



# NASA Update to SMPAG

Dr. Kelly Fast  
Planetary Defense Officer (Acting)

Planetary Defense Coordination Office  
Planetary Science Division  
Science Mission Directorate  
NASA Headquarters  
Washington, DC

February 2026



## New NASA Administrator

- Jared “Rook” Isaacman is the 15th administrator of NASA
- Founder & CEO of Shift4 Payments, a global payments and commerce technology company
- Commander of Inspiration4, the first all-civilian spaceflight mission
- Led Polaris Dawn, becoming the first private citizen to perform a spacewalk
- Strong advocate for commercial space collaboration, rapid innovation, and mission-driven philanthropy



# Planetary Defense Coordination Office (PDCO)



The PDCO was established in 2016 at NASA HQ to manage planetary defense-related activities across NASA and coordinate with both U.S. interagency and international efforts to study and plan response to the asteroid impact hazard.

## Mission Statement

Lead national and international efforts to:

- Detect any potential for significant impact of Earth by natural objects
- Appraise the range of potential effects by any possible impact
- Develop strategies to mitigate impact effects on human welfare

*Title 51 U.S.C. Chapter 711 (Near-Earth Objects) defines PDCO's statutory roles and responsibilities from the NASA Authorization Act*

# ASSESS

Determine population survey completeness and the hazard from NEOs that pose the highest risk

CENTER FOR NEAR-EARTH OBJECT STUDIES (CNEOS)



# SEARCH, DETECT & TRACK

Find and track NEOs (asteroids and comets) to determine their orbits and identify any that pose an impact hazard to Earth

GROUND & SPACE-BASED OBSERVATORIES  
NEO SURVEYOR  
MINOR PLANET CENTER (MPC)  
INTERNATIONAL ASTEROID WARNING NETWORK

# NASA PLANETARY DEFENSE

# MITIGATE

Demonstrate in-space technologies to divert NEO impact threats; inform emergency response activities on the ground if in-space mitigation is not possible

ASTEROID THREAT ASSESSMENT PROJECT  
DOUBLE ASTEROID REDIRECTION TEST (DART)  
FEMA EXERCISES

# PLAN & COORDINATE

Work with U.S. government agencies and international collaborations to develop effective impact threat response

U.S. INTERAGENCY  
SPACE MISSION PLANNING ADVISORY GROUP

# CHARACTERIZE

Determine NEO physical characteristics (size, shape, composition, rotation)

INFRARED TELESCOPE FACILITY  
GOLDSTONE SOLAR SYSTEM RADAR  
NEOWISE ARCHIVE

# Asteroid 2024 YR4: IAWN and U.S. Government Notifications

- 2024 YR4's impact probability dropping below 1% was followed by final NASA notification to the U.S. government, per NASA's Policy Directive 8740.1
- IAWN (coordinated by NASA) issued final "all clear" notification to SMPAG (chaired by ESA) and to the United Nations Office of Outer Space Affairs
  - 2024 YR4 marks the first time the notification policies was implemented since IAWN's establishment in 2014
- **Lessons learned posted on NASA's Technical Reports Server:** <https://ntrs.nasa.gov/citations/20250006886>
- JWST will attempt to observe the asteroid in Feb. 2026 so that JPL Center for NEO Studies and the other orbit computation centers of IAWN can update its lunar impact probability; it is otherwise unobservable until June 2028

## INTERNATIONAL ASTEROID WARNING NETWORK (IAWN)<sup>1</sup>

### FINAL NOTIFICATION: NO SIGNIFICANT POTENTIAL FOR FUTURE IMPACT WITH EARTH BY NEAR-EARTH ASTEROID 2024 YR4

Date: 24 February 2025

From: International Asteroid Warning Network (IAWN)  
IAWN Coordinating Officer (NASA) for the IAWN Steering Committee

To: Chair (ESA), Space Mission Planning Advisory Group (SMPAG);  
Planetary Defence Programme Officer, United Nations Office of Outer Space Affairs (UNOOSA)

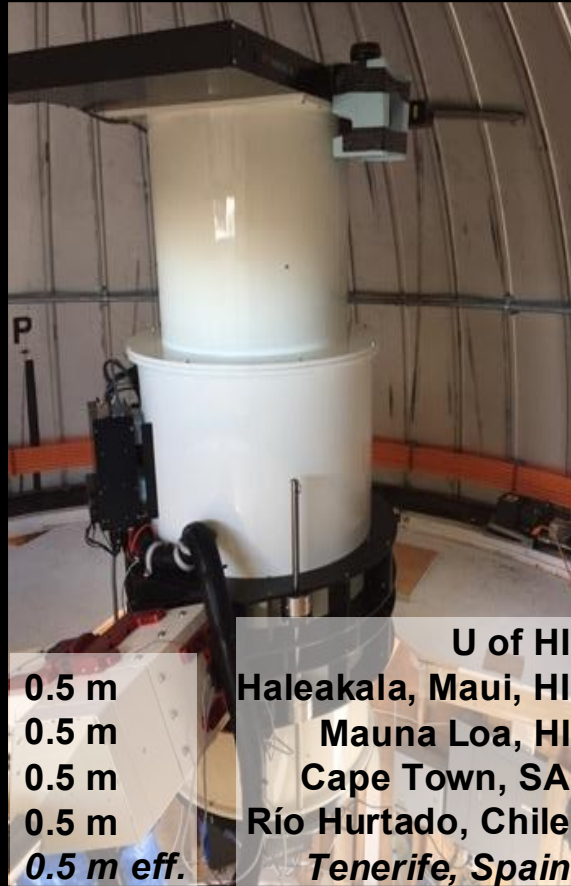
Title: Final Notification: Probability of Impact of Near-Earth Asteroid 2024 YR4 on 22 December 2032  
Drops to 0.004% - No Significant Potential for Future Impact with Earth

<b>Impact Probability</b>	0.004% on 22 December 2032 as calculated by NASA JPL Center for NEO Studies, ESA Near-Earth Objects Coordination Centre (NEOCC), and NEO Dynamic Site (NEODYs)
<b>Date of Potential Impact</b>	There is no significant potential for an impact with Earth for the next century

#### ADDITIONAL DETAILS:

- **Notification Threshold:** 1% is the notification threshold for IAWN<sup>2</sup>; reissuance of notification if impact probability drops below 1%.
- **Impact Probability:** Continued observations of 2024 YR4 during January and through 23 February 2025 have dropped the probability of Earth impact on 22 December 2032 to 0.004% (1 chance in 26,000) after the asteroid had reached a peak impact probability of 3.1%. There is now no significant potential for an impact with Earth for the next century.
- **Impact Probability Confirmation:** The impact probability was calculated by the NASA JPL Center for Near-Earth Object Studies (CNEOS), ESA Near-Earth Objects Coordination Centre (NEOCC), and NEO Dynamic Site (NEODYs), in coordination with the worldwide network of observatories in the International Asteroid Warning Network (IAWN) submitting observations to the Minor

# NASA-Funded Asteroid Surveys



## ATLAS

Asteroid Terrestrial-impact  
Last Alert System



## CSS

Catalina Sky Survey



## Pan-STARRS

Panoramic Survey Telescope  
and Rapid Response System



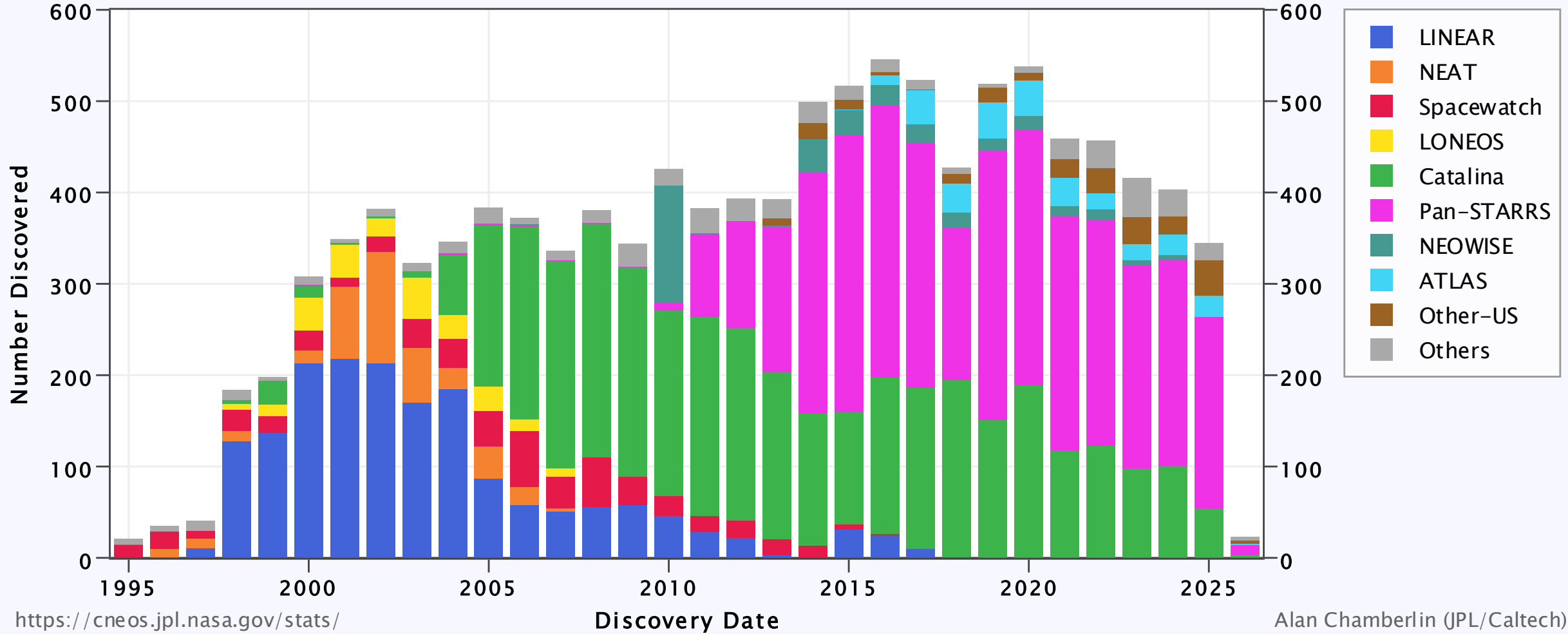
## LINEAR

Lincoln Near-Earth  
Asteroid Research

Also processing of data for NEO detections from Caltech's Zwicky Transient Facility

# Near-Earth Asteroid Discoveries by Survey

~140m and larger NEAs (as of 2026-Jan-28)



# NEO Surveyor – Latest Status

- Completed Project Critical Design Review in February 2025
- SpaceX Falcon 9 selected as launch vehicle in February 2025
- The telescope completed thermal vacuum testing at the Space Dynamics Lab (SDL), and the instrument is being integrated before undergoing environmental testing at SDL



NEO Surveyor instrument enclosure inside the TVAC chamber at NASA Johnson

# OSIRIS-Apophis Explorer (APEX) and Apophis 2029 Close Approach

- OSIRIS-APEX uses the OSIRIS-REx spacecraft, repurposed following its 2023 delivery of samples from asteroid Bennu to Earth
- OSIRIS-APEX is currently on a trajectory, taking it around the Sun multiple times, to meet up and match orbits with Apophis in 2029
- OSIRIS-APEX would rendezvous with Apophis in June 2029, several weeks after the close approach to Earth
- NASA OSIRIS-APEX is participating on the SMPAG Apophis Flight Mission Working Group
  - NASA would put forward other flight missions that fall under U.S. launch authority
  - NASA leads IAWN has *ex officio* representation on the Working Group



# Research Continues Following NASA's DART Mission

- Scientists from NASA and ASI used LUCIACube imagery to refine previous estimates of the amount of material ejected from Dimorphos
- New research estimate 16 million kilograms of dust and rocks were ejected from DART's hypervelocity impact
- The research team studied a series of 18 LICIACube images and compiled an animation showing the ejecta plume
- More information:
- <https://science.nasa.gov/missions/close-up-views-of-nasas-dart-impact-to-inform-planetary-defense/>



This animated series of images was taken by a camera aboard LICIACube 2 to 3 minutes after DART crashed into Dimorphos. Credit: ASI/University of Maryland/Tony Farnham/Nathan Marder

# Planetary Defense for the Next Decade (2023 - 2033)

## Update to the original 2018 National Strategy and Action Plan

### National Plan Goals (Critical Focus Goals in Red)

1. Enhance NEO detection, tracking, and characterization capabilities
2. Improve NEO modeling, prediction, and information integration
3. Develop technologies for NEO reconnaissance, deflection, and disruption missions
4. Increase international cooperation on NEO preparedness
5. Strengthen and routinely exercise NEO impact emergency procedures and action protocols
6. Improve U.S. management of planetary defense through enhanced interagency collaboration

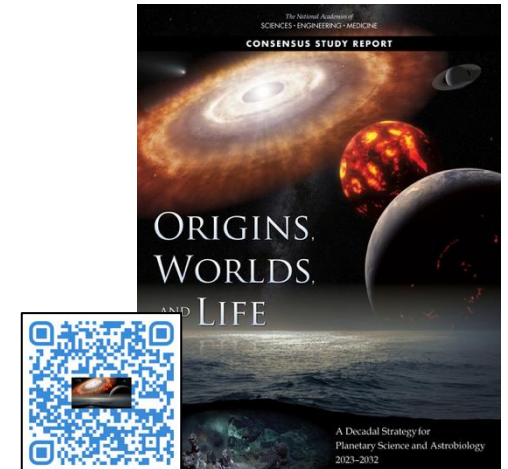
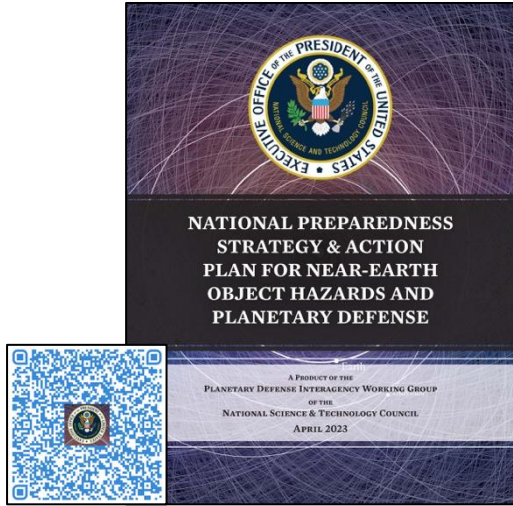
<https://ntrs.nasa.gov/citations/20250005751>



### NASA Plan has Additional Goals

7. Improve organization of NASA's planetary defense activities
8. Enhance strategic communications related to planetary defense

**Planetary Science Decadal Survey**  
Chapter 18 Planetary Defense: *Defending Earth Through Applied Planetary Science*



# Lucy

- Flyby of main belt asteroid Donaldjohanson flyby took place on April 20, 2025
- Closest approach: ~600 miles
- Images reveal a bilobed object
- Start of Trojan asteroid tour: 2027



*Main-belt asteroid Donaldjohanson, as seen by the Lucy Long-Range Reconnaissance Imager (L'ORRI) during the flyby. Timelapse shows images captured ~every 2 seconds; obtained about 40 seconds before closest approach*

# Psyche

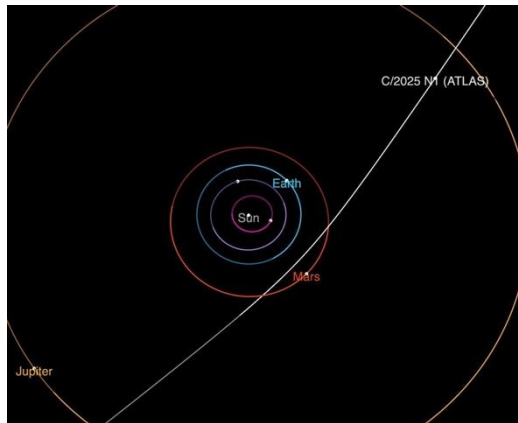
- The mission is on target to fly by Mars in May 2026 when it will use the Red Planet's gravity as a slingshot to help the spacecraft get to the asteroid Psyche



NASA's Psyche captured images of Earth and our Moon from about 180 million miles (290 kilometers) away in July 2025, as it calibrated its imager instrument. When choosing targets for the imager testing, scientists look for bodies that shine with reflected sunlight, just as the asteroid Psyche does. Credit: NASA/JPL-Caltech/ASU

# NASA's Science Community Studies Third Interstellar Object

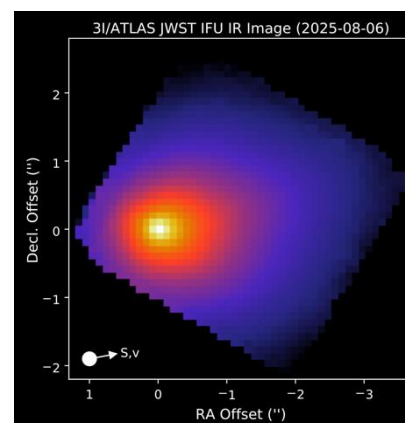
- On July 1, the NASA-funded ATLAS (Asteroid Terrestrial-impact Last Alert System – U. of Hawai'i) telescope in Chile discovered this object
- With the confirmation of an interstellar trajectory and cometary activity from multiple telescopes, the object was designated 3I/ATLAS or C/2025 N1 (ATLAS), the third known interstellar object
- Comet 3I/ATLAS does not pass the Sun close enough to be considered a near-Earth object
- NASA and other missions worked together to track and study 3I/ATLAS as it passes through our solar system
- More information: <https://science.nasa.gov/solar-system/comets/3i-atlas/>



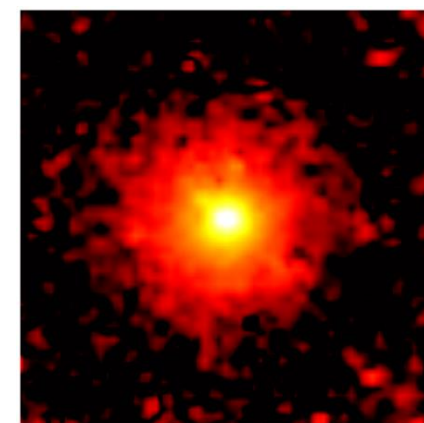
Trajectory of 3I/ATLAS.  
Credit: NASA/JPL CNEOS



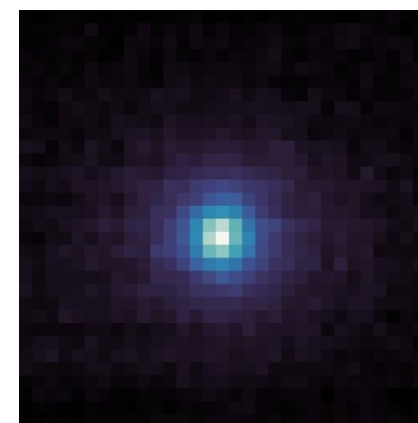
Credit: NASA/ESA/Hubble Space Telescope



Credit: NASA/James Webb Space Telescope



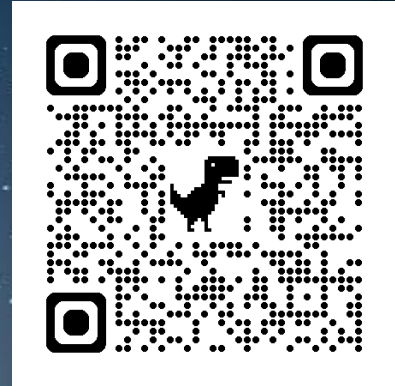
Credit: NASA/SPHEREx



Credit: NASA/MAVEN

A NASA+ DOCUMENTARY

# PLANETARY DEFENDERS



WE FIND ASTEROIDS BEFORE THEY FIND US

