



Instituto de Astrofísica de  
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## INSTITUTO DE ASTROFISICA DE CANARIAS

Tenerife, November 13, 2019

Dr. Tim Spahr  
IAWN Manager  
International Asteroid Warning Network (IAWN)

Dear Dr. Spahr

On behalf of the Instituto de Astrofísica de Canarias (IAC), I am pleased to inform you of our wish to join the International Asteroid Warning Network (IAWN). To this effect, I attach the Statement of Intent.

Yours sincerely



Professor Rafael Rebolo  
DIRECTOR



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## INSTITUTO DE ASTROFISICA DE CANARIAS

### **The Instituto de Astrofísica de Canarias (IAC) participation on IWAN**

The IAC manage two first class observatories in the Canary Islands, one in the island of La Palma ("El Roque de los Muchachos" observatory, ORM) and another in the Tenerife island ("Observatorio del Teide" observatory, TO). Both observatories holds 14 telescopes larger than 1m, including the world largest optical telescope, the 10.4m Gran Telescopio Canarias (GTC), and several more smaller ones.

The IAC is already involved in near-Earth objects (NEO) research. Part of this work is done in collaboration with the NEO Segment of ESA's Space Situational Awareness and also other part of the research is funded by an European Union H2020 program.

The IAC Solar System group is member of the ESA P3NEOI "Observational Support from collaborating observatories" program funded by the call ESA ITT no. AO/1-9591/18/D/MRP. The IAC lead the WP2: Demonstration of Spectroscopic Observations and WP4: Support to NEO Deflection Mission (Didymos binary system). Also, in the framework of the IAC Director Discretionary Time Allocation, the IAC may perform astrometric measurements of NEOs deemed potentially hazardous, using the 10.4m GTC telescope. The observations target objects presenting a high-risk value (typically PS > -5 on the logarithmic Palermo Scale index), and which cannot be observed with smaller telescopes (typically, with magnitude in the 23-26.5 range). The GTC astrometry refines the orbit of these objects, ensuring they shall not be lost, and clarifying their status as potential impactor. The IAC Solar System group is also member of the NEOROCKS: "The NEO Rapid Observation, Characterization and Key Simulations" project funded by the EU H2020-SPACE-2018-2020, Topic SU-SPACE-23-SEC-2019, and lead the Task 3.5 - "Observational support to the Arecibo Planetary Radar Program".

In case of a NEO on a confirmed collision orbit, the IAC may carry out detailed observations in order to physically characterise the object in question, and thus provide data in support of possible mitigation measures.

## **Statement of Intent for Participation in the International Asteroid Warning Network**

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. IAWN endeavors to foster a shared understanding of the NEO hazard and optimize the scientific return on these small celestial bodies. Herein, this statement provides guidance and operational principles for the partners in this network. This partnership is organized consistent with the concept developed within the United Nations (UN) Committee on the Peaceful Uses of Outer Space (COPUOS).

### **Participation**

Participation in the IAWN is entirely voluntary and each participant's activities are funded through their own resources. The IAWN can be supported by survey telescope operations; critical follow-up observations; orbit computation and hazard analysis; observations to characterize specific NEOs; data distribution, processing, and/or archiving; or other analysis and infrastructure contributions. New facilities and capabilities may contribute to the IAWN as they come online and are integrated into the network.

As a condition of participating in the IAWN, the partners accept the existing set of coordination roles amongst the various existing NEO network facilities and agree to a policy of free and open exchange of all data submitted to the network. Distribution of data submitted to the network may be limited for a short period during processing while these data are ingested, correlated and verified.

As conceived, the IAWN may be expanded and enhanced with the identification of new partners and the availability of new capabilities for NEO detection, follow-up, and characterization observations, together with the methods to analyze these data products. As current survey and follow-up capabilities are limited, global coordination and distribution of effort is highly desired.

### **Operational Principles**

The overall needs, goals, and objectives of the IAWN are to:

- Maintain, support, and enhance existing ground-based observation facilities that currently perform discovery and physical characterization of NEOs;
  - Develop international rapid all-sky search capacity, geared towards discovering small, imminent impactors;
  - Build ground-based facilities to globally survey larger areas of sky to fainter magnitudes;
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- Develop a well-positioned space-based infrared survey to discover objects much faster than the current rate; and
- Establish an international communication policy and procedures regarding close approaches and impact risks.

To execute the objectives above, the functions of the IAWN are to:

1. Discover, monitor, and characterize potentially hazardous NEOs using optical and radar facilities and other assets based in the northern and southern hemispheres and in space;
2. Provide and maintain an international clearing house for the receipt, acknowledgement, and processing of all NEO astrometric observations and orbits to provide a global NEO database;
3. Serve as the international focal point for accurate information on the NEO population and any hazards they pose to the Earth;
4. Compute precision orbit determination of specific NEOs that pose a threat with the Earth and provide appropriate warning and evaluation of that threat;
5. Provide a portal for characterization data on potentially dangerous NEOs that are of great interest;
6. Coordinate campaigns for observing potentially hazardous NEOs;
7. Support the development and use of numerical and other theoretical modeling to obtain broader understanding of object characteristics and thus to augment what can be achieved via direct observation;
8. Recommend policies regarding criteria and thresholds for notification of an emerging NEO impact threat;
9. Develop a database of potential impact consequences, depending on geography, geology, population distribution, and other related factors;
10. Assess hazard analysis results and communicate them to entities identified by partners as being responsible for the receipt of notification of an impact threat in accordance with established policies; and
11. Assist Governments in the analysis of impact consequences and in the planning of mitigation responses.

### **Communication Strategy and Planning**

The signatories to this Statement of Intent recognize the importance of being adequately prepared for communications with a variety of audiences about NEOs, close approaches, and NEO impact risks. Participants in the IAWN recognize the need to consult with experts in science communication, risk communication, public policy analysis, and emergency management in developing messages and other content for communication with various audiences. The IAWN intends to be coordinated and prepared for communicating effectively the nature of the NEO hazard and detection of any specific impact threats with national and international political leaders, policy makers, emergency managers, and the general public. Signatories agree to coordinate with validated authoritative sources for:

- astrometric and orbital data (via the International Astronomical Union (IAU)-mandated
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- Minor Planet Center (MPC));
- the computation of impact probabilities (NEODyS and NASA's NEO Program Office);
- the ensuing actions aimed at improving the knowledge of the relevant NEOs (NASA's NEO Program Office and the ESA NEO Coordination Centre);

before the release of any statements to the media or public warning of the potential for impact of any specific asteroid or comet threat.

### **The IAWN Steering Committee**

Representatives of core capabilities for the IAWN intend to form a Steering Committee to better coordinate the operation and interchange of the network, and guide its growth, enhancement and evolution. The Steering Committee intends to meet on approximately an annual basis to perform a review and provide guidance and recommendations. All partners in the IAWN are welcome to send representation to the Steering Committee meetings.

### **Signature:**

The objectives of the IAWN can only be realized through a global multilateral partnership dedicated to a better understanding of the NEO impact hazard. Signature on this Statement of Intent serves as an expression of interest in supporting the IAWN and its objectives, but does not constitute a binding commitment.

A handwritten signature in black ink, appearing to read 'Rafael Rebolo', with a long horizontal flourish extending to the right.

Professor Rafael Rebolo  
DIRECTOR

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