

THE METROLOGY AROUND THE WORLD: EXPERIENCE OF YEARS OF INTERNATIONAL COOPERATION AT NIST

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Introduction

Participation in International cooperation in the measurement sciences has a history that dates back even further than the establishment of a National Metrology Institute (NMI) in the United States. The U.S. recognized the importance international cooperation in the measurement sciences in the late 1800's when, in 1870, the predecessor to the National Institute of Standards and Technology (NIST) attended a conference in Paris to consider the advisability of constructing new metric standards with 14 other countries: Austria, Colombia, Ecuador, France, Great Britain, Greece, Italy, Norway, Peru, Portugal, Russia, Spain, Switzerland, Turkey and the U.S. As a result of these early discussions, the Treaty of the Metre was ratified on September 27, 1878 by the US Congress and thus began our long and illustrious history of international cooperation.¹

Since that time, the NMI for the U.S. has undergone a couple of name changes, most recently to NIST in 1988, and an expansion of its mission, but its commitment to the international measurement community remains strong as evidenced by the extensive and vibrant relationships NIST has with its colleagues throughout the world.

In the 1970s, the National Bureau of Standards (NBS) began to expand its international programs with support from the U.S. Agency for International Development (US AID). This support allowed NBS to work with specific "Less Developed Countries" ² on determining the effectiveness of national metrology institutes, which included their effectiveness in providing standardization and

measurement services that benefited smaller farmers and urban workers. Throughout the years, since the U.S. participation in the Convention of the Metre, its international cooperation has been developed around formal and informal arrangements. Formally, NIST engages in government to government or institute to institute agreements in support foreign policy objectives such as trade and market access agreements, as well as infrastructure development programs and peace initiatives supported by U.S. agencies, the World Bank, regional development banks or donor organizations. Informally, arrangements are typically scientist to scientist cooperative agreements. Included in both types of arrangements are opportunities for scientist exchanges which continue to play a large part in promoting international cooperation.

Cooperative Arrangements – Multilateral

The largest and certainly the oldest international cooperative metrology activity in which NIST participates is the Convention of the Metre. Although the U.S. has been a part of this multilateral cooperation since its conception in 1870, NIST's participation began in 1901 with the creation of NBS.

NIST's second largest and most diverse multilateral cooperation is with the institutes responsible for metrology in the 34 member states of the Organization of American States (OAS). The revitalized Sistema Interamericano de Metrologia (SIM), as it is called today, is a regional structure established in 1995 with the help of Centro Nacional de Metrologia (CENAM) and the assistance of the OAS and the Department of State (DOS) to train technical staff, to educate policy makers in metrology, and to

harmonize measurements in the Americas. SIM is a unique and remarkable success story as most of the countries of the Americas participate in its regional activities, regardless of their individual economic status or technological advancement.

SIM's history dates back to the 1970's when NIST, as NBS, with support from USAID and OAS carried out a series of workshops, seminars and training of technical staff from the region. The cooperation among NBS, U.S. AID and OAS resulted in the initial establishment of SIM. This original SIM included 13 Latin American countries. At that time, U.S. served primarily as provider of technical assistance. Unfortunately, many of the metrology institutions developed during that initial project, have subsequently, been compromised by turbulent economic politics that characterized the region in the late 1970's.

Cooperative Arrangements – Bilateral

From the 1970's to the present, NIST has continued to participate in a series of government to government joint fund cooperative research programs established by the U.S. DOS to support a wide range of cooperative research. The rationale behind these programs was that collaborative research founded on the basis of mutual interest and benefit would strengthen the scientific productivity of each country, advance the frontiers of knowledge, and contribute to national economies and social development.

The Joint Funds of each country (Hungary, Poland, Korea, Israel, the former Czechoslovakia, the former Yugoslavia, Egypt, India, Croatia, Slovenia and Pakistan) were governed and managed by a bilateral Joint Board on scientific and technological cooperation. During the lifetimes of each of these programs, NIST has served as a member of each Board and the cooperative relationships established continue to this day. One example of success was the Metrology Institute for the Republic of Slovenia developed its Electrical Metrology Unit through a joint fund project with NIST.

Closer cooperative research with Mexico was spurred by the North American Free Trade Agreement which also hastened the creation of CENAM. NIST worked with the World Bank to provide technical cooperation with the CENAM staff and management in addition to providing extensive staff exchange which resulted in good personal and professional working relationship between the key technical leaders of both laboratories. An example of the benefits is a new cooperative approach to developing the standard reference materials needed to measure industrial emission in both the U.S. and Mexico. These reference materials provided each nation with the same measurement base. In addition, this means that the total development cost is lower than if the work was done independently.

Finally, CENAM has been one of NIST's prime examples of what cooperation in metrology can do. NIST's cooperation has played a significant role in promoting economic growth by assisting Mexico in establishing their own national metrology laboratory which serves as one of the lead laboratories in SIM and an equal partner with NIST.

Conclusion

These cooperative arrangements are a few highlights of NIST's participation in various international science and technology cooperative programs assuring that the US competes on a level field. Specifically, NIST participates in bilateral and multilateral agreements with counterpart institutes, other technical laboratories and national science foundations, provides opportunities for technical interactions, stimulates informal scientist to scientist collaborations and encourages cooperation through its foreign guest researchers program.

References

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- [2] Mason, H.L. and Peiser, H.S., *Metrology and Standardization in Less-Developed Countries: The Role of a National Capability for Industrializing Economies*, NBS Special Publication 359, 1971.

