



Target NEOs! Observing Program Introduction



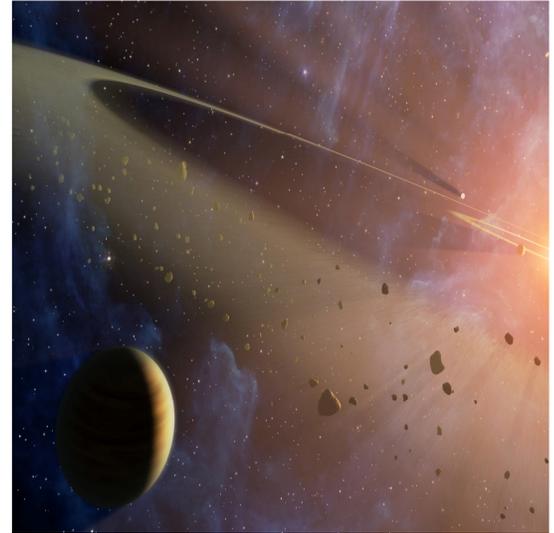
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This artist's illustration shows an asteroid belt full of rocky bodies of different sizes and compositions that orbit the Sun. Some of these are near-Earth objects (NEOs) that travel within 1.3 AU of Earth. Credit: NASA/JPL-Caltech

Introduction

*Target NEOs!** is an exciting opportunity for amateur astronomers to participate in a long-term citizen science project that will contribute to basic scientific understanding of near-Earth objects (NEOs). Observers collect data about asteroids on a selected list and submit images and corresponding reports. These observations directly support NASA's OSIRIS-REx asteroid sample return mission and aid future mission designers and scientists. Citizen scientists' astrometry and photometry data will enable scientists to test theoretical models about these objects to refine orbits and taxonomy. The observations, which are personally gratifying for the observer, represent important, real contributions to asteroid exploration. Some of the NEOs in this program are observable by 8-inch telescopes or larger equipped with CCD cameras. A larger telescope will allow more objects to be observed. Remote observing is welcomed, too.

Many advanced amateur astronomers are highly skilled, possess large aperture telescopes equipped with research quality instrumentation, and are eager to engage in research oriented activities. Your observations can complement professional observations, provide greater geographic distribution, and create larger data sets through more frequent observing.

* *Target NEOs!* and *Target Asteroids!* are companion programs that use the same list found here:
<http://osiris-rex.lpl.arizona.edu/>
Select the *Target Asteroids!* button and then select "List".

Target NEOs! complements the AL Asteroid Club and other asteroid programs

Target NEOs! is a natural follow-on project for observers who have completed the League's Regular and Gold Asteroid Certificates and, yet, can be attempted by observers who have not completed these programs. We encourage observers to refer to the Astronomical League's Asteroid Observing Guide and the links found on the OSIRIS-REx mission's *Target Asteroids!* webpages found here:

<http://osiris-rex.lpl.arizona.edu/>

Select the *Target Asteroids!* button. Then select "Instructions" and "FAQ" for observation planning, helps, and reporting formats.

This program builds on the excellent work done by experienced observers for many years and other NASA NEO programs. We encourage observers to continue to submit observations to these programs as well.

Target NEOs! and Target Asteroids!

Target NEOs! is the Astronomical League's observing program through which observers may earn a certificate and/or pin. *Target Asteroids!* is the Education and Public Outreach project of the NASA OSIRIS-REx asteroid sample return mission that provides the list of asteroids to be observed. Many of the resources are shared between the programs:

OSIRIS-REx asteroid sample return mission <http://osiris-rex.lpl.arizona.edu/>

OSIRIS-REx Education and Public Outreach *Target Asteroids!* <http://osiris-rex.lpl.arizona.edu/>

Select the *Target Asteroids!* button.

These pages include helpful tips, links to information, software and standard star catalog suggestions.

The Targets!

"*Target NEOs!*" is built around a dynamic compilation of objects selected by Carl Hergenrother, OSIRIS-REx lead astronomer. He selects NEOs that are more than 200 meters in size and easily reachable by sample return spacecraft. It will change as new observations are made, new asteroids are discovered, and spacecraft mission requirements change. Currently, there are more than 70 objects on the list ranging from 15 - 21.5 absolute magnitude (H) and approximately 0.2–6 kilometers in size. There will be ample opportunities for observers to attain the highest level of achievement over the course of several years. The current list of objects may be found here: <http://osiris-rex.lpl.arizona.edu/> Select the *Target Asteroids!* button and then select "List".

How to get started

Fill out the *Target Asteroids!* Observer Registration Form right away, mark *Target NEOs!*, list your Astronomical League member club, and email to Target_NEOs@lpl.arizona.edu. This will allow you to receive updates and helpful information.

How to report observations

When you are ready to submit observations, upload three images spanning a half hour interval to <ftp://orexftp.lpl.arizona.edu/pub> and email the corresponding astrometry or photometry report to Target_NEOs@lpl.arizona.edu and the International Astronomical Union's Minor Planet Center at mpc@cfa.harvard.edu. Do not wait until you have observed 10 or 25 objects to submit your data. Submit your observations as you make them.

The suggested image file name is in the format:

Observer_Object_YYYYMMDD_HHMMSS_Flag(TA or TNEOs).FITS

For example: Hergenrother_1999RQ36_20120318_041510_TNEOs.FITS

The TNEOs flag lets us know you are an Astronomical League observer.

Corresponding astrometry and photometry reports should be in "MPC format" described here:

<http://www.minorplanetcenter.net/iau/info/ObsDetails.html>

The Achievement Levels

Target NEOs! is dynamic and exciting! We invite you to take up the challenge! There are ample opportunities for observers to start with the intermediate level and to attain the highest level of achievement over the course of several years. This is *one of the few AL observing programs in which you submit your observations as you make them* rather than waiting until you have observed the minimum number of objects.

Membership	Asteroids Required	Award	Minimum Telescope Size
Intermediate	10	certificate	8-inch
Advanced	25	certificate & pin	8-inch

intermediate certificate

advanced certificate



advanced pin



To qualify for a *Target NEOs!* Program Certificate, you must be a member of the Astronomical League, either through an affiliated society or as a Member-at-Large, and you must observe and report the required number of asteroids. Observations are in digital form (see "How to report observations" above). Contact the coordinator if you plan to use photographic images.

To receive your certificate and/or award pin, send a summary of your observations that includes the list of NEOs observed and the dates to Target_NEOs@lpl.arizona.edu. We will verify receipt of the observations and forward a certificate and/or pin to you or your society's "Awards Coordinator", whomever you choose. Be sure to specify which you prefer and provide the necessary address.