Students Across the Western US Measuring the Outer Solar System

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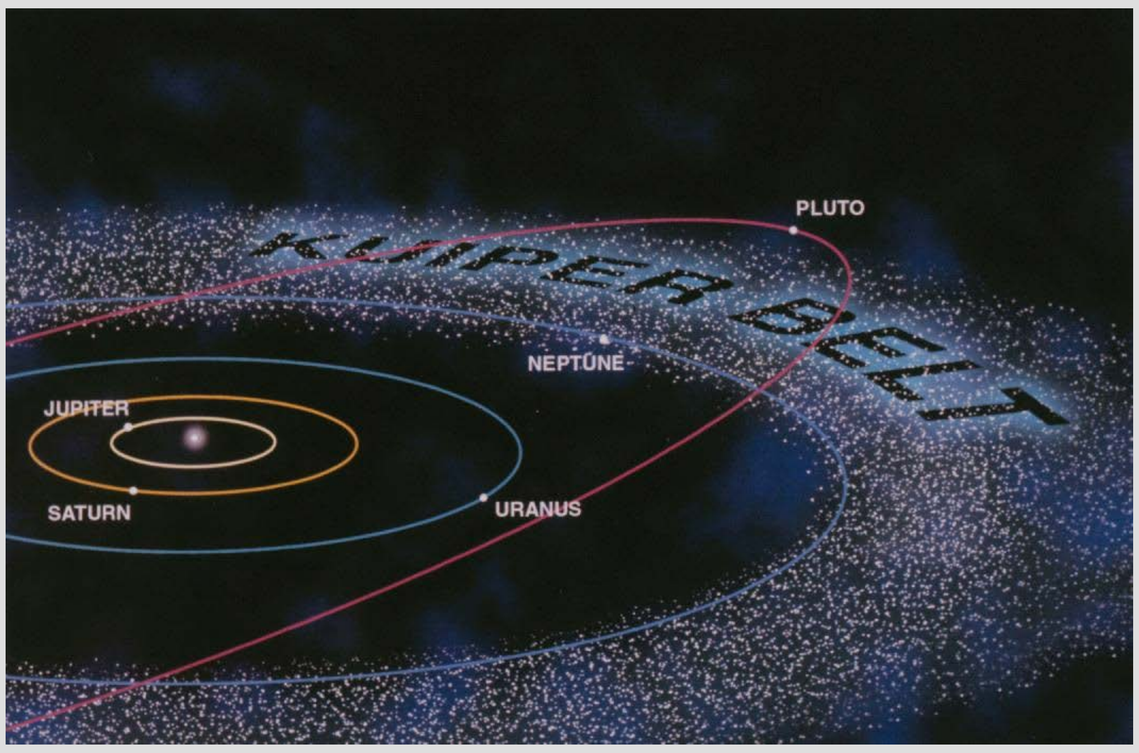
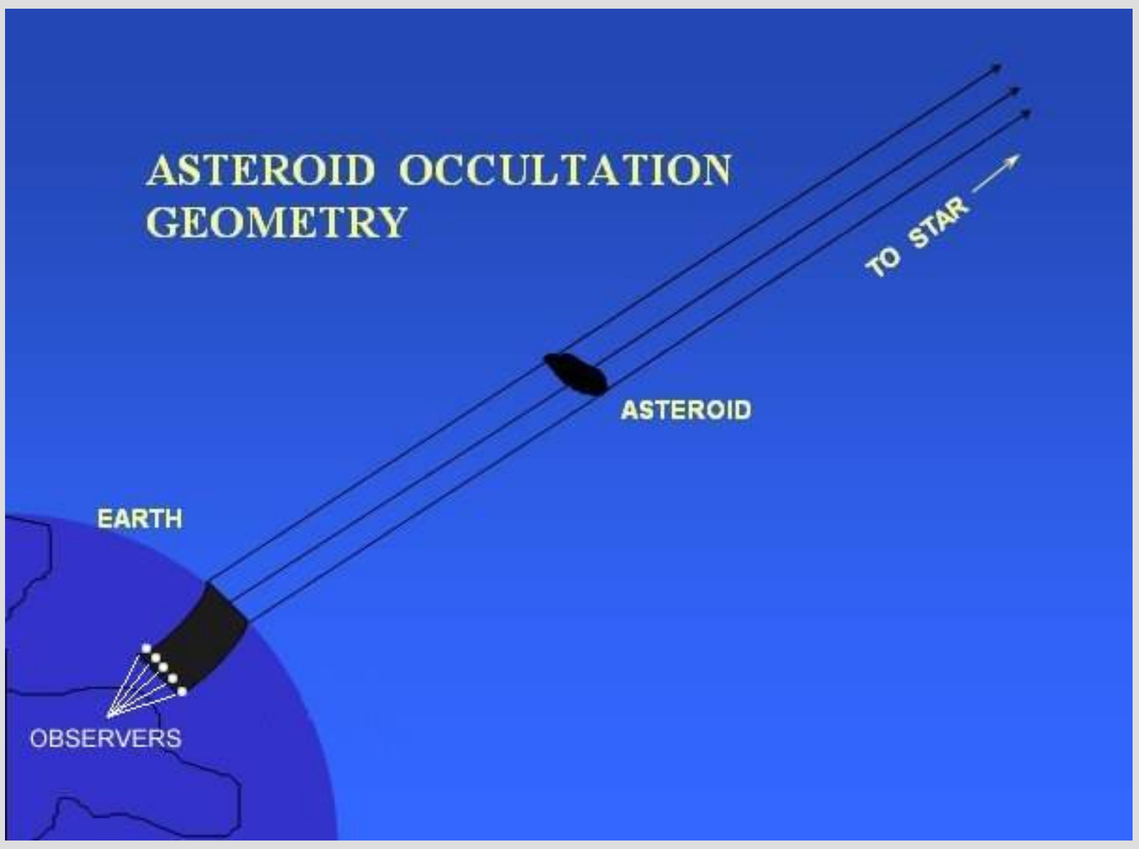
RECON Science

Recently discovered objects orbiting beyond Neptune called Trans-Neptunian Objects (TNOs) provide key clues into the formation and history of the Solar System. Perhaps the most famous TNO is the dwarf planet Pluto, which orbits the Sun in a region called the Kuiper Belt. Since 1992, over a thousand additional Kuiper Belt Objects (KBOs) have been discovered. Estimates place the number of KBOs larger than 100 km in diameter at over 100,000.

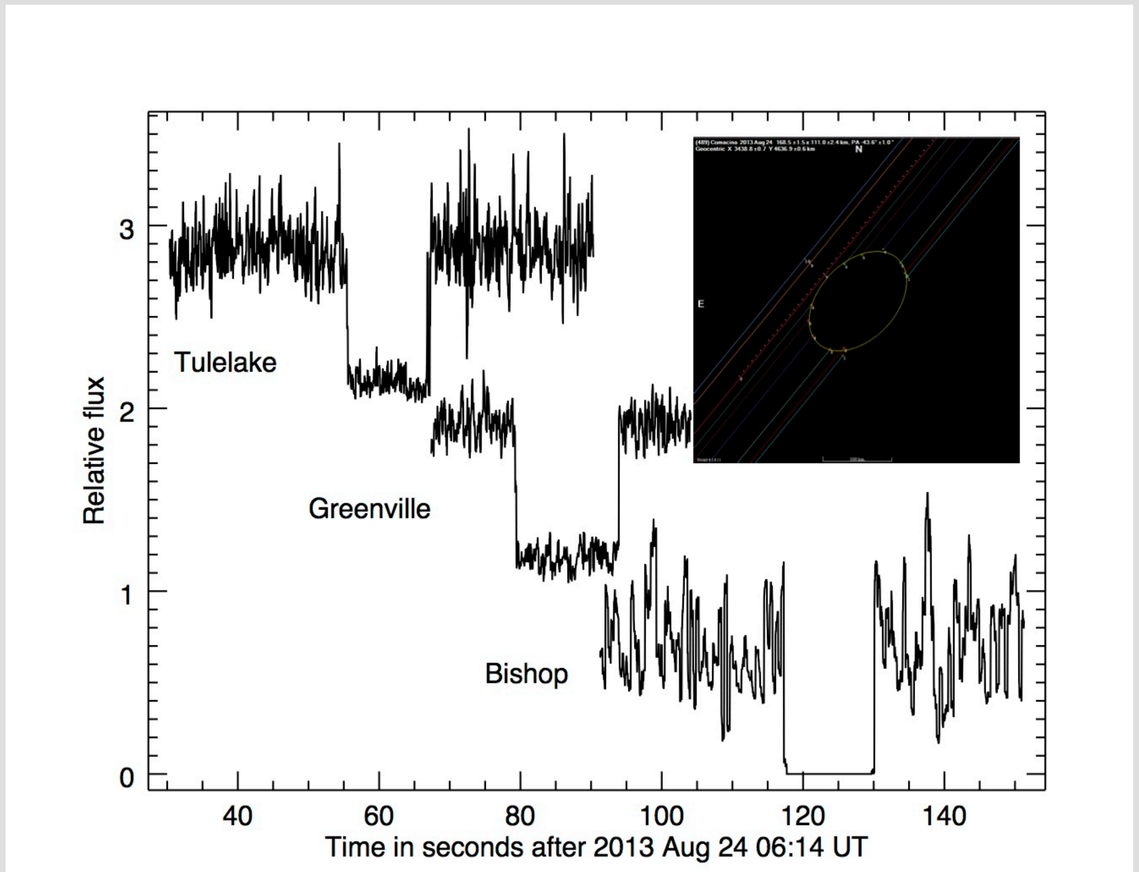


Credit: NASA

A common technique for characterizing the sizes, shapes, moon, and ring systems of objects in our Solar System involves measuring the object's shadow as it passes in front of a distant star. This type of astronomical event is called an occultation because the star is "hidden" by the passing object.

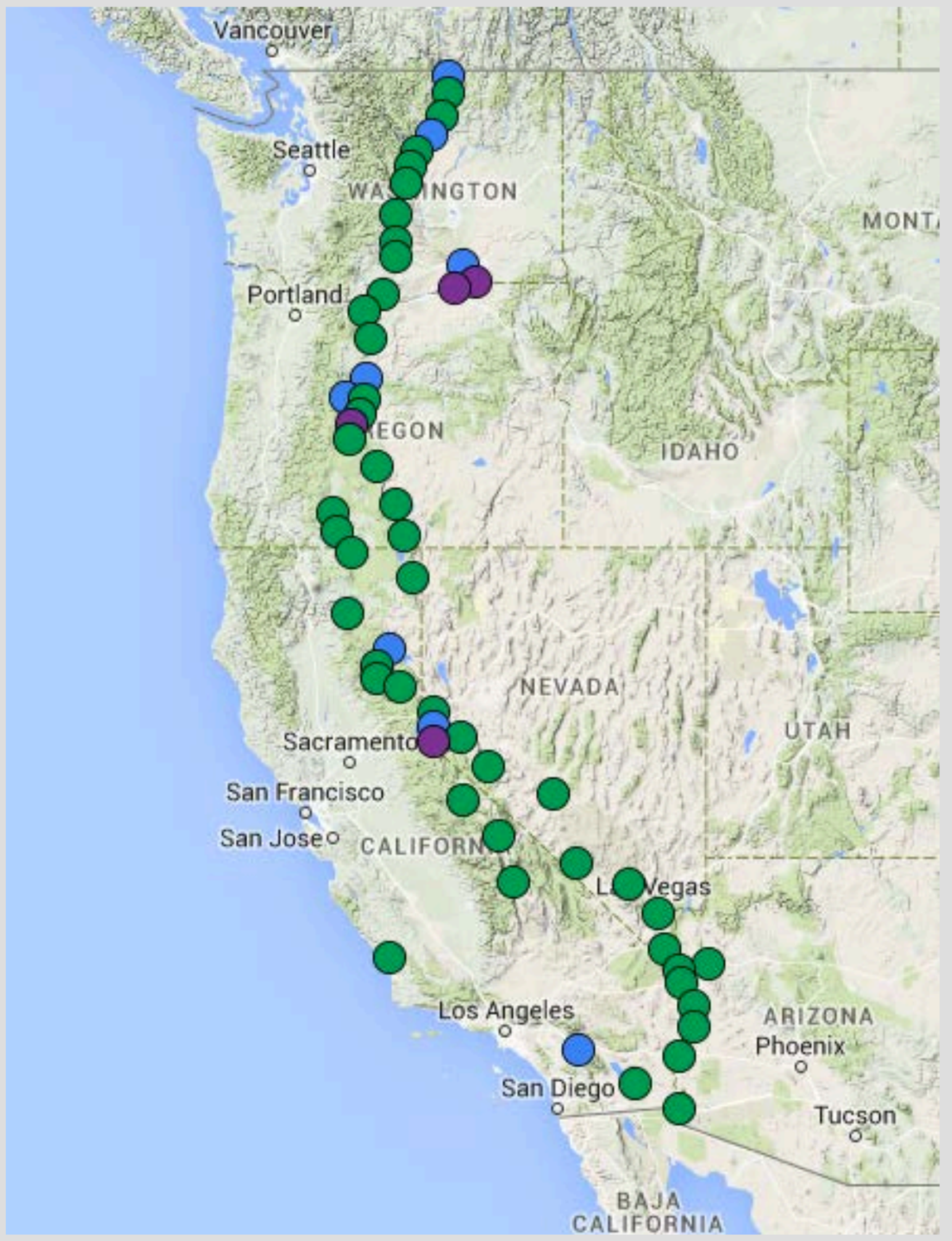


Credit: International Occultation Timing Association



RECON Citizen Scientists

Uncertainties in both KBO orbits and star positions make it challenging to predict occultation shadow paths to within 1,000 km. The Research and Education Collaborative Occultation Network (RECON) is an innovative approach to address this challenge. RECON has established 55 telescope sites involving over 60 high schools across the rural western US to measure the sizes and characteristics of KBOs as small as 100 km in diameter.



This five-year NSF-funded project will characterize at least 10 known KBOs through active engagement of teachers, students, and community members as occultation astronomers. Green sites above have received both telescope and camera equipment. Blue sites have received cameras but are using existing telescopes, and purple site are providing their own equipment. The RECON project was piloted with 14 communities north and south of Reno starting in Spring 2013. Following training workshops in Kingman and Pasco in Spring 2015, the full RECON network will be operational through at least Fall 2019.

This material is based upon work supported by National Science Foundation under Grant No. 1212159 and 1413072. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.