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- Key International and Political Developments**
- Advancements and Progress in NEO Discovery**
- NEO Characterization Results**
- Deflection and Disruption Models & Testing**
- Mission & Campaign Designs**
- Impact Consequences**
- Disaster Response**
- Decision to Act**
- Public Education & Communication**

Short Term Threat Response Requires Long Term Preparation

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ABSTRACT

Comets, such as the recent Comet C/2013 A1 (Siding Spring) can impact terrestrial planets with very short warning times: for Siding Spring the time from discovery to closest approach to Mars (135,000 km) was less than 22 months. Short warning times are also possible for certain asteroids approaching on unfavorable orbits. The time to design, build, test and launch a high-reliability Interceptor spacecraft is on the order of 5 years, a timescale incompatible with threat mitigation for such short warning times. A potential solution is to build the interceptor before the threat is detected and put it into storage until it is required. Launch of a stored spacecraft could be accomplished in less than a year after authorization based on experience with the DISCOVER program managed by NASA's Goddard Space Flight Center.

While asteroidal impacts are of order 100 times more likely than cometary impacts, comet impacts will carry more than 100 times the energy of a typical asteroid threat, making their destructive probability nearly equal. Cometary threats have been largely ignored to date, a situation that needs to change as our Planetary Defense efforts become more mature. An idealized threat response system will be described.