12th Steering Committee Meeting of the International Asteroid Warning Network (IAWN)

https://iawn.net/

30-31 March 2021 - 13:00 UTC

IAWN steering committee members in attendance:

Sergio Camacho (INAOE)
Paul Chodas (JPL/CNEOS)
Alan Harris (DLR)
Lindley Johnson (NASAHQ/PDCO)
Detlef Koschny (ESA/PDO)
Patrick Michel (CNRS/OCA)
Boris Shustov (Russian Academy of Sciences)
Giovanni Valsecchi (INAF)

IAWN permanent observers in attendance:

Gerhard Drolshagen (ESA/U.Oldenburg, SMPAG chair)
Romana Kofler (UN-OOSA)

IAWN signatory representatives in attendance:

Harel Ben-Ami (ISA)
Andrew Williams (ESO)
Cristovao Jacques (SONEAR, Brazil)
Artem Mokhnatkin (Keldysh Institute, Russia)
Olivier Hainaut (ESO)
Peter Birtwhistle (Great Shefford, UK)
Guy Wells (Northolt Branch Observatory, UK)
Paola Tanga (La Grange/OCA)
Francesco Manca (Sormano Obs.)
Eduard Kuznetsov (UrFu)
Hong-Kyu Moon (KASI)
Sergio Camacho (INAOE)
Ettore Perozzi (ASI)
David Balam (Canada)
Javier Licandro (IAC)

12th IAWN Meeting Observers

James Bauer (U of Maryland, NASA PDS SBN)
Linda Billings (NASA PDCO)
Matthew Payne (MPC)
Mike Kelley (NASA HQ/PDCO)
Doris Daou (NASA HQ/PDCO)

12th IAWN Meeting Convener

Kelly Fast (NASA HQ/PCO)

Opening
Kelly Fast convened the meeting. All participants introduced themselves. No additions or changes to the agenda were proposed.

IAWN.net
Tim Spahr from NEO Sciences LLC gave an update on IAWN.net. He introduced Elizabeth Warner, who oversees posting content on the IAWN website. The current website has a lot of content but they are looking for additional content. There is information about IAWN and how to join and documents about how the IAWN was founded. There is also a place for news items and articles. There are plans for posting interviews and timely articles to generate more interest in what the IAWN is doing. In the last year IAWN.net has added a Twitter feed of IAWN signatory accounts. There is also information posted about NEO close approaches from the MPC website and summary details about observing campaigns. A description of the website along with screenshots were shown.

IAWN Signatory Updates and Forum

ESA: Detlef Koschny reported on the addition of two new members to the ESA planetary defence team. Two new test bed telescopes are being installed now; one will be close to Madrid and will have an aperture of 56-cm and 2.5° field-of-view. The Flyeye telescope is being installed in the southern part of Italy and the cameras are being aligned right now. Talks are underway about radar capabilities in Europe that would benefit international collaboration with JPL. ESA coordinated with NASA on removing Apophis from the risk list. On the mitigation activities front, a detailed information exchange scenario was carried out with German emergency response colleagues using a text-based information format.

NASA: Lindley Johnson introduced the mission statement for the NASA Planetary Defense Coordination Office (PDCO). He presented an overview of NASA PDCO missions including DART and NEOWISE, NEO surveys, MPC, CNEOS, planetary radar and the NASA IRTF. NEO discovery statistics passed a major milestone with more than 25,000 known NEOs today. NASA is pursuing better capability for space-based IR telescopes (NEO Surveyor). Talks underway currently with the National Science Foundation about the next generation of planetary radar following the Arecibo 305m antenna collapse. Interesting recent NEO work included the discovery of 2020 SO, a Centaur rocket body from the 1966 launch of a Surveyor mission to the Moon. DART is working towards a November 2021 launch period.

Keldysh Institute: Artem Mokhnatkin summarized the efforts of the Keldysh Institute. Optical observations are made part of the ISON network. They participated in the Apophis campaign with data contribution from nine locations. All telescopes on their network are operational with one 80 cm telescope under repair. They plan on participating and contributing to future IAWN campaigns.

Israel Space Agency: Harel Ben-Ami made prepared remarks about Israel Space Agency joining IAWN. ISA is funding a team at the Weizmann Institute on planetary defense. David Polishook contributed to the Apophis campaign as the spectroscopy lead. They are also funding scientists to develop algorithms for calculating close approaches more efficiently.

Observatoire de la Côte d'Azur: Paola Tanga presented a summary of activities at OCA including a history of contribution to planetary defense through the work of Patrick Michel, PI of Hera mission. OCA participates in several ESA missions that have contributed to planetary defense/small body science including GAIA. An overview of optical ground-based telescopes also presented work done on stellar occultation of asteroids.

"Walk-on" IAWN Signatory updates

KASI: Hong-Kyu Moon presented a summary of activities at KASI including their participation in IAWN campaigns starting with 2012 TC4 in 2017. They also participated in the recently concluded Apophis mission and presented results from that campaign.

ESO: Andrew Williams presented a brief update from ESO on their NEO activities. ESO participated in IAWN campaigns using the Very Large Telescope (VLT) in the past including imaging 1999 KW4 binary system.

INAOE: Sergio Camacho gave an overview on their participation in IAWN campaigns and new telescopes being commissioned, including a 40-cm telescope.

Astrometric follow-up discussion

Tyler Linder presented an overview of astrometric follow-up of NEOs, working with a team of other IAWN observers. The goal was to optimize follow-up work by identifying the right telescope for the right target. The presentation gave an overview of the current follow-up status over the last five years and looked at the anticipated changes for future follow-up when the Vera Rubin Observatory and NEO Surveyor come online. Over the last five years, observers have doubled the number of NEOs observed at 23rd visual magnitude. Analyzing all of the 25,000 known NEOs, they noticed that 16% of the population is brighter than 22nd visual magnitude on any given night. New ATLAS southern hemisphere telescopes that are coming online would lead to new discoveries that need rapid follow-up. Small aperture telescopes are needed to recover brighter objects so the workload on larger apertures can be focused on fainter targets. Follow-up sorting tools such as NEOfixer (Catalina Sky Survey) are the key to more efficient follow up going into the future. Gerbs Bauer working on an IAWN specific follow-up tool for IAWN.net that would help coordinate follow-up observations.

IAWN Apophis Campaign

Vishnu Reddy presented summary of results from the recently concluded IAWN campaign focused on the 2021 flyby of asteroid Apophis. An overview of the campaign structure was presented including the working groups and people leading them. More than 40 observers/modelers participated in the campaign from Oct. 2020-April 2021. Apophis was treated as a new object and was 'discovered' by NEOWISE following observations by Catalina Sky Survey. Several observatories contributed photometric data that led to the improvement in the absolute magnitude of Apophis and rotation period. NASA IRTF spectral observations suggested a composition like ordinary chondrites and the radar observations improved on the NEOWISE diameter. Impact hazard modeling was done using the PAIR model from NASA Ames and the campaign ran the model on three epochs as observations trickled in. Since Apophis was treated as a new object, the impact probability for the real Apophis was relatively high during early epochs but was eliminated

as the campaign progressed at which point a synthetic clone of Apophis was used for hypothetical impact modeling. Key findings from the campaign include: Some observers ran FindOrb and removed observations that did not fit the orbit well; Rotational information on Apophis had little impact on the outcome of the impact hazard modeling; getting a diameter estimate early using thermal IR observations is very important for constraining impact effect modeling and for planetary defense.

Minor Planet Center update

Mike Kelly from University of Maryland provided an update a new sky survey tool they are planning to deploy at the Planetary Data System Small Bodies Node. The motivation for deploying this tool is that planetary defense surveys are producing millions of images per year so there is a lot of data to browse through if one wants to find a moving object. It takes a specialized tool to sift through these data for an average astronomer to find the object they are interested in. The tool being deployed will help users to quickly find comets and asteroids in wide field time domain survey data. Technical details about the tool with an example was presented.

Matthew Payne gave an update on the Minor Planet Center (MPC). Matt Holman stepped down as MPC director and Matt Payne is the new acting director. An overview of the MPC staff was presented along with their roles. They have made a major effort to make astrometry data available to the community in ADES format that includes uncertainty. This should help those who fit orbits to the data. MPC has adopted a help desk platform for managing interactions with the community. All community members are encouraged to use this help desk platform rather than emailing the MPC staff directly. MPC is also working toward automating data processing as much as possible. Peter Veres is working with Rob Weryk on Isolated Tracklet File (ITF) data to create orbits for newly recognized objects. Vera Rubin observatory test data was sent to MPC and was processed without any issues.

International Astronomical Union report

Gonzalo Tancredi presented a report from the International Astronomical Union. An overview of the various IAU divisions and commissions was presented. There is a commission dedicated to small bodies and people are encouraged to join the commission. The Working Group for Small Bodies Nomenclature is responsible for approving asteroid names. The most recent approval is the name of the DART mission target, Dimorphos. The next IAU General Assembly will be held in Busan, South Korea in August. 2022 depending on the status of the COVID-19 pandemic. A list of members from the scientific organizing committee was presented.

Artificial satellite policy for the Minor Planet Center

Lindley Johnson presented text on the artificial satellite policy with respect to the asteroid surveys. Previously when surveys found “artsats” they did not pass on the observations to the MPC or others. The revised policy is that these data can be sent to the MPC for controlled distribution to agencies and institutions recognized internationally for providing information for a space safety purpose.

ESA contract on an observational database for artificial satellites

Detlef Koschny (ESA) presented an overview of European Space Agency efforts to track artificial objects to keep them off of the MPC’s Near-Earth Object Confirmation Page. A current artsat catalog is maintained by Bill Gray but it is not official. Focus of ESA efforts would be on high-

area-mass-ratio (HAMR) objects. Most of these objects are fragments of mylar that need to be continuously tracked because they are affected by non-gravitational forces (solar radiation pressure) and traditional methods of tracking natural/artificial objects don't work effectively. They are working with a contractor to develop the tool so professional and amateur astronomers can track them. Vishnu Reddy mentioned similar efforts at the US Space Force (USSF) and proposed possible collaborative pathways for ESA/USSF to work on this problem.

ESA asteroid impact warning/alert notification text blocks

Richard Moissl presented on ESA's asteroid impact warning and alert notification system. SMPAG has worked out a notification system in case of a credible asteroid threat. This is very helpful, but one limitation is that it is provided only in the English language. So recently they have been working to add a purely text-based service. Details of how the text-based service will extract the relevant information from various sources using APIs was presented. The process would be fully automated and therefore relevant people would be instantaneously notified without delay.

International Year of Planetary Defense

Doris Dau from NASA HQ/PDCO presented about a proposed International Year of Planetary Defense. Plans are afoot to propose this to the United Nations. Momentum can be built by taking advantage of the Planetary Defense Conference. Names of key people were mentioned along with their responsibilities if such a declaration is made by the UN. The timeline and the process for getting the UN to approve the event were also presented and discussed. The goal is to have the International Year of Planetary Defense in 2029 during the flyby of asteroid Apophis. The logistics of organizing the event means that it cannot be done any sooner than that.

Issues of communications for planetary defense

Linda Billings led a discussion about communication issues for IAWN. The focus areas were on how information about NEOs is perceived and how IAWN operates as a network. IAWN signatories are encouraged to communicate with local, national and international media. The current communication environment is multi-cultural, multi-lingual and it is important to have a clear, concise, correct, consistent, coordinated, and timely message. The need to be open and transparent was also discussed with focus on building and maintaining trust, which has been a challenge. There is a need to develop effective ways to communicate complex information with decision makers. NASA PDCO has conducted several workshops for media professionals, and this has helped foster good relationships with them. IAWN members are encouraged to carry out similar activities in their local communities.