

Planetary Defense Conferences: Sharing Information on NEO Threats and Mitigation

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Presented at meeting of the
Working Group on Near Earth Objects of the Scientific and Technical Subcommittee
of the
United Nations Committee on the Peaceful Uses of Outer Space

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Overview of Threat to Earth from Asteroids and Comets

- >300 asteroids known as of today with non-zero but small probability of impacting Earth in next 100 years
 - 2 > 1 km diameter
 - 131 > 30 m diameter
- Many more yet to be discovered
- Recognition that small objects represent greatest risk of impact
- ~1 in 5 chance of Tunguska-class (30-meter asteroid) entry this century
- 1 in 3000 chance of 130-meter asteroid impact in 2048 (may be reduced by additional tracking); impact energy 150 MT



Tunguska



Photo: Leonid Kulik Expedition, 1927

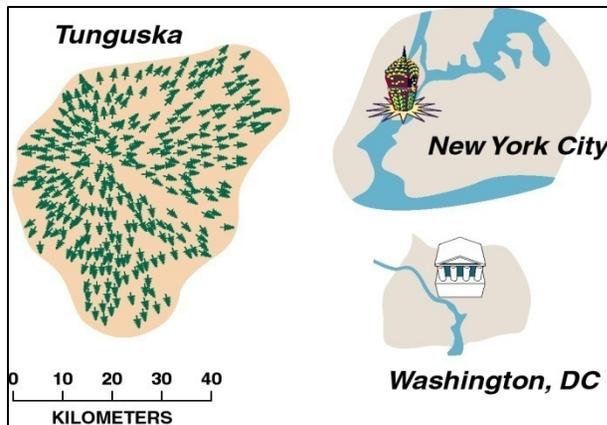


Image courtesy
Clark Chapman

- **June 30, 1908:** Tunguska, Siberia
- Airburst of ~30 m diameter object at ~6 km altitude
- 2-15 MT explosion
- Two deaths
- Leveled and ignited over 2000 km² of forest
- Most powerful natural explosion in recent history

History of Known NEO Population

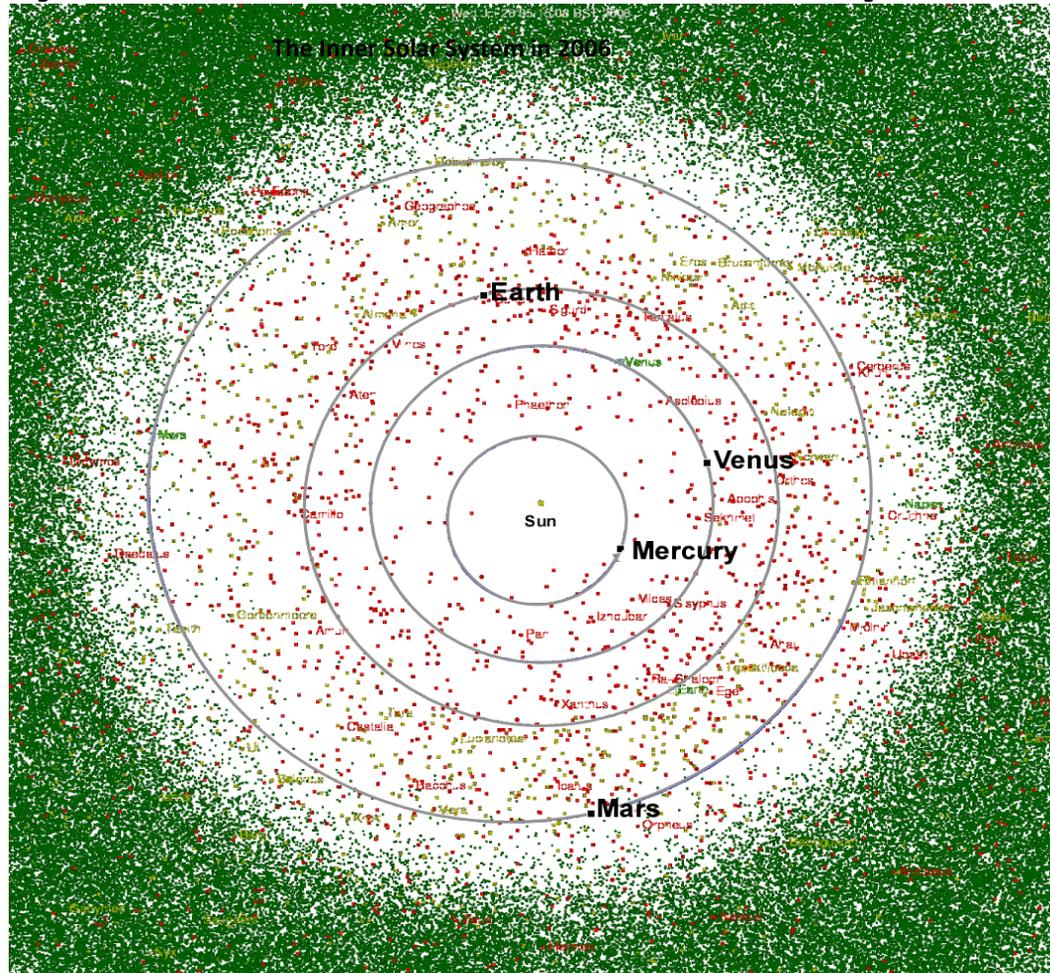
2006

Earth Crossing ●

Outside Earth's Orbit ●

NEO: Perihelia <1.3 AU

PHO: pass within 0.05 AU of Earth's orbit



Known

- 350,000 minor planets
- 4500 NEOs
- ~830 PHOs

New Survey Will Likely Find

- 100,000+ NEOs (> 140m)
- 20,000+ PHOs

Scott Manley
Armagh Observatory



Background

- Three international conferences since 2004
- Became an International Academy of Astronautics (IAA) conference in 2009
- 2011 IAA Planetary Defense Conference, May 9-12, Bucharest, Romania
- Goal: Since mitigation attempt would be international effort, involve all space-faring nations in the discussion



2004 Planetary Defense Conference: Defending Earth from Asteroids

- Anaheim, California
- Sponsored by The Aerospace Corporation, American Institute of Aeronautics and Astronautics (AIAA)
- 140 attendees
- Published White Paper summarizing key points
- Videos of presentations, conference materials at <http://www.planetarydefense.info>
- White Paper evolved to AIAA Position Paper (Protecting Earth from Asteroids and Comets, 2004)



2007 Planetary Defense Conference

- Washington, D.C.
- 13 sponsoring organizations
- 145 attendees
- Published videos of presentations, conference materials at <http://www.planetarydefense.info>
- Published White Paper summarizing key points



2009 IAA Planetary Defense Conference

- Granada, Spain
- 19 Sponsoring Organizations
- 170 attendees
- Conference materials published at <http://www.congrex.nl/09c04>
- Videos of presentation to be published



2011 IAA Planetary Defense Conference

- 9-12 May, 2011, Bucharest, Romania
- 16 sponsoring organizations (additional sponsorship opportunities available)
- Conference web page:
<http://www.pdc2011.org>



Conference Format

- World's experts discuss
 - Current state of knowledge on Near Earth Objects (how many, physical characteristics, current limitations, etc.)
 - Consequences of an impact (tsunami, NEO size vs. consequence, economic impact, past events)
 - Techniques for deflecting or mitigating a threatening NEO (kinetic impact, gravity tractor, explosive devices)
 - Design of a NEO deflection mission and campaign (launch requirements, cost, timelines)
 - Political, policy, legal considerations affecting a decision to act
 - Current activities supporting planetary defense
- Encourage student attendance and participation
- Concluding panel session summarizes key points, develops recommendations for moving forward
- Session and conference chairs develop White Paper capturing key points, recommendations



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*Conference Co-Chair



Summary

- Planetary defense is an international issue
- Mitigating a threat may require decisions and agreements by the world community, coordinated actions by space-faring nations
- The 2011 IAA Planetary Defense Conference will provide the most current information on NEO hazards, options for mitigation, and related issues

Invitation: Become a sponsor of the conference;
Join us for an excellent meeting!

