The Size Distribution of Small Earth Approaching Asteroids.

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The Spacewatch Project [1] explores the various populations of asteroids and comets in the solar system through statistical studies. The goal of these studies has been to assess the asteroid hazard, study the statistical properties of various classes of asteroids in the solar system and to provide targets for ground based radar observations and spacecraft missions to the asteroids.

The Spacewatch 0.9 meter telescope on Kitt Peak has now been used to survey and detect Near Earth Asteroids (NEAs) and other solar system bodies for more than 24 years. In late 2002, a mosaic of CCDs was introduced to the telescope, giving it a field of view of 2.9 square degrees and allowing us to survey approximately 1400 square degrees each lunation to a magnitude limit of V=21.5 using 120 second integrations (McMillan [1]). In the years since 2002 we have used this system to survey approximately 80,000 square degrees for asteroids, mostly at lower inclinations ($|\beta| < 20\,\mathrm{deg}$) which represents a factor of six improvement to our previous drift scanning rate. The mosaic system to date has made more than 1800 detections of NEAs in a consistent, automatic fashion with attention to observing conditions.

We are currently analyzing the mosaic camera's detection history using the techniques described by Jedicke, Larsen and Spahr [2]. Our first use of the technique was in Larsen et al. [3] and allowed us to place limits on the number of large asteroids at low inclinations in the Kuiper Belt. In this contribution, we will present our second result from the Spacewatch mosaic data: the distribution of small NEAs in absolute magnitude. We will also present our results for the total number of NEAs detectable per unit of sky area and extend that number to predict the total number of EAs detectable over the entire sky by our system.

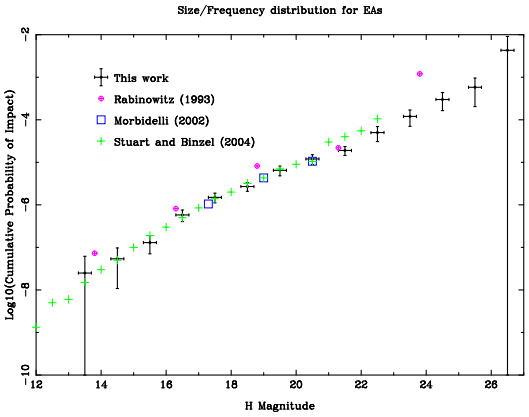

Figure 1: The preliminary size distribution as presented in Larsen [4] based on the technique of Rabinowitz [5]. This paper will refine the distribution using a bias model.

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[1]http://spacewatch.lpl.arizona.edu

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