Planetary Defense Conferences:
Sharing Information on NEO Threats and Mitigation

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The Aerospace Corporation
Co-Chair, 2011 IAA Planetary Defense Conference

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

February 2011
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

**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

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

**New Survey Will Likely Find**
- 100,000+ NEOs
- 20,000+ PHOs

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**Earth Crossing**

Outside Earth’s Orbit

NEO: Perihelia <1.3 AU
PHO: pass within 0.05 AU of Earth’s orbit

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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.planetary defense.info
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 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
Sponsors of 2011 IAA Planetary Defense Conference

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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!