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Near-Earth Object (NEO) Discovery
NEO Characterization

Catalina Sky Survey: NEO Discovery, Follow-Up and Beyond

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ABSTRACT

The Catalina Sky Survey (CSS) has been discovering NEOs at ever-greater rates for over two decades, due to innovative hardware, software and operational upgrades enabled by sustained investment from NASA. CSS remains a NEO discovery survey at its core, operating two full-time survey telescopes (MPC codes G96 and 703), and a part-time survey (MPC code V00) jointly with Spacewatch and the University of Minnesota. However, in recent years we have focused on expanding our footprint of NEO-related activities. CSS is now the most prolific NEO follow-up team in operation, contributing nearly half of all NASA-sponsored follow-up observations during a recent 2-year period (corresponding to about 20% of all worldwide NEO follow-up). The bulk of these observations come from our full-time 1.0-m follow-up telescope (MPC code I52), but also from an approximately 30% share in the Kuiper 1.54-m telescope (MPC code V06).

To maximize the impact of our own and community follow-up observations, CSS operates the public NEOfixer service, providing customized, priority-sorted target lists to over 90 subscribing observatory sites. NEOfixer ranks NEOs and NEO candidates according to object importance, site-specific cost, benefit, urgency, and community interest, and provides a built-in coordination mechanism to minimize duplication of effort. NEOfixer also calculates per-tracklet benefit estimates for all reported NEO observations, allowing quantitative analysis of the benefit of any and all follow-up observations.

Supplementing our operational discovery and follow-up efforts, CSS has also undertaken several projects worth highlighting. Nearly 20 years of archival imagery are being reprocessed with our current pipeline, and are being published for public access through the Planetary Data System's Small Bodies Node. CSS is also creating a Zooniverse project to allow citizen scientists to help validate both historical and contemporary asteroid survey data. A nascent effort to use 8-meter class telescopes for occasional high-priority follow-up observations is beginning to pay off,

and semi-automated archival precovery searches continue to improve NEO orbits. Through the totality of these observational, archival, and community infrastructure activities, CSS seeks to serve today's NEO community, but also to help lay a solid foundation for a future that includes increasingly powerful NEO surveys.

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Comments:

Oral presentation preferred