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To:
International Asteroid Warning Network
Dr. Lindley N. Johnson
Planetary Defense Office
NASA Headquarters Washington, DC 20546
USA

Darmstadt, 18 March 2016

**Subject:** **Capabilities of ESA which contribute to the IAWN**

**Visa:** **R.Densing, Director of Operations** 22.3.

On behalf of ESA's Space Situational Awareness Programme (also referred to as "ESA" below), I am pleased to inform you about our intention to participate in the International Asteroid Warning Network. The Space Situational Awareness Programme is in a position to act consistent with the terms as laid out in the IAWN Statement of Intent, dated 9-Mar-2014, in line with the elements laid out in the following table in support of IAWN. A signed version of the Statement of Intent is also attached.

| Facility | Location | Contributions |
|---|---|---|
| NEO Coordination Centre | Frascati, Italy | - Coordination of observational activities in Europe and beyond<br>- Preparation of observations performed with own and other telescopes, including the ESO VLT<br>- Expert analyses of orbits, impact probabilities |
| SSA-NEO technical web portal | Frascati, Italy | - Presentation of data obtained from the NEODyS system<br>- Priority List giving a list of NEOs in need of observation<br>- Planning and visualisation tools |
| Optical Ground Station (1-m aperture, 1 deg FoV diagonal), IAU code J04 | Tenerife | - NEO follow-up observations, typically 4-6 nights per month |
| Test-Bed Telescope (56 cm aperture, 2.5 deg FoV diagonal) | Cebreros, Spain | - NEO follow-up, possibly survey |
| Collaborative telescopes | Various | - NEO follow-up observations with different nationally-owned telescopes. At the time of writing of this list, we sponsor the Klet observatory (Czech Republic) and the 80 cm Schmidt telescope on Calar Alto. |
| Interfaces to emergency response agencies | | - ESA is setting up a formal interface to national emergency response agencies which can be used to distribute information on asteroid impact threats. |

Nicolas Bobrinsky
SSA Programme Manager

18. 3. 2016

European Space Agency
Agence spatiale européenne

VISA D/OPS
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Date: 22.3.16

9-Mar-2014

# 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;

- 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

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.

[Signature by Official of Institute/Organization]

For ESA's SSA Programme :

18-3-2016.