

WORLD METROLOGY DAY

A Perspective from NIST

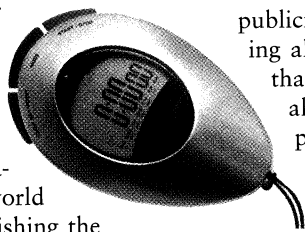
MAY 20, 2008

by Belinda L. Collins,
Director Technology Services, NIST

The origin of the Treaty of the Metre is discussed as the inspiration for World Metrology Day on May 20 each year. Themes for the 2007 and 2008 celebration of this event are presented, along with an explanation of the role that metrology plays in both measurements for the environment (the 2007 theme) and in sports (the 2008) theme. Details are given on the NIST celebration in 2007 along with plans for the 2008 celebration.

In 1875, 20 nations met in Paris to finalize the Treaty of the Meter, establishing what has become known as the International System of Units (SI) or metric, as the world system for measurement. The treaty establishing the Metre Convention was signed on May 20, 1875. The Convention created the International Bureau of Weights and Measures (BIPM) and set the framework for global collaboration in the science of measurement and in its industrial, commercial and societal applications. Today there are 51 Members of the Convention and 17 Associate States and Economies of the General Conference on Weights and Measures. The original aim of the Metre Convention – the worldwide uniformity of measurement – remains as important today, in 2008, as it was in 1875.

This is the fourth year that World Metrology Day will be celebrated around the world. Three years ago, the International Bureau of Weights and Measures (BIPM) formally established May 20th as World Metrology Day, and encouraged such



National Measurement Institutes as the National Institute of Standards and Technology (NIST) to celebrate metrology and its importance to society.

NIST had its inaugural celebration of World Metrology Day on May 21, 2007. The theme was Measurements in our Environment. NIST research and measurements provide a significant foundation for environmental measurements. NIST invited a set of speakers to discuss NIST research and measures for the environment from a variety of perspectives, including climate research and applied technology in the built environment. NIST publicized the events with a variety of announcements, including all-staff e-mails, posters around NIST, and a declaration that May is Metrology Month. The NIST Research Library also created a collection of resources, both electronic and physical, which were on display throughout the month of May.

At the actual celebration, the following talks were given:

- Introduction to Measurements for the Environment and Climate Monitoring – Dr. Katharine Gebbie (Physics Laboratory)
- Climate Research: A Challenge for Metrology– Dr. Jerry Fraser (Physics Laboratory)
- Measurements and Standards to Characterize the Atmospheric Column – Ms. Pam Chu (Chemical Sciences and Technology Laboratory)
- Measurements and Methods to Remove Barriers facing the Photovoltaic Industry – Mr. Hunter Fanney (Building and Fire Research Laboratory)
- Concluding remarks –Dr. Willie May (Chemical Sciences and Technology Laboratory)



BIPM, Pavillon de Breteuil, France

For May 20, 2008, Dr. Andrew Wallard, Director of the BIPM in Paris, has announced that this year's theme is Metrology and Sports, recognizing the importance of measurements for time, length, mass, and physical fitness for sports, in this Olympic year. While you might think that metrology for sports is totally settled, with no current challenges, you may be surprised to learn that a recent marathon course in Chicago was inadvertently set to be one mile too long. The error was discovered only after the Lakeshore Marathon race had been completed.¹ Another use of metrology in sports comes from the U.S. car racing community, where the ruling body (NASCAR) imposes a $\frac{1}{4}$ inch tolerance² on ride heights of cars. A race car was recently disqualified because its front end didn't meet the minimum height requirement. Similar tolerances are required for car weight in NASCAR races. In swim events, electronic timers takes precedence over conventional timing, with a requirement that timing have a tolerance of 0.001 second. Of course, swimming pools must conform to national and international standards for length, while mass measurements underpin weight requirements for race horse jockeys

to weight lifting. Information on measurement requirements for a number of sports can be found at www.infoplease.com/ipa/A0113430.html

The United States is slowly transitioning its measurements for sports to the global system. We regularly compete in 10K runs, for example. The Metric Program of the U.S. Department of Commerce offers Sporting Fast Facts to help understand units used in international events such as the Olympics. Examples include specifications for road racing bikes, whose frames are made from steel, aluminum, titanium, or carbon fiber, and which must be strong and lightweight (8 to 10 kilograms). Almost all track and

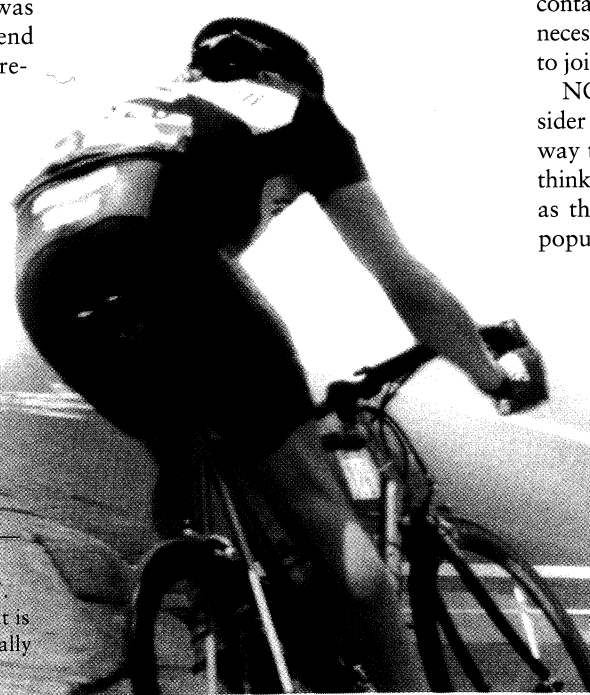
field events involve the use of metric measurements. For example, competitors in the high jump are allowed a 25-meter run-up, the uprights are placed 4 meters apart, and the bar itself must not weigh more than 2 kilograms. For more examples, see: <http://ts.nist.gov/WeightsAndMeasures/Metric/olympics.cfm>.

Length, time, and mass are not the only measurements that affect sports, however. The use of chemical measurements to test for traces of performance-enhancing drugs, such as steroids and hormones, has become an increasingly familiar requirement for fair competition in events ranging from the Tour de France to baseball. Linking to last year's World Metrology Day theme, measurements of air quality can be an important component that affects athletic performance. Still another use of metrology is found in a project at NIST which is providing measurements and standards for replacement joints needed by athletes and others as the originals wear out. See www.orthosupplier.com/bonezone/online/2007/fall/editorial_dagalakis.pdf All of these standards and requirements trace back to measurements made at the various NMIs, and ultimately back to the SI maintained by the BIPM.

NIST is planning another celebration for May 20, 2008, with talks on metrology in sports, as well as a set of information resources in the NIST Research Library. If you will be near NIST on May 20, please contact Sandra Auchmoody to make the necessary security and visitor arrangements to join us. Sandra.auchmoody@nist.gov

NCSLI encourages its sections to consider events for Metrology Day! It's a great way to make metrology come alive as we think about its applications to society, such as the Olympics, Super Bowl, and other popular sporting events. ■

belinda.collins@nist.gov



¹ Associated Press, "Extra Mile Upsets Marathoners in Chicago," June 3, 2005.
² Customary units are used here since that is the NASCAR specification; NIST normally reports measurements in SI units.