appeared on 8th Feb 2006

# Are there 10 planets or just 8?

What should count as a planet is getting somewhat resolved, says S.Ananthanarayanan.

More powerful telescopes and other equipment are leading to more detail of the heavens available down on earth. Innumerable new objects have been discovered to be orbiting our world and there has been more thinking on which of these can be called planets.

**New kid on block**

2003 UB 313, an object, 97 times further away from the sun than the earth (which is more than twice the distance of Pluto), was spotted in 2003. When it was announced in July 2005, its co-discoverer, Mike Brown said, “Its definitely bigger than Pluto”. This made it the largest object in the solar system discovered since Neptune and its moon, Triton, discovered in 1846, or Pluto, discovered in 1930.

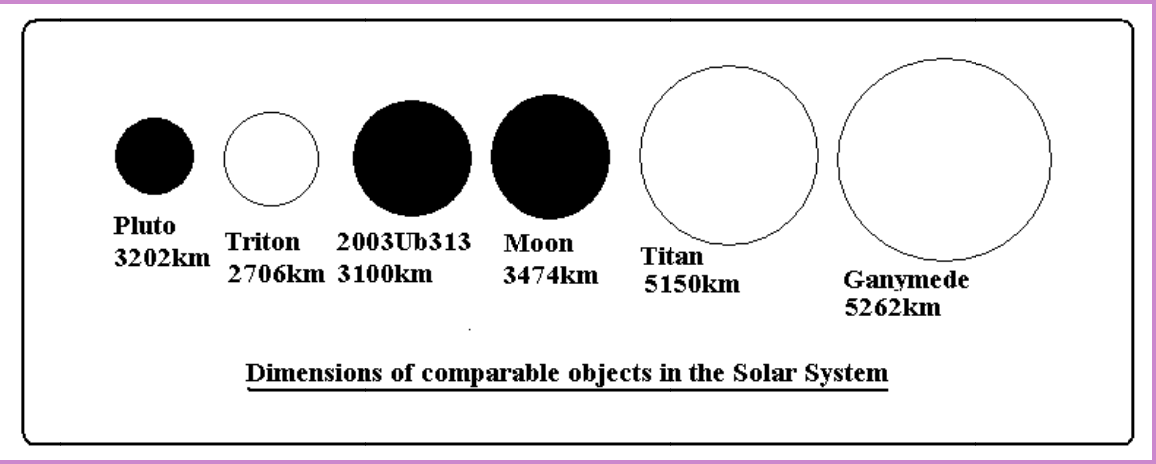
Since the announcement of the 2003 UB 313, the question has been raised, “is it a planet or is it not?” One line of response suggests that the line should be drawn at Pluto, the 9$^{th}$ planet, a culturally accepted number, and to admit no more. A more scientific answer was that as Pluto had been accepted, objects larger than Pluto should be included. But the question has not been decided by any authoritative body of astronomers and scientists.

**Measuring the size**

2003 UB 313 is barely visible, as a dot, in the most powerful telescopes. Measuring so distant and faint an object is not possible directly. Pluto had first been proposed to explain deviations in the orbits of other planets and was finally discovered in 1930. But it still took many years to become sure about its size. It was first thought to be about the size of the earth, but was finally found to be smaller than the moon!

The indirect method used is via the amount of light that the object reflects. Now how much light an object reflects would depend on 2 things – how large it is, which is what we are interested in, and what fraction of the light that falls on it actually reflects. One way to know these factors separately is to find how much of incident radiation the object absorbs, so that it reflects the remainder. This factor, fortunately can be discovered by finding out the temperature of the object.

It can be worked out that at its distance from the sun, 2003 UB 313 receives sunlight that should make its temperature around 248ºC below freezing, the exact figure depending on how much of the sun’s heat it reflects. Now, a body radiates heat at a predominant frequency which depends on the temperature of the body. The instruments we have today are accurate indeed in determining this frequency and the news is that 2003 UB 313




**Dimensions of comparable objects in the Solar System**

reflects a large part of the radiation that it receives. This information, with the actually brightness of the object, reveals how large it is. And the size has been found to be 3100 km, larger than Pluto, at 2,300 km and smaller than the moon, at 3474 km.

**Is it a planet?**

Until the 19th century the word 'planet' meant an object that went around the sun with a largely circular orbit, and did not have a tail, like a comet. Many objects in the belt between Mars and Jupiter then got included in the list of planets. When the number of such objects got out of hand, they were renamed 'asteroids' or little planets.

Now, with the addition of Pluto and the discovery of 2003 UB 313, and many more objects, we are getting back into a state like in the mid 19th century. A committee of the International Astronomical Union is meeting to see what to do.

One possibility is to say objects of the size of Pluto or more would count. This would put us straightaway at 10 planets. Another possibility is that objects with enough mass to become spherical should be treated as planets. This would add a large number!

Another alternative is to say that objects with a unique orbit, which implies that they be both massive and far from gravitational influences, are planets. By this definition, we would have only 8 planets, as Pluto would not qualify.