

9th IAA PLANETARY DEFENSE CONFERENCE 2025

Monday, May 5, 2025 - Friday, May 9, 2025

STELLENBOSCH, CAPE TOWN, SOUTH AFRICA

Scientific Program

A broad theme of the conference is to highlight processes, technologies, techniques, missions, and data sets that have been and must be developed to support planetary defense and strengthen international cooperation for protecting the Earth from impact hazards associated with asteroids and comets. Special highlights include recent space missions related to planetary defense, a hypothetical asteroid threat exercise, and panel discussions by decision-makers, legal experts, disaster managers and others. Topic areas for papers include:

Technical Sessions

Apophis T-4 Years

Ongoing and Upcoming Mission Highlights

- Current and proposed space missions to inform and test planetary defense technologies
- Highlights of Hera, Hayabusa2#, OSIRIS-REx/APEX, NEO Surveyor, Apophis, etc.

Hypothetical Asteroid Threat Exercise

- Policy planning and developments towards an international planetary defense strategy
- National and international activities, strategies and plans for planetary defense
- Proposal for International Year of Asteroid Awareness and Planetary Defence in 2029, on the occasion of close-approach of asteroid Apophis: ideas for campaign

Near-Earth Object (NEO) Discovery

- Current NEO survey progress, requirements, and goals for future surveys
- Astronomical and space-based techniques for discovery of NEOs
- Prospects for future NEO survey systems and efforts (e.g., LSST, NEO Surveyor)

Near-Earth Object (NEO) Characterization

- Findings related to characterizing NEO physical, dynamical, and orbital properties.
- Characterization of properties most crucial to planetary defense mission success and disaster preparation and mitigation planning.
- Technologies to characterize NEOs via remote sensing and spacecraft flyby/rendezvous/landing.
- Current and planned flight missions to NEOs; Opportunities from NEO close approaches.

Deflection / Disruption Modeling & Testing

- Results of modeling/experimentation that characterize effects of proposed NEO deflection and disruption techniques and technologies
- Progress on key technologies needed to deflect, disrupt, or otherwise mitigate hazardous NEOs

Space Mission & Campaign Design

- Development and validation of critical technologies for planetary defense.
- Designs for planetary defense flight validation missions.
- Rapid response NEO reconnaissance mission concepts.
- Design of in-space mission campaigns to respond to hazardous NEOs (reconnaissance, characterization,

mitigation).

Earth Impact Effects & Consequences

- Hazards of individual impactors; ensemble hazard integrated over the predicted population of impactors
- Analysis tools that could aid decision makers.
- Process of atmospheric break-up and airbursts for a variety of NEO types and lessons learned based on Tunguska and Chelyabinsk super-bolides
- Transition from regional to global effects as a function of impactor size, location, and other factors.
- New results on the effects of ocean and land NEO impacts and related damage footprints.
- Short- and long-term post-impact effects on the atmosphere, environment, near-Earth space and space systems (e.g., communications)

Disaster Management & Impact Response

- Lessons learned from past natural disaster responses, exercises, alerts, public education, risk communications strategies and warnings, and their application to Planetary Defense Management.
- Review of current and near-future disaster response plans and preparations specific to NEO impacts, incl. communication strategies for warning and informing decision makers, the general public and others.
- International perspective on disaster management in view of regional and national assets.

The Decision to Act: Political, Legal, Social and Economic Aspects

- Outlook on current and future national and international planetary defense / NEO-response policies and decision-making processes, including any envisioned participation of nations' defense sector in planetary defense.
- International coordination and collaboration, and distribution of responsibilities for planetary defense.
- Legal aspects of NEO mitigation.
- Cost effectiveness of mitigation options.
- Short and long term economic, political, and social consequences of a serious threat or an impact
- Ethics of Planetary Defense.

Public Education and Communication

- Current status of planetary defense / NEO-related communication and public education efforts, including dissemination, alerts, public engagement, student programs, outreach initiatives, etc.
- Concepts for improving trusted NEO / planetary defense public education and communication.

Panel Sessions

International Year of Planetary Defense

International Disaster Management for Planetary Defense

Effective Risk Communication to the Public for Planetary Defense