness at magnifications in excess of 100,000x at both high and low accelerating voltages.

The determination of image “sharpness” is intended to monitor the fact that all scanning electron microscopes, whether they are in laboratory or on the production line, slowly lose performance as the instruments are used. Loss in image quality also means loss in measurement sensitivity. Loss of performance is due to a whole array of contributing factors including misalignment, contamination, and increase in size of the primary electron beam. Measuring the loss in image sharpness is one way that has been shown to identify this performance decrease.

Reference Material 8091 is intended primarily for use in routinely checking the sharpness performance of scanning electron microscopes in conjunction with the NIST/SPECTEL SEM Monitor Program (1998 R&D 100 Award), the NIST Kurtosis program, the University of Tennessee SMART program, or other similar analytical procedures. RM 8091 is supplied as a small, approximately 2 mm x 2 mm diced silicon chip. This sample is capable of being mounted directly onto a wafer, wafer piece or specimen stub for insertion into a laboratory scanning electron microscope or wafer inspection scanning electron microscope.

The chip also can be mounted onto a “drop-in” wafer. A supply of machined 150 mm and 200 mm drop-in wafers also was delivered to OSRM with the samples. The Reference Material is fully compatible with state-of-the-art integrated circuit manufacturing. A source for full wafer size samples of RM 8091 is being sought. Contact: Michael Postek (301) 975-2299, <michael.postek@nist.gov>.
NEW ABSOLUTE MAGNETIC MOMENT STANDARD REFERENCE MATERIAL FOR THE RECORDING INDUSTRY

A new Standard Reference Material for use in calibrating the magnetometers used in the recording industry and research laboratories has been issued. Industry should find this SRM (SRM 762) more useful than the existing SRM (SRM 772a) because its geometry is similar to the sample shapes used for recording tape or hard disk samples, and it will eliminate the need for applying shape corrections for accurate measurements.

Because the magnetic properties of metals depend on thermomechanical processing history and geometry as well as purity, the properties of the nickel disks used for the SRM were certified using the absolute magnetometer developed by NIST. The saturation moment of the new SRM (1.75 mAm2 or 1.75 emu) is about half that of the old SRM which may be advantageous for some magnetometers. The new SRM is certified for applied fields between 280 kA/m and 4000 kA/m (3500 Oe and 50,000 Oe) and for temperatures between 280 K and 310 K. Contact: Robert D. Shull (301) 975-6035, <robert.shull@nist.gov>.

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NEW HIGH-SPEED MEASUREMENT COLLABORATION

The EEEL Radio-Frequency Technology and Optoelectronics Divisions are embarking on an exciting joint venture, the creation of a "High-Speed Measurement Laboratory." This laboratory will develop calibratable high-speed electrical and optoelectronic measurements for next-generation optical telecommunications, electrical phase standards for non-linear and other microwave measurements, and high-speed digital integrated circuits.

The laboratory already boasts one success, the development of an electro-optic sampling system for characterizing the magnitude and phase response of fast photoreceivers to 30 GHz. This is significant not only because this unique measurement system is fully calibratable but because it can be extended to the much higher frequencies critical to the optical telecommunications market. The next target is photoreceiver characterization over a 100 GHz bandwidth, which the scientists involved, Paul Hale and Dylan Williams, hope to achieve later this year to aid the development of the new 40 GB/s optical links.

But high-speed photodetector characterization isn't the only objective. A photoreceiver with one or two hundred GHz of calibrated bandwidth has many applications. These very fast photoreceivers can be used as transfer standards to establish absolute electrical phase, a critical quantity required for non-linear device characterization at microwave frequencies, and to push calibrated temporal measurements to microwave frequencies, creating a new microwave-measurement paradigm. Contact: Thomas R. Scott (303) 497-3651, <scott@boulder.nist.gov>.

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NIST CENTENNIAL STANDARDS SYMPOSIUM SPONSORED

As one of the major events of Centennial Week, the TS Office of Standards Services (OSS) sponsored the NIST Centennial Standards Symposium-standards in the Global Economy: Past, Present, and Future. This highly successful event focused on a variety of topics, including information technology; semiconductors and optical sensing; transportation, materials and manufacturing; and building and construction.

Speakers from the American Society for Testing and Materials, the American Society of Mechanical Engineers, the International Organization for Standardization, the International Electrotechnical Commission, and other public and private-sector organizations took the opportunity to praise the partnerships that have been formed with NIST over the last century. The final session addressed the National Standards Strategy, developed and adopted by the American National Standards Institute and the standards community, including NIST.

The participants were experts from industry, government, international standards organizations, and academia, including the five living former directors of NBS/NIST. Many of the symposium participants and various other representatives of the standards and conformity assessment communities attended the Centennial Gala and accounted for almost half the plaques presented to NIST to commemorate the centennial.

Symposium proceedings are being prepared and will be published by OSS in the near future. Several of the symposium presentations and papers may be viewed at <http://ts.nist.gov/ts/it/docs/210/centen-celebration.htm>.

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METROLOGY INTEROPERABILITY CONSORTIUM PROPOSED

Globalization and continuing pressure to decrease time to market are driving manufacturers to seek hardware and software for automated dimensional metrology that can be mixed and matched with products from a variety of vendors. They require metrology systems that can be easily integrated into their overall manufacturing operations and that have standard command and data interfaces that allow inspection operations to be executed on equipment from different vendors without reprogramming. While there are ongoing efforts in a number of areas headed toward this goal, there is still work to be done.

Daimler-Chrysler, Ford, and NIST hosted a meeting in Rosemont, Ill., coincident with the Quality Expo International, to propose the formation of a new consortium to address interoperability among the software and hardware components used in automated metrology. Establishment of such an umbrella organization to coordinate standards development and testing activities was one of the primary action items that came out of a NIST-Metrology Automation Association (MAA) workshop on Open Architecture for Metrology Automation held in May 2000.
The meeting on April 25, 2001, was attended by approximately 30 representatives of major metrology system users, vendors, and technology providers. Attendees were largely very supportive of the idea of setting up a Metrology Interoperability Consortium. An all-day follow-up meeting was planned for May 22, 2001, in Detroit, to provide more detail on the proposed consortium and to develop the consortium projects and statement of work. Presentation slides from the April 25 meeting will be posted at the MAA web site <http://www.metrologyautomation.org/.

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NIST ISSUES RETROSPECTIVE OF CLASSIC PUBLICATIONS

As part of its Centennial Celebration, NIST has issued Special Publication (SP) 958, A Century of Excellence in Measurements, Standards, and Technology--A Chronicle of Selected NBS/NIST Publications, 1901-2000. The book, edited by NIST alumnus David Lide, consists of 102 vignettes about papers that had significant impact on science and/or the general public. Special efforts were made to include the many technical fields in which the institution has been active during the past century. In addition to distribution through the major operating units, copies are available in the NIST Library; the book can also be found on (and downloaded from) the NIST Centennial website. It has been produced, along with the Centennial Brochure and the Centennial Video, on a CD ROM available from Public and Business Affairs. A small number will be sold by the Superintendent of Documents, and there is the possibility of reproduction by a private-sector organization for general public sale. Contact: Walter G. Leight (301) 975-4010, <walter.leight@nist.gov>.

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WORK WELL UNDER WAY ON WORLD’S PREMIER MEASUREMENT LAB

A drive past NIST headquarters in Gaithersburg, Md., these days might have you looking twice. There’s an evergrowing stockpile of dirt on the campus’ southern side from excavations, five (and soon to be six) cranes poised high above a construction site and the sight of men and women and machines busily at work on a very special building.

When it is ready for occupancy in 2004, the 47,480-square-meter (511,070-square-foot), $235.2 million Advanced Measurement Laboratory will give NIST and its partners in U.S. industry and science access to research and development capabilities not available anywhere else in the world. The laboratory will have state-of-the-art controls for humidity, temperature, vibration, and air quality. Two of the AML’s five wings will be built underground with special active and passive vibration isolation systems. The unique characteristics will help its occupants achieve higher quality reference materials, improved measurement and standards, and more rapidly-developed research advances.

For more information on the AML, along with an artist’s rendition of the finished facility and a live webcam view of the construction site, go to <http://aml.nist.gov>.

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NIST UNCOVERS POTENTIAL PROBLEM FOR SEMICONDUCTOR LITHOGRAPHY

NIST researchers have uncovered a potentially serious optical problem affecting designs for future generations of semiconductor manufacturing equipment using “deep ultraviolet” light. The “Moore’s Law” phenomenon—the doubling of chip complexity with each generation—has been possible largely because of continual advances in lithography, allowing manufacturers to image and process integrated circuits with smaller and smaller dimensions. Reaching very small dimensions requires using very short-wavelength light. Current state-of-the-art production processes use deep ultraviolet lasers at 248 and 193 nanometers to image circuits with critical features as small as 130 to 150 nanometers. The next major steps for lithography are expected to be systems using 157-nanometer light, ultimately achieving feature sizes in the range of 70 nanometers.

Some of the optics for 193-nanometer and all of the optics for 157-nanometer lithography are made of calcium fluoride, one of only a few materials that are transparent at 157 nanometers. NIST physicist John Burnett recently showed that calcium fluoride is inherently bi-refringent in the deep ultraviolet—meaning that the crystal refracts light differently depending on the polarization of the light. NIST physicists Eric Shirley and Zachary Levine confirmed these results theoretically.

The practical impact is that a calcium fluoride lens will not focus properly without, at the very least, careful control of the light as it enters the lens and a design that accounts for this intrinsic bi-refringence. This is a difficult problem given that there are about 20 such lens elements in a typical “stepper” or optical lithography lens. The modeling software used to design such systems is being modified to account for the effects of birefringence, but it is not expected to be ready until October.

NIST researchers are pursuing potential solutions to the problem involving mixed crystals to compensate for the birefringence effect. Details of Burnett’s findings were first made public at the International SEMATECH-sponsored International Symposium on 157-nanometer Lithography. Contact: Michael Baum (301) 975-2763, <michael.baum@nist.gov>.

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NIST WANTS YOUR VIEWS ON TIME SERVICES

For the third time in 26 years, NIST is surveying customers of its time and frequency services, specifically:

- listeners to its two shortwave radio stations, WWV in Colorado and WWVH in Hawaii;
- users of its low frequency radio broadcast, WWVB;
- persons accessing the Internet time service for setting computer clocks;
- computer operators setting their PC’s clock via a phone call to the NIST Automated Computer Time Service if the PC is behind a firewall or not connected to the Internet; and
- browsers of the time and frequency web page <www.boulder.nist.gov/timefreq>.

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The survey's goals are to determine what services are working well, what services need to be improved and what additional services customers would like.

In addition to voice announcements every minute and a time code, NIST's radio stations provide OMEGA navigation system status reports, geophysical alerts, Global Positioning Service status reports and marine storm warnings.

Completed surveys will be accepted through September 30, 2001. A report of the results will be made available later in the year.

The survey may be accessed by going to <http://timesurvey.nist.gov/>. This site provides a printable form for mailing or faxing, or an online version for electronic submission.

For a hard copy of the survey or for more information, contact John Lowe, NIST, MS 847.40, Boulder, Colo. 80305-3328; <lowe@boulder.nist.gov>.

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NEW SYSTEM BEING DEVELOPED TO DETECT CONCEALED WEAPONS

Suppose there's an unruly crowd where law enforcement officers have reason to believe some members are carrying concealed weapons—guns, knives, perhaps even plastic explosives. Word goes out over the police radio to bring an unmarked, nondescript van up to within 10 meters of the shouting demonstrators.

Within minutes of the van's arrival, the armed personnel are identified and captured before they have a chance to use their weapons. Far fetched? Not if a new technology under development by the National Institute of Standards and Technology proves successful.

Working with funding from the National Institute of Justice and the Federal Aviation Administration, members of NIST's Electromagnetic Technology Division in Boulder, Colo., have been testing individual components of a system designed to reveal concealed weapons in a crowd.

The technology involves a radar-like apparatus that would illuminate a group with low-level electromagnetic waves. Clothing is transparent to the waves but objects concealed beneath the clothing are not. Images of guns, knives and plastic explosives are reflected back to the NIST device, then directed through a set of optics which focus the radiation onto an array of 8-centimeter (3-inch) silicon wafers with millimeter-wave antennas attached. The antennas are so tiny that 120 can fit onto a single wafer. An electronics package converts the electromagnetic radiation into images, and these are projected onto a laptop computer screen.

The researchers are hoping to have a prototype of the weapons detector ready for testing by year's end. Contact: Fred McGehan (Boulder), (303) 497-3246, <mcgehan@boulder.nist.gov>.

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NIST SAYS 'MORE ATTENTION MUST BE PAID TO REPAIR WELDS'

A new paper from NIST suggests that more attention must be paid to weld repairs in order to avoid failures due to problems such as stress-corrosion cracking. Even at the outset, a welded joint has a higher risk of failure from degradation of base material near the weld because of the welding process itself. This risk of failure is increased if repair welding is performed.

"Therefore, the welding, quality control and quality assurance technologies need to be developed to more stringent requirements if we want to avoid the conditions for failure, and so achieve higher reliability for welded construction," reads the report prepared by Ivan Samardzic, a visiting scientist from Croatia, and Thomas Siewert of NIST. Their paper discusses possible difficulties that could occur during repair welding of high-strength steel used to manufacture pressure vessels for the storage and transport of liquefied gases. The crux of these problems, they report, is the complex temperature variations that occur during the welding repair which "can cause significant degradation of the welded-joint zone."

Repair welds are usually short, so their temperature fields are more complex than long welds. The degradation is most severe at weld starts and stops, but also can occur at other locations along the weld and for different stress conditions. Much of the report concerns degradation in properties at the weld starts and stops.

For a copy of paper no.18-01, contact Sarabeth Harris, NIST, MC104, Boulder, Colo. 80305-3328; (303) 497-3237; <sarabeth@boulder.nist.gov>.

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WANTED: MEASUREMENTS WITH GOOD REFERENCES

In nearly all types of activities—be they related to manufacturing, finance, health, regulatory affairs or even sports—people and organizations are becoming sticklers for measurement accuracy. But unlike beauty (said to be in the eye of the beholder), accuracy must be judged on the basis of a measurement pedigree—a documented line of descent from accepted standards.

NIST, the nation's measurement authority, has responded to this growing customer need for demonstrable accuracy. It has created an on-line resource <http://www.nist.gov/traceability/>—devoted to matters pertaining to the integrally related topic of measurement traceability—whether the result of a specific measurement can be related to accepted international or national standards through an unbroken chain of comparisons.

"More and more of our customers are asking questions about traceability," explains NIST Acting Director Karen Brown. "These range from the most basic—What is it?—to the more complex—How can I judge the credibility of a supplier's claims that his measurements are linked to those developed and maintained by NIST and ultimately to the SI, the International System of Units?"
Factors driving the growth of traceability requirements include increasing world trade, growing reliance on laboratory accreditation as a means of assuring confidence in calibration and test reports, the continuing spread of quality standards and, in some technology areas, a proliferation of regulations.

At the new web site, visitors can read the NIST policy on traceability. They also can review, among other resources, a glossary of terms, answers to an extensive set of frequently asked questions on traceability, examples of relevant NIST measurement programs, and a traceability checklist for users of calibration services.

To learn more, visit the NIST traceability web site at <www.nist.gov/traceability>.

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NEW ONLINE PAGES GUIDE INDUSTRY TO SECTOR-SPECIFIC NIST SERVICES

How do you find accurate measurement standards for gauging the thrust from a jet engine? How do you verify the accuracy of your new infrared spectrometer for EPA-required emissions monitoring? Where do you order a NIST measurement standard for optical fiber diameter that’s accurate to within a micrometer?

Answers to these and many more questions are just a couple of clicks away on a new NIST “Information for Industry” web site. NIST has created these new web pages to help industry personnel find the specific NIST standard, measurement or technology they need with minimal effort. Pages for nine different industry sectors—aerospace, automotive, chemical processing, communications, computers, construction, electronics, health care and manufacturing—are available from <www.nist.gov/public_affairs/industry.htm>.

Each industry-sector page is organized by subcategories with brief descriptions of relevant NIST support, activities and research. Many of the activities include a contact name with a phone number and e-mail address. You also can get to the industry sector pages from the NIST home page <www.nist.gov>. Click on “Industry” under the “Information For” heading.

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NEW NIST PRACTICE GUIDE ON ROCKWELL HARDNESS TESTING AVAILABLE

The NIST Recommended Practice Guide: Rockwell Hardness Measurement of Metallic Materials (NIST Special Publication 960-5)—the latest in the new practice guide publication series—is now available. Rockwell is a method-based test primarily used by metals and metal products producers to measure the hardness of metal parts, such as those found in aircraft and automobiles. The new guide is aimed at promoting accuracy and consistency in test results in the laboratory and on the production floor.

Offering good practice recommendations, the guide highlights the causes of variability in test results. To help machine operators avoid errors, the guide covers common problems, such as using the correct Rockwell scale, surface preparation, speed of testing, machine verification and environmental factors.

As part of its Rockwell hardness standardization program, NIST has developed standard reference material test blocks for the Rockwell C scale, which is used for hard metals, primarily steel. The SRMs are used to calibrate commercial hardness machines. Researchers are working on SRMs for the B scale softer metals, such as aluminum, bronze, copper and brass. NIST also is involved with the American Society for Testing and Materials, the International Standards Organization and the International Committee of Weights and Measures in developing an international reference standard.

Responding to a related industry problem, NIST has established a microform calibration system for measuring the geometry of diamond indenters with high accuracy.

To obtain a copy of NIST SP 960-5, contact Public Inquiries, (301) 975-NIST (6478), <inquiries@nist.gov>. For more information on NIST’s Rockwell hardness research, contact Sam Low, (301) 975-5089, <samuel.low@nist.gov>. The contact for NIST’s diamond indenter calibration effort is John Song, (301) 975-3799, <song@nist.gov>.

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SEMICONDUCTOR LABS PUT NEW NIST SOFTWARE THROUGH ITS PACES

Forty semiconductor industry laboratories that require accurate measurements of the concentration and distribution of dopant atoms within nanometer-scale devices are field testing a beta version of NIST’s new FASTC2D (“fast capacitance to dopant” level) software. The software provides an essential link between qualitative images captured by a scanning capacitance microscope (known as an SCM) and quantitative data required to design transistors for future integrated circuits.

Dopants are like a seasoning within semiconductor devices. The distribution of dopants controls how a transistor works. To control the flow of electrons to the levels required in modern circuits, engineers must know the precise distribution of dopants, with a spatial resolution better than 10 nanometers.

SCMs are strong candidates for achieving target levels of precision and resolution. Therefore, the International Technology Road Map for Semiconductors has identified them as a critical measurement tool for continued miniaturization of semiconductors.

Capacitance—a measure of electrical charge-storing capacity—also could benefit from the use of SCMs. The SCM senses capacitance between the doped region and a sharp tip positioned close to the surface of a cross section cut through the transistor structure. However, details of the resulting image have resisted accurate interpretation.

The FASTC2D computer software transforms pixel data from an SCM image into a map that accurately shows the distribution of dopant atoms. NIST researchers developed the underlying theory and later packaged it into software suitable for manufacturing engineers. Designed to run on a desktop computer, the software features a user-friendly graphical interface. It also produces highly accurate results achieved with models based on principles of physics that translate capacitance into two- or three-dimensional quantitative data on dopant concentrations.
NIST is improving the software based on responses from the 40 laboratories and plans to publish a new version and a user's guide to the software this summer. Both the software and the guide will be available via NIST's World Wide Web site at that time. Contact: Philip Bulman, (301) 975-3661; philip.bulman@nist.gov.

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NEW ATOMIC CLOCK COULD BE 1,000 TIMES BETTER THAN TODAY'S BEST

NIST researchers have demonstrated a new kind of atomic clock that has the potential to be up to 1,000 times more accurate than today's best clock. They reported the findings July 12, 2001, on Scienceexpress<www.scienceexpress.org>, an online publication of Science Magazine.

The new clock is based on an energy transition in a single trapped mercury ion (a mercury atom that is missing one electron). Building a clock based on such a high-frequency transition was previously impractical because it requires both “capturing” the ion and holding it very still to get accurate readings, and having a mechanism that can “count” the ticks accurately at such a high frequency.

Precise timekeeping underlies much of the structure of modern civilization, including navigation, electric power management, and communications. It also has made possible significant advances in astronomy and physics. Today, the best clocks are based on a natural atomic resonance of the cesium atom—the atomic equivalent of a pendulum. For example, NIST-F1, one of the world's most accurate time standards, neither gains nor loses a second in 20 million years.

How good a clock is depends on stability and accuracy—whether the clock provides a constant, unchanging output frequency, and how close the measured frequency is to the fundamental atomic resonance that provides the clock's “tick.” One advantage of the new clock is that it ticks much faster.

Today's international time and frequency standards, such as NIST-F1, measure an atomic resonance of about 9 billion cycles per second. By contrast, the new NIST device monitors an optical frequency more than 100,000 times higher or about 1 quadrillion cycles per second.

For technical information, contact Scott Diddams, (303) 497-7459.

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NIST OFFERS ONLINE METROLOGY RESOURCE FOR ELECTRONICS MANUFACTURERS

Semiconductor, electronics and data storage device manufacturers can use a new NIST web page to easily find the NIST research, products and services of greatest relevance to their industry. The NIST semiconductor/electronics industry-sector web page <www.nist.gov/semiconductors> is designed to help industrial R&D departments and manufacturing operations find the most accurate measurements, standards, calibrations and data available from NIST. Links to NIST cooperative research and funding opportunities also are offered.

The semiconductor/electronics web page gives very short descriptions of what NIST does to help build better microchips, from more accurately measuring step heights, dielectric films and interconnects to ways to improve manufacturing processes. Along with the brief project descriptions, the page offers links to more detailed descriptions of each project or program, as well as contact names, e-mail addresses and phone numbers.

The page is one of several new industry-sector web pages intended to improve industry awareness of NIST products, services and programs. Go to “Information for Industry” on the NIST home page <www.nist.gov> to access the index for all of the NIST industry-sector web pages. Contact: Linda Joy, (301) 975-4403

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FROM CURVES TO CORKED BATS: NIST HELPS AMERICA 'PLAY BALL'

A new addition to the Centennial web site for the National Institute of Standards and Technology will be a hit with baseball fans from Boston to Seattle. Titled “NIST and the American Pastime,” this historical page <www.100.nist.gov/baseball.htm> describes the surprising connections between the federal government's first physical science laboratory and the sport from the diamond.

Visitors can learn how Lyman Briggs, director of NIST's predecessor, the National Bureau of Standards from 1933 to 1945, scientifically addressed a World War II concern of major league batters. Batters thought that all-cork-center baseballs—used to replace the previous rubber-cushioned cork center balls when rubber supplies were at a premium—were less lively. “A hard-hit fly ball with a 1943 center,” he reported, “might be expected to fall about 30 feet [9 meters] shorter than the prewar ball hit under the same conditions.”

The new web page also details the famous research conducted in the late 1950s by the then-retired Briggs on the physics of the curve ball. Using wind tunnels and pitchers from the Washington Senators, Briggs demonstrated that a thrown ball can curve up to 17-1/2 inches (44-1/2 centimeters) over the 60.5 feet (18.4 meters) that separate pitcher and batter. Briggs revealed that it was the ball’s spin, rather than speed, that caused it to break.

Other featured NIST links to baseball include investigations of corked bats, better radio signals for game broadcasts and innovations in light-emitting diode displays that make today's spectacular full-color scoreboards possible. Contact: Mark Bello, (301) 975-3776
MEASUREMENT SCIENCE CONFERENCE (MSC)
Bob Johnson, Liaison Delegate

First, thanks to all of you who stopped by the M.S.C. booth in Washington D.C., to say hello, ask questions, and pick up conference literature. We hope to see you all in January.

As autumn is upon us, with winter not far behind, now is a good time to begin making plans to attend the 2002 Measurement Science Conference at the Disneyland Hotel and Convention Center in Anaheim, CA., the week of January 21 - 25, 2002. While we can’t actually guarantee that the weather will be perfect, there is a high probability that it will be much nicer than what the majority of the country experiences at that time of year.

2002 Technical Program

The technical program consists of papers in technical disciplines including:

AC/DC/Low Frequency
Electro Mechanical
Dimensional / CMMS
Time and Frequency
Electro Optics
Microwave / Millimeter Wave

Topics include:
Metryology and Quality Assurance
Statistical Process Control
Productivity
Laboratory Accreditation
Calibration Automation
Industrial process measurements
Environmental measurement techniques etc.

We are always interested in receiving measurement science-related papers for presentation. If it’s too late for the 2002 program, it can be an early entry for the 2003 program.

NIST Seminars

NIST Seminars are scheduled for Monday and Tuesday, January 21st and 22nd.

Tutorial Workshops

There is an aggressive tutorial workshop program scheduled for Wednesday, January 23rd. The workshop format will be in half-day sessions. Each workshop will be offered twice, in both morning and afternoon sessions, making it possible to attend two workshops. The exception is workshop G, which is all day long and will be offered only once.

A. Mass Measurement Techniques IV: Scales Uncertainty
B. The Management Challenges of Laboratory Accreditation
C. The Anderson Loop Measurement Circuit Topology
D. Choosing the Correct Measurement Tool
E. An Introduction to Pressure Metrology
F. Risk Based Selection and Support of Test & Measurement Equipment
G. Measurement Uncertainty by Example
H. Advances in Ultraviolet Metrology
I. TTI Technology Training Initiative: Vibration and Shock

Speakers

On Wednesday evening @ 6:00 PM at the Exhibits Opening, we will have The World’s Fastest Electric Car on display. The driver, Patrick Rummerfield, has an extraordinary personal history. In addition to his driving accomplishments, he has overcome injuries that left him a quadriplegic to compete in triathlons, including completing the Iron Man Triathlon.

On Thursday morning the conference opening Keynote Speaker will be F. Whitten Peters, former Secretary of the Air Force.

The luncheon speakers for Thursday and Friday are:

Dennis G. Casclier is an expert on the history of the Mojave Desert. He has authored and published more than 20 books and scores of articles on the subject. He has compiled the most extensive collection of research materials pertaining to the Mojave Desert that exists anywhere, including a 6000 volume library, 40,000 historical photographs, 700 oral histories, 3000 early maps, and more.

Joe Malarkey—Audiences always want to know, “what qualifies this speaker to talk about my business?” and that is the key to Joe Malarkey’s speaking career. Virtually no one knows more about the pitfalls, mistakes, honest errors, lapses in judgement and lethal mistakes of not just one industry, but many. Joe has been there in the trenches, falling on the sword, taking the heat, paying the price and finally moving on to another endeavor. That kind of experience can’t be purchased, it can only be endured.

Guest Programs

Professionally guided bus tours are planned so that your guests can explore the unique and fun aspects of a trip to Los Angeles. Thursday, January 24th, will be an all day trip to see the “Insiders LA”, hitting the famous and not so famous parts of Los Angeles including lots of stops, even one at the International Jewelry Mart! Our guide is renowned for this tour and your guests will come away feeling like they have really seen Los Angeles. Friday, January 25th is a half-day trip; the third annual MSC Whale Watching Cruise.
Liaison News

This time we have added a new twist. We will be going out of Long Beach on the Long Beach Marine Institute’s ship Conqueror. We’ve combined their “Sea Creature Safari” program with their “Incredible Journeys” program. Learn more about it at their web site <www.longbeachmarineinstitute.com>. Of course there will also be discounted tickets available for both Disneyland and the newly-opened theme park, California Adventure.

Many of our sponsoring organizations, committees or subcommittees plan meetings to be held in conjunction with the conference each year. While we make every effort to accommodate these requests, there is a limited amount of places to meet and a limited amount of hours to work with. Those who are planning to have a meeting during MSC, please submit your requests early. Please include date, preferred time of day, meeting length, quantity of people attending, and any special requirements. Please contact Tama Stevens at (909) 273-4345, <StevensTL@corona.navy.mil> or Mike Magin (858) 514-2412, <DavidMMagin@eaton.com>.

The M.S.C. website has been redesigned. For more detailed information on the conference including registration information, both on-line and by mail, please visit the website at <www.msc-conf.com>.

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

Roxanne M. Robinson, Liaison Delegate

ASTM E36 meeting report, June, 2001

This committee revisited the minutes from the December 2000 Long Range Plan Subcommittee Meeting. Further definition of the future role of E36 was desired, keeping in mind the ASTM Board of Directors’ concerns with maintaining ownership of ASTM-generated standards and focusing on more sector-specific standards or guides, where there is a need.

The following suggestions for possible E36 activities were made:

1) The primary mission of the committee should be to fill any void or niche with needed standards or guides;
2) Take on issues and provide guidance relating to technical standards as they impact accreditation and coordinate work done by other ASTM committees;
3) Serve as educational advisor in conformity assessment, including establishing training courses and providing instructors.
4) Serve as the ASTM E36 Committee representative on the ANSI ICAC Committee
5) Generate domestic and/or sector-specific generic standards or guides, when needed or requested. Effort will have to be made to ensure that the appropriate technical committees are included in the discussion on the development of these standards or guides.

The committee agreed that E36 should not serve as a “rubber stamp” for the adoption of international standards. They also agreed that the application of measurement uncertainty guidance needs to be addressed at the test methodology level. Generation of a guidelines document for performing mutual recognition arrangement evaluations was deemed not necessary as this subject has been addressed by other organizations such as NACLA, APLAC and ILAC.

The financial and administrative support needed for the role of the ASTM E36 representative to ICAC will have to be decided, if ANSI’s receptiveness to this suggestion is confirmed.

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JOINT LOGISTICS COMMAND/Calibration Coordination Group (JLC/CCG)

J. V. Fishell, Liaison Delegate

Navy Heats Up at Technology Grove.

Navy metrology engineers demonstrated infrared (IR) measurement technology to the public and to local high-technology companies on 21-22 April 2001 at the Technology Grove in Riverside, California. This annual event, held in conjunction with the Orange Blossom Festival, attracts more than 250,000 people from around California’s Inland Empire. It is an opportunity for high-tech businesses to publicly demonstrate their latest innovations.

Among the other technologies displayed, visitors to the Navy booth were treated to printed IR images of themselves and their families during the two-day event. The IR camera on display was a product of the Navy Metrology Research and Development Program and is many times more accurate than the IR imaging equipment currently on the market, and in use by the police, fire, and other organizations. Engineers were also on hand during the event to provide information on Navy technical programs and numerous job opportunities available to the many Technology Grove visitors.

NACLA Evaluations Begin, Using DOD Representatives.

To date, four Department of Defense (DoD) representatives have passed the National Cooperation for Laboratory Accreditation (NACLA) evaluator’s examination. The exam is based on ISO Guide 58, Calibration and Testing Laboratory Accreditation Systems — General Requirements for Operation and Recognition and the NACLA Recognition Procedure. The purpose of the exam is to ensure that applicants are qualified to evaluate the competency of laboratory accreditation bodies who, in turn, will be accrediting laboratories. The first evaluations utilizing DoD representatives as evaluators will begin in the month of June.

NACLA is a non-profit organization chartered to facilitate the accreditation of laboratories through implementation of a standardized process for recognition of accreditation bodies. The goal is for a laboratory to obtain accreditation by one recognized accreditation body that will be recognized by all accreditation bodies.

NACLA collaborates with the International Laboratory Accreditation Cooperation (ILAC) and with other international accreditation organizations on issues of mutual recognition of accreditation bodies. Seeing the significance and value of these goals, the DoD has participated in NACLA since its inception, and has representatives on several committees, as well as a seat on the Operations Council.
AMERICAN ASSOCIATION OF LABORATORY ACCREDITATION (A2LA)
Ramona J. Saar, Liaison Delegate

Status of Calibration Accreditation Program
# of accredited calibration labs: 251
# of applicant calibration labs seeking A2LA accreditation: 101

Status of Testing Laboratory Program
# of A2LA accredited testing laboratories: 1297
# of applicant testing labs seeking A2LA accreditation: 139

Searchable Database on A2LA Web Site
A2LA has completed the development of a searchable database of A2LA accredited calibration laboratories. The new database is accessible through the A2LA web site at <www.a2la.org> as of July 24, 2001.

The database provides access to the information contained on each A2LA accredited calibration laboratory’s Scopes of Accreditation through free form text searches as well as through searches by lab name/location. It will now be much easier to locate laboratories that are accredited for specific calibrations and measurement uncertainties.

The database is being expanded to include search capabilities for A2LA accredited testing laboratories as well.

Transition to ISO/IEC 17025 - Update
A2LA is entering into the last phase of its transition plan from ISO/IEC Guide 25 to ISO/IEC 17025:1999. As of July 1, 2001, all laboratory assessments must be conducted to ISO/IEC 17025. A2LA expects to have the majority of laboratories accredited to the new standard by mid-2002, six months in advance of the December 2002 deadline set by the International Laboratory Accreditation Cooperation.

International Activities
A2LA participates in a number of international activities:

Peter Unger, A2LA President, chairs both the International Laboratory Accreditation Cooperation (ILAC) Arrangement Management Committee (AMC) and the Asia Pacific Laboratory Accreditation Cooperation (APLAC) Mutual Recognition Arrangement (MRA) Council and is the Convener of the working group on ILAC Arrangement documentation.


Roxanne Robinson, A2LA Vice President, has been appointed one of the Evaluation Managers for the ILAC Arrangement and has been assigned to lead a number of accreditation body evaluations to support the APLAC MRAs.

Warren Merkel, A2LA Technical Manager, is the Chair of the APLAC Public Affairs Committee.

GIDEPE METROLOGY
Jim Carlton, Liaison Delegate
Thu Ngo, GIDEPE Reporter

Metrology DVD/CDs
- Work on disk PDF_0009 is completed and is ready for production and distribution. The GIDEPE Metrology database is now on a single search engine, and all of the data is on DVD_0001 and PDF_0004 through PDF_0009. The entire metrology DVD and CD set contain metrology data submitted to GIDEPE from 1 October 1993 through 1 October 2000.
- It has been requested that the GIDEPE software on the Metrology data DVD/CDs be modified to make the DVD/CDs able to be used in a Network system. Work is progressing for the new search engine that will allow the DVD/CDs to work in a network environment, in addition to the local computer.
- GIDEPE is developing a Technical Manual (Equipment Operating and Maintenance Manuals) DVD/CD set that will contain all the "pdf" format, GIDEPE database technical manuals. The main thrust of this effort has come as a result of the Air Force Metrology Center submitting over 2500 electronic (digitized) technical manuals to GIDEPE. Processing these documents into the GIDEPE database is nearly completed. As each document is processed, it is available to all GIDEPE participants from the GIDEPE database website (you don't have to wait for the DVD/CDs to obtain the documents). The Tech. Manual DVD/CDs should be available by October 2001.

DoD MIDAS Transition to GIDEPE
GIDEPE met with the Metrology Systems manager from the Navy Measurement Science Directorate to discuss the possibility of transitioning DoD MIDAS customers to GIDEPE. The GIDEPE database has all the calibration procedures that are on the DoD MIDAS CD. DoD MIDAS has about 86 customers from private industry and it is not cost effective for Navy Metrology to continue distributing DoD MIDAS to these customers. As a result, GIDEPE and the Navy Metrology are working together to find the best way to transfer DoD MIDAS customers to GIDEPE. About 58% of DoD MIDAS customers are not GIDEPE participants.

Calibration/Certification Procedure Committee
GIDEPE participated in the Calibration/Certification Procedure Committee at the NCSLI conference in Washington DC. GIDEPE has created the electronic version of NCSLI’s RP-3 (Recommended Practice for developing calibration procedures) that was reviewed by team members at the conference in August.

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INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY (OIML)
Dr. Charles Ehrlich, Liaison Delegate
Ambler Thompson, OIML Reporter

OIML Mutual Acceptance Arrangements for OIML Type Evaluation (OIML TC3/SC5 Conformity Assessment)
The 8th committee draft “Framework for a Mutual Acceptance Arrangement on OIML Type Evaluations” (MAA) including annex covering “Checklists for Issuing Authorities and Testing Laboratories carrying out OIML Type Evaluations”, was developed based on comments received on earlier drafts and from the OIML Presidential Council meeting earlier this year.

Key changes in the 8th draft MAA are eliminating the term “self assessment” in favor of “peer assessment” (which requires an on-site visit by a peer expert), including the option of “laboratory intercomparisons” as viable means of demonstrating competence of a testing laboratory (without requiring an on-site visit). It also clarified the meaning of “participant” in a declaration of mutual confidence (distinguishing between “issuing authority” and “national responsible body”), including who the signatory would be.

Dr. Ehrlisch will present these materials at the 36th CIML meeting in Moscow in September. He will also present an update on the status of the revision to OIML International Recommendation 87 “Net Content in Packages”, and staff Changes in the U. S. OIML Program. Draft agenda is available upon request.

Model Law on Legal Metrology (OIML D1 revision)

At the joint OIML-BIPM-ILAC meeting in February 2001, it was decided to set up a joint international working group (IWG) between the three institutions. The purpose is to develop an initial draft document giving recommendations and model legal elements to be considered by countries who are revising their law on metrology or who are developing such a law. Once an initial document is prepared by the IWG, further revision will be within OIML TC3 with the USA as secretariat.

US OIML Activities now in ANSI “Standards Action”

In order to notify and invite participation in US OIML activities, the NIST Technical Standards Activities Program has developed an OIML informational section in American National Standards Institute’s “Standards Action.” Standards Action is published biweekly and circulated to the more than 1000 ANSI members. The OIML section describes OIML, the US process for work within OIML and the currently active projects within OIML with the responsible NIST person’s contact information.

Other OIML Activities

Developing an OIML technical participant Homepage <oiml.nist.gov> for the download and commenting on OIML documents under development.

Evaluating the European Commission’s Measuring Instrument Directive (MID) for its impact on U.S. instrument manufacturers and potential Technical Barriers to Trade. Report will be forwarded to the European Commission, the USTR office and the International Trade Administration.

Draft Recommendation “Liquid-in-glass thermometers” developed by USA was approved by CIML postal ballot and is scheduled for ratification at the CIML meeting in Moscow in September 2001.

USA distributed the 1st Committee Draft Revision of OIML International Document 33 “Conventional Mass.”

USA distributed the 1st Committee Draft Revision of OIML International Recommendation 82 “Gas chromatographs for measuring pollution from pesticides and other toxic substances” to OIML TC 16/SC3.

USA distributed the 1st Committee Draft of a new OIML International Recommendation entitled “Fourier transform infrared spectrometers for measurement of air pollutants” to OIML TC 16/SC4.

Ralph Richter and Wayne Stiefel began a project to merge OIML Recommendation 105 “Direct Mass Flow Measuring Systems for Quantities of Liquids” (for which the U.S. is the Secretariat) with OIML R117 “Measuring Systems for Liquids other than Water” (for which Germany is the Secretariat). The U.S. is the convener of the international working group TC 8/SC 4/WG 1 named “Combination R105/R117.” Ralph and Wayne are coordinating their plans with the U.S. National Working Group on flowmeters and the Netherlands (Convener of the work group tasked with revising R117).

Dr. Ambler Thompson attended a meeting of OIML TC17/SC1 “Humidity” held in June in Berlin, Germany. The subject of the meeting was OIML Recommendation D 59 “Moisture Meters for Cereal Grains and Oils seeds.” TSAP had submitted comments to the People’s Republic of China that holds the OIML Secretariat for this Recommendation and these constituted the basis for the meeting and its discussions. Dr. Thompson presented U.S. proposals to clarify the scope and general direction that the revision process should take and highlighted the need to recognize new technologies and tolerances for these instruments.

Another issue is the need for a global reference method for moisture determination. The Chairman of the meeting asked the U.S. to prepare an OIML draft, based on the National Conference on Weights and Measures National Type Evaluation Program (NTEP) for review by an International Working Group (IWG) composed of France, Germany, Poland, China and the U.S. Dr. Thompson agreed to this, will consult with the NTEP Committee, and forward copies of the U.S. documents to the IWG.

Ralph Richter established a U.S. Working Group on Pressure to review draft revisions of OIML Recommendations R 101 “Indicating and recording pressure gauges, vacuum gauges, and pressure-vacuum gauges with elastic sensing elements (ordinary instruments)” and R 109 “Pressure gauges and vacuum gauges with elastic sensing elements (standard instruments).” Comments from the U.S. working group were sent to Russia, the OIML Secretariat
APLAC
Peter Unger, Liaison Delegate

Status of APLAC MRA

One new signatory has been added since the 24 October 2000 meeting of the MRA Council. Fifteen bodies are now signatories of the APLAC MRA for both testing and calibration, except where noted:

NATA, Australia; SCC, Canada; CNACL-China; CNLA, Chinese Taipei; HKAS, China SAR Hong Kong; NABL, India; KAN, Indonesia (testing only); JAB, Japan (testing only); JCSS, Japan (calibration only); JNLA, Japan (testing only); KOLAS, Korea; IANZ, New Zealand; SAC-SINGLAS, Singapore; A2LA, United States; ICBO ES, United States (testing only); NVLAP, United States; and VILAS, Vietnam.

Since the last APLAC General Assembly meeting in October 2000, meetings of the APLAC MRA Council, Technical Committee and Board of Management were held the week of 21 May 2001 in Sydney.

At the MRA Council, two MRA decisions were made:

1. KAN Indonesia was added as a new signatory, but for testing only.
2. KOLAS Korea scope of recognition was expanded to include calibration as well as testing.

A detailed management review of APLAC MRA procedures was completed and an internal audit had earlier been conducted of the APLAC Secretariat in Melbourne, Australia. We identified the need to establish rules for the use of the APLAC logo by signatories. We adopted procedures for monitoring the performance of peer evaluators.

Several other modest changes were made to the evaluation procedures including incorporation by reference to the Key Performance Indicators.

At the Board of Management, several issues were reviewed in relation to the situation in APLAC economies. These included impartiality, conflict of interest, competition, commercial and tax status as discussed in the EC November 2000 paper on "Challenges facing the European Accreditation System" and the ILAC 1996 paper on "Competition in Laboratory Accreditation". We have at least three economies with overlapping accreditation bodies, which could be considered in competition with one another. They happen to be the largest countries in the Asia-Pacific region.

The Board of Management agreed with the view that accreditation bodies need to act in a non-commercial, public service manner. While agreeing that any unsavory or unacceptable behavior leading to the degradation of impartiality may be a problem with "for profit" "competitive" bodies, writing rules to prohibit membership simply based upon tax status or being in competition was not possible for now. APLAC acknowledged the legal "thin ice" we would place ourselves on in imposing formal restrictions of this nature.

The solution the Board of Management proposes for the APLAC MRA is a code of ethics: 17 points have been proposed. Among them are: MRA signatories shall not take any actions that state or imply APLAC recognition in areas outside the scope specified by APLAC. Signatories shall not entice clients from other signatories. Signatories shall set fees in a nondiscriminatory manner and shall not allow fees to be a source of pressure affecting a comprehensive and correct assessment and objective accreditation decisions. Signatories shall not disparage the accreditation processes of other signatories for the purpose of obtaining a competitive advantage.

At the APLAC Technical Committee, several ILAC draft documents were reviewed.

The APLAC draft on Reporting of Compliance with Specifications is out for final vote. It differs slightly from the ILAC guide and will be proposed as a new ILAC work item.

The Uncertainty in Testing workshop in Hong Kong in June will be developing policies for APLAC for each of the various testing disciplines and will also be preparing training program(s). The EA program of preparing technical guides was reviewed and members were asked to note the work groups listed and to contact EA Convenors directly if they wish to have input into the development of any of these. EA has indicated that it will welcome input from APLAC members.

APLAC is pleased to note that the policies of both EA and APLAC, of using each other's work, and to elevate important issues to the ILAC level, are in substantial harmony.

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INSTITUTE OF ENVIRONMENTAL SCIENCE AND TECHNOLOGY (IEST)
Robert L. Mielke, Liaison Delegate

In May, the IEST held its Annual Technical Meeting, where it announced its new officers for 2001/2002. The new Technical Vice Presidents are:

Contamination Control
Jan Eudy
Cintas Cleanroom Resources

Design, Test, Evaluation & Product Reliability
Stanley Poynor
Lockheed Martin

In 2002, the IEST Annual Technical Meeting will also host the ICCCS [International Confederation of Contamination Control Societies] biennial meeting which will be held at the Disneyland Hotel in Anaheim, CA, from April 28 to May 1. The ICCCS is made up of seventeen contamination control societies from around the world.

IEST holds the Secretariat for ISO Technical Committee 209 on Cleanrooms and Associated Controlled Environments, which has eight Working Groups. The status of the documents that are being written by those Working Groups is as follows:
WG-1

ISO 14644-1:1999 Cleanrooms and associated controlled environments—Part 1: Classification of air cleanliness

[ISO Standard in 1999]


[ISO Standard in 2000]

WG-2

ISO/DIS 14698-1 Cleanrooms and associated controlled environments—Biocontamination control—Part 1: General Principles

[Vote on the Draft International Standard (DIS) is complete and comments are being addressed]


[Vote on the Draft International Standard (DIS) is complete and comments are being addressed]

WG-3

ISO/CD 14644-3 Cleanrooms and associated controlled environments—Part 3: Metrology and test methods

[Committee Draft (CD) has been voted on and revised based on comments; the Draft International Standard (DIS) is being finalized for vote]

WG-4


[ISO Standard 2001]

WG-5

ISO/DIS 14644-5 Cleanrooms and associated controlled environments—Part 5: Operations

[Out for Draft International Standard (DIS) vote, do by 12/5/2001]

WG-6

ISO/CD 14644-6 Cleanrooms and associated controlled environments—Part 6: Vocabulary

[Out for Committee Draft (CD) vote, due by 9/12/2001]

WG-7

ISO/DIS 14644-7 Cleanrooms and associated controlled environments—Part 7:

Separative enclosures (clean air hoods, gloveboxes, isolators, mini-environments)

[Draft International Standard (DIS), vote was completed on 7/22/2001]

WG-8

[Preliminary work being done for a document on molecular contamination]

For further information on the status of these ISO Standards, including procurement, or any of IEST's Recommended Practices on the subjects of 'cleanrooms', 'contamination' 'control', 'design, test, and evaluation' or 'product reliability', contact Julie Kendrick, Executive Director of IEST at (847) 255-1561, E-mail at <jkendrick@iest.org> or visit IEST's web site at <www.iest@iest.org>.
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EDITOR'S NOTE:
This schedule is for guidance for anyone who needs to submit material for publication in the Newsletter.

FUTURE CONFERENCES

2002 NCSL International Workshop & Symposium
August 4-8, 2002
San Diego, CA

2003 NCSL International Workshop & Symposium
August 17-21, 2003
Tampa, FL

2004 NCSL International Workshop & Symposium
July 11-15, 2004
Salt Lake City, UT

Abstracts are required for Workshops, Panels, and Papers. For more information contact:
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1800 30th St., Suite 305B
Boulder, CO 80301-1026
Tel: (303) 440-3339
Fax: (303) 440-3384
E-mail: info@ncslinternational.org

BOARD OF DIRECTORS' MEETING DATES

October 22-24, 2001
Radisson Woodlands Hotel
Flagstaff, AZ

January 27-30, 2002
The Cliffs at Shell Beach
San Luis Obispo, CA

April 29-May 1, 2002
The Golden Hotel
Golden, CO

August 4 and 9-10, 2002
Town & Country Resort
San Diego, CA
(in conjunction with the NCSL International Workshop & Symposium, August 4-8, 2002)

October, 2002
Nashville, TN

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