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ATLAS – Warning for impending impact

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ABSTRACT

The Asteroid Terrestrial-impact Last Alert System (ATLAS) comprises two 0.5m telescopes, cameras, and software, each imaging 30,000 square degrees per night to m=20. These systems are being commissioned in 2015 and should be in full operation by the end of 2015. The aperture, sensitivity, and field of view are specifically designed to provide meaningful warning of impending impact: approximately 1 week for a 1 megaton impact and approximately 1 month for a 100 megaton impact.

ATLAS will be particularly sensitive for detecting asteroids within a few lunar distances of the Earth, and therefore is capable of determining a better census of the local density of asteroids, as a function of velocity and size. ATLAS will routinely use two filters and therefore should be capable of some degree of characterization of asteroid type, ideally leading to meaningful estimates of albedo and density. Because ATLAS observes each asteroid several times per night, it will also be possible to determine rotation properties for thousands of bodies, potentially providing insight on the sources of new NEOs.

The design of ATLAS is optimized to maximize “etendue per unit cost”, and replication of ATLAS units should be possible for less than $1M and 2 years. The longer term goal of the project is to place additional ATLAS units around the world in order to improve the probability of detecting any asteroid large enough to cause ground effects to near unity.