IAU votes to redefine the astronomical unit – giving it a constant value

September 19 2012, by Bob Yirka

Credit: NASA

(Phys.org)—Members of the International Astronomical Union have voted to approve a change to the definition of the famous "astronomical unit" aka, AU, from one based on variable data, to a definite number. The change has been a long time coming and will allow those in the field to describe their work more easily and will allow professors to forego the lengthy explanation of the prior definition to new students.

The AU is at its root a measure of the distance between the Earth and the sun; which was first calculated by the famous astronomer Giovanni Cassini who noted the position of Mars while standing in Paris and compared it to its angle in the sky when viewed from a site in South America at the same moment in time. Using parallax he was able to come up with a very close estimate of just how far the Earth was from

Mars, and then the Earth from the sun, which he said should be about 140 million kilometers. That eerily accurate figure came to be used throughout astronomy as a standard for describing distances in the visible solar system. To make it more accurate, the calculation was changed in 1976 to include a tie to the sun's mass, which for newcomers to the field only made things more difficult to understand. It also didn't take into account the fact that the sun is gradually shrinking.

Subsequent new developments in science and technology have led to much more precise ways to measure the distance between solar objects, which served to make using the old calculation even more obsolete. The only reason it's lingered as long as it has, astronomers say, is because everyone was used to it and thought changing things might be too disruptive.

That line of thinking apparently gave away to common sense at the latest meeting of the IAU, as members voted to make the AU an exact 149,597,870,700 meters, which is the average mean distance between the Earth and sun when viewed from the Earth. This last point is important because the old calculation violated Einstein's Theory of Relativity in that using it should have given different answers depending on where the measurement was taken, i.e. from different objects in the solar system.

Most in the field seem to be relieved to finally have the AU changed to a constant, believing it will help make their work more accurate and because it will, of course, require a lot less explaining to those new to astronomy.

astronomical-constant.html