

2 February 2017

English only

**Committee on the Peaceful
Uses of Outer Space**
Scientific and Technical Subcommittee
Fifty-fourth session
Vienna, 30 January-10 February
Agenda item 11: Near-Earth Objects

**Status report by the International Asteroid Warning Network
(IAWN) and the Space Mission Planning Advisory Group
(SMPAG)**

Submitted by the Chairpersons of IAWN and SMPAG

Introduction

1. The International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG) were established in 2014 as a result of the Recommendations of the Action Team on Near-Earth Objects for an international response to the near-Earth object impact threat (documents [A/AC.105/C.1/L.329](#) and [A/AC.105/C.1/L.330](#)), which were welcomed by the General Assembly in its resolution [A/RES/68/75](#) (para. 8) of 11 December 2013. The recommendations provide for a coordinated international response to the NEO impact threat, aimed at ensuring information-sharing in discovering, monitoring and physically characterizing potentially hazardous NEOs with a view that all countries, in particular developing countries with limited capacity in predicting and mitigating a NEO impact, are aware of potential threats, and emphasize the need for an effective emergency response and disaster management in the event of a NEO impact threat.

2. IAWN is a virtual network linking together the institutions performing functions such as discovering, monitoring and physically characterizing the potentially hazardous near-Earth object population and maintaining an internationally recognized clearing house for the receipt, acknowledgment and processing of all near-Earth object observations. It was established as a network that would also recommend criteria and thresholds for notification of an emerging impact threat and recommend strategies using well-defined communication plans and procedures to assist Governments in their response to predicted impact consequences.

3. There are currently eight official signatories to the IAWN Statement of Intent, representing observatories and space institutions from Europe, Colombia, Mexico, the Republic of Korea, the Russian Federation, the United States of America, and an

* Reissued for technical reasons on 7 February 2017.



amateur observer from the United Kingdom of Great Britain and Northern Ireland. These participants bring to bear a variety of ground and space-based assets to detect and observe NEOs; as well as abilities in orbit computation, potential impact prediction and modeling of potential impact effects. The signatories to the Statement of Intent recognize the importance of collaborative data analysis and being adequately prepared for communications with a variety of audiences about NEOs, their close approaches, and impact risks.

4. SMPAG also has an interface role and links Member States with space agencies and other relevant entities. Its responsibilities include laying out the framework, timeline and options for initiating and executing space mission response activities as well as promoting opportunities for international collaboration on research and techniques for near-Earth object deflection.

5. SMPAG members at present include: AEM (Mexico), ASI (Italy), Belspo (Belgium), CNES (France), DLR (Germany), ESA, ISA (Israel), JAXA (Japan), KASI (Republic of Korea), NASA (USA), ROSA (Romania), ROSCOSMOS (Russian Federation), SSAU (Ukraine), SUPARCO (Pakistan), UKSA (UK) and IAWN (ex officio). SMPAG observers at present include: Association of Space Explorers (ASE), International Academy of Astronautics (IAA), International Astronomical Union (IAU), Office for Outer Space Affairs (UNOOSA).

6. The two groups have their work facilitated by the United Nations on behalf of the international community (A/AC.105/C.1/L.329). The General Assembly in its resolution 71/90 (para. 9) of 6 December 2016 also decided that the Office for Outer Space Affairs serves as the permanent secretariat to SMPAG.

7. In accordance with the Scientific and Technical Subcommittee's decision (A/AC.105/1109, para. 182), SMPAG and IAWN continue to be invited as observers to the sessions of the Subcommittee and report annually on their progress of work on planetary defence. The two entities maintain their websites at <http://iawn.net/> and <http://smpag.net/>.

8. The present conference room paper contains information on initial agreements achieved in close coordination between SMPAG and IAWN on the criteria and thresholds for impact response actions, which also have direct relevance for Member States in terms of information sharing on a potential NEO threat.

Proposed criteria and thresholds for impact response actions

(1) IAWN shall warn of predicted impacts exceeding a probability of 1 per cent for all objects characterized to be greater than 10 meters in size, or roughly equivalent to absolute magnitude of 28 if only brightness data can be collected.

Rationale: Impact probabilities greater than 1 per cent are rare. Most objects greater than 10 meters in size will have effects (air blast and pieces) that could reach the Earth's surface. IAWN is compelled to warn populations if bodies will have effects that reach the ground. Setting threshold at 1 per cent is a compromise between not being overly alarmist and not warning too late for necessary action to be initiated. It is a probability figure that individuals and governments can comprehend. An alert such as this demonstrates that the IAWN is functioning. Further, it ensures the flow of communications from IAWN to the public and the United Nations.

(2) Terrestrial preparedness planning is recommended to begin when warned of a possible impact:

- Predicted to be within 20 years,
- Probability of impact is assessed to be greater than 10 per cent, and

- Object is characterized to be greater than 20 meters in size, or roughly equivalent to absolute magnitude of 27 if only brightness data can be collected.

Rationale: Terrestrial preparedness and the increased potential for impact will also involve determination of a “risk corridor” from objects with 10 per cent impact probabilities and impacts in less than 20 years. This provides populations and population centres on the Earth information to begin preparations for emergency preparedness if needed. The surprising effects of the Chelyabinsk event in 2013 from an object ~18 meters in size in turn, led to the establishment of a lower limit (20 meters) in these threshold criteria.

(3) SMPAG should start mission option(s) planning when warned of a possible impact:

- Predicted to be within 50 years,
- Probability is assessed to be greater than 1 per cent, and
- Object is characterized to be greater than 50 meters in size, or roughly equivalent to absolute magnitude of 26 if only brightness data can be collected.

Rationale: Several decades warning, if available, enables sufficient lead time to mount characterization missions. If a 1 per cent probability on a 100-meter object is assessed, SMPAG will be informed immediately following verification of the precise orbit. Part of such a characterization mission would likely deploy a transponder with the object.
