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NCSLI Newsletter

NCSL International

Serving the World of Measurement Since 1961

NCSLI's 40th Anniversary Special Commemorative Edition

NCSL International 1961 – 2001

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On the covers: This photo montage tries to compress 40 years into two pages. It does not accomplish that.

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John Minck
Editor

The Lengthening Shadow of NCSLI

One of our best NCSLI habits, I believe, is that we take time every five years to look back at our achievements, not only for those 5 years just past, but to remember again our NCSLI Founding Fathers, and what they had hoped to accomplish with an organization of metrology professionals.

But this is not just another pat on the back, or handing out some Attaboy Awards for all the hard work and dedication of our Board, Committees, Regions and Member Organizations. Instead, it is a chance for our newest Member Delegates to understand the culture of the past, what we stand for and what we do. There are so many new Members who have been in the organization less than 5 years. And, they come from other industrial sectors; Airlines, Pharmaceuticals, Utilities, and more.

We're delighted to have all you newcomers join us in this important work. Many of our "old timers" have now reached retirement age, and joined the ranks of our NCSLI Alumni. While we used to refer to them affectionately as "Graybeards," we should retire

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PRESIDENT'S MESSAGE

John Ragsdale
NCSLI President

Many Reasons for Celebration

This year marks the 40th anniversary of NCSL International. It is also significant that this year marks the Centennial anniversary of the National Institute of Standards and Technology (NIST). NCSLI certainly owes much of its origin and long record of accomplishment to the vision and foresight of senior staff members, in what was then the U.S. National Bureau of Standards (NBS). Without the initial support and guidance from NBS, NCSLI might not have survived its infancy. Indeed, NBS nurtured and supported our organization for the first 24 years of its life, and currently, as the National Institute of Standards and Technology, maintains a close, ongoing partnership with NCSLI.

NBS, along with other visionaries from industry, laid the cornerstone that has become the foundation of our success. For more information about the formation of NCSLI and its 40-year history, please refer to the four excellent articles in this commemorative supplement written by John Van de Houten, Jerry Hayes, Ed Nemeroff and John Minck.

When NCSLI was established, the "founding fathers" set three major objectives for the organization. These objectives were:

1. To determine the requirements of science and industry for greater precision in measurement.

2. To increase the overall competence of standards laboratories by the development of uniform practices relating to laboratory organization, staffing and operation.

3. To provide an opportunity for volunteer participation in measurement agreement operations to demonstrate competence and continued uniformity among standards laboratories.

Reflecting back on 40 years of accomplishment, the vision of these men was extraordinary. The objectives that they established for the organization are as meaningful today as they were at the inception and are still guiding the course of NCSLI's activities today.

One only has to look at NCSLI's current Vision and Mission Statements which state that the vision of the organization is to "promote the competitiveness of NCSL International member organizations by improving the quality of products and services through excellence in calibration and testing." Our mission is "to advance technical and managerial excellence in the field of metrology, measurement standards, instrument calibration, and test and measurement, through voluntary activities aimed at improving product and service quality, productivity, and the competitiveness of member organizations in the national and international marketplace." With this vision and mission, NCSLI has evolved over the past 40 years into a highly respected and extremely influential international organization that proactively represents the interests of its member companies.

In keeping with the original objectives, input is gathered from internal committees, member organizations, formal surveys, and through direct involvement with regional metrology organizations, national and international accreditation organizations, and annual meetings with the Directors and senior staff members of NIST, the National Research Council of Canada (NRCC) and Centro Nacional de Metrologia (CENAM) of Mexico. This enables NCSLI to effectively represent the continuing and emergent measurement requirements of its member organizations. NCSLI also maintains a close working relationship with 24 Liaison Delegates from other professional societies and organizations with an interest in measurement science.

Ongoing development of Recommended Practices, Recommended Intrinsic Standards Practices, Position Papers on important conformity assessment and metrology-related topics, and active involvement in the development of national and international documentary standards continues to reinforce our commitment to increase the technical and managerial competence of our member organizations. These activities certainly provide an excellent opportunity for volunteers to participate, through established committees and standards writing groups, in increasing the competency and uniformity among standards and testing laboratories.

Since our 35th anniversary we have added five new committees and will soon add a sixth, the Dimensional Metrology Committee. We have also increased the number of Regions/Sections by 30% over the past 5 years. However, over this same period membership growth has been relatively flat. This is due primarily to a number of major mergers of corporations within the organization, but most recently the impact has come from the economic downturn in the technology sector.

Maintaining an acceptable rate of membership growth, while promoting volunteerism and obtaining support from member companies for volunteers, will continue to be a major challenge for NCSLI to overcome in the future. As NCSLI's international influence continues to expand, these challenges will become even more significant.

However, in my opinion, the biggest challenge and long term threat to the organization is the small number of individuals who are currently pursuing a career in metrology. Historically, at least in the United States, industry, academia, and government organizations relied heavily on the armed forces to recruit and train competent metrologists and metrology technicians. Unfortunately, this source of training has ceased to exist and it is up to NCSLI to develop effective means to inform prospective students about the rewards that can be derived from a career in metrology. We must also work closely with academic institutions to develop effective curriculum and degree programs to supply competent metrologists to industry.

Much has been accomplished in the last 40 years and the future certainly presents its challenges. However, I am confident that NCSLI will rise to the occasion and continue to be successful.

Happy 40th Birthday NCSLI

John Ragsdale
NCSLI President

CONGRATULATORY MESSAGE

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-

OFFICE OF THE DIRECTOR

MAY - 1 2001

Mr. John Ragsdale
President, NCSL International
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1101 Market Street
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Dear Mr. Ragsdale:

I am delighted to send warm greetings to NCSL International as you observe and celebrate your 40th Anniversary. This year's Workshop and Symposium in Washington, D.C. is a unique opportunity to celebrate and to accept recognition for your achievements and contributions to the world of metrology.

As society becomes even more dependent upon a technological infrastructure, the research and measurement programs of the National Institute of Standards and Technology (NIST) become more inextricably involved with the technology of the time, both serving it and using it. In accomplishing its mission, NIST relies heavily upon NCSL International and other organizations in deciding what is the best way to meet critical measurement needs in a country and world where rapid technological change and technological complexity are constants. Indeed, the 40th Anniversary of NCSL International is a unique opportunity to thank the multitude of member organizations for 40 exciting years of cooperation, collaboration, and partnering with NIST for the benefit of industry, science, and technology.

As the measurement community faces and addresses the measurement needs of more complex technological infrastructures of the 21st century, I am confident that NCSL International and NIST will maintain and strengthen their partnership. Working together to provide the tools to ensure the compatibility of measurements and the conformity of products and services through the development and provision of physical standards, calibrations, and documentary standards is of enormous value in a world that is becoming even more harmonized for interchanging goods, services, and ideas.

Best wishes for a successful and memorable anniversary year and continued acclamation in "serving the world of measurement."

Sincerely,

Karen H. Brown

Karen H. Brown
Acting Director

NIST

A NARRATIVE HISTORY OF NCSLI

John Minck

Introduction

At our 40th-year milestone, it seemed appropriate to take this opportunity to interview a few of our past NCSL Member Delegates, who were present in 1961, at the birth of this great organization, and record some of their observations of that event and its surrounding conditions. I am indebted to Dean Brungart (Teledyne), Jerry Hayes (U.S. Navy), John Van de Houten (Aerojet), Hank Daneman (L&N), Dave Mitchell (Rockwell), and others who took time to share with me some of their remembrances.

My main objective was to try to capture some of the technical and business conditions of the late 1950's, which led up to the recognition that an organization like NCSL was needed. But it is also fitting that we take a backward look, because not only has our organization grown far beyond the modest expectations of its founders, but with its present international reach and influence, all those hundreds of members who contributed to our accomplishments through these 4 decades are due a sincere vote of thanks. Finally, to preserve a better sense of our history as you read, I will use our original title of NCSL throughout the paper, until we changed our name. Similarly, NIST will be NBS until approximately the time they changed their name.

The Environment of the Late 1950's

As the decade of the 1950's drew to a close, the Global Cold War was in full bloom. Jet engine technology from the Korean War had moved to the in-flight sophistication of the USAF B-47, and was headed toward the commercial Boeing 707. ICBM (Intercontinental Ballistic Missile) technology was represented by the Atlas and Polaris missiles. The Soviet Sputnik had begun orbiting the earth in late 1957, so the United States was in a confused scramble to do something, anything to catch up.

Consumer electronics was booming. Television and FM radio had captured the entertainment segment of the nation, and Americans were using their newly-found wealth in the post-WWII era, to fill their new houses with a plethora of electronics. Automobiles boasted tail fins, appliances proliferated, and modern gadgets were receiving their dose of the advertising dollar.

Industrial development was booming too, with the communications industry exploiting technology advances made during the war. Cable multiplex telephony and microwave terrestrial technology was spanning the country with high-capacity communication links. Although the transistor had been invented in 1948, it took a surprisingly long time to move into industrial and commercial applications, especially when compared to the short time-to-market development cycles of today.

Trade shows and technical conferences were still primitive by today's standards. There were only a couple of conferences specialized for measurement assurance or calibration, and they were purely technical. The Institute of Radio Engineers (IRE) had merged with the American Institute of Electrical Engineers (AIEE) to become the Institute for Electrical and Electronic Engineers (IEEE), and held their massive annual trade show in New York City each Spring. A West Coast spinoff, Wescon, alternated between Los Angeles and San Francisco. But these were giant, general-purpose trade shows and conferences, aimed at technology research and big-science matters.

Some engineering specialties were holding their own specialized shows. The Microwave Theory and Techniques (MTT) professional group of IEEE began sponsoring their own annual conference, in the early years, without an exhibit. The Electronic Warfare industry trade group had their own show called the Association of Old Crows (AOC), a vestige of WWII and Korean countermeasures specialists who were called Ravens (because of their "clever" ways of sniffing out electronic and communications intelligence from microwave transmissions.).

In the measurements sector, the co-sponsorship of a periodic Conference on Precision Electromagnetic Measurements (later CPEM) by the IEEE Professional Group on Instrumentation and Measurements (I&M) and NBS was popular. This was usually held in the Boulder, Colorado region.

Test and measurement instrumentation was primitive by today's standards, and almost all products were still based on vacuum-tube technology. For example, it wasn't until 1958, that Hewlett-Packard's first transistorized product, the HP 721A Power Supply, was introduced. It boasted a variable 50-volt, 150 mA output with a novel current-limiting protection feature, with the level adjustable by the operator. We were very proud of that product, although it could easily be done today with a single IC chip. It was followed in 1959 by the transistorized HP 302A, Audio Wave Analyzer, which seemed to be a 50 kHz wonder of its time.

In test instrumentation maintenance, the industrial organizational culture was based mostly on manufacturer's recommendations. A typical instruction manual suggested "re-calibration" once a year, or "as required." Since the design technology was based on vacuum tubes, drift and aging phenomena was a common problem in maintaining measurement accuracy on production lines or testing laboratories.

The aerospace sector was the dominant driving force in test and measurement, for the period following WWII, because of the technology race to field new weapons and military infrastructure such as communications and electronic countermeasures. The Korean Conflict had re-energized those military and aerospace sectors. The U.S. Navy Systems Commands were focused on the Polaris Fleet Ballistic Missile and the accompanying nuclear-powered Navy.

The US Air Force's Strategic Air Command funded major programs in long-range communications, navigation, and command and control technologies. Missile technologies included massive and expensive programs for defensive surveillance radars and fire control radars for ground to air missiles. The DEW-line radars (distant early warning) were spaced across the northern reaches of Canada, on watch for Soviet missile launches. In a word, the world was living in a tense time.

While test instrumentation technology raced ahead in the manufacturing companies, the users were facing a different problem. With armies of scientists, engineers and technicians working on high-tech programs, the need for a much more rigorous and disciplined calibration process became evident in quality control circles. In most cases, quality control programs were ultimately established by the final customer, and this was usually the military agency or prime contractor involved in the program development.

Military and government contracts were traditionally characterized by written "specifications," and except for wartime emergencies, were subject to competitive bidding for the chance to produce the hardware. The production process itself had long been controlled by other specifications which defined the quality of the product, and careful delineation of procedural steps for inspection and testing of the supplies and components, as well as the subassemblies and finished products, sometimes even the primary raw materials.

As background, we should recognize that there were some laissez-faire attitudes and practices which gave rise to the need for a measurement assurance-focused organization. Hank Daneman of Leeds and Northrup, recalls, "The industry's thought leaders deplored the state of the instrument industry and the lack of reliability of the measurement systems to produce data closely related to scale definitions. By measurement systems, I mean the components, interconnection schemes, laboratory environment, measurement practices and calibration practices. Laboratories depended on instrument manufacturers to direct their efforts. Those support activities ran the gamut from good to deceptive."

"At the first Boulder meeting, which I attended, Curt Biggs (Sandia) and Charlie White (AVCO), especially, deplored the fact that a large portion of instruments they were testing in incoming inspection were defective. White and Biggs wrote papers on this matter. White reported about 15% defectives. When I corresponded with him, the proportion was worse. I wrote a paper on the same subject. Not all makers had the same results. L&N (my company, happily) had no defectives as shown on the AVCO printout supplied by White."

Somewhere in the testing processes, it became evident that there was a need to establish a chain of traceability of the test standards used, upwards from the production test line or the Navy support fleet or Air Force maintenance hangers to secondary and primary national standards. As the test equipment became increasingly sophisticated and accurate, aerospace entities were pressuring the U.S. National Bureau of Standards (NBS) to assist with more accessible standards and procedures and the calibration services necessary to support significant increases in accuracy and reliability.

In the quality standards and measurement systems specifications arena, MIL-Q-9858, Quality Program Requirements, defined a well-known quality system and contractual process for most companies working in aerospace. In later years, it transitioned to MIL-STD-45662A, Calibration Systems Requirements, in various incarnations. Handbook 52B, Evaluation of Contractor's Calibration System, which was a detailed, "how-to" instruction manual, also contributed to more standardized procedures in the grand plan of instrumentation, measurements and measurement assurance.

Editor's Note: See the accompanying article by Jerry Hayes, "The Navy Measurement Assurance System Factor," for some background on the evolution of contractual requirements for sophisticated measurement assurance systems.

The Birth of NCSL

The first reference to the formation of a standards laboratory organization was made by Harvey Lance, of NBS, Boulder, CO, on June 22, 1960, at the Conference on Standards and Electronic Measurements held at Boulder during June 22-24, 1960. In his paper titled, "The Nation's Electronic Standards Program: Where Do We Now Stand?" Harvey posed six problems concerning standards laboratories operations and concluded by suggesting the need for some sort of association of standards laboratories to help solve these problems.

In the discussion which followed, several people requested a meeting to consider Harvey's suggestion. This meeting was held at 8:00 am in the Boulder Laboratories Auditorium the next day, with Harvey Lance presiding and Wilbur F. Snyder of NBS, Boulder as Secretary Pro Tem. Attendance was 132 (the attendance list still exists) and the meeting concluded with the motion by Bill Wildhack, also of NBS, "that the General Conference Committee appoint a steering committee to investigate the possible organization, scope, and objectives appropriate for an organization of standards laboratories." The motion was unanimously approved.

The General Arrangements Committee, with Ivan Easton of General Radio as Chairman, met at noon on June 24, 1960 and appointed an Ad Hoc Committee with Curt Biggs as Chairman, Harvey Lance as Executive Secretary, and Messrs. Amey, Geist, Wildhack, and Wilson as the other members. The Arrangements Committee also directed that the nucleus of six should increase the Ad Hoc Committee membership to twelve (later increased to 20). The Ad Hoc Committee membership was as follows:

H.C. Biggs, Chair	Sandia Corporation	Albuquerque, NM.
Harvey W. Lance, Exec. Secretary	NBS	Boulder, CO.
W.G. Amey,	Leeds & Northrup	North Wales, PA.
W.K. Geist,	W.K. Geist Co.	Los Angeles, CA.
William A. Wildhack,	NBS	Washington, DC.
Lloyd B. Wilson,	Sperry Gyroscope,	Great Neck, NY.
Ivan Easton,	General Radio Co.,	West Concord, MA.
W.R. Holmes,	Convair,	San Diego, CA.
O.L. Linebrink,	Battelle Memorial Institute	Columbus, OH.
J. Marks,	Office of Secretary of Defense	Washington, DC.
M.A. Mason,	George Washington University	Washington, DC.
J.W. McNair,	American Standards Association	New York, NY.
R.S. Chernoff,	Bell Aerosystems Co.	Buffalo, NY.
Jerry L. Hayes,	Bureau of Naval Weapons,	Pomona, CA.
R. C. Hill,	Hughes Aircraft Co.	Culver City, CA.
Charles Johnson,	The Boeing Company,	Seattle, WA.
Col. R. Stolle,	USAF, Air Material Cmd	Dayton, OH.
A.F. Welch,	General Motors Tech Center	Warren, MI.
Charlie E. White	AVCO R&D	Wilmington, MA.

The Ad Hoc Committee held four meetings as follows:

Sept 27, 1960	New York
Feb 13-14, 1961	Albuquerque
May 23, 1961	Boulder
Sept 15, 1961	Los Angeles

At the May meeting four committees were constituted and these four reported on their activities at the Sept 15th meeting. These first four NCSL committees and chairmen were:

Needs Committee	William Amey
Technical Committee	Lloyd Wilson
Operations Committee	Jerry Hayes
Measurement Agreement Committee	Charles Johnson

In the Ad Hoc Committee meetings and correspondence, names for the organization title, such as the Council of Standards Laboratories and Association of Standards Laboratories were used in discussing a more formal organization. Curt Biggs in his memorandum of July 29, 1960 refers to an ASL while Bill Wildhack in his memo of Sept 15, 1960 refers to a CSL.

The eventual choice of the word, "Conference," seems to stem from the fact that the organization, whatever it was to be called, had as one of its prime functions to convene periodic conferences of standards laboratory personnel. The Sept 15, 1961 meeting culminated with the introduction by Harvey Lance of a "Resolution to Establish a Continuing Organization of Standards Laboratories." This resolution was amended slightly and adopted by unanimous approval. The text of this resolution is as follows:

"Whereas, an Ad Hoc Committee on an Association of Standards Laboratories was formed at the request of a group which met in Boulder, CO, in June 1960, to consider the need for an organization to further the common interest of standards laboratories, and after several meetings and much discussion, resolved that there IS a need for such a mechanism, to achieve three major objectives:

1. Determining the requirements of science and industry for greater precision in measurement,

2. Increasing the overall competence of standards laboratories by the development of uniform practices relating to organization, staffing and operation, and,

3. Providing opportunity for voluntary participation in measurement agreement operations to demonstrate competence and continued uniformity among standards laboratories;

Whereas, the Ad Hoc Committee has established several special committees to begin substantive work in these areas and with the cooperation of ISA, has arranged this Conference on Standards Laboratories to discuss the work of the Committee and to adopt plans for continuing activity;

Whereas, the Executive Committee of the Ad Hoc Committee has unanimously voted that a Conference on Standards Laboratories should be held in Boulder, CO in Aug, 1962, consecutively with the International Conference on Precision Electromagnetic Measurements;

Therefore it is resolved that this Conference expresses its thanks for the work of the Ad Hoc Committee, declares the Ad Hoc Committee dissolved at the conclusion of this meeting, and directs that a continuing committee, to be known as the General Committee for the National Conference on Standards Laboratories, be established to:

(a) continue and expand the work begun by the special technical committees of the Ad Hoc Committee,

(b) arrange a continuing series of conferences on standards laboratories,

(c) continue study of the desirability of a more formal organization of standards laboratories and make recommendations reflecting its findings, and

(d) initiate other activities as required to meet developing needs.

It is further resolved that this Conference requests the members of the Executive Committee of the Ad Hoc Committee to organize this General Committee by choosing individuals from representative phases of standards activity, such as users, suppliers, and standards laboratories, but with at least fifty percent definitely from standards laboratories; including enough members of the Ad Hoc Committee to assure continuity; and also including representatives of such societies and government agencies as may accede to the Committee's request to act as sponsors."

After the resolution was adopted, the Executive Committee of the Ad Hoc Committee selected Lloyd Wilson and Charles Johnson as the first Chairman and Vice Chairman, respectively, of the NCSL General Committee. Thus, NCSL became a formal organization on Sept 15, 1961. In subsequent developments, Dr. Allen V. Astin, then-Director of NBS, in his letter of Dec 4, 1961 agreed that NBS would act as a sponsor for NCSL. He appointed Bill Wildhack as NBS/NCSL Liaison Representative. Bylaws were drawn up and adopted on Aug 1, 1962.

Hank Daneman recalls, "The first general meeting included roundtables, and assigned various subjects. The participants circulated amongst these roundtables to share the discussion topics. I was assigned to the roundtable on Specifications and Procedures (two separate subjects). The discussion on Specifications mainly dealt with the meaning of accuracy. On Procedures, we focused on direction books. The Specifications discussion led to the formation of the ASA C-100 committee."

The NCSL Procedures group, whose chairman was at Naval Air Station, Pt. Mugu, CA, set up an enormous file of test procedures. When NCSL found that management of this large number of files was very labor intensive, they negotiated to transfer them to the IDEP (Industry Data Exchange Program) organization. IDEP was located at Vandenberg AFB, CA. IDEP later became GIDEP (Government Industry Data Exchange Program), which is now headquartered at Corona, CA, and provides a Liaison Delegate to NCSL.

Hank also mentioned one early indication of the industry hunger for sharing best practices, procedures, and statistical data such as calibration times and recall periods. "At one early meeting, Charlie Johnson of Boeing brought with him a thick manual of Boeing calibration practices. When he announced the availability of copies in the lobby, there was almost a riot. They went out in the lobby and snapped up all copies. Charlie had to arrange for printing more for mailing."

Regarding the motivations of those Founding Fathers (FF), Jerry Hayes observes, "that all the people involved in the formulation of NCSL were of a like mind. They were deeply concerned about our national measurement control processes and the lack of capability or consistency in the national measurement infrastructure. Here was a group of very competent, patriotic engineers, and a more committed bunch, you wouldn't find. They were cooperative, not adversarial. Since disagreements were few, progress was swift."

"This fledgling organization included most of the key players of the time-NBS, military procurement, government program offices, aerospace industry, and some of the T&M manufacturers (especially the basic standards makers, such as L&N, General Radio, Gertsch, HP, etc, all of whom clearly had a vested interest in the success of the

'market makers.' Indeed, the market for calibration equipment blossomed exponentially after the military specifications, which mandated calibration and measurement controls were added to prime and sub-contracts. Before that, bottom-line managers saw little value in metrology and calibration investments (which unfortunately may still be true today)."

In recent decades, the emergence of the Edwards Deming approach to Total Quality Management has renewed attention to measurements. Deming preached, in his continuous quality improvement processes, that to keep production processes in control, statistical test data must be made available to all personnel involved; management, engineering and the production people. They can then base corrective actions on a continuous stream of measured data revealing how products are proceeding through the quality measures. So, instrumentation and routine measurements in the process-control loop are as vital today as they ever were.

Dean Brungart offered his observation that in those first formative years, there were three people who should get extra credit for the early success of NCSL. They are Bill Amey of L&N and Ivan Easton of General Radio on the industrial side, and Jerry Hayes, of the U.S. Navy, on the government side. Although there were many other hard-working people who wanted NCSL to prosper and succeed, it was these men who were the sparkplugs and furnished the cheerleading to push everyone into action.

NCSL's Organizational Structure

It is not recorded just what discussions ensued, when our Founding Fathers (FF) searched for an organizational structure for the NCSL. Should they set up what was to become a Trade Association of Organizations or opt for an organization with the membership of individuals? The IEEE organization, for example, is a membership of individual engineers, as is the American Society of Quality Control (now ASQ). NCSL could have been structured as a personal membership type of organization, as was the Precision Measurement Association (PMA). It seems likely that the FFs recognized the advantages of setting up a trade association-type structure, where the membership unit was the companies and organizations themselves, with one assigned person, the Member Delegate, to represent each individual company.

Procedurally, upon joining NCSL, an officer of the Applicant Member Organization appoints a Member Delegate who is "authorized" to represent that organization and their interests in the continuing affairs of NCSL. This process is still maintained to this day in the application for membership, and for daily operations of NCSL. It should be understood that this structure, which tangentially involves the Member Organizations in the activities of NCSL worldwide, does provide limits on the responsibilities for the activities of the central NCSL organization. In other words, the mere financial support represented by membership dues does not constitute a legal connection to activities of NCSL.

So, while NCSL speaks for the metrology industry, and for its industrial and government and international Member Organizations, it clearly does not legally bind any particular Member Organization to its policies or activities. Nor should it, since those legal actions might not be in the Member Organization's best interests for any particular action of the NCSL Management Team. In many ways, the legal interactions of NCSL and its Member Organizations are similar to the IEEE, which long ago set up a "Political Action Committee." That committee plans and implements strategic positions, and is active on business and technology issues which are in the best interest of the individual engineer members, although, on any particular IEEE position, no engineer member is legally liable.

The NCSL Secretariat

During NCSL's earliest years, the NBS sponsorship was one of our fledgling organization's most important resources. The organization was running on a fairly informal basis, with administration tasks performed by the officers and committees. But that changed in October, 1966, when NBS Director Dr. Allen Astin and NCSL President John Van de Houten signed an agreement to provide a home for the NCSL Secretariat.

Not only was the financial support of the NBS administrative support people in the NCSL Secretariat important, but the close organizational ties to NBS were priceless, both technically and administratively. Since NBS was the premier technology center for metrology in the world, the close working relationship of top-level NBS management and the fledgling NCSL managers from their industrial organization world was crucial.

The formalized NCSL Secretariat was located first in Washington, DC, then in Gaithersburg, Maryland, for almost 10 years, and various NBS personnel were informally assigned to NCSL duty. Kay Etzler was one of the NBS people who assisted with NCSL activities at Washington and Gaithersburg. The Secretariat personnel also participated in organizing a long series of annual measurement conferences.

To keep a high-level connection to NCSL, NBS agreed to furnish a continuing presence on the NCSL Board of Directors. These men were originally call Sponsor's Liaison Delegates, and later NBS Representatives. The crucial ingredient they offered NCSL was access to ongoing operations of NBS, and their top management. This is a good place to recognize the service of that long line of NBS executives, who served in that role.

William Wildhack	1961-1967
Dr. Merrill Wallenstein	1967-1968
Joe Cameron	1968-1976
Bascom Birmingham	1976-1985
George Uriano	1985-1987
Dr. Joe Simmons	1987-1994
Dr. Peter Heydemann	1994-1999
Dr. Richard Jackson	1999-2000
Dr. Richard Kayser	2000-present

At times other NBS executives managed the Secretariat Office (not the same as the Sponsor's Delegate) or represented the Sponsor's Delegate at meetings. NBS's Brian Belanger, Art McCoubry, Ray Sangster, and Ernie Ambler were often involved with NCSL activities, and we thank them for their efforts in those crucial years of growth.

In 1976, in conjunction with the appointment of Bascom Birmingham, of NBS, Boulder, to replace Joe Cameron as the NBS Sponsor's Delegate, the Secretariat was moved from NBS, Gaithersburg to their Boulder Labs. Ken Armstrong of the Boulder Public Information Office was then assigned as the first Secretariat

Manager. Ken supervised Helen Valdez, who dedicated most of her time to the NCSL activities. Ken performed this function in conjunction with his other Public Information duties.

The Middle Years

Our chief NCSL officer was designated "Chairman" for some years, perhaps because the early organization was centralized on the committee system. Then, in 1970, between the two terms of Jerry Hayes, the Board concluded that it should align itself more with industrial organization titles, and changed from Chairman to the title "President." Tradition also held that the organization's fiscal year was split between calendar years, until the 1982 term of Dean Brungart. At that time, our fiscal year was aligned with the calendar year.

NCSL membership growth in the first 15 years was modest, and reflected the specialized and highly-focused nature of precision metrology. Member organizations were dominantly recruited from the aerospace and instrumentation supplier organizations, and of course, the National Bureau of Standards, whose management recognized the need for close cooperation with industry in these matters. Even 15 years after the birth of NCSL, the membership ranks still stood at only about 200 organizations, having been almost flat for 10 years.

In 1974, the NCSL membership was opened to non-USA organizations for the first time. This was not a trivial decision, and had been under discussion for some years before in the Board of Directors meetings. Recalling that the Cold War climate in that political world had cast some world nations as foes of the U.S., there was considerable concern that if NCSL accepted member organizations from "friendly" countries, it might lead to applications from "unfriendly" ones. With the high content of aerospace and U.S. Government Members in the organization, even the possibility of an open membership was considered serious enough to prevent international applicants. Dean Brungart notes that, "these were serious matters, involving U.S. State Department regulations, which dealt with technology discussions and technology transfer considerations with other nations. It was a legal thing, with criminal implications, and an important enough matter that justified those years of U.S.-only membership."

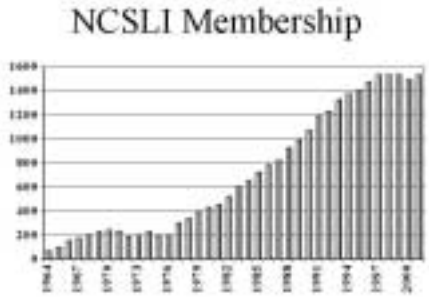
Later, the Board concluded that NCSL could accept or reject any potential applicant for cause, and therefore the original concerns were not applicable. Further, the substantial advantages of an open international membership far outweighed the downside issues, and the membership was opened. In 1975, Graham Cameron of the Canadian Department of National Defence, became the first non-USA delegate to serve on the NCSL Board, and in 1982, he became a full director. By encouraging the membership of National Measurement Institutes (NMIs) in key industrial nations, NCSL gained greatly in prestige and cooperation. In truth, our international activities of recent decades are among our brightest accomplishments.

In 1976, the first International Region was established, which recognized in a small way that our future belonged out in the world.

Editor's Note: See the accompanying article by Ed Nemeroff, detailing the continuing role of our International Membership and our Global Affairs.

The Membership Grows

Entering the 1970's, the NCSL membership had grown to approximately 200 organizations, and hovered at an almost constant level of 200. With the election of Dave Mitchell to president in 1975, things began to change. Dave managed the Rockwell Metrology Laboratory in Anaheim, CA, where he took a very measurement-



control, aggressive approach to organization-building. He applied the same principles to NCSL, and was really a PR man in Metrology Manager's clothing. From Mitchell's 1975 term, through the presidencies of Mike Suraci and John Minck, NCSL entered the 1980's with more than a doubled membership of 400 organizations.

Other changes were going on during those years, too, which began to separate NCSL from some of its overly-restrictive ties to the aerospace sector. For example, the Board of Directors' meetings which were held 4 times a year, were, of course, supported by the Member Organizations, which funded the travel of that company's Member Delegate. But, it was considered crucial for each of those various meetings to be sponsored and held at the facility of another Member Organization. As a way of demonstrating the beginning of organizational neutrality, one of John Minck's first actions as NCSL President in 1977, was to call his first meeting at a "neutral" location, which happened to be Las Vegas, Nevada.

In the years since that time, Board meeting sites have not been restricted to cities with Member Organizations. Instead, the current President calls meetings for locations across the country, to equalize travel distances for Board members on both coasts and in-between, over the 4 annual meetings. It was recognized also that Board members realize an enormous drain on their time and energy when they volunteer for service on the NCSL Board.

Attendance costs for Board and Committee and Regional meetings are, of course, funded by the Member Delegate's company, but the travel time and separation from family is a distinct hardship for the people involved. Meetings are scheduled for locations which may offer sightseeing and enrichment opportunities for accompanying spouses, as a useful perquisite to the hard work that NCSL Board membership entails.

For all of the technical, business, quality, and organizational achievements that NCSL has made, possibly one unexpected result of our 40 years of efforts is the establishment of literally hundreds of personal friendships which developed among our Member Delegates from across the world. It is truly a remarkable characteristic of our organization, that those easy working relationships which developed from Committee work, Board activities, Regional meeting workshops, and the other countless coordinations of commercial and government and international groups have lasted for decades.

Part of the reason for those personal roles in our complex technical activities is the friendly and unusually informal atmosphere which was developed early by our Founding Fathers. They were all in much the same activities together, and to bring about results, found that cooperation worked best when it didn't stand on formality and status symbols.

It was possible for even the newest Member Delegate to pick up the telephone and call one of our most expert Metrology Managers, and get an hour of advice and specific directions on solving a problem. The same friendly and helpful attitude was encouraged for those Metrology experts at NBS, who were able to help our NCSL people with their everyday technical efforts.

The Evolution of the Annual Conference

Over almost all our 40 years, NCSL was faithful to its middle name, Conference. Probably the most important benefit of membership was attending those annual conferences. The conferences offered our Member Delegates the chance to network with a whole array of other engineers and managers who were doing much the same kind of work. That was the genius of NCSL, because, even though some Member Organizations were often in competition with each other, it was still possible for the Metrology and Quality functions of those organizations to share their processes, procedures, and operational data such as calibration times vs. model number, or salary surveys for metrology personnel.

All the early NCSL annual conferences were focused on technical/management subjects, and were "plenary" in format, that is, they had a single time track for papers. In 1976, Jim Valentino and Dean Brungart decided to try the "workshop" format, which would allow more interaction between attendees and the forum leaders. The workshop format was particularly well received and became our standard annual practice. Dean reports that the only problem to develop was that Jim Valentino was struck by a heart attack that year, leaving the total organizing of the conference to Dean. Jim recovered after the conference was over.

In 1986, at Denver, CO, the Board made a major decision to add exhibits to the annual meetings. While the primary reason was to add some much needed revenue flow to the NCSL financial picture, the exhibits turned out to have great benefits for both the exhibitors and for the attendees, who could meet and examine the latest in equipment and services for metrology. Again, Dean Brungart stepped forward to take on the management for marketing the exhibit spaces, while Roland Vavken, of Rockwell Corp., assumed most of the continuing management of the arrangements for the conferences.

It is hard to overstate how hard our conference managers worked to achieve success year after year. The jobs demand the utmost in planning and execution detail, because when 1200 people show up, they expect a professional presentation, and comfortable accommodations. Managing the selection of technical papers and finding volunteer session commanders is very labor intensive. Lining up superior convention space and hotel accommodations must be done 4 to 5 years in advance.

While the early conferences used the excellent facilities of NBS, alternating between Boulder and Gaithersburg, in 1991 the conference moved away to a neutral location in Albuquerque, NM. This strategy proved very successful, and we continued to visit many other popular cities of our nation, culminating in 2000, with our first International Conference location in Toronto, Canada. With very close advanced planning and careful attention to processes, like inbound equipment freight shipments through customs, this international venue presented additional challenges, but brought with it real benefits to our Member Delegates too.

Regional Organizations Fill the Gap Between the Annual Conferences

In the middle years, NCSL's powerful regional organization strategy came into its own. While the regional structure utilizing regular local meetings began almost immediately, the effectiveness of creating aggressive Regional Coordinator management took form in the middle years. There were several important benefits to be gained from regional structure. One was to reinforce the concept of NCSL as a friendly organization with personal interactions and contacts being very central to the group. If a Member Delegate had a particular problem, it was very likely that another associate would have solved the very same thing, so a phone call or visit might easily lead the Member Delegate to a solution.

The second benefit was to offer more frequent occasions for meeting others and learning through presentations by NBS visitor experts, other industry speakers, and workshops to get everyone in on the discussions. Finally, the volunteer Region or Section Coordinator positions served as an entry point to further NCSL management positions. Committee Chairmen also found that their positions were entry portals to higher levels on the Board of Directors.

NCSL Interfaces with Congress

In the middle 1970's, NBS was undergoing some periodic belt tightening caused by some severe government budget cutbacks. Yet, the U.S. Congress had continued to legislate new technical support programs which they mandated to be managed by NBS on their already tight budgets. Such confidence in the NBS technical resources was encouraging on one hand, but the mandates came along with very little increase in the NBS funding, such that NBS had something like 7 new program efforts which caused a terrific overload of their resources.

The Member Organizations of NCSL were observing the effect of these overloads, and their negative effect on calibration services, and were interested in trying to support the NBS budget process. Yet, many of the NCSL member organizations were other branches of the U.S. Government, such as the various military metrology organizations. They were legally prohibited from any such political activity. One thing we did try was to publicize the dire effects of the overload at NBS, which included one memorable article in the magazine Business Week, which showed a worried-looking NBS Director Ernie Ambler, under a headline, "Work Overload at NBS."

In 1982, the NCSL Board addressed this advocacy problem by voting to assume a stronger advocacy position in support of NBS, by carefully separating the advocacy activities into a "commercial" segment of NCSL. The commercial segment of NCSL was already primed to provide informational inputs into the U.S. political process. It was during Dean Brungart's 1982 Presidency that NCSL began informal discussions with the technical staffs of the several U.S. Congressional Committees on Science, which had budgetary oversight on NBS. The objective was to confirm to Congress that

the U.S. industrial technology sector was serious about their needs for a strong central standardizing agency, with adequate funding.

In 1983, NCSL established its U.S. National Measurement Requirements Committee, which was to acquire, as a formal, annual process, broad industry survey information that defined real measurement standards needs, and provide them for program planning information to the NBS. These close cooperative programs between NCSL and NBS were the essence of the purpose that an industrial trade association can provide to long-range planning activities of NBS.

This led, in 1984, to the first invited Congressional testimony to the U.S. Senate Science Committee, which was responsible for NBS budgets. NCSL President Hartwell Keith, George Rice, and Peter England appeared before the committee and outlined a comprehensive plan for the technology and metrology needs of the nation's industry. It was quite effective, and increased the political awareness of the crucial importance of this relatively-invisible technology branch of the U.S. government. The three also appeared before the U.S. House of Representatives Science Committee. Soon after, NCSL established the Government Affairs Committee, which served as an information center for a broad range of future advocacy activity. NCSL had grown up and faced the world.

In several years following, other NCSL executives were invited to present informational testimony to the U.S. Congress, about the status of the U.S. Measurement System. These teams included Presidents Gary Davidson, who appeared in 1988, John Lee, Ed Nemeroff and others. We also continued our informational approach with the appropriate staff members on those Congressional committees, who are the behind-the-scenes experts on those budget matters.

One other person who contributed greatly in the strategy-setting sessions leading to our official testimony, was Bob Weber, whose advice and counsel were very valuable in prioritizing our measurement needs. His world-class Lockheed Sunnyvale [CA] Metrology Lab gave him important insights to future sophisticated needs planning. At the 1994 Conference, Mike Suraci chaired a panel on Politics 101, with representatives from Capitol Hill on the Panel.

By 1985, the number of our Canadian members had increased to an extent that the Canadian Region (12) was established to distinguish it from the rest of International Region 10.

NCSL Moves out on its Own

In 1985, after considerable discussion, an agreement was signed to end NBS's formal sponsorship of NCSL. There were several obvious reasons for this decision. Foremost was the fact that NCSL had grown in stature and competence in running its own affairs, professionally, organizationally and financially. Secondly, the NBS sponsorship clearly limited the politically-oriented activities that NCSL felt they must pursue.

Thus, in July, 1986, NCSL struck out on its own. Ken Armstrong retired from NBS and became NCSL's first Business Manager. He was instructed to set up a new downtown office in Boulder, which happens to be the same 1800 30th St address we presently occupy. Ed Nemeroff was NCSL President at the time. Joan Wilshire (also ex-NBS) was an early recruit for administration activities at the office. In 1987, NCSL filed incorporation papers as a non-profit Colorado corporation.

Past-President Gary Davidson recalls working long hours with Ken, setting up the new NCSL office, and that, as a result, Ken co-chaired many of those NCSL Conferences. In those days, they were rotated between Gaithersburg and the NBS Boulder Labs, because of the excellent conference facilities available there, auditoriums, large and small conference rooms, cafeteria, and other support functions. NBS was organized to sponsor many different industry conferences for its wide-ranging technical activities.

Ken was the logical "volunteer" for conference director of those early meetings. Gary reports, "It was always a pleasure working with Ken. He was dedicated to NCSL and took excellent care of the day-to-day activities of NCSL. His dedication and insight into the NCSL organization had a lasting effect, in particular, as it transitioned from an NBS/NIST-sponsored organization to an independent, incorporated organization with its own full time staff."

Ken held the Business Manager position until his retirement from NCSL in October, 1989. At that time, Wilbur Anson, a career NBS engineer, retired from NBS, and accepted the Business Manager position at the business office. Wilbur served NCSL into the late 1990's.

1988 was a significant year for metrology, nationally, because President George Bush (Senior) signed the Technology Competitiveness Act of 1988, thereby officially changing the name of NBS to the National Institute of Standards and Technology (NIST).

More than just a name change, this Act provided for a much more industrially-oriented Institute, and one intended to become more attuned to support the nation's research and technology infrastructure. For example, more aggressive Technology Transfer programs were instituted nationally, to assist small-business manufacturers. In other areas, central technology support was provided for Productivity and Quality Improvements programs. The annual Malcolm Baldrige National Quality Award was established in memory of the former U.S. Secretary of Commerce, to recognize companies who had achieved certain Criteria for Performance Excellence. A recent NIST report noted that over 2 million copies of the Baldrige Criteria had been requested since 1988.

Education and Training Committments

While Education and Training activities were part of the NCSL charter from the start, the NCSL Board was always in the forefront of efforts to support Metrology training. One early example was the Butler County Community College, in Butler, PA, which set up a formal course in Metrology. NCSL voted to contribute scholarship funding to encourage enrollment of young scientifically oriented students into our profession.

NCSL became involved with many other colleges through the years. This strategic role became even more important in the years after the U.S. Air Force discontinued their military Metrology Training School at Lowry AFB in Denver. For many decades our Member Organizations had benefited by being able to hire metrology technicians and engineers who had training in military metrology schools and added to their skills with years of military metrology service, before leaving the service for civilian jobs. With the various scholarship grants, NCSL attempted, in a small way, to encourage more college-level training to replace these other sources of personnel.

Gathering Influence

As the Cold War ended in the late 1980's, NCSL's worldwide reach was becoming more apparent. Starting even before the 1991 Presidency of Graham Cameron of Canada, we saw our international membership on a steady rise. Perhaps more importantly, our organization had become a participant in a widening variety of inter-country metrology agreements, which linked the National Measurement Institutes of many countries into common purposes of international trade and industry.

One of NCSL's finest hours began inauspiciously in 1990. The April 15, 1991 NCSL Newsletter roster showed the first appearance of Gary Davidson's TQM committee on Calibration System Requirements. Gary was 1988 NCSL President, and a career manager at TRW, Inc. His experience in managing their vast equipment inventory and calibration processes within multiple quality systems gave him a mission to consolidate those varieties of calibration systems, which the NCSL Member Organizations worked under.

It was not just the number of military specifications, primarily MIL STD 45662, but also those quality systems of other governmental units such as Energy, Nuclear, NASA, Transportation, and more. Some Member Organizations had reported that they needed to conform to 5 or more different quality systems, which obligated them contractually. This involved considerable administrative and technical resources, including annual or twice-annual audit visits, which were basically redundant.

Gary's committee objective was to bring together all the national players in calibration and quality systems, and work towards a common specification which could satisfy the contracting agencies with a quality system that unified the calibration community. The result was NCSL/ANSI Z540-1-1994, "Calibration Laboratories and Measuring and Test Equipment Standard." From the outside, one can only imagine the great political and technical discussions that ensued, including the necessity to set up the new standards-writing process to operate under the auspices of the American National Standards Institute (ANSI), which authorized NCSL to become a standards-creating entity. As a result, the NCSL Business Office also became an ANSI-Approved Secretariat.

Managing the Z540 process to conclusion resulted in Gary Davidson being awarded the Wildhack Award in 1996. It was well deserved because in one sweeping move, multiple calibration standards were reduced to one. Not all contracts or agencies came on board immediately, but the overall impact of NCSL/ANSI Z540-1 was immense, and demonstrated again that NCSL's influence in metrology matters was crucial. In 1995, the U.S. DoD published a letter officially retiring MIL STD 45662 in favor of Z540-1.

In 1997, the TQM Committee, now under the Chairmanship of John Wehrmeyer, published its second specification, NCSL/ANSI Z540-2, "U.S. Guide to the Expression of Uncertainty in Measurement." This was a document, modified from the ISO/IEC 17025, an international standard which was promulgated by the International Standards Organization in France. For that period, it was important that the U.S. maintain its own version of the ISO/IEC document.

However, in 2000, the NCSL Board, after recommendation by the NCSL TQM Committee, voted to move all the way to the current international standard, and voted to approve the ISO/IEC 17025 as a U.S. National Standard. Most significantly, NCSL voted jointly with the American Society for Quality (ASQ) and the American Society for Testing and Materials (ASTM), which emphasizes the importance of that world document. Concurrently, to accommodate certain contractual situations, the NCSL/ANSI Z540-1 was revised slightly, and voted to be maintained in the U.S. for an interim period.

So, again, the NCSL organization had undertaken important programs to establish management systems which would assist our Member Organizations and Contracting Agencies around the world. In the light of rapidly increasing Globalization of trade, such timely activity by the world's standards writing organizations was well received. In conjunction with the increasing use of bilateral and multi-lateral Memorandums of Understanding (MOU's), by National Measurement Laboratories, which defined inter-laboratory measurement practices to be accepted by another nation, NCSL's role in the greater acceptance of ISO/IEC system documents becomes even more persuasive.

In the last year of the Millennium, the international reach of NCSL was remarkable. One of the first actions in 2000 was to vote a change in our organization's name. NCSL International was the chosen title, and the significance is timely. For background, it should be understood that our international outreach had been in force even before we admitted our first international member way back in 1974. The logical question had been asked at that time, and regularly ever since, "Why do we call our organization the National Conference of Standards Laboratories," when it has been International since 1974?

The answer is not an easy one. I do remember multiple times in the 1970's and 80's, I sat in Board discussions about changing our name to the "International Conference of Standards Laboratories" (ICSL). Seems logical. Of course, at the same time, some people wanted to change the word Conference too. Seems we were more of an Association than a Conference. We had an annual Conference, but we weren't continually in "conference." And further, since our organizations were more than Standards Laboratories too, so, shouldn't it be Metrology Labs or Calibration Labs?

The name-change discussions went on from year to year, but never really reached a conclusion. Most likely, the main reason was that there were enough traditionalists on the Board who just favored the status-quo. By the time year 2000 arrived, our International flavor could not be denied, and finally the NCSLI Board recognized what we were all along, a strongly international organization.

It showed immediately on our Board membership. Mexico's CENAM organization was recognized with their representative, Dr. Salvador Echeverria-Villagomez, sitting on the Board. That was no more than proper since Canada had long had their representative, starting with Graham Cameron in 1974. The InterAmerican Metrology System (SIM) appointed their representative, Roosevelt DaCosta, of the Jamaican Bureau of Standards, to the Board also.

The past 5 years have seen a remarkable increase in world accreditation, registration and certification activities. And, since NCSLI Member Organizations were often involved, we have taken on a leadership role in harmonizing the relationships with all these national and regional bodies. Our Liaisons read like a world census of accreditation: The American Association for Laboratory Accreditation, The European Cooperation for Accreditation, Asia/Pacific Laboratory Accreditation, North American Calibration Cooperation/N.A. Metrology Cooperation, and others.

Tony Anderson observes we have done more than just cooperate with the international community of accreditation. We have taken a leadership role in representing the laboratory community in that area. NCSLI has had a permanent seat on the board of directors of the National Cooperation for Laboratory Accreditation (NACLA) from its beginning in 1997, and in 1998, became one of the founding members of this new organization. Tony has been the NACLA board member, representing NCSLI for the last four years, as well as being part of the interim board, which planned the formation of NACLA.

NACLA was born out of the U.S. Transfer of Technology Act of 1994, as part of NIST's role in the area of Conformity Assessment. NACLA is the United States recognizing organization of accrediting bodies, and has played a major role in promoting acceptance of the US accreditation system by government, laboratories, accrediting bodies and specifiers as well as promoting the acceptance of the U.S. system by the rest of the world.

There is still a long way to go; so far there are only three U.S. accrediting bodies who have been recognized and have signed the NACLA MRA, with 7 more in process. NCSLI has been a key player in this initiative. A year ago at the Toronto NCSLI Conference, the MOU between NIST and NACLA was formerly signed, clearing the way for NACLA recognition to be accepted by both government and the private sector.

NCSLI was also invited, in 1997, by the International Laboratory Accreditation Cooperation (ILAC) to be a member of their Laboratory Liaison Committee (LLC). Tony serves in this role. He also observes that before Ed Nemeroff assumed the role of V.P. International, our International activities were mostly symbolic.

In early 2001, the NCSLI Board voted to publish a position paper to clarify and define the distinctions between Accreditation, Registration and Certification, which in some cases are used interchangeably and improperly. The position paper was published in the April 2001 issue of the NCSL Newsletter. One only has to review the regional meeting minutes from our many regions and sections to understand how important these accreditation issues are, by merely counting the ratio of presentations made to our Members. And internationally, they just tie our Member Organizations and all the Global legal entities closer together and assure better cooperation and understandings.

Liaison Delegates Link NCSLI to Many Organizations and Issues

One early innovation of our Trade Association was to recognize our dependence on continuing liaisons with other technical associations. We did this by assigning some of our NCSLI Member Delegates, who were also active on those other technical groups, to become our Liaison Delegates to those other organizations. As the NCSLI moved into many other industries, such as pharmaceuticals and utilities, and began to rely less and less upon our traditional aerospace-industry base, our liaisons reach broadened. The present roster of Liaison Delegates numbers 23, a remarkable way for NCSLI to keep up with common management and technical issues of the world's organizations.

Satisfying the extremely broad constituencies of NCSLI is an endless and unfinished job. Not only are our Member Organizations spread across dozens of different industrial and government sectors, but most of our International Members come to our forums with their own national cultures, legal issues and practices. When one considers all those hundreds of positions, interfacing, interacting, we can actually be pleased (and often amazed) that we accomplish as much as we do. And, considering the downside of not coming together as NCSLI, we know that we are doing the right thing.

Still, it is crucial for NCSLI to keep our attention on the fact that we are a metrology organization, made up of measurement professionals. We should define ourselves as custodians of the proper practice of measurements and measurement systems and measurement process control. Measurement process platitudes will sink ships and abort missiles and render communications unworkable, just as sure as assembling bad parts.

Yet, it is the broadening of NCSLI interest globally and industrially which sets our present course. The reach is most apparent by examining the organizational picture roster in the back of each newsletter. There are almost 150 actual assignments of our willing volunteers who fill the committee chairs, the regional and section coordinators, and the liaison delegate positions. In addition, there are many of the Member Organizations who furnish even more than one individual to committee work, who are not the official Member Delegate from that organization.

So, the work of NCSLI goes on globally, with the usual hard work and dedication of organizations and people, in our search for better contributions to metrology and management. JLM

NIST at 100

The rich and long-term relationship between NCSLI and NIST, first it's sponsor, and later partner, is still producing impressive technical and organizational results. Today, NIST is 100 years old, and its magnificent Gaithersburg campus is undergoing dramatic new construction projects to modernize certain of its crucial technology programs and services.

This historical brochure, produced by NIST on their 100th anniversary, describes a fascinating world of scientific projects from optical lens glass technology to support WWI, to the proximity fuse of WWII, to the high-speed dental drill development, which makes our dental visits more endurable. Ask NIST at <inquiries@nist.gov> for Special Publication 956.

JOHN VAN DE HOUTEN REMEMBERS . . .

John Van de Houten was our 5th Chairman in 1965-66.

WOW! It's hard to believe that NCSL is 40 years old. Even more sobering, it is more than 40 years since I first became involved in calibration as an energetic young engineer (as opposed to this vibrant older retiree and Las Vegas gambler). Those thoughts started me recalling the years leading up to the formation of NCSL.

The paper Harvey Lance of NBS delivered on June 22, 1960, expressed a need for an association of standards laboratories. This, in turn, resulted in a series of meetings to discuss the various options, which culminated in the establishment of NCSL. The years leading up to this - the 1950's - were dynamic growth years in technology. Much of this was due to the demands of high technology programs such as missiles, ICBMs, guidance systems, nuclear, etc. The ramifications from these efforts led to the broad high tech progress of this country and, in turn, of the world of today.

The world of the 1950's was still an analog world!

The 50's were still the days of black and white television, monaural vinyl records and the slide rule. Computers were very large, expensive and slow even when compared to today's desktops.

But those technologies were changing rapidly, and the changes, particularly in the Defense Industry, pushed engineering and manufacturing ahead, thereby increasing the need for more accurate measurements.

Calibration in those days was largely limited to the fields of dimensional gaging, engineering labs and instrument manufacturers. There were very limited quality control concepts in place, such as traceability, accuracy ratios, calibration intervals, etc. and little in the way of contractual quality-system requirements. A 10:1 accuracy ratio was regularly stated though measurement error was little understood. (Even the term measurement uncertainty came much later.)

In early 1956, I was a LTJG in the U.S. Navy, serving as Gage Officer in the Bureau of Ordnance (BuOrd) in Washington, DC. There were five gage labs around the country providing specialized dimensional gaging to Naval Inspectors of Ordnance and BuOrd facilities - primarily go/no-go gaging.

One day, a young Jerry Hayes and another engineer from the Pomona, CA, Gage Lab showed up at the Bureau to sell the idea of a BuOrd calibration management program. This proposal was well received, and I was assigned as the BuOrd interface to work with Jerry. With their ideas and assistance I drafted a NavOrd Instruction establishing the program. Though seemingly very basic now, it was a very advanced concept at the time. A short time later it was extended to BuOrd's suppliers in the Polaris (submarine-launched ICBM) Program.

Around this time, NASA and Sandia Corporation (Atomic Energy Commission) had also been developing calibration and standards programs. The U.S. Army and Air Force were developing such programs too. Over the next few years, the Navy did some reorganizing, with BuOrd merging into the new Bureau of Weapons (BuWeps). Finally, the three services began to discuss a single documented calibration requirement - which would apply to all contractors - which culminated in MIL-Q-45662, promulgated in the early 1960's.

The rapidly-advancing technology and emphasis on improved measurement accuracy in industry was typically an engineering function - not resident in the quality and manufacturing arenas. Even so, the compatibility of measurements between these different groups was very questionable, and the growing awareness of this disconnect was becoming obvious. The National Bureau of Standards, engineering societies, and instrument manufacturers were taking more and more note of these problems. These discussions became the focus for improving measurement accuracy.

The technical groups I remember best were:

- Institute of Radio Engineers (IRE) & the American Institute of Electrical Engineers (AIEE). These later combined into IEEE - a name change that truly reflected the changing technology.
- Instrument Society of America (ISA)
- Precision Measurement Association (PMA)
- American Ordnance Association (now the National Defense Industrial Association)

There were others, of course, then and later. Interestingly, many are reflected in today's Liaison Delegates to NCSLI.

IRE/AIEE and the NBS sponsored joint High Frequency Measurement (HFM) meetings starting in 1949. Later ones were organized in 1951, 1953, 1955, and then, in 1958, during the dedication of the new NBS Boulder Laboratories. These led to the 1960 HFMC at NBS Boulder where Harvey Lance's seminal paper was presented, leading to the formation of NCSL.

Among the many key papers on measurement technology at the 1960 HFM Conference, there were two broader papers that I recall made a significant impact on me. One by Lloyd Wilson, later the 2nd Chairman of NCSL, was entitled "A New Space Age Challenge -Standards and Electronic Measurements." The other was by A. G. McNish and Joe Cameron of NBS, titled "Propagation of Error In A Chain Of Standards." I'm not sure any of us listening to that paper at the time could have predicted where this recognition of "traceability" of error in a chain of measurements would lead.

At about the same time, the Instrument Society of America was put-

ting more and more emphasis on the calibration and standards for the variety of instrumentation that had been their focus for many years. Several metrologists, including Bill Wildhack (NBS) and Doug Strain (Electro Scientific Industries (ESI)) served terms as ISA Presidents. There was a growing realization on their part as well, that lack of methodology in calibration and standards was a basic weakness, so they expanded their focus accordingly. ISA also held a number of conferences in the late 1950's on measurement accuracy — again with assistance from NBS and the instrument manufacturers.

In 1958, a number of engineers in the Los Angeles area recognized a need for local metrologists to get together periodically. As a result, the Precision Measurements Association was formed. At the time, LA had the greatest concentration of Defense and Space contractors, along with their early metrology programs. The PMA gave these groups the means to regularly interact and network.

The American Ordnance Association (AOA) had a Dimensional and Metrology Division for many years. This provided a platform for interaction of the various gage labs and gage manufacturers. The greatest demand for measurement control was, for many years, dimensional acceptance gages. Thread technology and standards were complex, as was the interchangeability and assembly of mechanical ordnance equipment. A perfect example was managing these interactions among the Navy's five Gage Labs. The Army had a similar program, managed out of Frankford Arsenal in Philadelphia. About this time, the AOA group expanded and became the "Standards and Metrology Division" with 3 sections; Dimensional, Electronic and General Physical Standards.

These organizations all built up a core of metrology personnel groups - many individuals were active in several or all of these. The NBS was kept busy attending conferences, making numerous presentations and managing their involvement in everything - a very busy schedule. This brought on the realization by NBS and others for the need of a clearer focus - and the critical presentation by Harvey Lance.

After returning to civilian life in late 1956, I went to work for Aerojet General Corp. in Azusa, CA - in their Quality organization. Less than a year after that I visited their new facility near Sacramento, CA, to help improve their calibration program. In 1958, I transferred there permanently to set up a standards laboratory and a centrally-controlled calibration program.

There were two independent plants - the Solid Rocket Plant and the Liquid Rocket Plant - an organization that was to reach 23,000 employees in the early 60's. I was given the responsibility over calibration in both of them. The plants each had a number of contracts - the SRP's major one was Polaris and the LRP's was Titan. The Navy made participation in their calibration programs mandatory for Polaris operations. LRP was also under pressure from the USAF to improve their measurement systems. Both plants had extensive hardware manufacturing facilities. SRP also had critical chemical analysis needs. Both had very large rocket testing facilities. The testing required state-of-the-art measurements of thrust, pressure, etc., in ranges not normally found elsewhere, requiring very sophisticated measurement systems and analysis for those days.

To start from scratch and develop the facilities, standards and control systems in a supportive environment was a wonderful and challenging experience. Much help came from the interaction with others in the same position - through direct contact and with technical organizations. The other major source of help was from the Navy's Program Offices. We used their lab as well as NBS for traceability to our standards. Their documents became our system requirements.

A major element of their management technology was their "Standards Laboratory Information Manual" or "SLIM", put together by the U.S. Navy's Pomona Group, led by Jerry Hayes. Jerry was, of course, also active in the various technical societies and the beginning of and growth of NCSL. I've considered what my life and career would have been like without Jerry's technical and personal friendship since 1956 - but can't imagine it.

When I look back at the list of individuals active in the formative years of NCSL, I have asked myself "Who were the MVPs in the formation of NCSL?" Various names pop up - and then I see others. The task becomes more difficult. There were key moments such as Harvey's speech. But there were many, many others, whose input at national, local and committee levels was crucial. I well remember those people - and I get a deep sentimental feeling about those stimulating years, and wish we could all get together again to recall those wonderful days.

But I also have come to realize it was not just those few who were responsible. It was more like an "Origin Of Species." There was a distinct change in the environment and a crucial need to adapt. This, in turn, became the crucial aspect in the ensuing fast development of technology. So, there is no MVP, only hundreds of cooperative young engineers, teaming together to share ideas, best practices, and some of the most magnificent technology of those times. In doing so, they created the profession of metrologist. And, NCSL was right there in the middle of it all. Today's strong and vital world measurement assurance system is the result, something we can all take some credit for.

Still many thanks are due to all those people - for all those efforts, over all those years, that have brought us to where we are today and prepared us for where we are going tomorrow. JVdH

THE NAVY MEASUREMENT ASSURANCE SYSTEM FACTOR

Jerry Hayes was at the heart of the early U.S. Navy program to mandate measurement assurance programs. He was also NCSL "Chairman" in 1969-70 and "President" in 1970-71.

The main factor driving the measurement system situation in the U.S. aerospace industry of the mid-1950's was the realization that something was systematically wrong with measurement controls. This is the story of the U.S. Navy's measurement assurance program; the why, what, when and where of how it all began. To a very real extent, these activities set the stage for NCSL.

The Navy's formal program began back in 1956, with their Bureau of Ordnance (BuOrd). The program was a side effect of the problems the nation was having with missile failures, and where it was found that a high percentage of missiles that were being accepted at contractor's plants, were being rejected when they reached BuOrd's ammunition depots. A study was commissioned by BuOrd, which revealed that a lack of common test, measurement and calibration controls at both contractor and Navy facilities was the principal culprit.

This inability of one activity to produce measurements which agreed with those of another, when testing the same identical item, had serious consequences in the U.S. Navy's development, design, evaluation, factory, depot and fleet activities. These incompatibilities resulted in significant rework and shipping costs as well as serious doubts as to the validity of the measurement data. This, in turn, put in doubt the designs and subsequent factory specifications which emanated from development activities, and affected the reliability and confidence of these important national assets.

As a result, action was undertaken by BuOrd to assure that common tests and tolerances were specified at the factories and depots, that calibration systems were available to control the uncertainties of the test equipment being used, and that all measurements were controlled and traceable to a common national resource, the National Bureau of Standards.

This formal program to centralize the engineering aspects of metrology, and establish a hierarchy of Navy laboratories, was initiated by BuOrd in 1956, and first covered the ammunition depots. The newly formed Metrology Branch at the Naval Ordnance Laboratory (NOL), Corona, CA, was assigned as the central engineering group to define the data requirements of a program, acquire and distribute measurement equipment for laboratories, prescribe calibration methods and procedures, identify calibration recall intervals and train personnel.

Prior to 1955, some standards laboratories and calibration facilities existed in prime contractor plants and the depots of the Bureau of Aeronautics (BuAir), Bureau of Ships (BuShips) and BuOrd. These were primarily focused on dimensional measurements with modest capability for electrical measurements. BuOrd had a prime interest in gaging of ordnance, such as shells and gun barrels; BuShips in dimensional measurements of shipbuilding components; and BuAir in mechanical and electrical measurements on aircraft construction and rework equipment.

With the merger of BuOrd and BuAir into Bureau of Weapons (BuWeps), the program now included aviation depots. BuShips joined the program around the same time. The Navy's Special Projects Office, responsible for the Fleet Ballistic Missile (FBM) program, was included in the same time frame, as was the Marine Corps. Thus, finally, a Navy-wide calibration program emerged.

The Office of Naval Material (NavMat) formalized this program on March 20, 1959, with the release of SECNAV Instruction 4355.11. Probably more importantly, in July 1959, a document called the Standards Laboratory Information Manual (SLIM) was published. It was prepared for use by both Navy field activities as well as Navy contractors at the request of the FBM Special Projects.

With this innovative action, the Navy Calibration Program has been tied historically and technically with its fleet and field activities as well as those of its prime and subcontractors. For example, some 6,000 such contractors in the Fleet Ballistic Missile (FBM) program were impacted by the SLIM, and subsequent implementing military specifications which were an outgrowth of it, such as NavOrd Instruction 4355.28, OD 21549 and Mil Std 45662.

The NOL Measurement Standards Branch moved in January, 1957, to the Naval Ordnance Plant in Pomona, California, having outgrown available space at Corona, and later became the Navy Metrology Engineering Center (MEC). The tasks specified by BuOrd at that time included the following as quoted from the task assignment letter dated February 1957:

1. "Select and designate specific and proper reference and transfer standards and associated equipment, evaluating these to assure high quality selections.
2. Coordinate the documentation of and prepare, where necessary, the detailed calibration and certification procedures and techniques.
3. Designate the calibration and certification periods for reference and transfer standards and associated equipment
4. Devise and establish an appropriate calibration and data reporting and analysis system to provide for any revision to calibration periods or changes to procedures, techniques, equipment, etc. necessary to the continued improvement of the calibration program. This system will include the monitoring of all calibrations performed throughout the program to assure compliance with calibration periods, procedures and related technical requirements.
5. Determine and recommend locations for and the relative status of standards laboratories giving major consideration to existing facilities, workload, economics, and the technical requirements of each.
6. Provide for the necessary technical coordination among standards laboratories and programs of other agencies to assure compatible operational philosophies and the dissemination of available technical information.
7. Monitor new developments in standards, calibration equipment and techniques, and where technical requirements of the program dictate, develop and construct the necessary reference and transfer standards.
8. Provide for necessary packaging and shipping systems to assure safe transit environment for all transfer standards.
9. Provide for the necessary training of standards laboratory personnel in techniques, procedures, laboratory operation, calibration philosophies and scope of the program."

I look back on those days with wonder— there were only thirteen people at Pomona, engineers, physicists, statisticians and techni-

cians—, and am amazed at our accomplishments. Long before today's dot.com work ethic, we accounted for too many 12-hr days, 6-day weeks before additional resources could be acquired, both by hiring new personnel and contracting with Convair/General Dynamics, with whom space was shared. Meanwhile, this small staff produced the SLIM and began to fulfill the tasks described.

Admittedly, a lot of plagiarism was involved, with the cooperation and aid of the few aerospace company standards laboratories, which existed at the time. The first issue of the SLIM was released in February, 1958, for use by FBM prime contractors who were directed by the Special Project Office to use it to implement their own measurement control programs for themselves and their sub-contractors. The manual included background on the operation and objectives of the calibration and guidance to the contractor and Navy laboratory alike on a variety of subjects that are still applicable to this day. Typical subjects were:

- Calibration System Controls
- Establishment of a Standards Laboratory
- Determination of Calibration Requirements (this included the 4:1 accuracy requirement that replaced a stringent 10:1 requirement previously used)
- Laboratory Equipment
- Laboratory Facilities (there were even specs for lab benches)
- Packaging for Shipment of Standards
- Calibration Intervals (included an appendix listing intervals by generic categories)
- Laboratory Practices
- Calibration Procedures (including formats, contents and data checklists)
- Determination of Calibration Tolerances and Checkpoints
- Sample Generic Calibration Methods and Procedures
- Servicing Labels and Tags
- Personnel and Training
- Identification Codes for Instrument Manufacturers and Participating Laboratories

It seems quite clear that without these mandated, contractual measurement assurance requirements, the government, aerospace and test & measurement sectors of 1960 would not have been in their quandary going into that test conference, where Harvey Lance of NBS reported on a national measurement system badly in need of an industry association.

The Navy metrology people were deeply involved in the formulation and development of NCSL to reach out to U.S. industry to adopt and nurture adequate and traceable measurement and calibration processes.

It should also be observed that in those early years, the U.S. Air Force and U.S. Army Program Offices were also defining and installing similar measurement programs concurrently, as national measurement systems gained confidence and sophistication. I had the pleasure of working with their leaders and the NBS personnel of that time and remain friends with many of them to this date. JLH

Editor's Note: This article was adapted from material published in the Metrology Bulletin of the Measurement Science Directorate, John Fishell, Director, at the U.S. Naval Surface Warfare Center, Corona, CA, April 2001. Reprinted with permission.

Editor's Message
(continued from page 2)

that term too, since we now have a good number of women as Member Delegates, some of whom have also retired. So I have tried to assemble this commemorative issue to meet the mindset of our 5-10 year Members.

About the only value in looking back, is to figure what our founding fathers were up to. In 1961, metrology was barely a separate field. We certainly had test and measurement, and we had "calibration." What the world really didn't have was a World-Class measurement system.

So NCSLI learned how to organize, promote, lobby, educate, communicate, network, and help each other on to some real accomplishments. We should be very proud of where we have been and of the heights we have reached. After all, we're just a bunch of bright engineers, with an important job to do, who had to learn all those non-technical habits of promotion and communication.

But life never stops changing. The new realities mean that while communications and aerospace sectors are important, the many other sectors we now embrace; utilities, pharmaceuticals, medical, petroleum are moving ahead. NCSLI has been in the forefront in the internationalization of metrology and quality, and with our strong ties with NIST and their international scope, we have done much together.

This is also a good time to recognize the source of our "Trade Association's" strength, which is the Membership of your Parent Organizations. We owe all your Member Companies our sincere thanks for supporting the work of NCSLI with their membership. We thank them too, for supporting you, the Member Delegate, with some allotment of time and travel expense to allow you to do your job better, be better informed, and enhance your networking and attendance at the annual conference and the regional meetings.

Finally, I am still trying to proofread all the appearances of our title, NCSLI. It seems an endless task, with my ace Associate Editor, Chris Franks, and I never able to catch them all.

John Minck
Editor

40 YEARS OF GLOBAL PROGRESS

Ed Nemeroff
Vice President, NCSL International

International Affairs

As the year 2001 marks the 40th anniversary of NCSL, we recognize that we have gone through and been part of profound changes in the field of measurement science. 15 years ago, while President of this organization, I stated at the time of our 25th anniversary, that we had made the transition from electrical to electronic metrology. Now we can say that we have made the major transition from that of being a national metrology organization to achieving the status of a global forum for metrology, accreditation, standards and conformity assessment.

From the great pyramids of Egypt, to the ancient city of Jerusalem, to the Empire of Japan, to the southern hemisphere, NCSLI has participated in symposiums, workshops and conferences that promoted international cooperation in metrology, standards and conformity assessment as well as enhanced the reputation and visibility of NCSL International.

NCSL International has recognized and been recognized and earned the respect and admiration of the international measurement science community. Our membership has expanded to 44 countries in Latin America, Europe, Africa, Canada, the Pacific Rim, the Middle East and the Caribbean. 26 National Metrology Institutes (NMIs) are members of NCSL International. We have 27 regional and country coordinators outside the USA. We have formal liaison with 10 other international technical societies and organizations.

As I look back over our 40 years, I reflect on some of the highlights of our international activities. We have co-sponsored international conferences in Israel, Egypt, Chile, Brazil, Jamaica, India and Australia.

- We were invited and participated in international conferences and meetings in Ecuador, Japan, Egypt, Venezuela, United Kingdom, Chile, Canada, Mexico, Switzerland, Belgium, France and Holland.
- We have become a stakeholder member in the International Laboratory Accreditation Cooperation (ILAC) and have a permanent seat on the Laboratory Liaison Committee.
- In 1999, the General Assembly of the Inter-American Metrology System (SIM) voted and approved the admission of the National Conference of Standards Laboratories as an Associate Participant to SIM. We have since become a major part of SIM activities
- In 2000, NCSL-International and the Brazilian Society of Metrology established and signed a formal Agreement of Cooperation.
- In 1999, we completed our first recommended Practice, (RP14) “Guide to selecting Standards Laboratory Environments" in Spanish.
- We have established Partnerships and board representation with NIST (USA), INMS (Canada), CENAM (Mexico), SIM (Americas)
- In 2000, we had our annual workshop and symposium for the first time outside the United States. Toronto, Canada was the host site for attendees and exhibitors from 33 countries.

With all this type of activities, it is quite evident why the National Conference of Standards Laboratories is now NCSL International.

In summary, we have had a distinguished past. What a dynamic future we have to look forward to! We can all be proud that we have had this opportunity and to have been part of it.

The accompanying photographs recall a small sampling of our recent International activities.

With our increasing global reach in the standards arena, NCSLI began working with International organizations, such as the International Standards Organization, whose headquarters is shown here in Geneva, Switzerland.

NCLSI President Dave Abell speaks at an International Metrology Conference, held in Jerusalem, Israel in 2000.

A well-attended Middle-East/North Africa meeting, in 2000, with an NCSLI banner presence.

NCSLI International V.P. Ed Nemeroff participates at a Team-99 Conference in India in 1999.

Ed Nemeroff presents an NCSLI watch to Batyrbek Davlesov, Director,Kyrgyz Republic, The State Inspection for Standardization and Metrology - Kyrgyzstandart -former USSR.

World Trade Organization (WTO) headquarters, Geneva, Switzerland, another travel destination for our peripatetic International V.P., Ed Nemeroff.

One of the ideas that Ed Nemeroff brought back from one of several trips to Metrology Labs in Egypt, was the story of the ancient length standard called the cubit, which NCSLI later published as a poster.

NCSLI MILESTONES

1960 • June 22. Harvey Lance, NBS, in a paper presented at a Conference on Standards and Electronic Measurements at NBS, Boulder, suggests the need for an organization of standards laboratories.

• June 23. Harvey Lance presides over an informal meeting of conference attendees interested in his suggestion of the previous day.

• June 24. The Conference Arrangements Committee under Ivan Easton, General Radio Co., appoints an Ad Hoc Committee to study the matter. Curt Biggs of Sandia Corp. was chosen chairman of the committee.

• Sept 27, Feb 13-14, 1961, May 23, 1961. Ad Hoc Committee meetings.

1961 • Sept 15. NCSLI formally organized with Lloyd Wilson as the first General Chairman. The Ad Hoc Committee is dissolved.

• Dec 4. Dr. A.V. Astin, NBS Director, officially designates NBS as a sponsor organization for NCSLI and appoints William Wildhack as NBS Liaison Representative.

1962 • Jan 23-25. First NCSLI Workshops at Boulder.

• Jan 26. First General Committee (later called the Board of Directors) meeting at NBS, Boulder.

• Feb 20. Charlie White, AVCO Corp., starts NCSLI financial history by depositing $487.24 in the Arlington Trust Company branch in Lawrence, MA.

• Mar 15. Charlie White writes the first NCSLI check for $16.50 to Lloyd Wilson.

• June 1. First issue of the NCSLI Publicity Release (later called the NCSL Newsletter) published by Charlie White.

• Aug 1. Original NCSLI Bylaws adopted.

• Aug 8-10. First NCSLI Conference at Boulder.

• Aug 9. First NCSLI Member Delegate's Assembly. Charles Johnson, of Boeing, is elected as the new Chairman of the General Committee.

1964 • Apr 17. NCSLI becomes a dues-paying organization and dues are set at $50.00 per year.

• July 23. Endevco, General Radio, ITT, Federal Electric, Kentron Hawaii, and Lockheed-California are the first organizations to remit NCSLI dues.

• Oct 12. Preliminary edition of the first NCSLI Directory of Standards Laboratories is published.

• A Joint Measurement Conference is held in conjunction with the ISA 19th Annual Conference in New York City. Cooperating organizations are NCSLI, PMA and AMS.

1965 • Mar 21. General Committee name is changed to Board of Directors. NBS is designated as the sole sponsoring organization for NCSLI.

1966 • May 12. The National Electrical Standards of the National Bureau of Standards are transferred from the downtown Washington facilities to the brand new Gaithersburg, MD campus during the 1966 Annual Conference.

• The first NCSLI Conference is held at the new NBS, Gaithersburg facilities.

• Oct 13-20, 1966. Dr. Astin, NBS, and NCSLI President John Van de Houten sign a Memorandum of Agreement for NBS, Gaithersburg to provide Secretariat services to NCSLI.

1967 • Sept 13. Dr. Merrill Wallenstein replaces William Wildhack as Sponsor's Delegate. Wildhack had served since 1961.

1968 • Jul 1. Dr. Wallenstein passes away. Joe Cameron is appointed as Sponsor's Delegate. The 1968 Annual Conference is held at NBS, Boulder Labs.

1969 • Mar 17. Second-class mailing privileges are granted to the NCSL Newsletter.

• May 23. The first NCSLI regional meeting is held at Battelle Memorial Institute in Columbus, OH.

1970 • June 16. Jerry Glassman, Navy Metrology Engineering Center, Pomona, CA, is the first recipient of the newly-established William A. Wildhack Award for best paper presented at the 1970 Conference.

• Sept 17. Non-profit organizational status is granted to NCSLI by the U.S. Internal Revenue Service.

• Oct 1. Office of the NCSLI Executive Vice President (and President Elect) is established.

• Dec 16. First Cost Reduction Seminar is held in Baltimore, MD. NCSLI is divided into 13 regions.

1972 • June 21-23. First Joint Measurement Conference is held in Boulder, CO. Sponsoring organizations are NBS, NCSLI, PMA, ASQC, IEEE and ISA.

1973 • The Annual NCSLI Conference is held at NBS, Boulder.

1974 • Feb 22. NCSLI membership is reopened to non-USA organizations.

• Nov 11. Regional structure is revised. The 13 regions are reduced to 8.

• The 2nd Joint Measurement Conference is held at NBS, Boulder.

1975 • Oct 1. Graham Cameron of the Canadian Department of National Defence becomes the first non-USA delegate to serve on the NCSLI Board.

1976 • Sept 15. 15th Anniversary of the formal founding of NCSLI. Don Greb edits a special 15th Anniversary Edition of the NCSL Newsletter; NCSLI also initiates its first formal 5-yr Long Range Plan.

- May 15. Bascom Birmingham succeeds Joe Cameron as the NBS Sponsor's Delegate. The Secretariat is moved to NBS, Boulder, and Ken Armstrong assumes the position of Secretariat Manager.
- Oct 4. The NCSLI International Region is established.

1978
- Nov 2. Andy Woodington, 1963-65 Chairman, passes away.

1979
- Recommended Practices 1, 2, 3, and 4 are published.

1980
- RP-5 published. Education and Training Committee is re-activated.

1981
- Jan 28. NCSLI fiscal and administrative year is changed to the calendar year. 1980-81 Board members serve 15 months.
- Oct 4. NCSLI Regions are realigned and Region 9 is created. There are now 9 U.S. regions plus the International Region.
- Dec 31. Jim Valentino completes a record 10 years and 3 months as an NCSLI Board Member.

1982
- Jan 1. Dues are increased to $100.00 per year, the first increase in 17 years.
- Jan 13. Graham Cameron (Canada) is appointed as first NCSLI International Director.
- The NCSLI Board votes for the first time to assume an advocacy position in support of NBS.

1983
- First report is published by the NCSLI National Measurement Requirements Committee.
- Membership and Publicity Committees are established.

1984
- Mar 6. The first invited testimony is presented to the U.S. Senate by NCSLI President Hartwell Keith, George Rice and Peter England, in support of the NIST budget.
- May 22. NCSLI President Hartwell Keith presents metrology testimony to the U.S. House of Representatives.
- Government Affairs Committee established.

1985
- July 9. William Wildhack, NCSLI Pioneer and first Sponsor's Delegate, passes away.
- The Canadian Region is established, separate from the International Region.
- George Uriano is appointed to replace Bascom Birmingham as NBS Sponsor.
- Dec 31. An agreement to end formal NBS sponsorship of NCSLI is signed.

1986
- May 22. The first open meeting of the Equipment Management Forum is held, with sponsors Gary Davidson of TRW and Bill Martin of Lockheed presiding. Charlie Sides of Boeing is elected as first Chairman.
- Sept 15. NCSLI celebrates its 25th birthday. An Anniversary edition of the NCSL Newsletter is published to observe the event.
- Sept 29. The NCSLI Secretariat moves out of NBS, Boulder facilities to new quarters in Boulder, CO. Ken Armstrong becomes the first Business Manager, and Joan Wilshire is appointed as Administrative Assistant.
- Dues are increased from $100 to $125.

1987
- Jan 1. The Equipment Management Forum, a group formed by Asset Managers to advance the profession of equipment management, joins the NCSLI committee structure.
- Joe Simmons succeeds George Uriano as NBS Representative.
- NCSLI incorporated as a Colorado, non-profit corporation.
- For the first time, a commercial exhibit is featured in conjunction with the NCSLI Annual Conference.

1988
- Aug 23. The U.S. President signed the Technology Competitiveness Act of 1988, and thereby officially changed the name of the National Bureau of Standards to the National Institute of Standards and Technology (NIST).
- The U.S. Congress passed the "Metric Use Act of 1988," which designated a metric "preferred" system for the U.S. and metric-mandatory system for federal agencies.
- Sept 27. The Consultative Committee on Electricity (CCE) established new international reference standards of voltage and resistance based on the Josephson Effect and the quantum Hall effect, respectively, to become effective Jan 1, 1990.
- The NCSLI logo becomes a legal trademark of our organization.
- The Glossary Committee is established.
- Oct 19. The 50th Anniversary of bonded strain gages is celebrated in Houston at the meeting of the International Measurement Confederation (IMEKO).

1989
- The Intrinsic and Derived Standards Committee is established.
- The International Development Committee is established.
- Stickers for SI 1990, representing the change in electrical units were designed and published.
- Oct 15. Wilbur Anson, after retiring from NBS, succeeds Ken Armstrong as Business Manager of NCSLI.

1990
- NCSLI testimony given before the Dept. of Commerce, Congressional Committee hearing, on improving U.S. participation in international standards activities.
- NCSLI dues were increased from $125 to $175.
- TQM Committee on Calibration Systems established.
- NCSLI Metrology Job Exchange was established on an Electronic Bulletin Board for enhancing job and personnel availability notices.

1991 • April 15. The NCSL Newsletter roster shows the first appearance of Gary Davidson's TQM Committee on Calibration System Requirements. Their audacious mission was to attempt to consolidate multiple government and aerospace quality specifications along the line of the ISO 9000 documents. The European Community had earlier adopted ISO 9000 in 1987.

• NCSLI celebrates its 30th anniversary with a special edition of the NCSL Newsletter.

• The first NCSLI President is elected from outside the U.S., Graham Cameron of Canada.

• The NCSLI Annual Conference moves away from its alternating Boulder and Washington, DC, locations for the first time, moving to Albuquerque, NM, and drawing a record attendance of 740.

• Oct 21. Region 12 was formally established by the NCSLI Board to recognize importance of the Canadian Region activities.

1992 • NCSLI makes formal application to ANSI to become an accredited standards-writing body in the area of metrology.

• RISP-2, "Triple Point of Water," published.

1993 • Georgia Harris, NIST, becomes the first woman to be elected to the NCSLI Board of Directors,

• May 24. A new NIST Director, Ms. Arati Prabhaker, was appointed by President Clinton, and confirmed by the U.S. Senate. Her previous work at the Advanced Research Projects Agency was considered important due to the expected increase in NIST project management initiatives for productivity and technology transfer.

• Canada's National Research Council (NRC-INMS) appoints Roy VanKoughnett as its representative to the NCSLI Board.

• Oct 22. The first Joint NCSLI/NRC-INMS management meeting was held in Canada at the National Research Council to strengthen ties and promote common interests.

1994 • Peter Heydemann succeeds Joe Simmons as NIST Representative.

• The ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment Standard" received final ANSI approval. Due to the rigorous standards-creation process rules of ANSI, the NCSLI was obligated to establish its business office as an ANSI-approved Secretariat for the period of that spec-writing process.

• The Annual Conference attendance in Chicago was 1003.

• The dues were increased from $175 to $225.

• Oct 17. The NCSLI Board establishes India as a separate region, and assigns it Region 13.

1995 • Feb 27. DOD publishes a letter announcing the official cancellation of MIL-STD-45662A and its replacement by ANSI/NCSL Z540-1. The Z540-1 standard was widely accepted and the publication became a best-seller, selling more than 6000 copies.

• NCSLI, in cooperation with ASQC/MQD, established a memorial scholarship fund in memory of Dr. Joe Simmons, who passed away this year.

• Project "Vision 2000," a long-range plan identifying future goals of NCSLI, was completed.

1996 • NCSLI celebrates its 35th anniversary with a commemorative NCSL Newsletter.

• Gary Hysert, INMS, Canada, succeeds Roy VanKoughnett as NRC Representative.

• NCSLI goes "on-line" with its own web site.

1997 • RISP-3, "Quantized Hall Resistance," was published.

• NCSLI's second ANSI standard, ANSI/NCSL Z540-2, "U.S. Guide to the Expression of Uncertainty in Measurement," was published.

• Wilbur Anson retired as NCSLI Business Manager after 8 years of service.

1998 • RISP-4, "Deadweight Pressure Gauges," was published.

• The NCSLI Board approves a permanent, non-voting CENAM (Mexico) Representative on the Board. Dr. Salvador Echeverria-Villagomez is the first appointment.

• An "Encyclopedia of Metrology," Seven Years of NCSLI Conference Proceedings,21 were published on CD-ROM.

• Full responsibility for maintenance of the NCSLI web site, <www.ncsl-hq.org>, was moved to the Boulder office.

1999 • Committees for Automotive Metrology and Chemical Metrology were formed.

• Craig Gulka was appointed as the new NCSLI Business Manager.

• Dues increase was voted from $225 to $325. For the first time, new Member dues were increased to $400 to cover initiation costs.

• Dr. Richard Jackson succeeds Dr. Peter Heydemann as NIST Representative.

2000 • NCSL changes its name to NCSL International to recognize its increasing international influence.

• The first Annual Conference was held outside the United States, in Toronto, Canada, with an attendance of 1120 from 33 countries.

• The NCSLI Board voted to install Sistema Interamericano de Metrologia (SIM) as a non-voting member of the Board. The first SIM Representative is Roosevelt DaCosta.

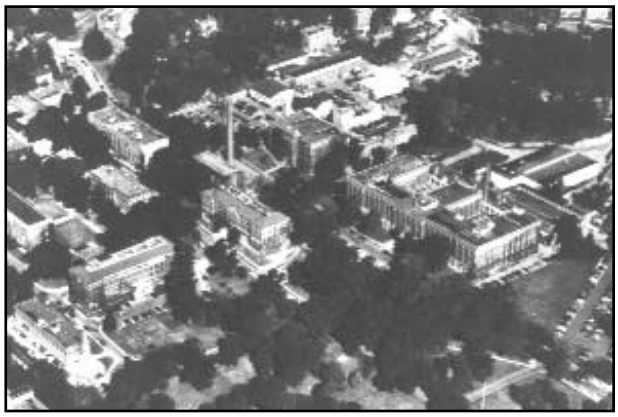
• Dr. Richard Kayser succeeds Dr. Richard Jackson as NIST Representative.

• The NCSLI Board votes to adopt ISO/IEC 17025 jointly with ASQ and ASTM as a U.S. National Standard, while at the same time revising ANSI/NCSL Z540-1-1994 to remain in service for an interim period.

40 YEARS OF TECHNICAL ACCOMPLISHMENTS AND PERSONAL FRIENDSHIPS

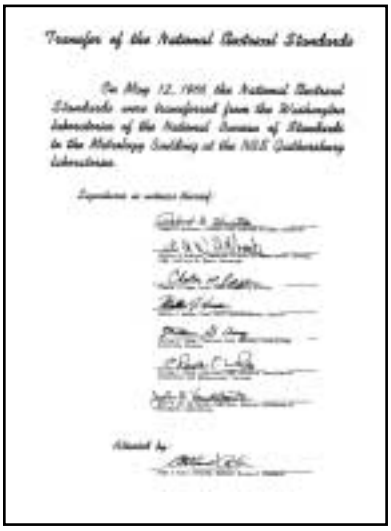
Executive Ad Hoc Committee attendees of the First NCSLI Conference—August 1962. (L-R) Charles Johnson, Lloyd Wilson, Harvey Lance, Charles White and William Wildhack.

A meet-the-experts panel at a Conference forum in the mid-60's.



The location of NBS at the founding year of NCSLI was on Connecticut Avenue, in downtown Washington, DC, in typical "government" buildings. It was rapidly outgrowing its space.

A committee meeting from the early 1960's. Ivan Easton, General Radio, Lloyd Wilson, Sperry, William Wildhack, NBS, Charles Johnson, Boeing.



Transfer of the National Electrical Standards

On May 12, 1966 the National Electrical Standards were transferred from the Washington laboratories of the National Bureau of Standards to the Metrology Building at the NBS Gaithersburg laboratories.

Witnessed by

This photo shows the move, and the certificate documents the transfer of key national standards from downtown Washington, DC, to the brand new NBS campus at Gaithersburg on May 12, 1966. Presumably the scientists didn't want "professional" movers to handle their precious hardware, such as saturated standard cells. But would you want your standards in the hands of these well-meaning amateurs? The certificate shows that three NCSLI executives witnessed and certified the transfer; Bill Amey, Charlie White and John Van de Houten.

This overview, shot in 1966, of NBS's magnificent new campus at Gaithersburg, MD, has served as home for NBS/NIST since their move from downtown. It was designed to house superior facilities for industry conferences across the many constituent groups that NIST serves.

The June 1968 Newsletter reported the promotion of Dr. Ernest Ambler to Director of the Institute for Basic Standards of NBS. He would later assume the overall direction of NBS during their important growth years of NCSLI in the 1970's.

After his service to NCSLI as the first NCSL Newsletter Editor, Charlie White left AVCO and his metrology career, to become Executive Editor of Telecommunications Magazine, a well-respected industry publication. He held that post for decades.

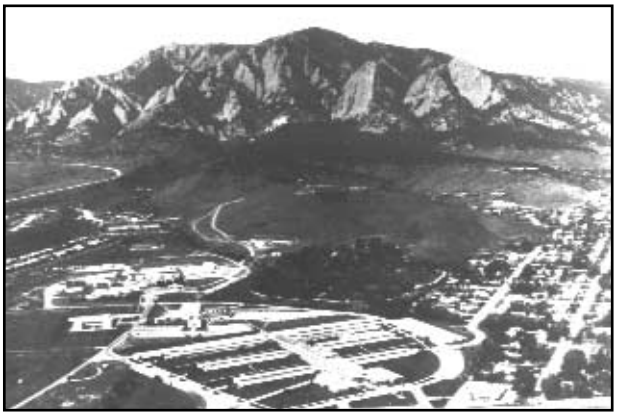
A 1968 NCSLI Annual Conference skit with Bryan Werner (L) as the R&D scientist and Ralph Berra as the Metrology Lab Manager, trying to communicate with each other. Our metrology community has learned over the years how to communicate the value of metrology and measurement assurance to the government and to our industry's upper management teams. In recent decades, Metrology has been in the forefront of the programs for Total Quality Commitment and lately, ISO and the internationalization of metrology.

The large crowds attending the NCSLI Annual Conferences were always treated with technical and management and regulatory subjects of the highest order. International experts from NIST and other world standards and certification organizations were regular speakers. Yet, the friendly atmosphere and spirit of cooperation in the workshops and forums, offered the newest metrology manager the ability to leverage processes which had already been developed by others.

A typical BOD meeting, July 1971. Seated (L-R): Bill Vandel, Jim Hadley, Dave Mitchell, Steve Kozich, Jerry Hayes, Marty Vyenielo, Mort Angelo, Wes McPhee and Ralph Barra. Standing: Carl Boyer, Don Greb, Don Hervig, Harvey Lance and Frank Dyce.

Management meeting at NBS, Boulder, (circa 1974), when Dave Mitchell (L) was President and Mike Suraci (R) was Exec. V.P., involved William Wildhack and Curtis Biggs. Love those sideburns.

A new cast of characters gather at a BOD meeting, sometime during 1974. Front row: John Minck, Jim Valentino, Ralph Berra, Laurel Auxier, Bob Delapp. Rear: Dave Mitchell, Mike Suraci, Walt Cassidy, Clyde Moss, John Riley, John Lee, Marlyn Hed. Wide colorful ties and double-knit sports coats were the uniform of the day. This was near the end of the era of white shirts, splashy ties and polyester suits.



This aerial shot of NBS, Boulder, shows a grand vista of NBS's high tech facility at the base of the Rocky Mountains. We used to truly enjoy those NCSLI Conferences scheduled at the NBS facilities, the mountain air and those crisp mornings. The social events often included a Western theme, barbecue cookouts and square dancing lessons.

The 1978 Board of Directors had still more fresh faces, because operations and committees and regions were expanding. Front: Laurel Auxier, Don Greb, Max Unis, Denny Gallagher, John Lee, Hartwell Keith. Middle: Sam Davidson, Chuck Coleridge, Ron Kidd, Ken Armstrong, Moe Corrigan, Doug Doi, Jim Valentino. Back: Pete England, Mac McKinney, Bob Delapp, Bascom Birmingham, John Minck, Cliff Koop, Frank Flynn, Graham Cameron, Dean Brungart.

Our very first NCSL International Luncheon at the 1979 Annual Conference. This period was the beginning of stronger Member Organization recruitment outside the U.S. Clockwise: Phil Joyce and Graham Cameron, Canada, Knut Birkeland, Norway, Felix Kapron, Canada, Mac McKinney, U.S. Army, Ko Chien-Yeh, Taiwan, Nejamis Ovaldo, Argentina, Per-Olof Lundbom, Sweden, Damiela Kruh, Israel, Jim Valentino, Sanders Associates.

NCSLI's regional structure, with sections added later, gives the advantage of more personalized interaction with fellow professionals in the area, but often with international invited speakers. Regional meetings, reported in the newsletter, show tremendous creativity of the organizers, in structuring workshops and forums which target important issues, common to the metrology field.

For years, the largest regional operation was Region 8 for the greater Los Angeles area, managed by Rolf Schumacher of Rockwell. In this meeting on the Queen Mary ship in Long Beach, Rolf invited Member Organization's Appointing Officers to attend, along with their Member Delegates, as a method of promoting the value of NCSLI membership. Today's title for leading region for meeting attendance probably is shared between the Twin Cities Section of Region 11 or the Japan or Canada regional meetings.

Over the decades, many close friendships have developed among the NCSLI spouses who often attended the Board meetings and other NCSLI activities. Here, Betty Auxier (L) and Betty Gallagher (R) staff the spouse's activity-signup booth at the 1981 Annual Conference.

This hotel fire during a Board meeting in Ottawa, Canada was one of three fires, which interrupted the safety of our people during several decades. Other fires occured in Gaithersburg, during an Annual Conference, and in Montreal, Canada during another Board meeting. Luckily, none of our members was ever hurt.

An early-1980's Board meeting, chaired with President Jim Valentino. Jim later endured some serious health problems, and passed away in 1985.

Harvey Lance, shown in retirement in 1986, on the occasion of the 25th anniversary of NCSLI. It was actually Harvey who presented the 1960 paper, suggesting a need for an organization of standards laboratories. Bill Wildhack got the credit for throwing NBS support to the fledging committee movement, but we should still recognize Harvey's vision.

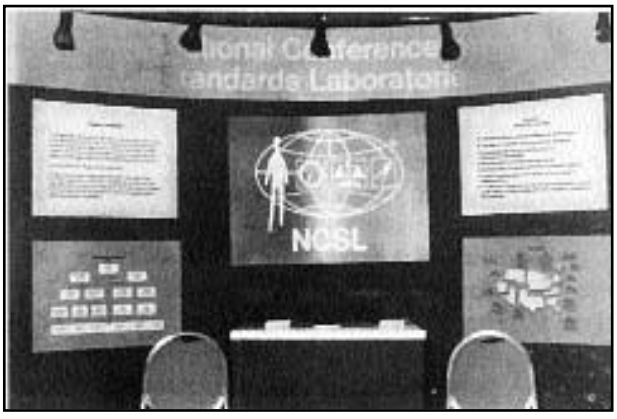
Along with general promotional efforts to publicize the importance of metrology to the nation, NCSLI began effective informational testimony to U.S. Congressional Science Committees in 1984. Here, George Rice is shown at Capitol Hill before his testimony later that day. NCSLI officers also developed important technical contacts with those key committee staffs as well.

In 1986, after NBS decided that it should no longer serve as a Sponsor for NCSLI, the NCSLI Secretariat moved from NBS, Boulder, to this office complex across town in Boulder. Ken Armstrong retired from NBS to become our first Business Manager, later succeeded by Wilbur Anson.

A crowd gathered to celebrate the opening of the NCSLI office in 1986. Bob Weber, Joan Wilshire, the new NCSLI Office Manager, and Pete England watch NCSLI President Ed Nemeroff hang the "Good Luck" sign. Ken Armstrong, the brand new NCSLI Business Manager, and Bob Kamper, Director of the NBS Boulder Labs look on.

The personal friendships which went along with the professional side of the NCSLI Board have always been a major characteristic of NCSLI activity. During one of the social times for this Board meeting in 1986, someone bought a new picture frame and cast Ralph Bertermann in the picture. Jim Ingram is holding the frame. It is not likely that either of these men realized in those earlier years of hard work on the Board that they both would later rise to the NCSLI Presidency.

The NCSLI Annual Conferences have always had topical entertainment to go along with the serious technical purposes of the meetings. In Boulder, it might be a Western cookout with line dancing, while in Washington, DC, it might be these Washington entertainers with a decidedly Politically-Incorrect slant.



In its recent decades, NCSLI got a lot better with publicity and promotion. We funded a promotional show booth with the NCSLI story presentation. This booth was used in other associated shows such as the Measurement Science Conference, ASQ, and other groups which maintained a liaison with NCSLI.

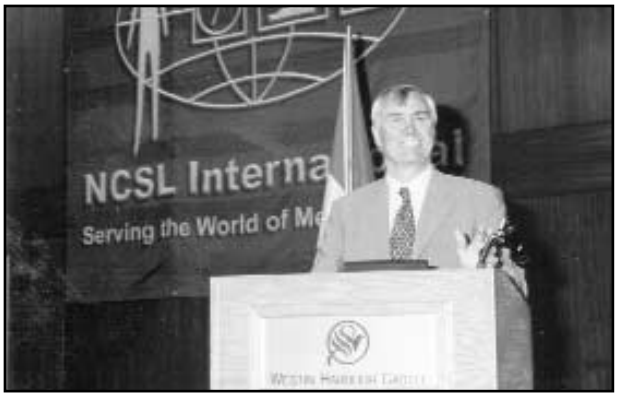
International membership and attendance at the NCSLI Annual Conferences continued to grow in the 1980's. This grouping at 1989 Conference showed seventeen countries in attendance. We expanded these personal contacts with an annual International Dinner, attended by many of the U.S. Members, as hosts.

Annual conferences are much more than attending technical sessions and committee meetings. The social events, banquets, receptions, coffee breaks, all provide time to renew the personal relationships among Member Delegates and spouses and friends. They also lead to professional networking which aids all of us in keeping up with the best practices.

Management of NCSLI Annual Conferences started with local volunteers, and did not include the technical exhibits, making it only half a back-breaker. The addition of exhibits did wonders for the NCSLI treasury, but also required a professional "volunteer," Dean Brungart, to manage those highly successful exhibitions. Later, Business Manager Wilbur Anson, shown here with his computer, took over all registration and proceedings activities, a major management overload once a year.

NCSLI has focused on long-range planning for several decades, usually with the Executive Vice-President being responsible for researching and preparing the annual long-range plan. Recent years have seen a broader effort to bring in the grass-roots level of NCSLI to future planning. Here, Jim Ingram moderates a discussion of NCSLI 2000, a 1990's survey which looked ahead at our future. Don Dalton headed Vision 2000, the 1996 vintage of our planning process.

Through Dean Brungart's keen management, the technical exhibits at our annual conference grew to become a major source of funding for the organization. At the same time, test and measurement suppliers found the NCSLI Conference Exhibit offered a pre-selected source of customers for their wares. Exhibits became very professional, and rivaled those of big-time trade shows.



Finally, in the year 2000, NCSLI organized our first Annual Conference and Workshop outside the USA. A very successful conference was held in Toronto, Canada. Dr. Arthur Carty, President of Canada's National Research Council delivered the Keynote Address.

NBS ACCEPTS NCSLI SPONSORSHIP

L. B. W.
12/7/61

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

ADDRESS REPLY TO
NATIONAL BUREAU OF STANDARDS
WASHINGTON 25, D. C.

December 4, 1961

IN YOUR REPLY
REFER TO FILE NO.
30.00

Mr. Lloyd B. Wilson, Chairman
Gen'l Committee, National Conference
of Standards Laboratories
c/o Sperry Gyroscope Company
Mail Station 1-37
Great Neck, L.I., N. Y.

Dear Mr. Wilson:

With reference to your letter of November 8, 1961, the National Bureau of Standards will be pleased to act as a sponsor for the National Conference of Standards Laboratories. Mr. William A. Wildhack will serve as the official liaison representative between NBS and the Conference.

The National Bureau of Standards is pleased to cooperate in this effort of standards laboratories throughout the country to further the development and application of standards for physical measurement.

Sincerely yours,

A. V. Astin
Director

CC: W. A. Wildhack

A GALLERY OF NCSLI PRESIDENTS

1960-61
H. Curtis Biggs
Sandia Corp.

1961-62
Lloyd B. Wilson
Sperry Gyroscope Co.

1962-63
Charles E. Johnson
The Boeing Company

1963-64, 64-65
Andrew J. Woodington
General Dynamics

1965-66
John R. Van de Houten
Aerojet General Corp.

1966-67, 67-68
Charles E. White
AVCO Corp.

1968-69
Harvey W. Lance
NBS

1969-70, 70-71
Jerry L. Hayes
Navy Metrology Engineering

1971-72
Frank J. Dyce
Martin Marietta Corp.

1972-73
Ralph J. Barra
Westinghouse Electric

1973-74
Donald J. Greb
Lockheed Missiles & Space Co.

1974-75
J. Dave Mitchell
Rockwell International

1975-76
J. Michael Suraci
Lockheed Corp.

1976-77
John L. Minck
Hewlett-Packard Co

1977-78
Laurel Auxier
Beckman Instruments

1978-79
Ron Kidd
Microwave Associates

1979-80
James A. Valentino
Sanders Associates

1980-81
John Lee
U.S. Instrument Rentals

1982
Dean A. Brungart
Teledyne Systems

1983
Hartwell Keith
TRW

1984
George Rice
Rockwell International

1985
R.B. (Pete) England
General Dynamics Corp.

1986
H. Bryan Werner
Westinghouse Specialty

1986-87
Ed Nemeroff
Datron, Inc.

1988
Gary Davidson
TRW

1989
Del Caldwell
Navy Metrology Engineering Center

1990
William Simmons
Sverdrup Technology Inc.

1991
Graham Cameron
Canadian Dept. of Defence

1992
Robert Smith
Loral Aeronutronic

1993
James Ingram
Guildline Instruments

1994
Ralph Bertermann
Abbott Laboratories

1995
William F. Doyle
AT&T Capital Corp.

1996
Anthony Anderson
Guildline Instruments

1997
Kevin Ruhl
TRW Corp.

1998
William Quigley
Hughes Aircraft Company

1999
Dr. Klaus Jaeger
Lockheed-Martin Corp

2000
David Abell
Agilent Technologies Inc.

2001
John B. Ragsdale
Tennessee Valley Authority

THE VISION OF HARVEY LANCE

Harvey Lance, in retirement, in 1986

Perhaps the true hero, with the founding vision for NCSLI, was Harvey Lance, of the Boulder Labs of NBS. It was his paper, presented in that well-reported Conference on June 22, 1960, which created the immediate popular support for taking some sort of action, which would result, a year later, in the establishment of our measurements-oriented organization.

Excerpts from:

"THE NATION'S ELECTRONIC STANDARDS PROGRAM: WHERE DO WE STAND?"

by Harvey Lance

In this paper, recent progress in the nation's electronic standards program is noted. Some current problems, which have arisen in connection with the program, are discussed, and suggestions are made regarding the solution of these problems.

What Constitutes a Good Standards Laboratory?

In keeping with general government policy, NBS provides calibration services only for standards of the highest quality and provides only those services which the laboratories cannot reasonably be expected to provide for themselves or to secure elsewhere. It is implied, then, that only a limited number of laboratories ordinarily should receive services directly from NBS, that those laboratories should serve additional laboratories of a lower level, and so on, until all standardization needs are met. This is, in fact, the system now in use.

There is a considerable variation in the procedures and methods of operation of the top echelon laboratories. Some of the methods and practices which have been observed seem to be more widely applicable, and if adopted should result in improved accuracy of measurement.

There are several criteria for a good standards laboratory:

First, the importance of the laboratory must be recognized and supported by management, and it must have competent supervisory and operating staffs.

Second, the laboratory must have adequate facilities and equipment and must maintain the proper physical environment.

Third, to preserve accuracy of measurement, the laboratory's reference standards should be segregated from its working standards, shop standards, and test equipment and should be used only as reference standards.

Fourth, the laboratory's reference standards should be calibrated in terms of the national standards.

Fifth, the calibrations performed by the laboratory must be accurate, within the claimed limits of error.

In particular, there is a serious need for an association of standards laboratories. This association might be a new and distinct organization or it might be made a part of an existing professional or technical group. There are many needs which such an association could fulfill.

1. Traceability of Calibrations
2. Justification of Standards Requirements
3. Interim Standards and Calibration Services
4. Measurement Agreement
5. Self-Qualification of Standards Laboratories
6. Education and Training of Standards Personnel
7. Electronic Calibration Services of NBS

It was pointed out that the nation needs a broader recognition of the benefits of standardization; further improvements in the quality of top echelon standards laboratories; a greater supply of competent personnel; and a substantial increase in the calibration services available from NBS, together with the creation of the new standards on which these services must be based.

The latter need was emphasized in recent discussions with representatives of industry regarding measurement requirements existing now in a few specific fields. As a result of the discussion, it appears that if work at NBS in these fields were to continue at its present rate, and without concern for future needs, five or ten years would be necessary to meet current requirements. A further and startling result is this: preliminary estimates agree that even if greatly increased funding were available immediately, it would be possible only to cut in half the time required to meet current needs.

A prime concern of NBS must be to find ways of bettering these estimates, and, at the same time, to increase its efforts toward meeting future needs. NBS should concentrate on these basic tasks and should leave to others the responsibility for additional interesting and necessary work.

This is one of the reasons why an association of standards laboratories is urgently needed to assist in meeting the nation's standards needs. It is one reason why systems engineers must determine what standards needs are really urgent, and must explain why they are urgent. It is a reason why everyone must work together to establish, at the earliest possible date, an electronics standards program which will close the wide gap between capabilities and requirements, and which will anticipate and meet the needs of the future.

THE FIRST NCSLI NEWSLETTER

With the possible exception of conferences, the NCSLI Newsletter is the most important communication function of NCSL International, and ranks high in the total functions of the organization. For many of our Member Delegates who are not able to travel to the annual conferences or regional meetings, it is the only way in which they can keep in touch with the organization's worldwide activities.

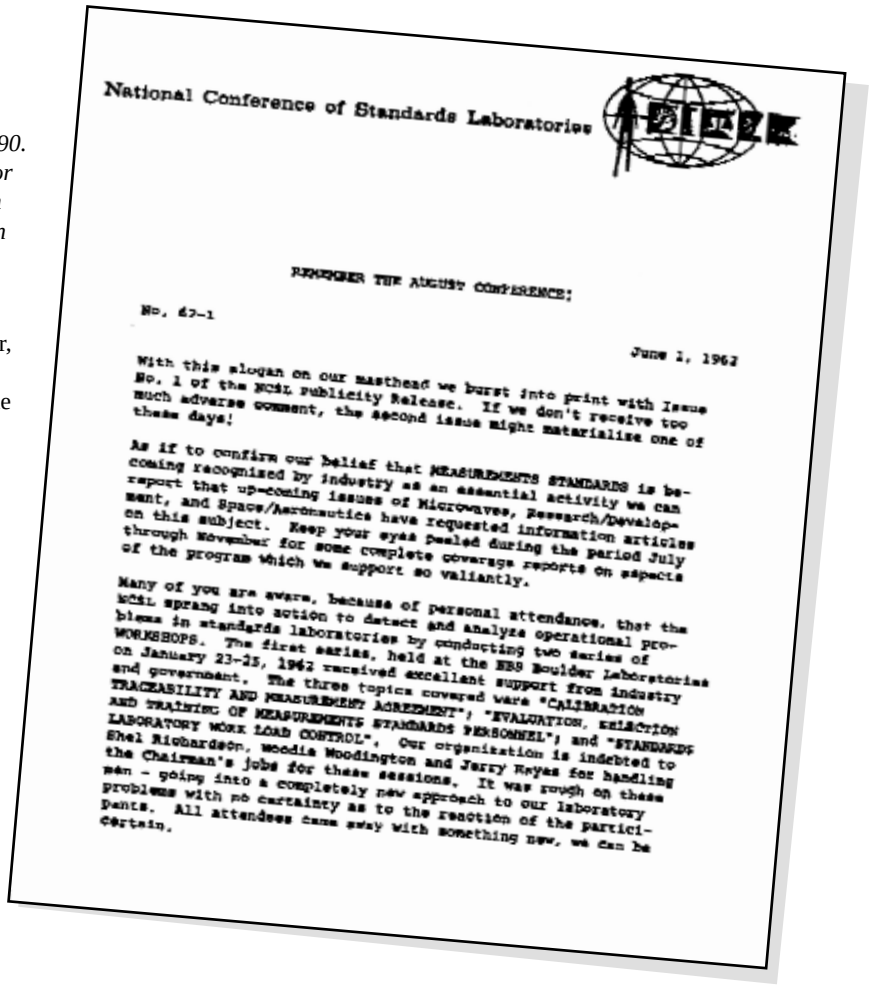
The first issue of the Newsletter—it was called the Publicity Release until 1964—is dated June 1, 1962, and consisted of six pages, including one full-page cartoon. The front page is reproduced below, and the format is utilitarian, indeed. The first two issues publicized the upcoming 1962 Annual Conference, and issue #3 reported on the affair.

There were three issues in 1962, two in 1963, one in 1964, and three or four for succeeding years.

Charlie White today is 90. Editing must be good for longevity. We thank him for his early publication efforts.

Charlie White was the first editor of the Newsletter, and served as editor from 1962 to 1970. All issues through #3 were printed and distributed through the courtesy of Charlie's company, AVCO. Charlie went on from his technical career in metrology to great achievements in industrial media publications, rising to become Executive Editor for Telecommunications Magazine, published by Horizon House in Boston. He was with that magazine for several decades, retiring in 1990.

Wilbur Anson of NBS, Boulder, served as Editor from 1970 to 1972. Mike Suraci, of Lockheed Corp., assumed the editorship from 1972 to 1975, with Wilbur stepping back in from 1975 to 1978. John Minck, of Hewlett-Packard, after his three years of NCSLI President, Exec VP, and Past President, has served as editor from 1978 to the present.



National Conference of Standards Laboratories

REMEMBER THE AUGUST CONFERENCE!

No. 62-1

June 1, 1962

With this slogan on our masthead we burst into print with Issue No. 1 of the NCSL Publicity Release. If we don't receive too much adverse comment, the second issue might materialize one of these days!

As if to confirm our belief that MEASUREMENTS STANDARDS is becoming recognized by industry as an essential activity we can report that up-coming issues of Microwaves, Research/Development, and Space/Aeronautics have requested information articles on this subject. Keep your eyes peeled during the period July through November for some complete coverage reports on aspects of the program which we support so valiantly.

Many of you are aware, because of personal attendance, that the NCSL sprang into action to detect and analyze operational problems in standards laboratories by conducting two series of WORKSHOPS. The first series, held at the NBS Boulder Laboratories on January 23-25, 1962 received excellent support from industry and government. The three topics covered were "CALIBRATION TRACEABILITY AND MEASUREMENT AGREEMENT"; "EVALUATION, EXECUTION AND TRAINING OF MEASUREMENTS STANDARDS PERSONNEL"; and "STANDARDS LABORATORY WORK LOAD CONTROL". Our organization is indebted to Shel Richardson, Woodie Woodington and Jerry Reyes for handling the Chairman's jobs for these sessions. It was rough on these men - going into a completely new approach to our laboratory problems with no certainty as to the reaction of the participants. All attendees came away with something new, we can be certain.

IN APPRECIATION OF WILLIAM WILDHACK

William Wildhack
1908 – 1985

William A. Wildhack was born in Breckenridge, Colorado, on September 24, 1908. He earned the B.S. in E.E. and the M.S. in Physics from the University of Colorado. After a year teaching at his alma mater, he went to Boise Junior College and later to George Washington University.

With NBS since 1935, Bill was first engaged in research and development in the Aeronautical Instrument Section headed by Dr. Brombacher. In 1948, he became Chief of the Missile Instrumentation Section, and later helped Dr. Huntoon to narrow somewhat the missile reliability gap of that era. Tutored by Dr. McPherson, Bill recorded many a meeting for the NBS Committee on Testing before he was appointed as Chief of the Office of Basic Instrumentation. In 1961, he became NBS Associate Director for Measurement Services, which brought him wide contacts with NBS customers in the Army, Navy, Air Force, NASA and the Defense Communication Agency.

In 1962, a group of NBS scientists visited the Soviet All-Union Scientific Research Institute of Metrology. Among the souvenirs presented to Dr. Wichers (NBS) for his museum was a photo showing George Toumanoff, Les Guildner, Don Johnson, Forrest Harris, Harvey Lance, Alvin McNish and Bill Wildhack as they toured the Mendeleev Institute in Leningrad. One result of that visit was the subsequent availability of English translations from Russian journals.

When the NBS Institutes were established in 1964, Bill was named Associate Director of the Institute for Basic Standards. In that capacity he was responsible for coordinating the Institute's calibration and measurement services to science, industry and other government agencies concerned with basic physical quantities. Before the advent of the Measurement Assurance Program, the torrid word was "traceability." That is noted in the definitive article on Instrumentation which he wrote for the McGraw-Hill Technical Encyclopedia. At the retirement party staged by his colleagues at NBS, he was presented with a volume containing copies of his five patents on oxygen apparatus, and the 39 technical reports he had prepared during his 34 years at NBS.

In 1968, the Instrument Society of America (ISA) bestowed on Bill an Honorary Membership, reserved for individuals whose contributions to advancing the art and science of instrumentation are deserving of special recognition. He was a charter member of ISA, served as President in 1954, helped establish its monthly journal, "Instrumentation Technology," and fostered its membership in

the International Measurements Association (IMEKO). He was a member of AAAS and the Federation of American Scientists. He was a Fellow of the American Physical Society and of the Washington Academy of Sciences. His activity in the International Geophysical Year gained him a Silver Medal Award from the Royal Swedish Academy of Engineering.

Back in 1961, when Harvey Lance opined that the industrial standards laboratories of the country ought to have an association, it was the three W's—Wilson of Sperry Gyro, Woodington of General Dynamics, and Wildhack of NBS—who became the prime movers. It was Wildhack who chaired the organization committee, developed the bylaws and the committee structure, and secured NBS Director Dr. Astin as godfather to the lusty infant, which has grown into the National Conference of Standards Laboratories International of today. Early in 1985, NCSLI President Pete England invited Bill and Marty to be his guests at the NCSLI Annual Meeting in Boulder. However, Bill's long bout with cancer made that impossible. He died on July 9, 1985.

Since coming to the Washington area, Bill and Martha Wildhack have raised two sons. William A. Jr. is a lawyer in Arlington, VA, while Michael is a wildlife biologist working in Oklahoma City, OK. As proud grandparents, they have delighted in Elizabeth, a senior specializing in Archeology at the University of Virginia, and Bill III, a chaplain in the Naval Reserve.

Wildhack's associates at NBS will remember the stimulation of his original ideas, and his enthusiasm for the NBS mission. His neighbors in Frisco, Colorado, will recall his lifelong interest in the history of Summit County. His friends at the Cosmos Club will recollect his jovial, "Terrible!" in response to a casual, "How are you?" His family will miss his prowess as a punster, and his absorbing fascination with so many things, including demi-semi-quavers and Halley's Comet.

H.L. Mason, July 25, 1985.

Ed. Note: Mason was an NBS colleague of Wildhack

THE ROSTER OF WILLIAM A. WILDHACK AWARD WINNERS

This silver medallion and a modest honorarium are presented to the annual winner of the Wildhack Award, for meritorious service to metrology.

The William A. Wildhack Award was established in 1970 in recognition of William A. Wildhack who was very instrumental in the founding of NCSLI, and who served as the Sponsor's Delegate from 1961 to 1967. Through his wisdom, leadership, dedication and foresight, he helped shape the organization during its early formative years.

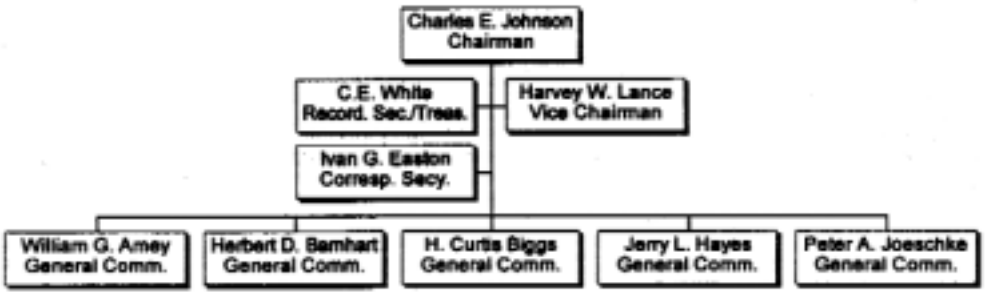
The Wildhack Award is the highest honor of NCSLI and is given annually to an individual or group for an outstanding contribution to the field of metrology and measurement science, and which is in consonance with the goals and purposes of NCSLI.

The award carries an honorarium of $1,500 plus a bronze and silver medallion bearing the likeness of Wildhack.

1970	Jerry Glassman	Navy Metrology Engineering Center
1972	Dr. Robert Kamper	NBS, Boulder
1974	Jack A. Hall	Rockwell International
1976	Dr. Ernest Ambler	NBS
1977	Doug Strain	ESI, Inc.
1978	Frank McGinnis	Sperry Corp.
1979	Jerry Hayes	Navy Metrology Engineering Center
1980	J. David Mitchell	Rockwell International
1981	Forrest Harris	NBS
1982	Dr. Churchill Eisenhart	NBS
1983	John M. Fluke	Fluke Corp.
1984	Dr. Andrew Dunn	National Research Council
1985	Dr. Bruno Weinschel	Weinschel Engineering Co.
1986	Dean Brungart	Teledyne Systems Co.
1987	John L. Minck	Hewlett-Packard Co.
1988	David Braudaway	Sandia Corp.
1989	Peter M. Clifford	London City University
1990	David Packard	Hewlett-Packard Co.
1991	Ed Nemeroff	Datron/Wavetek Inc.
1992	Dr. Joe Simmons	NIST
1993	Graham Cameron	Canadian Dept of National Defense
1994	Henry Sostman	Thermometry Consultant
1995	J. Michael Suraci	Lockheed-Martin Co.
1996	Gary Davidson	Strand, Davidson and Stata
1997	Robert Weber	Lockheed-Martin Co.
1998	Dr. Klaus Jaeger	Lockheed-Martin Co.
1999	Dr. Norm Belecki	NIST
2000	Ernest Garner	NIST

THE ORGANIZATION, THEN AND NOW

1962 Organization



Early Organization Efforts

By 1964, when the first "Directory of Standards Laboratories in the United States" was published, NCSLI had organized itself into working committees which met the needs of the time. The following committees were listed:

Standards Laboratory Work Load Control

Standards Laboratory Organization & Operation-Production

Standards Laboratory Organization & Operation-Commercial

Standards Laboratory Organization & Operation-R&D

Standards Laboratory Organization & Operation-Corporate Labs

Reliability of Measurements Standards & Instruments-Electronic

Reliability of Measurements Standards & Instruments-Electrical

Reliability of Measurements Standards & Instruments-Dimensional
Reliability of Measurements Standards & Instruments-Physical

Calibration Procedures, Specifications and Techniques

Evaluation, Selection and Training of Standards Lab Personnel

Recommended Practices for Standards Laboratories

Measurement Agreement & Calibration Traceability

Organization

Measurement Standards Information Center

Regional Organization

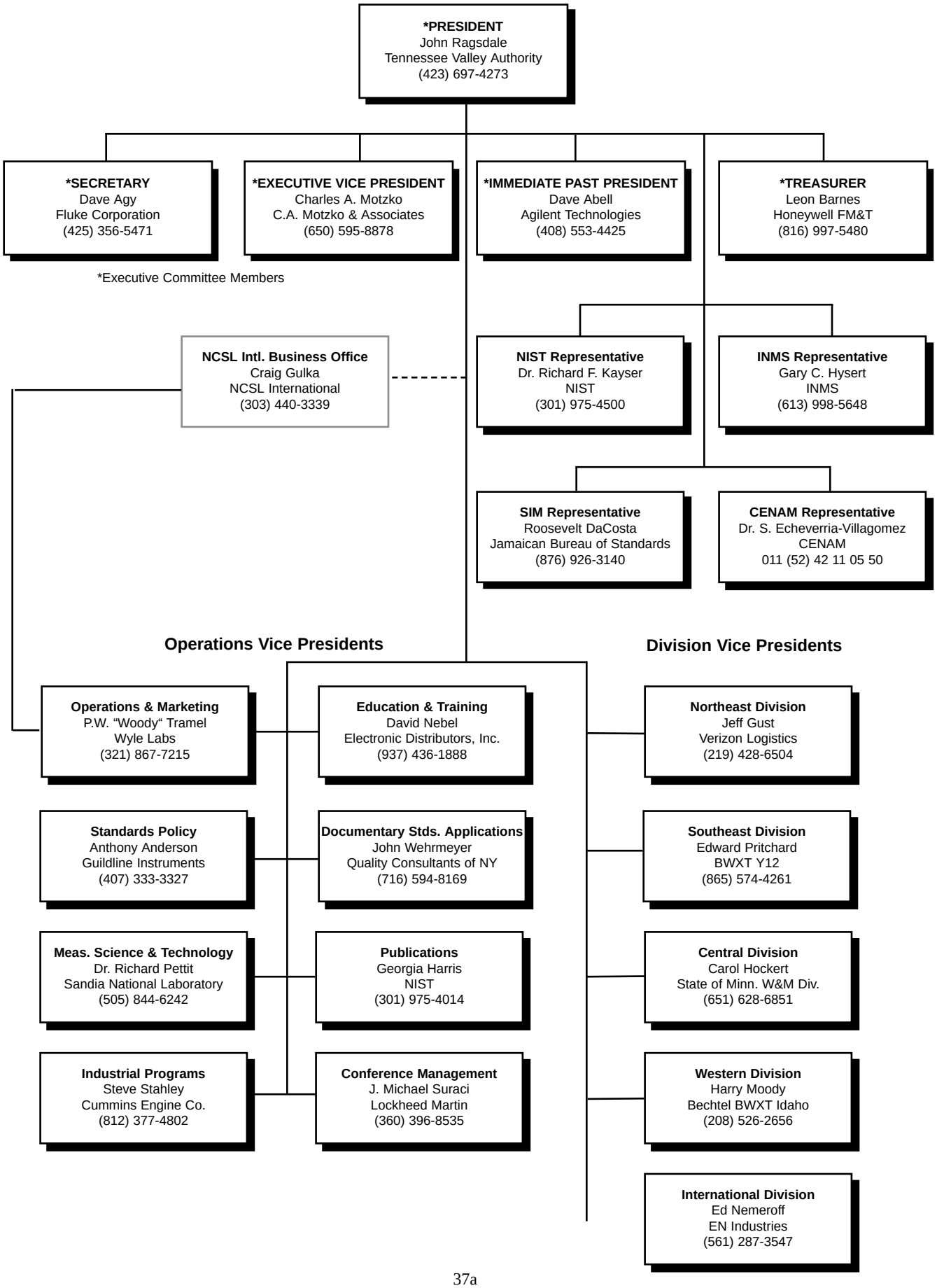
The first year's activities were accomplished without a formal regional structure.

For Contrast

The 2001 Worldwide activities of the NCSLI now include:

39 Standing Committees
70 Regions and Sections
24 Liaison Delegates

NCSL INTERNATIONAL BOARD OF DIRECTORS - 2001



LEST WE FORGET;
AN HONOR ROLL OF NCSLI CONTRIBUTORS

Forty years of accomplishments happened because willing industrial volunteers stepped up to the plate and put their time and energy into NCSLI. Over the years, some of the veterans have passed away, and this anniversary retrospective should recognize the names of those who were Friends, Associates, and Contributors.

It should be noted that many of the original Founding Fathers, whose names were listed on page 6a of the Narrative History of NCSLI, have passed on as well.

Ed. Note: The list has no particular order of service or of date of death.

Dr. Allen Astin
Dr. Joseph Simmons
Jacquelyn A. Wise
Dr. Churchill Eisenhart
Dr. Forest K. Harris
Jim Valentino
Max J. Unis
Lloyd B. Wilson
Bill Brenant
Chuck Gardner
Algie Lance
Herb Barclay
Joe Cameron
William A. Wildhack
Selden W. McKnight
Peter M. Clifford
Dr. Andrew Dunn
Andy J. Woodington
Dave O'Brien
Malcolm Shelton
John M. Fluke
David Packard
Mario Maury
Dr. Peter Lacy
Jack Sutcliffe
Donald Martin
Curtis Biggs
William Hewlett
Joseph F. Keithley
Ken Armstrong
Woodward G. Eicke, Jr.
James A. Harmon
Henry Sostman
Bascom Birmingham
Donald Greb
Norbert L. Kusters
Hank Gonzalez

FOUNDING MEMBER ORGANIZATIONS

Founding Member Organizations of NCSLI are a bit hard to identify after all these years. The following organizations were listed in the first "Directory of Standards Laboratories in the United States," 1964 Edition, or were companies with member delegates listed as committee chairmen, or they were listed as paying members in the 1965 edition of the directory. And, since the Founding Members supported our fledgling NCSLI with annual dues and with a commitment of their "Industrial Volunteer" Member Delegate's time and travel expense, it is proper to recognize them here.

A & M Instrument, Inc.,	Long Island, NY.
Aerojet-General Corp,	Sacramento, CA.
Wm. Ainsworth & Sons, Inc.,	Denver, CO.
Airesearch Mfg. Co.,	Phoenix, AZ.
Allegany Ballistics Laboratories,	Cumberland, MD.
Allied Amphenol Products,	Sidney, NY.
Allied Bendix Aerospace,	Kansas City, MO.
American Instrument Co.,	Silver Spring, MD.
Automation Industries, Vitro Labs,	Silver Springs, MD.
AVCO/Textron,	Wilmington, MA.
Battelle Memorial Institute,	Columbus, OH.
Bausch & Lomb, Inc.,	Rochester, NY.
The Bendix Corp.,	Sidney, NY.
James G. Biddle Co.,	Plymouth Meeting, PA.
Boeing Aerospace Co.	Seattle, WA.
Brush Instruments Co.,	Cleveland, OH.
Bunker Ramo Corp.,	Canoga Park, CA.
Charles Stark Draper Labs,	Cambridge, MA.
Collins Radio Co.,	Cedar Rapids, IA.
Daystrom, Inc.,	Newark, NJ.
Douglas Aircraft Co.,	Santa Monica, CA.
EG&G, Inc.,	Las Vegas, NV.
Electro-Scientific Industries Inc.,	Portland, OR.
Endevco,	San Juan Capistrano, CA.
The Eppley Laboratory, Inc.,	Newport, RI.
Federal Electric Corp.,	Paramus, NJ.
John Fluke Mfg. Co.,	Seattle, WA.
Garrett Turbine Engine Co.,	Phoenix, AZ.
General Dynamics Corp.,	San Diego, CA.
General Electric Co.,	Richland WA.
General Electric Co.,	Oklahoma City, OK.
General Electric Co.,	Palo Alto, CA.
General Electric Co.,	Schenectady, NY.
General Electric Co.,	Pittsfield, MA.
General Electric Co.,	West Lynn, MA.
General Precision Aerospace,	Little Falls, NJ.
General Precision, Inc.,	Van Nuys, CA.
GenRad,	Concord, MA.
Grumman Aerospace Corp.,	Bethpage, NY.
Hercules, Inc.,	Magna, UT.
Hewlett-Packard Co.,	Palo Alto, CA.
Holt Instrument Laboratories,	Oconto, WI.
Honeywell, Inc.,	Philadelphia, PA.
Hughes Aircraft Co.,	El Segundo, CA.
IBM,	Kingston, NY.
Inland Testing Laboratories,	Morton Grove, IL.
Julie Research Laboratories, Inc.,	New York, NY.
Lawrence Livermore Nat'l Lab.,	Livermore, CA.
Lear Siegler, Inc.,	Grand Rapids, MI.
Lear Siegler, Inc.	Grand Rapids, MI.
Leeds & Northrup Co.,	North Wales, PA.
Ling-Temco-Vought,	Honolulu, HI
Ling-Temco-Vought,	Dallas, TX.
Lockheed California,	Burbank, CA.
Lockheed-Georgia Co.,	Marietta, GA.
Lycoming,	Stratford, CT
Martin-Orlando,	Orlando, FL.
MIT,	Cambridge, MA.
Melpar, Inc.,	Falls Church, VA.
Memcor,	Huntington, IN.
Mettler Instrument Corp.,	Princeton, NJ.
Midwest Gage Lab.,	Chicago, IL.
Motorola, Inc.,	Phoenix, AZ.
National Astro Labs,	Pasadena, CA.
Niagara Mohawk Power Corp.,	Syracuse, NY.
Northrop-Norair,	Hawthorne, CA.
Pan Am World Services Co.,	Los Angeles, CA.
RCA,	Cambridge, OH.
RCA,	Camden, NJ.
RCA,	Patrick AFB, FL.
Raytheon Co.,	Charleston, SC.
Rockwell International,	Anaheim, CA.
Sandia National Labs.,	Albuquerque, NM.
Singer Co., Kearfott Div.,	Little Falls, NJ.
Soiltest, Inc.,	Evanston, IL.
Sperry Gyroscope Co.,	Great Neck, NY.
Sperry Rand Corp.,	St. Paul, MN.
Sperry Rand Corp.,	Troy,MI.
SSCO Standards Labs., Inc.,	Southfield, MI.
Stoddart Aircraft Radio Co.,	Hollywood, CA.
TRW,	Redondo Beach, CA.
U.S. Air Force, Aerospace Guidance and Metrology,	Newark, OH.
U.S. Air Force,	Vandenberg AFB, CA.
U.S. Navy, Metrology Engineering Div.,	Pomona, CA.
U.S. Navy, Eastern Primary Standards Lab.,	Washington, DC.
U.S. Navy, Western Primary Standards Lab.,	San Diego, CA.
U.S. Pacific Missile Range,	Point Mugu, CA.
Vitro Laboratories,	Silver Spring, MD.
Varian Associates,	Palo Alto, CA.
Western Electric Co. Inc.,	Winston Salem, NC.
Yellow Springs Instrument Co.,	Yellow Springs, OH.