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Historical Perspectives on Planetary Defense

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Interest in the asteroid impact hazard was born out of the public fascination with the Alvarez discovery that the dinosaurs died as a consequence of a cosmic impact. At a July 1981 NASA Workshop, Gene Shoemaker made the first modern quantitative estimate of the impact hazard. Further progress depended on new technology that was first demonstrated by Tom Gehrels, who used CCD cameras and more powerful desktop computers to automate the discovery of Near Earth Asteroids (NEAs). These ideas began to reach fruition in the early 1990s, when the U.S. House of Representatives called upon NASA to evaluate the impact hazard and assess the costs of carrying out the comprehensive NEA search called the Spaceguard Survey, as well as to consider (in consultation with U.S. Department of Defense) future technology for defense. In 1988, after a series of technical meetings and workshops, the NASA Planetary Science Division formally began the Spaceguard Survey, supporting several ground-based telescopes and a new NEO Program Office. At the same time, scientists at JPL and in Pisa Italy developed the software for accurate forward computation of NEA Orbits and impact risks.

Planetary Defense (or Mitigation) Workshops were held in Los Alamos, New Mexico, in 1993, at the Russian Federal Nuclear Center in Snezhinsk in 1994, at the DOE Livermore National Lab in California in 1995, and under NASA sponsorship in Arlington Virginia in 2002. In the same time-frame there were also a number of workshops focused on NEO detection and dynamics, including Vulcano Italy in 1995, Torino Italy in 1999, and Palermo Italy in 2001; a NASA Science Definition Team analyzed advanced NEA surveys in 2003. The first Planetary Defense Conference (PDC), combining surveys, NEA science, mitigation, and public communications, was held in February 2004 in Garden Grove, California, under the sponsorship of the AIAA and the Aerospace Corporation. The conference chair was William Ailor, who has organized all subsequent PDCs. The second PDC was held March 2007 in Washington DC, and the third in Granada Spain in April 2009. Reflecting increased international interest in this topic, primary sponsorship was assumed in 2009 by the International Academy of Astronautics, who also sponsored the 2011 PDC in Bucharest, Romania, and the 2013 PDC in Flagstaff, Arizona. This overview will summarize highlights of our evolving understanding of Planetary Defense as reflected in these meetings.