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Measurements in a dynamic world

As a mechanical engineer, the first thought that comes to my mind is that dynamics is a branch of applied physics, specifically the field of classical mechanics which is concerned with the study of forces and torques and their effect on motion. The study of dynamics falls under two categories: linear (quantities such as force, mass/inertia, displacement, velocity, acceleration and momentum) and rotational (quantities such as torque, moment of inertia/rotational inertia, angular displacement, angular velocity, angular acceleration and angular momentum). Very often, objects exhibit both linear and rotational motion.

Numerous instruments are utilized in “dynamic” legal metrology; some examples are:

- automatic weighing instruments, which can weigh items while in motion,
- electricity meters, which measure of the flow of electrons,
- various types of instruments that measure the flow of water,
- the flow of various other liquids and gases, and
- taximeters.

In English, however, the word “dynamic” relates not only to motion but also to change.

One example that highlights this continuous and productive change which encompasses many different sciences (including metrology) and engineering disciplines is space travel. On December 17, 1903 the Wright brothers made the first controlled, self-powered sustained flight. On October 4, 1957, the USSR placed in orbit the Sputnik 1, the first artificial satellite of Earth. On July 20, 1969, the first manned lunar landing was achieved by the United States’ Apollo 11 mission. In 1998 the first components of the International Space Station (ISS), or habitable artificial satellite, were put into low Earth orbit. In 2012, NASA’s Curiosity succeeded in landing on and exploring Mars. More recently in November 2014 the ESA’s Rosetta mission landed its Philae probe on a comet.

In the metrology community we are now seeing significant changes related to the definition of certain SI units as work on the new definition of the kilogram nears completion. Research continues to be successful in refining values and equipment used in the definition and the *mise en pratique* of other SI units.

While metrology, the science of measurement, is as old as human civilization it continues to constantly change; it continues to see forward acceleration and it continues to be dynamic. It is truly a fascinating time to be a part of this very dynamic work that we call “metrology”.