**PDC2025**
**Stellenbosch, Cape Town, South Africa**

*Please submit your abstract at https://iaaspace.org/pdc.*

*(please select the topic that best fits your abstract from the list below)*
*(you may also add a general comment - see end of this document)*

☐ **Ongoing and Upcoming Mission Highlights**
☐ **Apophis: T-4 Years**
☐ **Hypothetical Asteroid Threat Exercise**
☐ **Key International and Policy Developments**
X ☐ **Near-Earth Object (NEO) Discovery**
☐ **NEO Characterization**
☐ **Deflection / Disruption Modeling & Testing**
☐ **Space Mission & Campaign Design**
☐ **Earth Impact Effects & Consequences**
☐ **Disaster Management & Impact Response**
☐ **Public Education and Communication**
☐ **The Decision to Act: Political, Legal, Social, and Economic Aspects**

# NON-GOVERNAMENTAL NEO DISCOVERY INTERNATIONAL PROGRAMS INCLUDING THE ASTROMETRICA SOFTWARE

**Nancy C. Wolfson** [(1)],
[(1)]The *American Institute of Aeronautics and Astronautics, nancyplanetarydefense@gmail.com, 4725 Minnesota Ave NE, DC 20019, 202-345-1147*

***Keywords:*** *NEO, Detection, New Programs,*

Near-Earth Objects (NEOs) pose a significant threat to Earth. The Chelyabinsk meteor impact in 2013 served as a stark reminder of this danger, releasing energy equivalent to 30 times the Hiroshima atomic bomb, causing widespread infrastructure damage and injuring approximately 1600 individuals. Apophis, is an asteroid approximately 370 meters in diameter (roughly the size of three and a half football fields), This asteroid is expected to make a particularly close approach to Earth on April 13, 2029, highlighting the critical need for enhanced NEO observation. Current detection efforts have cataloged only a fraction of the estimated NEO population, with a tracking rate of less than 0.1%. This low rate is primarily attributed to factors such as time-consuming detection pipelines and software limitations in identifying faint, rapidly moving objects. This paper will explore the importance of expanding our NEO observation capabilities by:

1. Incorporating the contributions of Next-Generation Space Science (young professionals) through initiatives such as the "Developing CNN-Based Detection of Near-Earth Objects" effort.

2. Leveraging the efforts of non-governmental institutions and independent NEO detection campaigns. These campaigns utilize various technologies, including Astrometrica, a powerful tool for astrometric data reduction of CCD images. Key features of Astrometrica include: Image Processing: Facilitates automatic reference star identification, moving object detection and identification, and a "Track and Stack" function for following fast or faint objects. Data Integration and Sharing: Enables data sharing with the Minor Planet Center (MPC) and facilitates the downloading of MPCOrb data.

Furthermore, this paper will introduce our recently formed NEO Detection Program “look Up is an Asteroid”. This program aims to: a) Contribute significantly to the discovery of NEOs using Astrometrica, b) To provide comprehensive trainings to other professionals from various sectors within the space industry in order to foster their involvement in the field, and c) Unite currently fragmented international independent or non-governmental NEO Discovery efforts into a cohesive network. This unified approach will foster the growth and development of new independent NEO discovery programs worldwide. This paper will demonstrate that these independent efforts are not merely educational exercises, but genuine scientific endeavors that: Contribute significantly to our understanding of NEOs (NEO Catalog) and inspire the next generation of researchers in planetary defense. By integrating the valuable insights and data generated by these independent efforts, the global community can significantly enhance NEO discovery capabilities and strengthen our collective efforts to protect Earth from potential impacts.

**********

***Comments:***

*(No alternative session, oral presentation is preferred but a poster will work too. I couldn’t create an account, but please accept my abstract via the link provided on the instructions for this cases. My email: nancyplanetarydefense@gmail.com) – Thank you*