



International
Asteroid
Warning
Network

International Asteroid Warning Network (IAWN) Update

Kelly Fast

IAWN Coordinating Officer

Near-Earth Object Observations Program Manager

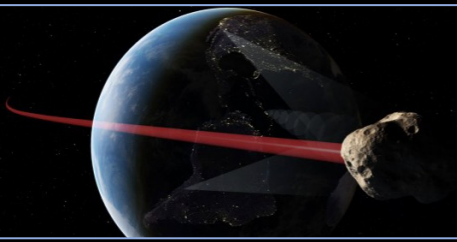
NASA Planetary Defense Coordination Office

IAWN Administration team at the University of Maryland/Planetary Data
System Small Bodies Node (Bauer, Reddy, Spahr, Warner, *et al.*)

Update to IAWN Steering Committee and Signatories

26 October 2023

<https://iawn.net/>



International
Asteroid
Warning
Network

IAWN Steering Committee

IAWN Steering Committee

Sergio Camacho, INAOE

Paul Chodas, JPL/CNEOS

Alan Harris, DLR

Lindley Johnson, NASA

Patrick Michel, OCA

Richard Moissl, ESA

Giovoanni Valsecchi, INAF

Boris Shustov, INASAN

Gonzalo Tancredi, Univ. del Uruguay

IAWN Coordinating Officer

Kelly Fast, NASA

IAWN Permanent Observers

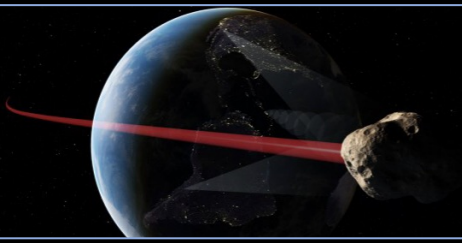
Space Mission Planning Advisory Group
(SMPAG)

Detlef Koschny, Chair for ESA

United Nations Office for Outer Space Affairs
(UNOOSA)

Romana Kofler

International Astronomical Union Near-Earth
Object Working Group (represented)



International
Asteroid
Warning
Network

IAWN Administration

NASA Planetary Data System Small Bodies Node at the University of Maryland

Tim Spahr	IAWN Manager - membership (<i>leave of absence</i>)
Vishnu Reddy	IAWN Coordinator – campaigns, meetings, membership,
Elizabeth Warner	IAWN Webmaster - website, meetings, membership
J. “Gerbs” Bauer	IAWN Administration supervisor

NASA Planetary Defense Coordination Office

Lindley Johnson	Lead for NASA’s IAWN organization role
Kelly Fast	Coordinating Officer for the IAWN Steering Committee
Mike Kelley	NASA lead for IAWN Campaigns
Josh Handal	NASA support for IAWN

IAWN/SMPAG History

- On February 15, 2013, the same day as the Chelyabinsk impact, the United Nations Committee on Peaceful Uses of Outer Space Working Group on Near-Earth Objects was meeting in Vienna to finalize a recommendation to the U.N. on how to defend Earth from possible asteroid impacts
- One result of this meeting was an endorsement by the U.N. General Assembly for the establishment of
 - an **International Asteroid Warning Network (IAWN)** for worldwide collaboration on the detection and tracking of potential impact hazards and;
 - a **Space Missions Planning Advisory Group (SMPAG)** as a forum for the national space agencies to collaborate on plans for preventing any possible asteroid impact
- In January 2014, the IAWN steering committee held its first meeting, and SMPAG met for the first time later that year

UN Office of Outer Space Affairs Committee on Peaceful Uses of Outer Space

Overview for NEO Threat Response



United Nations
COPUOS/OOSA

*Inform in case of
credible threat*

Parent Government Delegates

Determine Impact time,
location and severity

International Asteroid
Warning Network
(IAWN)
www.iawn.net

Coordinated
by NASA

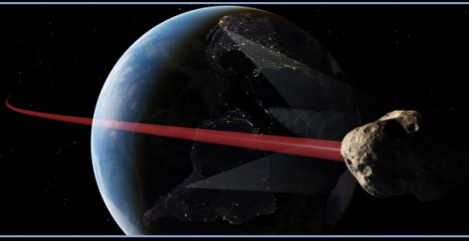
Observers, analysts, modelers...

Potential deflection
mission plans

Space Missions Planning
Advisory Group
(SMPAG)
www.smpag.net

Chaired
by ESA

Space agencies and offices



International
Asteroid
Warning
Network

International Asteroid Warning Network (IAWN)

A worldwide collaboration of asteroid observers and modelers recommended by the United Nations

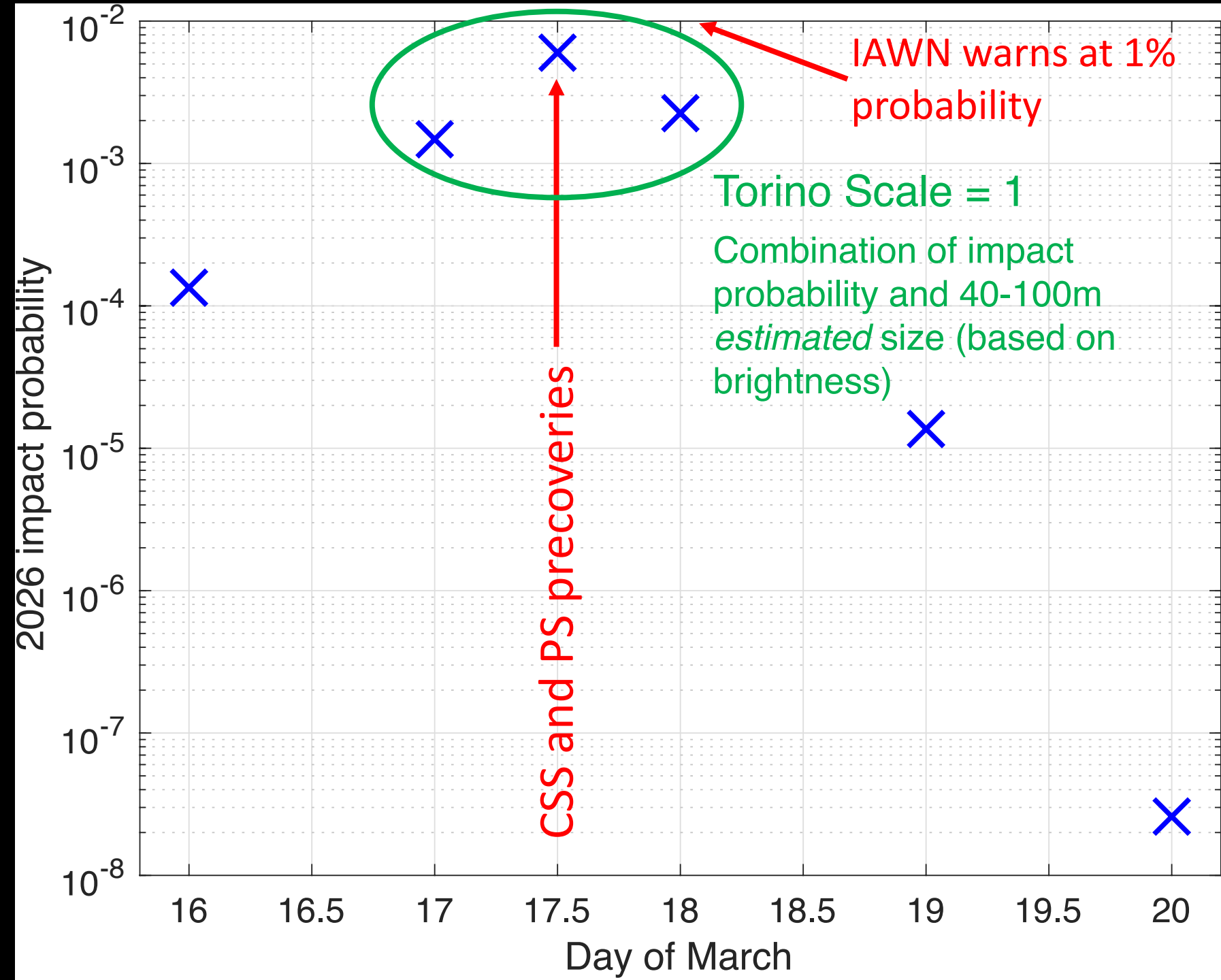
**IAWN includes
54 signatories
from over 25 countries
(October 2023)**

Newest signatories to IAWN include:

Australia	Univ. New South Wales, Canberra
Australia	Univ. Western Australia
Czech Republic	Klet Observatory
Japan	JAXA
France	K19-PASTIS
Italy	K78 Iota Scorpii
Italy	Virtual Telescope Project
Kazakhstan	Fesenkov Astrophysical Institute
Slovakia	Kysuce Observatory G02
United States	Mind's Eye Observatory

Recent risk list asteroid turned IAWN observing campaign target

- On March 16, 2023, the Minor Planet Center announced the discovery of near-Earth asteroid 2023 DZ2 by joint Romanian-Spanish team Para-SOL at MPC Code 950: Roque de los Muchachos Observatory (La Palma Observatory)
- Initially, 2023 DZ2 was estimated to be 40-100 meters in size found to have an impact risk in 2026, which was quickly ruled out by other astrometric observations
- The asteroid was inbound for a close approach within half the lunar distance from the Earth on March 25, 2023
- 2023 DZ2 was ideal for an IAWN rapid response characterization campaign
- Had the impact risk not been ruled out, this campaign would have been a critical example of IAWN's role and function instead of an exercise



Notification by IAWN - Threshold

IAWN shall warn of predicted impacts exceeding a probability of **1%** for all objects characterized to be greater than **10 meters** in size*

**Roughly equivalent to absolute magnitude of 28 if only brightness data can be collected.*

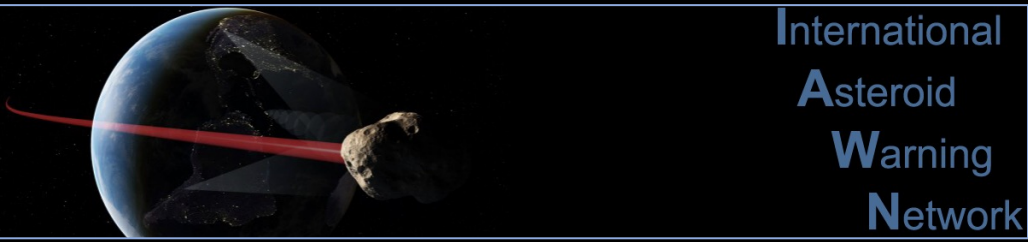
Reference: Report [SMPAG-RP-003](#) on Recommended Criteria & Thresholds for Action for Potential NEO Impact Threat (led by IAWN) at [smpag.net](#)
UNCOPUOS conference paper [A/AC.105/C.1/2017/CRP.25](#)

Notification by IAWN – Who?

The IAWN Coordinating Officer or a member of the IAWN Steering Committee will notify:

- Chair, Space Mission Planning Advisory Group (SMPAG)
- United Nations Office of Outer Space Affairs (UNOOSA)
 - UNOOSA will notify UN Member States

IAWN signatories would also notify and work with their own governments according to their own national policies, as applicable.



2023 Planetary Defense Conference Hypothetical Asteroid Impact Threat Exercise Notification by IAWN – “2023 PDC”

EXERCISE

EXERCISE

EXERCISE

INTERNATIONAL ASTEROID WARNING NETWORK (IAWN)

POTENTIAL ASTEROID IMPACT NOTIFICATION – HYPOTHETICAL SIMULATION

Date: April 3, 2023
From: International Asteroid Warning Network
To: Chair, Space Mission Planning Advisory Group (SMPAG);
United Nations Office of Outer Space Affairs
Title: Potential for Impact of Near-Earth Asteroid 2023 PDC

Impact Probability:	1% as calculated by NASA JPL CNEOS and ESA NEOCC
Impact Date:	22 OCTOBER 2036
Impact Risk Corridor:	From the South Pacific to the southern Indian Ocean, crossing North America, the Atlantic Ocean, and Africa
Approximate Size:	220 - 660 meters (720 - 2160 feet) determined from its observed brightness and an assumed range of most likely surface reflectivities
Expected Damage Level if Impact Occurs:	Uncertain – Regional to Continental. Energy released most likely to be in the range 54 Mt to 5.5 Gt

ADDITIONAL DETAILS:

- There is a 1% probability that asteroid 2023 PDC will impact Earth on 22 October 2036 as calculated by the NASA JPL Center for Near-Earth Object Studies and the ESA Near-Earth Objects Coordination Centre. While there is uncertainty in whether the asteroid will impact Earth, if an impact occurs it will be on this date.
- The impact risk corridor, which is the region of Earth where it is possible that 2023 PDC could impact, extends from the South Pacific to the southern Indian Ocean, crossing North America, the Atlantic Ocean, and Africa.
- The asteroid 2023 PDC has been tracked since it was first observed on 10 January 2023 by an international team using the Dark Energy Camera (DECam) at the Victor M. Blanco 4-meter Telescope at Cerro Tololo Inter-American Observatory in Chile and searching in the twilight region of the sky looking for asteroids in the inner Solar System.
- Further observations will reduce the uncertainty in the asteroid’s trajectory and impact probability. The asteroid will be almost continuously observable after late 2023, although it will be distant and quite faint and will likely require large (2-meter) telescopes.
- The asteroid size of 220 - 660 meters (720 - 2160 feet) is determined from its observed brightness (absolute magnitude H is determined to be 19.4) and an assumed range of most likely surface reflectivities.
- The size cannot be estimated with further precision without radar observations or imagery from a spacecraft that can closely approach the asteroid. The asteroid is too distant for radar observations and will not come within range until 2036.

EXERCISE

EXERCISE

EXERCISE

EXERCISE

EXERCISE

EXERCISE

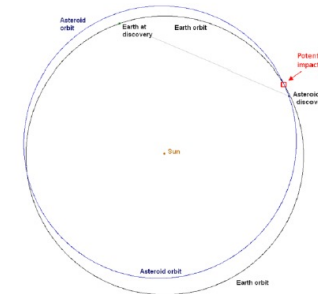
This notification is issued by the International Asteroid Warning Network (IAWN) in accordance with report [SMPAG-RP-003](#) on Recommended Criteria & Thresholds for Action for Potential NEO Impact Threat that defines the threshold for issuing warnings of possible impact effects, which is a probability of impact is greater than 1% and a rough size estimated to be greater than 10 meters (33 feet).

IAWN is a worldwide collaboration of asteroid observers and modelers that was recommended by the United Nations: <https://iawn.net>

Point of Contact: IAWN Coordinating Officer for the IAWN Steering Committee [email]

Graphics:

- Helio-centric orbit diagram relative to Earth orbit
- Impact risk corridor maps



EXERCISE

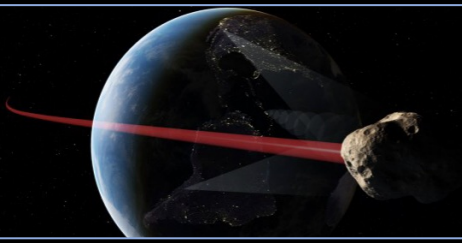
EXERCISE

EXERCISE

<https://cneos.jpl.nasa.gov/pd/cs/pdc23/>

Exercise

Exercise



International
Asteroid
Warning
Network

2023 Planetary Defense Conference Hypothetical Asteroid Impact Threat Exercise Notification by IAWN – “2023 PDC”

- Additional details and risk assessment were briefed by respective IAWN subject matter experts

Exercise

- Based on the hypothetical IAWN notification, SMPAG recommended in the exercise that a reconnaissance mission be quickly developed and launched

Exercise

8th IAA Planetary Defense Conference 2023 - Summary report and links to session recordings

<https://iaaspace.org/event/8th-iaa-planetary-defense-conference-2023/>

Latest IAWN campaign papers in the peer-reviewed literature:

- Apophis Planetary Defense Campaign
<https://iopscience.iop.org/article/10.3847/PSJ/ac66eb>
- International Asteroid Warning Network Timing Campaign: 2019 XS
<https://iopscience.iop.org/article/10.3847/PSJ/ac7224>

IAWN Steering Committee

- Interested applicants should see:
https://iawn.net/documents/charter/IAWN_Steering_Committee_ToR.pdf

The next IAWN meeting will be January 30 in Vienna, Austria (hybrid) on the margins of the UNCOPUOS Scientific & Technical Subcommittee meeting where IAWN and SMPAG will report.

The logo features a stylized Earth on the left, with a red line representing an asteroid's trajectory passing through it. To the right of the Earth is a grey, cratered asteroid.

International
Asteroid
Warning
Network

BACKUP

<https://iawn.net/>

IAWN Background

IAWN is a worldwide collaboration of asteroid observers and modelers that was recommended by the United Nations

From the IAWN Statement of Intent:

“The intent of the International Asteroid Warning Network (IAWN) is to establish a worldwide effort to detect, track, and physically characterize near-Earth objects (NEOs) to determine those that are potential impact threats to Earth. This network is comprised of a partnership of scientific institutions, observatories, and other interested parties performing observations, orbit computation, modeling, and other scientific research related to the impact potential and effects of asteroids.”