



# INTRODUCTION

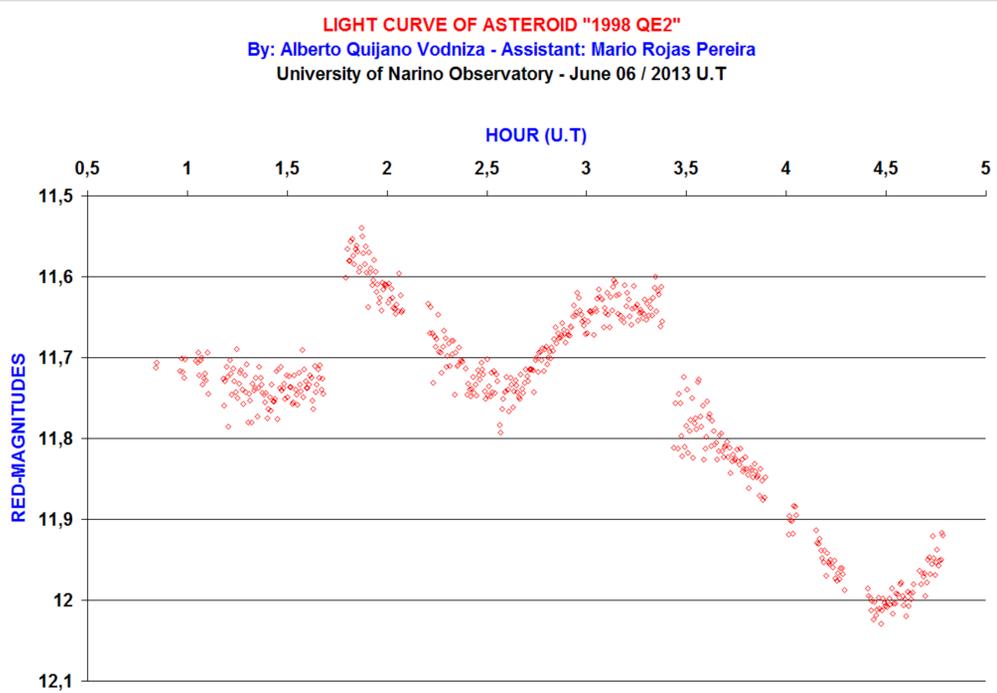
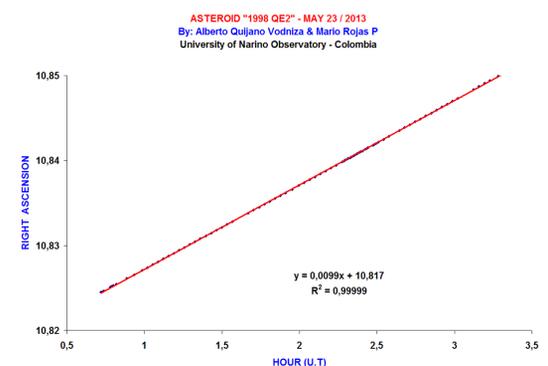
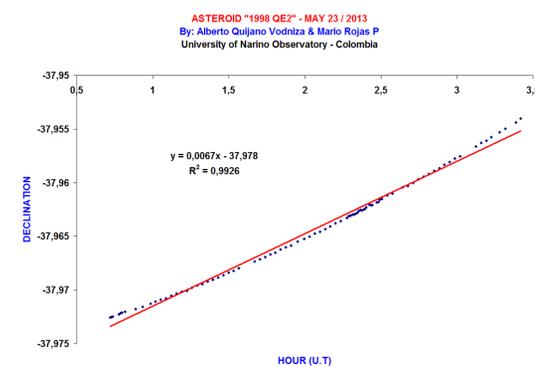
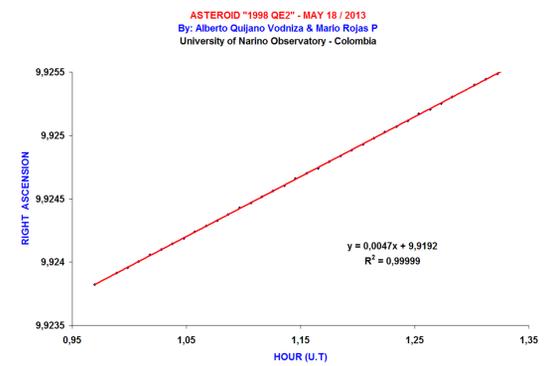
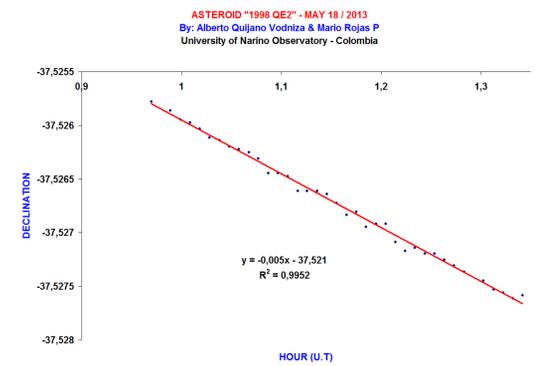
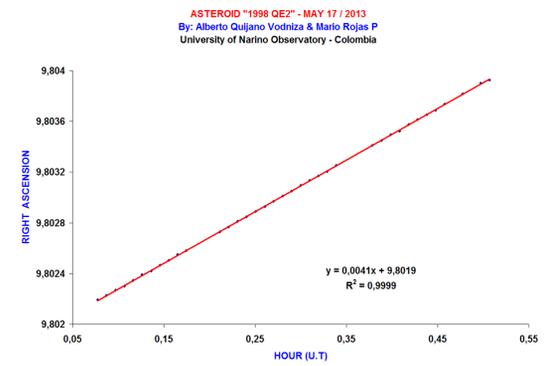
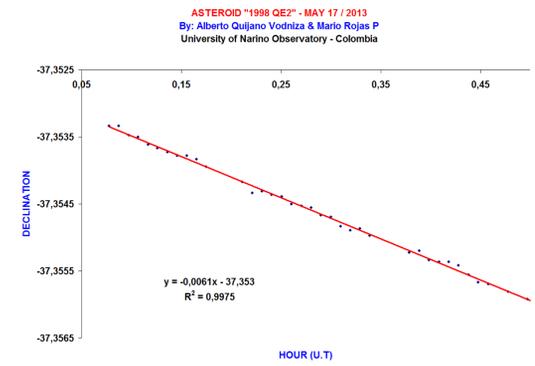
After having processed adequately all the photographs (bias reduction, dark frames correction and correction of flat frames), we employed the software "The Sky6" and the "CcdSoft-Version 5" in order to identify the stars appearing on the images, so we could have the coordinates of any standard star. It is necessary to use many reference stars so we can have a higher precision on determining the asteroid's coordinates. The asteroid is identified superposing the photos and designing a small video to appreciate clearly enough its movement with regard to the fixed stars.

## STUDY OF THE ASTEROID "1998 QE2"

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### ABSTRACT

This big asteroid was at 5.8 millions of kilometers from the Earth on May 31 (2013) and it has a diameter of 2.7 km. The radar images obtained by JPL showed that the period of rotation around its axis is close to five hours. Hills. K (2013) reported that the period is of 5.281 +/- 0.002 hours. On June 4 the team of Goldstone-Arecibo found a period of 4.75 +/- 0.01 hours. We also contributed with the light and phase curves to estimate the period by means of the telescope (with red filter). The radar imagery (JPL and Arecibo) revealed that 1998 QE2 has a moon, and we captured a mutual event (eclipse). From our Observatory, located in Pasto-Colombia, we captured several pictures, videos and astrometry data during several days. Our data was published by the Minor Planet Center (MPC) and also appears at the web page of NEODyS. The pictures of the asteroid were captured with the following equipment: CGE PRO 1400 CELESTRON (f/11 Schmidt-Cassegrain Telescope) and STL-1001 SBIG camera. We obtained the light curve of the body. Astrometry was carried out, and we calculated the orbital elements.



### SUMMARY AND CONCLUSIONS

We obtained the following orbital parameters: eccentricity = 0.5692181, semi-major axis = 2.41104631 A.U., orbital inclination = 12.82771 deg, longitude of the ascending node = 250.16876 deg, argument of perihelion = 345.61328 deg, mean motion = 0.26326658 deg/d, perihelion distance = 1.03863508 A.U., aphelion distance = 3.78345755 A.U. The asteroid has an orbital period of 3.74 years. The parameters were calculated based on 191 observations (2013 May: 17-24) with mean residual = 0.162 arcseconds. A video of the asteroid from our Observatory was published on the main page of the "SPACEWEATHER" web: <http://www.spaceweather.com/archive.php?view=1&day=21&month=05&year=2013>

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**What's up in space** Tuesday, May 21, 2013

Listen to radar echoes from satellites and meteors, live on listener-supported [Space Weather Radio](#).

**BRIGHT EXPLOSION ON THE MOON:** Recently, a small boulder hit the Moon and exploded with as much energy as 5 tons of TNT. NASA scientists say the explosion was bright enough to see with the naked eye. [\[full story\]](#) [\[video\]](#)

**A BIG ASTEROID APPROACHES:** Near-Earth asteroid **1998 QE2** is approaching the Earth-Moon system for a flyby on May 31st. There's no danger of a collision, at closest approach the asteroid will be 3.6 million miles away. Even at that distance, however, the 1.7-mile-wide space rock will be an easy target for mid-sized backyard telescopes. Using a 14-inch Celestron, Alberto Quijano Vodniza of Narino, Colombia took this picture of 1998 QE2 on May 17th:

GSC 7180.103

The sunlit side of the asteroid will turn more squarely toward Earth during the first week of June. At that time it will reach a maximum brightness of 11th magnitude.

NASA radars will be monitoring the flyby, too. "Asteroid 1998 QE2 will be an outstanding radar imaging target at Goldstone and Arecibo and we expect to obtain a series of high-resolution images that could reveal a wealth of surface features," says radar astronomer Lance Benner of JPL. "Whenever an asteroid approaches this closely, it provides an important scientific opportunity to study it in detail to understand its size, shape, rotation, surface features, and what they can tell us about its origin."

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**Asteroid 1998 QE2** May 17 / 2013  
**By: Alberto Quijano Vodniza & Mario Rojas Pereira - Colombia**  
**University of Narino Observatory**  
**Initial time: 0h: 04': 23.6" U.T**  
**Final time: 0h: 30': 09.5" U.T**  
**CGE PRO 1400 CELESTRON telescope**  
**STL-1001E SBIG camera**