

## DD Ignacio leads APMP PH delegation to Singapore SI takeoffs into the future



ITDI Deputy Director for ATS Dr. Diana L. Ignacio (*eighth from left*) led the Philippine Delegation to the 34<sup>th</sup> Asia Pacific Metrology Programme, General Assembly and Related Meetings held on November 20-30, 2018 at Resorts World Sentosa in Singapore. With her were MJNRatio, JMDLatosa, KPSuycano, FCBueno, CSDaniel, MSAAguineldo, BSEbarvia, MISalazar, LNOTaleon, MMRuiz, SPBLEones, TAnacleto and MREnot.

November 20, 2018 may just be an ordinary day for some, but certainly not for metrologists the world over.

Months earlier, metrologists and policy-makers across the world came and gathered in this momentous event at the General Conference on Weights and Measures (CGPM) in Versailles, France to witness the evolution of the International System of Units (SI).



The proceedings of the 34<sup>th</sup> APMP General Assembly and Related Meetings were re-echoed in the seminar “The New SI and Current Issues and Trends in Metrology” held last January 18, 2019 at NML in Taguig City. The seminar was formally opened by ITDI OIC Dr. Annabelle V. Briones and DD Ignacio (*seventh and eight from left*). With them were (*from left to right*) MSAAguineldo AEOrdoña, JMDLatosa, BSEbarvia, MREnot, MMRuiz, NML Chief Aurora V. Kimura, MISalazar, ABTongson, CSDaniel, SPBLEones, FCBueno, KPSuycano, and LNOTaleon.

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Maryness Salazar

This time in November during the 34<sup>th</sup> Asia Pacific Metrology Programme (APMP) General Assembly and Related Meetings held on November 20-30, 2018 at Resorts

World Sentosa in Singapore, a new page in SI history was flipped to change the century-old vision of James Clerk Maxwell’s definition of the SI units based on the immutable constants of nature.

Delegates from sixty countries, including 14 from the Philippines led by ITDI Deputy Director for Administrative and Technical Services Dr. Diana L. Ignacio, witnessed the ratification of the new definitions of Kelvin, ampere, mole, and kilogram.

The new SI definition will officially take effect on May 20, 2019 during the World Metrology Day. Further, National Metrology Institutes, like ITDI’s National Metrology Laboratory (NML) as the Philippine representative to SI, are tasked to promote awareness about the four re-defined units of measurement.

## Re-defining SI

As stated by the International Bureau of Weights and Measures (BIPM) Director Dr. Martin Milton, *“the new definitions have the advantage of being able to embrace future improvements in measurement methods because they are firmly based on the laws of physics that will use the rules of nature to create the rules of measurement linking measurements at the atomic and quantum scales to those at the macroscopic level”*.

In this statement, Dr. Milton affirmed the idea of Maxwell of having absolutely permanent measurement standards.

Take for instance the International Prototype Kilogram which when measured in 1988-1991 had a mass around 50 µg (micrograms) less on average than the other six identical cylinders surrounding it in a room at Pavillon de Breteuil in the BIPM. Despite being fabricated from a very special material, IPK is deemed to continuously drift over time.

But, this is resolved by the Planck constant. With the revised SI, the kilogram is defined in terms of Planck constant instead of the mass of IPK, which is physically unstable. In this context, SI will be able to cope with the fast-changing developments in science and technology. Even if it takes a millennia to this day, the kilogram of May 20, 2019 and onward, based on the Planck constant, will exactly be the same.

A short description of the four base units redefined from the NPL website is as follows:

- The kilogram will be defined in terms of the Planck constant ( $h$ ) instead of the mass of a metal cylinder called the International Prototype Kilogram (IPK);
- The ampere will be defined in terms of the elementary charge ( $e$ ) instead of an imaginary and impossible experiment involving the force between two infinite parallel, current-carrying wires;
- The kelvin will be defined in terms of the Boltzmann constant ( $k$ ) instead of by the point at which water coexists as a liquid, solid, and gas; and
- The mole will be defined in terms of the Avogadro constant ( $N_A$ ) instead of a quantity intimately connected to measuring the mass of a sample.

With this, all the seven base units (meter for measurement of length; kilogram for mass; second for time; ampere for electric\_current; kelvin for temperature; candela for luminous intensity, and mole for amount of substance) will now be founded on natural constants. This makes all quantities constant, accessible, and practical.

While these changes might have little or no effect on daily lives of the common man, for metrologists and those who perform high accuracy measurements in their research or experiments, the redefinition will be of enormous benefit.

The redefinition activities will be a work in progress as NMIs across the world will do their part to realize the new definitions. (LNAbian, MISalazar, JAGTrillana\ NMD)

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