

LEGAL METROLOGY

NIST/PML Office of Weights and Measures (OWM)

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Learning Objectives

- At the end of this session and using your notes, you will be able to:
 - Define Legal Metrology
 - Explain NIST's role in legal metrology
 - List two things NIST does to secure uniformity in weights and measures laws and applications

Legal Metrology

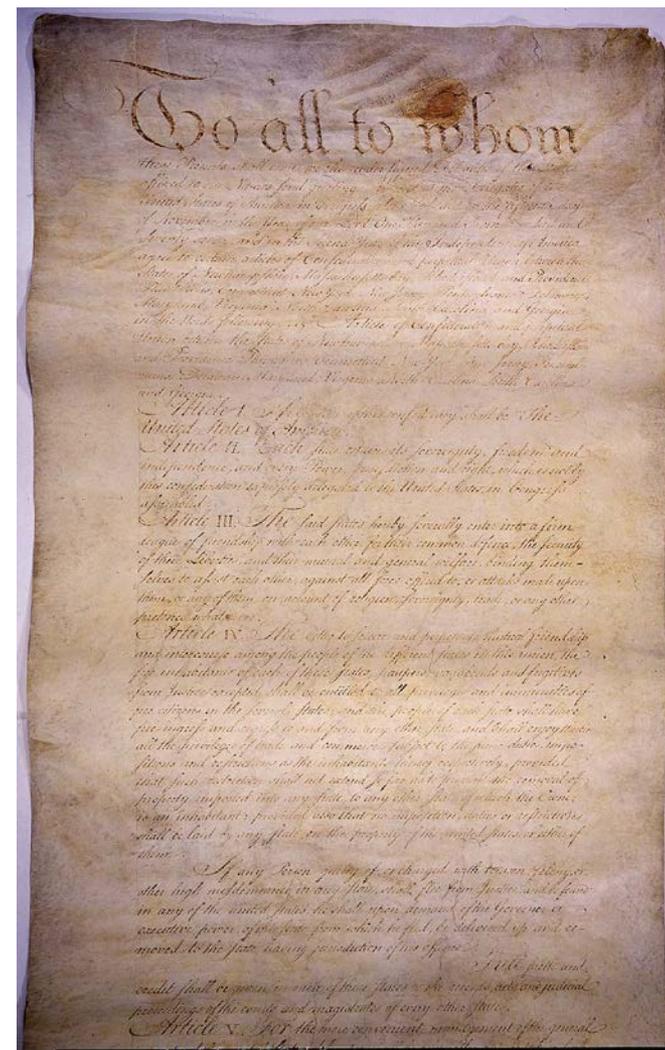
- Definition: The practice and process of applying statutory and regulatory structure and enforcement to metrology
- Commerce
- Law Enforcement
- Environment
- Health/Safety

NIST's Role in the Legal Metrology System

- To promote and help facilitate uniformity in legal metrology standards and practices, and provide metrological traceability to national standards.
- Note: Legal Metrology = Weights and Measures in the U.S.

1781: Articles of Confederation

- “The United States in Congress assembled shall also have the sole and exclusive right and power of regulating the alloy and value of coin struck by their own authority, or by that of the respective States – fixing the standard of weights and measures throughout the United States -”



1789: Constitution delegates responsibility to Congress to “...fix the standard of W&M”

WE, the People of the United States, in order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common Defence, promote the General Welfare, and secure the Blessings of Liberty to Ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.

A R T I C L E I.

Sec. 1. ALL legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

Sec. 2. The House of Representatives shall be composed of members chosen every second year by the people of the several States, and the electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislature.

No person shall be a Representative who shall not have attained to the age of twenty-five years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State in which he shall be chosen.

Representatives and direct Taxes shall be apportioned among the several States which may be included within this Union according to their respective Numbers, which shall be determined by adding to the whole Number of free Persons, including Indians taxed, three-fifths of all other Persons. The actual Enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by Law direct. The number of

Section 8. The Congress shall have the power

To coin money, regulate the value thereof, and of foreign coin,
and fix the standard of weights and measures

When vacancies happen in the representation from any State, the Executive authority thereof shall issue writs of election to fill such vacancies.

The House of Representatives shall choose their Speaker and other officers; and shall have the sole power of impeachment.

Sec. 3. The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof, for six years; and each Senator shall have one vote.

NIST Organic Act as Amended in 1950

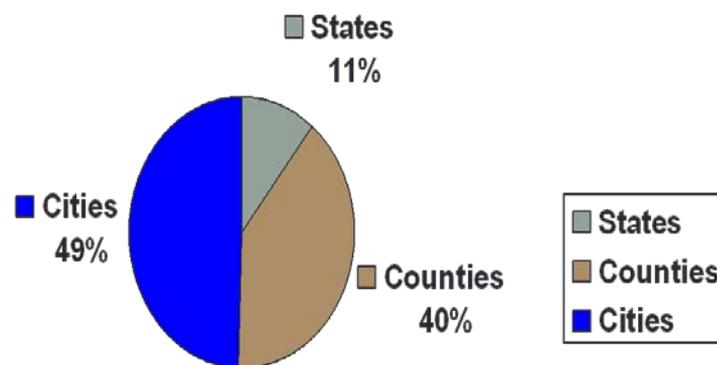
- “The Secretary is authorized to undertake the following functions:

Cooperation with the States in securing uniformity in weights and measures laws and methods of inspection”

Weights and Measures

- NIST has no:
 - police power or authority over the States.
 - we obtain uniformity and provide traceability through cooperation, standards development and training.
- Most weights and measures inspection activities are carried out at the state and local level.

U.S. Weights and Measures Jurisdictions*



55 States & Territories
200 Counties
250 Cities
505 Total W&M Jurisdictions

*the number of jurisdictions and percentages are estimates only.

OWM Mission

- To improve the accuracy of measurements, enhance consumer protection, foster fair competition, and facilitate economic growth and trade through technical activities that promote uniformity in national and international legal metrology laws, regulations, standards, test procedures, and enforcement.

Activities

• **Coordination**

- of responses to regulatory issues to promote uniformity and fair trade.

• **Technical Support to Stakeholders**

- Regulatory officials
- Business & industry
- Standards Committees
- Federal Agencies
- Laboratories

Training

- State and Industry Laboratory Metrology
- Field Officials
- Administrators

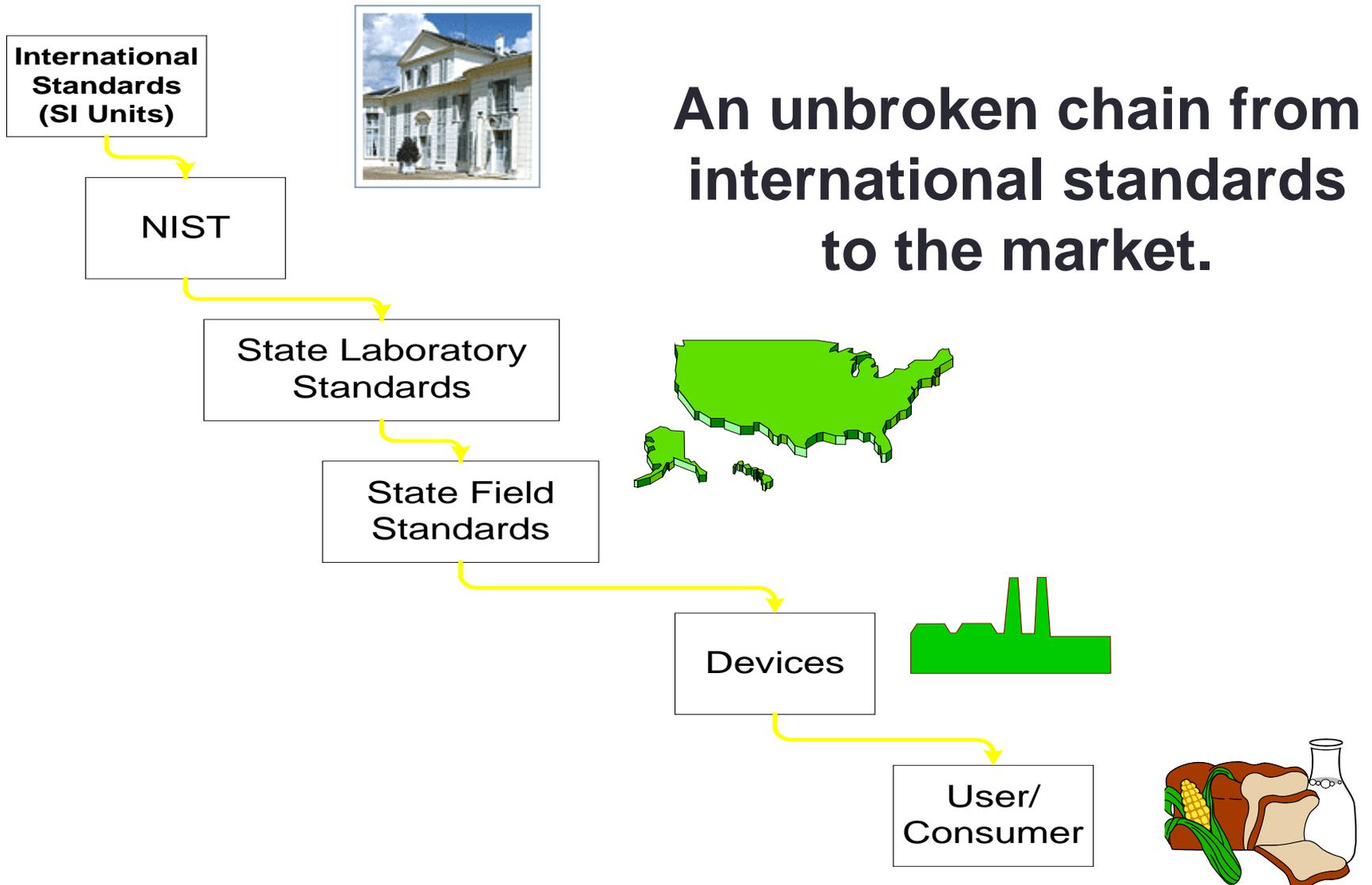
• **Information Dissemination**

- Publications and NIST Handbooks
- Website

• **Representation**

- OIML, SIM, APLMF and other international organizations

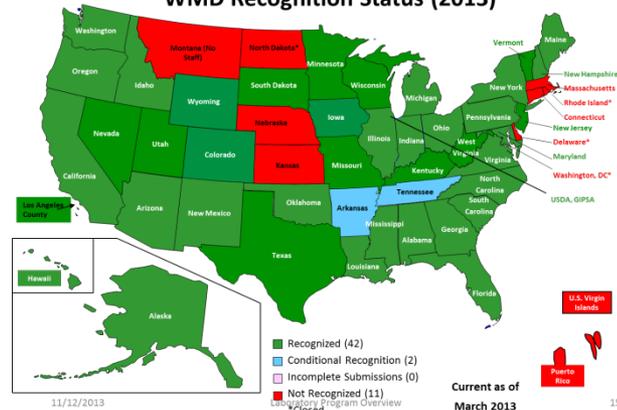
Metrological Traceability



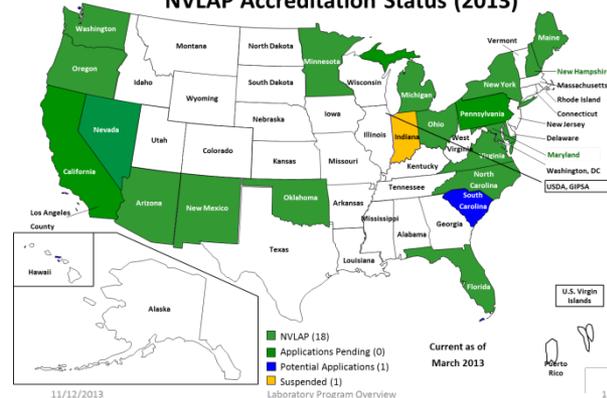
State Laboratory Recognition

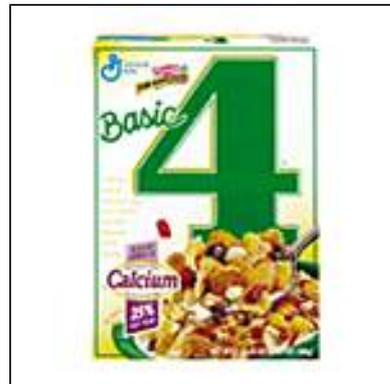
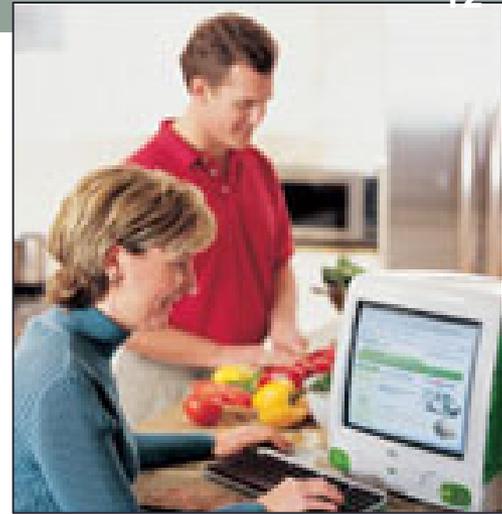
- Most states have a state run laboratory
 - Some counties and territories
- Laboratory metrologists trained at the NIST training laboratory for mass, volume and length calibrations
- Required to comply with NIST Handbook 143 for certificate of traceability
 - Requirements are identical to ISO 17025 with some additional legal requirements

U.S. State Metrology Laboratories
WMD Recognition Status (2013)



U.S. State Metrology Laboratories
NVLAP Accreditation Status (2013)





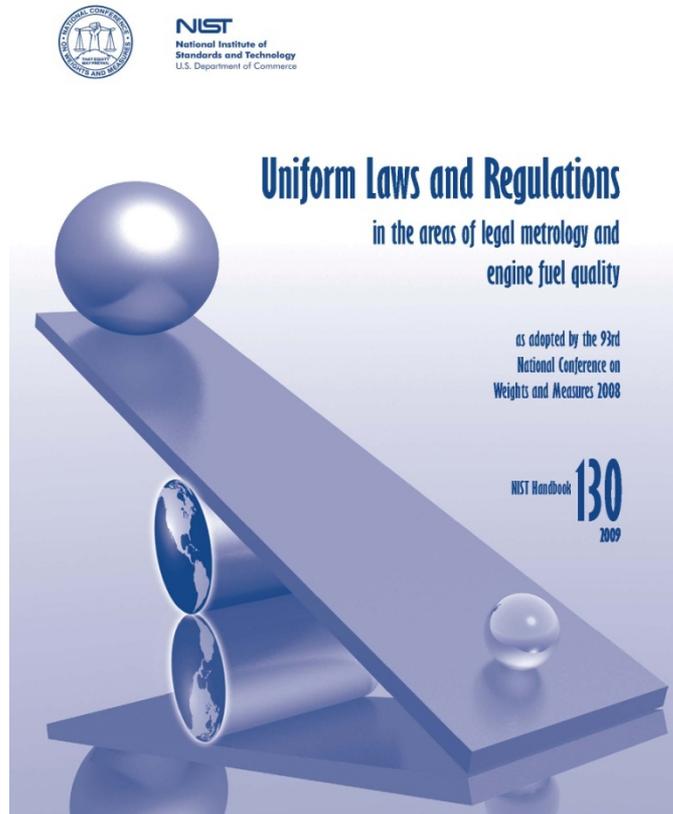




National Conference on Weights and Measures (NCWM)

- Established by NBS (NIST) in 1905
 - Privatized in 1999
- A unique collaboration between industry and government to further cooperation with States and encourage uniformity
- Voluntary standards organization
 - Standards developed through a committee and public hearing process
 - Uniformity is achieved through adoption and use of the standards

NIST Handbooks 44, 130, 133



- *“Uniform Laws and Regulations in the areas of legal metrology and engine fuel quality”*
- Published by NIST to promote uniformity
- Developed through the NCWM
- Uniform laws and regulations
 - Serve as template or model
- Adoption by States:
 - Some adopt in entirety
 - Some use as guideline
 - Some do not use at all

Training

Training	2011	2012	2013
Total number of students	450	615	633
in Webinars	300	448	110
Total number of courses	40	51	47
Webinars offered	30	28	16

New Technologies

Examples:

- Electric Vehicle Charging
- Hydrogen Cars
- Taxis using GPS as a basis for charging fees
- Compressed Natural Gas Vehicles

OWM Develops:

- Method of Sale
- Documentary Standards
- Test Standards
- Test Methods
- Training

International Legal Metrology Activities at NIST

International Organization of Legal
Metrology (OIML)

Sistema Interamericano de Metrologia (SIM)

Asia-Pacific Legal Metrology Forum
(APLMF)

Summary

- Defined legal metrology
- NIST Role in legal metrology
 - Non-regulatory
 - Technical expertise
 - Metrological Traceability
- Office of Weights and Measures Activities
 - Training
 - Publications
 - Representation
 - Technical Assistance
 - Coordination