New Perspective
on space-based disaster management cooperation
~International Cooperation in the context of UNCOPUOS~

The 9th Joint Project Team Meeting (JPTM)
5-7 November 2024, Philippines

Takanori MIYOSHI
Planetary Defense Team
Japan Aerospace Exploration Agency

Committee on the Peaceful Uses of Outer Space (COPUOS)

- Established by General Assembly in 1959 to govern exploration and use of space for the benefit of all humanity (& STSC + LSC)
- With the following mandates
- Review **international co-operation**
- **Study space-related activities** that could be **undertaken under United Nations auspices**
- Encourage and assist with national space research programmes
- Study legal problems which may arise from the exploration of outer space
- Instrumental in the creation of the five treaties and five principles of outer space, and important to strengthen the international legal regime governing outer space
- Provides a unique platform at a global level to monitor and discuss developments in the space agenda and space technologyapplications.

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Regular agenda items at COPUOS/STSC

United Nations A/AC.105/C.1/L.412

General Assembly

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Committee on the Peaceful Uses of Outer Space
Scientific and Technical Subcommittee
Sixty-first session
Vienna, 29 January–9 February 2024

Annotated provisional agenda

Provisional agenda

1. Adoption of the agenda.
2. Election of the Chair.
3. Statement by the Chair.
4. General exchange of views and introduction of reports submitted on national activities.
5. Space for sustainable development: technology and its applications, including the United Nations Programme on Space Applications.

7. Space-system-based disaster management support.

10. Near-Earth objects.

11. Long-term sustainability of outer space activities.
12. Future role and method of work of the Committee.
13. Space and global health.
14. Use of nuclear power sources in outer space.
15. Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union.
16. Draft provisional agenda for the sixty-second session of the Scientific and Technical Subcommittee.
17. Report to the Committee on the Peaceful Uses of Outer Space.

V.23-23716 (E)

Please recycle

Dedicated agenda items on:

- Space-based disaster management support
- Near-Earth objects

(a) Report on the United Nations/Austria Symposium on Space for Climate Action, held in Graz, Austria (online), from 12 to 14 September 2023 (A/AC.105/1299);

(b) Report on the third Space4Water stakeholder meeting, held in Vienna on 24 and 25 October 2023 (A/AC.105/1300);

(c) Report on the United Nations/International Astronautical Federation Workshop on Space Technology for Socioeconomic Benefits, on the theme "Challenges and capacity-building opportunities for emerging space nations", held in Baku from 29 September to 1 October 2023 (A/AC.105/1301);

(d) Report on the United Nations/Canada Space for Women expert meeting, on the theme "Building capacity to promote and advance gender equality in the space sector", held in Montreal, Canada, from 30 October to 3 November 2023 (A/AC.105/1309).

6. Space debris

The Subcommittee will have before it a note by the Secretariat on research on space debris, the safety of space objects with nuclear power sources on board and problems relating to their collision with space debris. The note contains information that the secretariat has received from Member States and international organizations (A/AC.105/C.1/125 and A/AC.105/C.1/125/Add.1).

7. Space-system-based disaster management support

The Subcommittee will have before it a report on activities carried out in 2023 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (A/AC.105/1310).

8. Recent developments in global navigation satellite systems

The Subcommittee will have before it the following documents:

(a) Report on the United Nations/Finland workshop on the applications of global navigation satellite systems, held in Helsinki from 23 to 26 October 2023 (A/AC.105/1303);

(b) Note by the Secretariat containing the report on the seventeenth meeting of the International Committee on Global Navigation Satellite Systems, held in Madrid from 16 to 20 October 2023 (A/AC.105/1304);

(c) Report of the Secretariat on activities carried out in 2023 in the framework of the workplan of the International Committee on Global Navigation Satellite Systems (A/AC.105/1305).

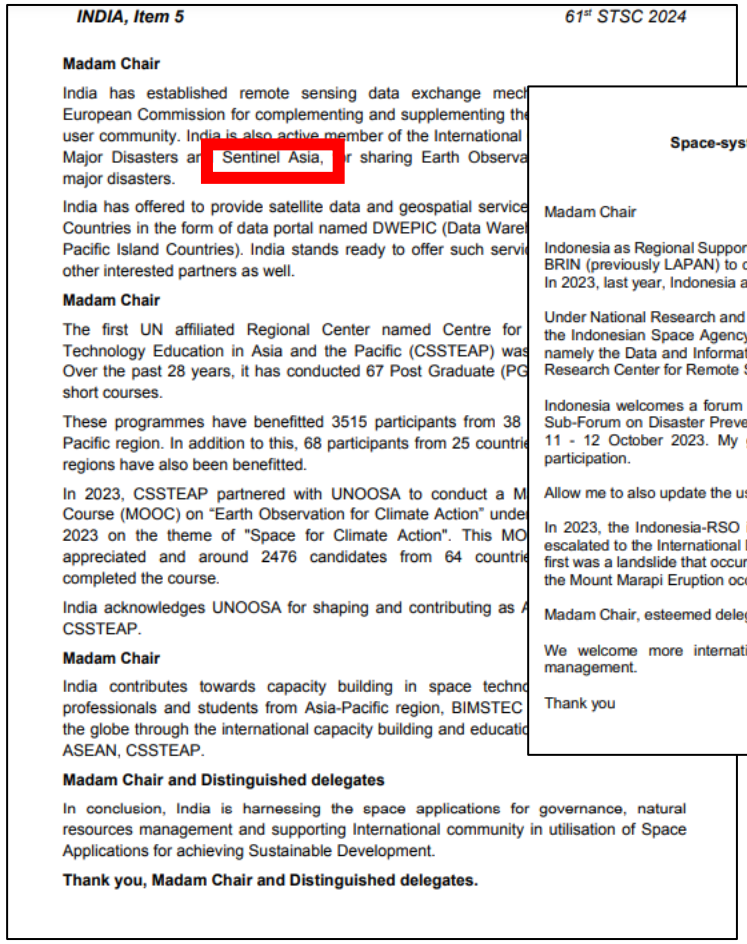
9. Space weather

The Subcommittee will have before it the report on the United Nations workshop on the International Space Weather Initiative: the Way Forward, held in Vienna from 26 to 30 June 2023 (A/AC.105/1302).

10. Near-Earth objects

The Subcommittee will continue to consider the work being undertaken by the International Asteroid Warning Network and the Space Mission Planning Advisory Group (A/AC.105/1279, paras. 165–183).

Sentinel Asia community's presence at the STSC 2024
～Statements by Member States mentioning Sentinel Asia～



INDIA, Item 5 ***61st STSC 2024***

Madam Chair

India has established remote sensing data exchange mech
European Commission for complementing and supplementing the
user community. India is also active member of the International
Major Disasters ar Sentinel Asia, r sharing Earth Observa
major disasters.

India has offered to provide satellite data and geospatial service
Countries in the form of data portal named DWEPIC (Data Ware
Pacific Island Countries). India stands ready to offer such servi
other interested partners as well.

Madam Chair

The first UN affiliated Regional Center named Centre for
Technology Education in Asia and the Pacific (CSSTEAP) was
Over the past 28 years, it has conducted 67 Post Graduate (PG
short courses.

These programmes have benefitted 3515 participants from 38
Pacific region. In addition to this, 68 participants from 25 countrie
regions have also been benefitted.

In 2023, CSSTEAP partnered with UNOOSA to conduct a M
Course (MOOC) on "Earth Observation for Climate Action" unde
2023 on the theme of "Space for Climate Action". This MO
appreciated and around 2476 candidates from 64 countrie
completed the course.

India acknowledges UNOOSA for shaping and contributing as
CSSTEAP.

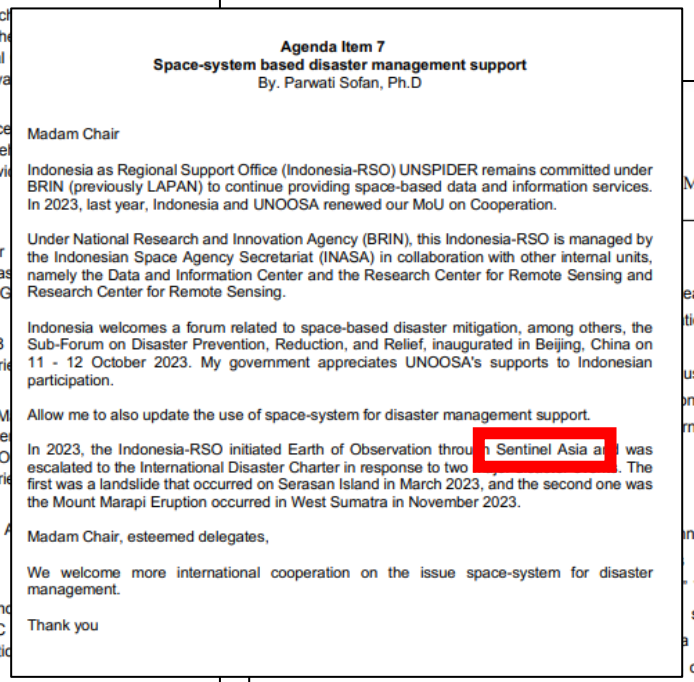
Madam Chair

India contributes towards capacity building in space techno
professionals and students from Asia-Pacific region, BIMSTEC
the globe through the international capacity building and educatio
ASEAN, CSSTEAP.

Madam Chair and Distinguished delegates

In conclusion, India is harnessing the space applications for governance, natural resources management and supporting International community in utilisation of Space Applications for achieving Sustainable Development.

Thank you, Madam Chair and Distinguished delegates.



Agenda Item 7
Space-system based disaster management support
By. Parwati Sofan, Ph.D

Madam Chair

Indonesia as Regional Support Office (Indonesia-RSO) UNSPIDER remains committed under BRIN (previously LAPAN) to continue providing space-based data and information services. In 2023, last year, Indonesia and UNOOSA renewed our MoU on Cooperation.

Under National Research and Innovation Agency (BRIN), this Indonesia-RSO is managed by the Indonesian Space Agency Secretariat (INASA) in collaboration with other internal units, namely the Data and Information Center and the Research Center for Remote Sensing and Research Center for Remote Sensing.

Indonesia welcomes a forum related to space-based disaster mitigation, among others, the Sub-Forum on Disaster Prevention, Reduction, and Relief, inaugurated in Beijing, China on 11 - 12 October 2023. My government appreciates UNOOSA's supports to Indonesian participation.

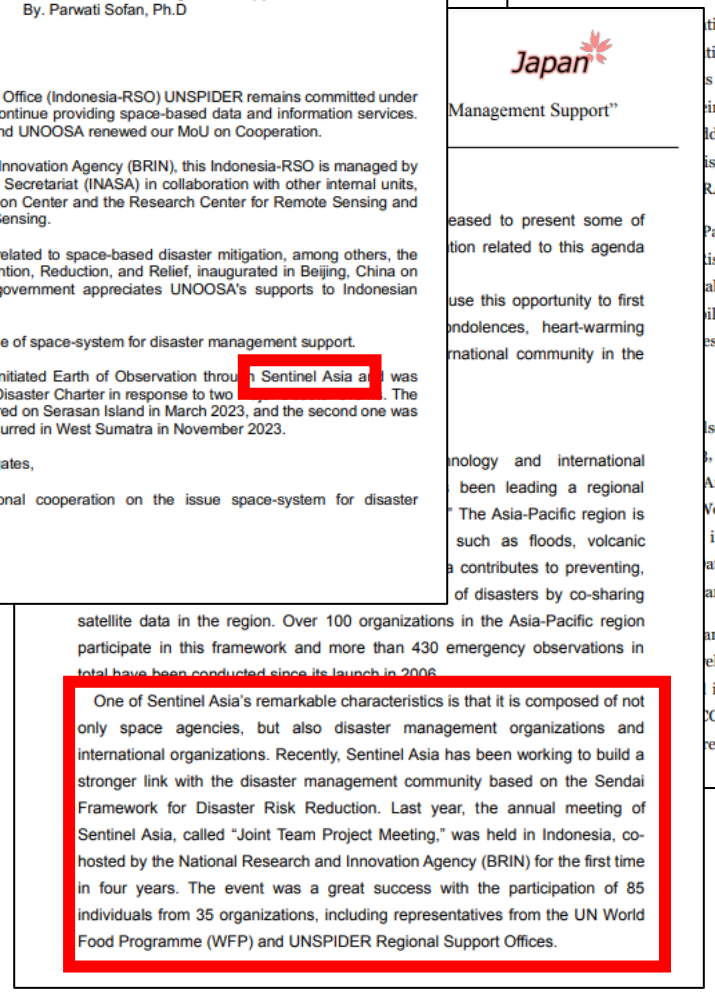
Allow me to also update the use of space-system for disaster management support.

In 2023, the Indonesia-RSO initiated Earth of Observation throu Sentinel Asia a was escalated to the International Disaster Charter in response to two . The first was a landslide that occurred on Serasan Island in March 2023, and the second one was the Mount Marapi Eruption occurred in West Sumatra in November 2023.

Madam Chair, esteemed delegates,

We welcome more international cooperation on the issue space-system for disaster management.

Thank you



Japan

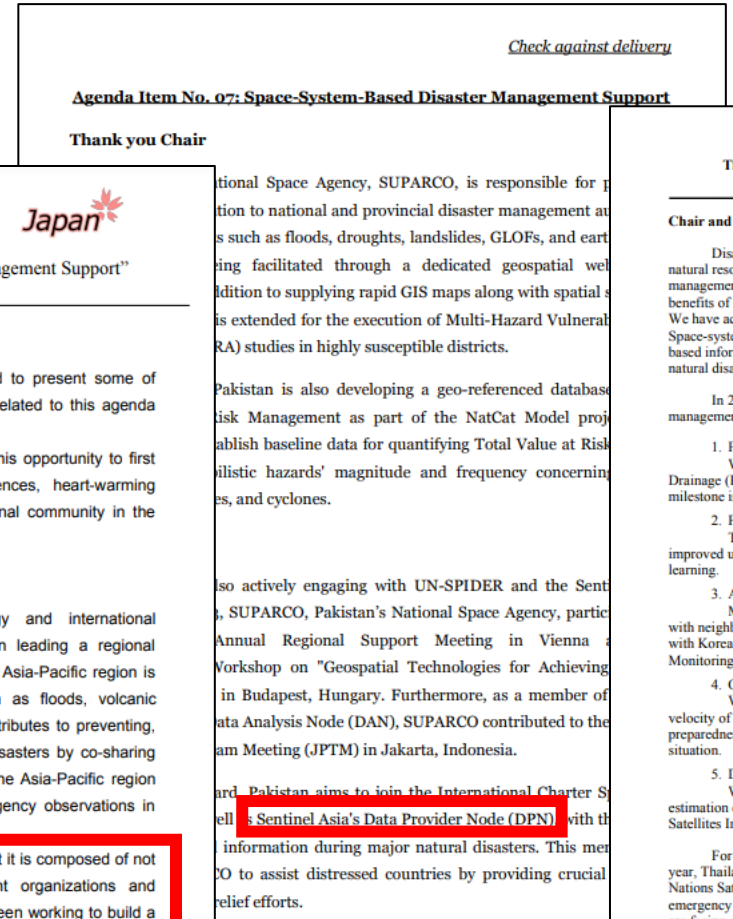
Management Support"

eased to present some of
tion related to this agenda

use this opportunity to first
ndolences, heart-warming
rnational community in the

nology and international
been leading a regional
The Asia-Pacific region is
such as floods, volcanic
contributes to preventing,
of disasters by co-sharing
satellite data in the region. Over 100 organizations in the Asia-Pacific region participate in this framework and more than 430 emergency observations in total have been conducted since its launch in 2006.

One of Sentinel Asia's remarkable characteristics is that it is composed of not only space agencies, but also disaster management organizations and international organizations. Recently, Sentinel Asia has been working to build a stronger link with the disaster management community based on the Sendai Framework for Disaster Risk Reduction. Last year, the annual meeting of Sentinel Asia, called "Joint Team Project Meeting," was held in Indonesia, co-hosted by the National Research and Innovation Agency (BRIN) for the first time in four years. The event was a great success with the participation of 85 individuals from 35 organizations, including representatives from the UN World Food Programme (WFP) and UNSPIDER Regional Support Offices.



Check against delivery

Agenda Item No. 07: Space-System-Based Disaster Management Support

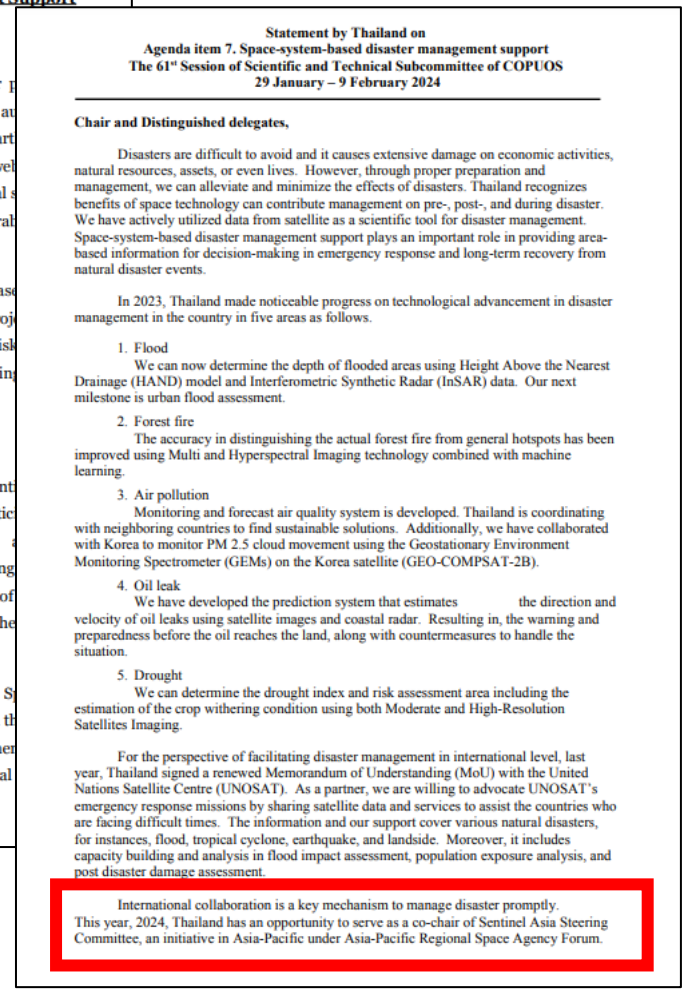
Thank you Chair

tional Space Agency, SUPARCO, is responsible for p
tion to national and provincial disaster management a
s such as floods, droughts, landslides, GLOFs, and eart
ing facilitated through a dedicated geospatial wel
ldition to supplying rapid GIS maps along with spatial s
is extended for the execution of Multi-Hazard Vulneral
RA) studies in highly susceptible districts.

Pakistan is also developing a geo-referenced databas
isk Management as part of the NatCat Model proj
ablish baseline data for quantifying Total Value at Risk
ilistic hazards' magnitude and frequency concernin
es, and cyclones.

lso actively engaging with UN-SPIDER and the Sent
, SUPARCO, Pakistan's National Space Agency, partic
Annual Regional Support Meeting in Vienna
Workshop on "Geospatial Technologies for Achieving
in Budapest, Hungary. Furthermore, as a member of
ata Analysis Node (DAN), SUPARCO contributed to the
am Meeting (JPTM) in Jakarta, Indonesia.

ard Pakistan aims to join the International Charter S
ell Sentinel Asia's Data Provider Node (DPN) with th
information during major natural disasters. This me
O to assist distressed countries by providing crucial
relief efforts.



Statement by Thailand on
Agenda item 7. Space-system-based disaster management support
The 61st Session of Scientific and Technical Subcommittee of COPUOS
29 January – 9 February 2024

Chair and Distinguished delegates,

Disasters are difficult to avoid and it causes extensive damage on economic activities, natural resources, assets, or even lives. However, through proper preparation and management, we can alleviate and minimize the effects of disasters. Thailand recognizes benefits of space technology can contribute management on pre-, post-, and during disaster. We have actively utilized data from satellite as a scientific tool for disaster management. Space-system-based disaster management support plays an important role in providing area-based information for decision-making in emergency response and long-term recovery from natural disaster events.

In 2023, Thailand made noticeable progress on technological advancement in disaster management in the country in five areas as follows.

1. Flood
We can now determine the depth of flooded areas using Height Above the Nearest Drainage (HAND) model and Interferometric Synthetic Radar (InSAR) data. Our next milestone is urban flood assessment.

2. Forest fire
The accuracy in distinguishing the actual forest fire from general hotspots has been improved using Multi and Hyperspectral Imaging technology combined with machine learning.

3. Air pollution
Monitoring and forecast air quality system is developed. Thailand is coordinating with neighboring countries to find sustainable solutions. Additionally, we have collaborated with Korea to monitor PM 2.5 cloud movement using the Geostationary Environment Monitoring Spectrometer (GEMs) on the Korea satellite (GEO-COMPSAT-2B).

4. Oil leak
We have developed the prediction system that estimates the direction and velocity of oil leaks using satellite images and coastal radar. Resulting in, the warning and preparedness before the oil reaches the land, along with countermeasures to handle the situation.

5. Drought
We can determine the drought index and risk assessment area including the estimation of the crop withering condition using both Moderate and High-Resolution Satellites Imaging.

For the perspective of facilitating disaster management in international level, last year, Thailand signed a renewed Memorandum of Understanding (MoU) with the United Nations Satellite Centre (UNOSAT). As a partner, we are willing to advocate UNOSAT's emergency response missions by sharing satellite data and services to assist the countries who are facing difficult times. The information and our support cover various natural disasters, for instances, flood, tropical cyclone, earthquake, and landside. Moreover, it includes capacity building and analysis in flood impact assessment, population exposure analysis, and post disaster damage assessment.

International collaboration is a key mechanism to manage disaster promptly.
This year, 2024, Thailand has an opportunity to serve as a co-chair of Sentinel Asia Steering Committee, an initiative in Asia-Pacific under Asia-Pacific Regional Space Agency Forum.

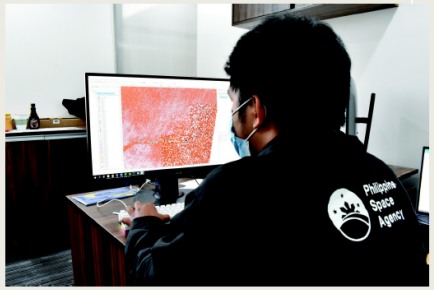
Statements by India, Indonesia, Japan, Pakistan, and Thailand.
*source: UNOOSA webpage

Sentinel Asia community's presence at the STSC 2024
～Technical Presentations on/mentioning Sentinel Asia～

PhilSA
Philippine Space Agency

Data Sharing for Disaster Management

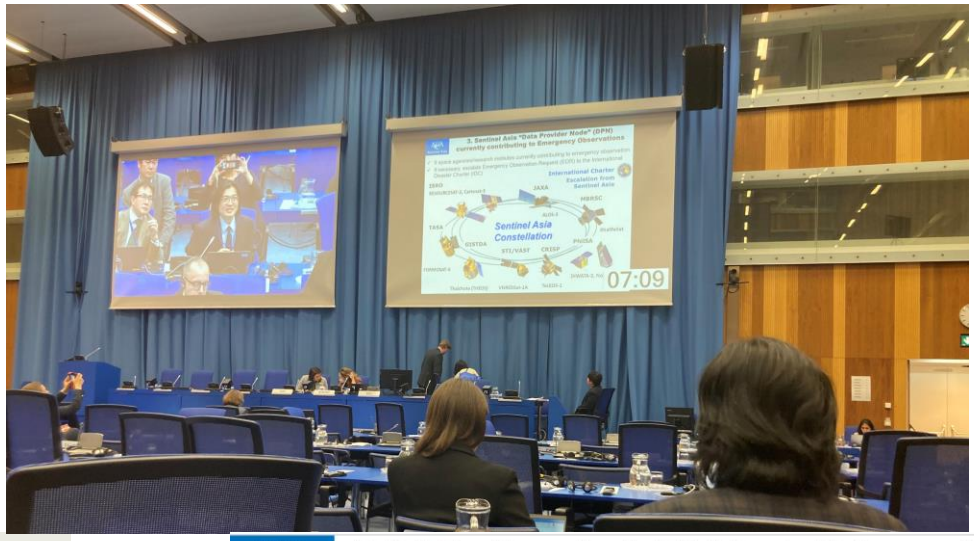
Sentinel Asia



25 MISSIONS TASKED for Sentinel-Asia requests using Diwata-2

5 CHARTER ACTIVATIONS for local disasters

25 PRODUCTS GENERATED and distributed locally



PhilSA
Philippine Space Agency

PhilSA as Data Provider Node

25 MISSIONS TASKED for Sentinel-Asia requests using Diwata-2

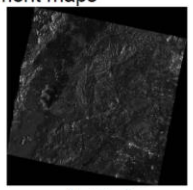
Disaster Type	**Storm**
Country	Bangladesh
Occurrence Date (UTC):	17 November 2023
SA activation Date(UTC):	17 November 2023
Requester	Bangladesh Water Development Board (BWDB)
Escalation to the International Charter	No
GLIDE Number	TC-2023-000230-BGD

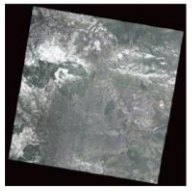
Sample successful capture from Diwata-2 (After Disaster)

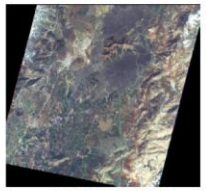
Sentinel Asia

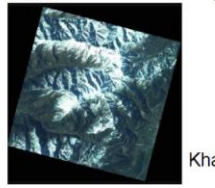
5.1.1 Earthquake in Türkiye in February 2023

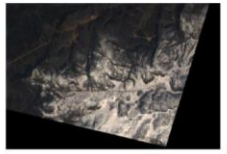
- ✓Disaster and Emergency Management Presidency of Türkiye (AFAD) requested emergency observation
- ✓AFAD, disaster relief team and UNWFP used disaster assessment map to monitor the impact of the earthquake
- ✓5 organizations provided satellite data and 8 organizations provided analyzed disaster assessment maps


ALOS-2


Cartosat-3


FORMOSAT-5


KhalifaSat


THEOS-1 (Thaichote)

Outcome – COPUOS/STSC 2024 Final Report
Sentinel Asia community's presence at the STSC 2024

99. The view was expressed that the respective mandates of the agencies and offices within the United Nations system should be respected to avoid duplication of work and, in that regard, the Inter-Agency Meeting on Outer Space Activities (UN-Space) was the relevant coordination mechanism.

IV. Space-system-based disaster management support

100. In accordance with General Assembly resolution 78/72, the Subcommittee considered agenda item 7, entitled "Space-system-based disaster management support".

101. The representatives of Argentina, Canada, China, France, Germany, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Pakistan, the Russian Federation, Rwanda, South Africa, Thailand, the United Kingdom and the United States made statements under agenda item 7. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

102. The Subcommittee heard the following scientific and technical presentations:

(a) "Progress in building emergency management satellites and satellite emergency response to major natural disasters in 2023", by the representative of China;

(b) "Latest trends and perspectives: Japan's contribution to disaster risk reduction in the Asia-Pacific region through Sentinel Asia", by the representative of Japan;

(c) "Multi-purpose aerospace monitoring system and service for the prompt provision of emergency situation data", by the representative of Kazakhstan;

(d) "Philippine space data mobilization for enhancing disaster resilience", by the representative of the Philippines;

(e) "Earth Observatory of Singapore – Remote Sensing Lab's support for humanitarian assistance and disaster relief", by the representative of Singapore.

103. The Subcommittee welcomed with appreciation the activities and achievements of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), as contained in the report on activities carried out in 2023 in the framework of UN-SPIDER (A/AC.105/1310).

104. The Subcommittee noted that in 2023, with the continued support of its network of partners, including the regional support offices, UN-SPIDER had conducted institutional strengthening missions to South Africa and Tonga and a scoping mission to French Polynesia; provided virtual support to Bolivia (Plurinational State of), El Salvador and Malawi; organized training courses in Chile, Fiji, Germany and Hungary; and organized workshops in Algeria and Germany, a subforum in China and an annual meeting of regional support offices in Austria.

105. The Subcommittee noted with satisfaction that UN-SPIDER had delivered tailored space-based information and resources that had helped to strengthen the capacity of States to effectively respond to disasters triggered by natural hazards.

106. The Subcommittee also noted that space-based support for disaster risk reduction and emergency response was vital for addressing and mitigating the impact of natural disasters, and that space technology played a significant role in the management of natural disasters, enabling national observatories to monitor a variety of natural hazards, including floods, wildfires, typhoons or hurricanes, droughts and landslides.

107. Some delegations expressed the view that space technology contributed to an improved understanding of disaster risks, enabling States to effectively allocate resources to reduce the associated negative impacts and to improve preparedness and response capabilities at the national and local levels.

108. The Subcommittee noted the benefits of initiatives such as the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (International Charter on Space and Major Disasters), which enabled the organization of resources and expertise for rapid response to catastrophic events and was an effective mechanism for using space-based information to support disaster management efforts.

109. The Subcommittee also noted the need to continue encouraging international collaboration in order to maximize the resilience of communities.

110. The view was expressed that there was a need to facilitate regional emergency observations outside the scope of the International Charter on Space and Major Disasters and Sentinel Asia, as well as a need to facilitate access to data for Member States in order to support the monitoring and prevention of disasters.

111. The Subcommittee expressed its satisfaction with the International Charter on Space and Major Disasters as an ongoing example of the collective use of satellites for good and via the universal access programme.

112. Some delegations expressed their satisfaction with the contribution of Sentinel Asia to disaster management efforts in the Asian region.

satellite constellations to monitor forest fires, to develop new tools and services to address water-related disasters using satellite data, to improve existing technologies for the thematic processing and analysis of remote sensing data and develop new ones, and to develop ground-based infrastructure for receiving and processing space information.

114. Some delegations expressed appreciation for the many international partnerships that promoted the free and open sharing of critical data, which would lead to greater utilization of space-based information for societal benefit.

115. The view was expressed that the Recovery Observatory of the Committee on Earth Observation Satellites (CEOS) allowed for coordinated satellite image acquisitions and synthesis of the information derived therefrom. The delegation expressing that view noted the efforts of UN-SPIDER to raise awareness of the Recovery Observatory at several workshops and training sessions in 2023.

116. The view was expressed that there was a need to enact and implement space policies to meet the objectives of the Paris Agreement on climate change and the Sendai Framework for Disaster Risk Reduction 2015–2030.

117. The Subcommittee noted the financial and staff resources that had been contributed by China and Germany to UN-SPIDER. Such support, including in-kind contributions, efforts to share experiences with other interested countries and the provision of experts, provided by States members of the Committee and by the regional support offices in 2023 for the activities conducted by the Office for Outer Space Affairs through UN-SPIDER, was crucial for States to reduce the risk of disasters.

118. The Subcommittee noted that since its establishment, UN-SPIDER had benefited from voluntary contributions (cash and in-kind) from the following States: Austria, China, Croatia, Czechia, France, Germany, India, Indonesia, Mexico, Republic of Korea, Russian Federation, Spain, Switzerland, Türkiye and United States.

V. Recent developments in global navigation satellite systems

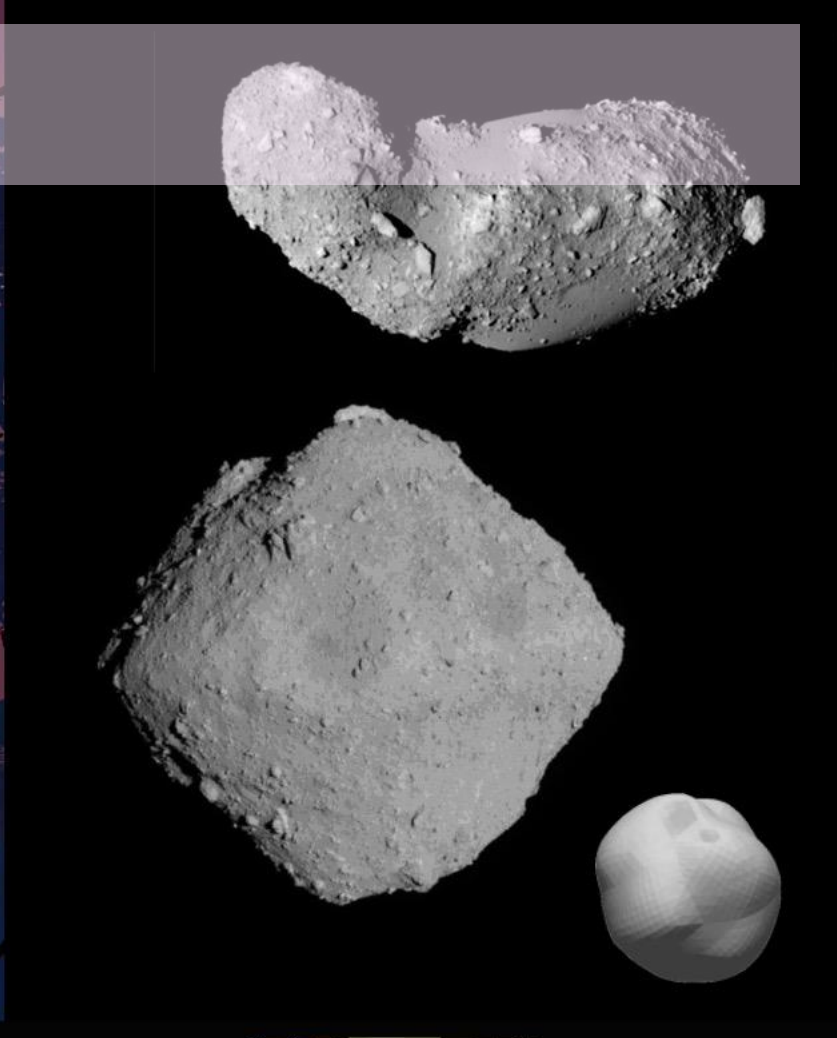
119. In accordance with General Assembly resolution 78/72, the Subcommittee considered agenda item 8, entitled "Recent developments in global navigation satellite systems", and reviewed matters related to the International Committee on Global Navigation Satellite Systems (ICG).

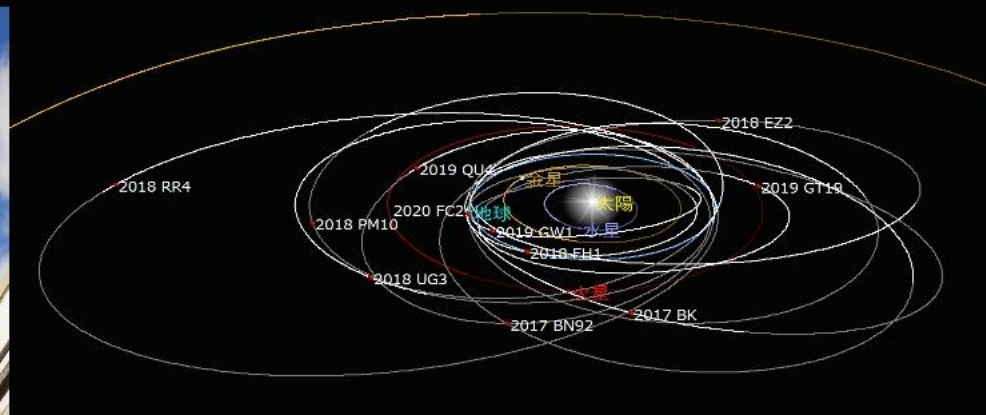
Proposal for collaboration in the COPUOS arena

- Sentinel Asia JPT members to encourage respective governments to deliver more statements /technical presentations on Sentinel Asia

- UNSPIDER team to work with the COPUOS secretariat to highlight the activities and significance of Sentinel Asia much more in the COPUOS reports to facilitate and motivate further collaboration

International Cooperation for “Planetary Defense”





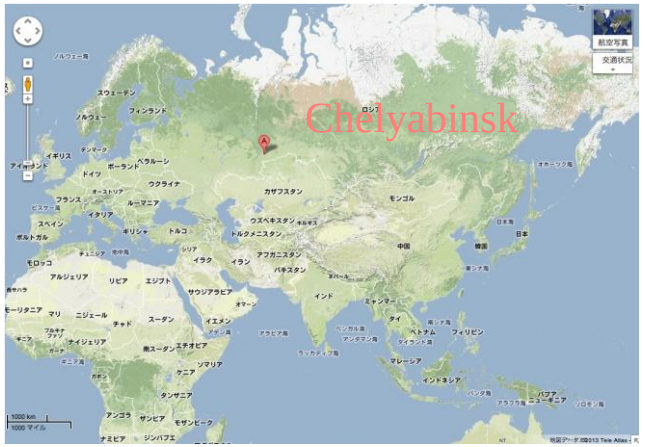
An asteroid burning up in the atmosphere over the Philippines
4 September 2024

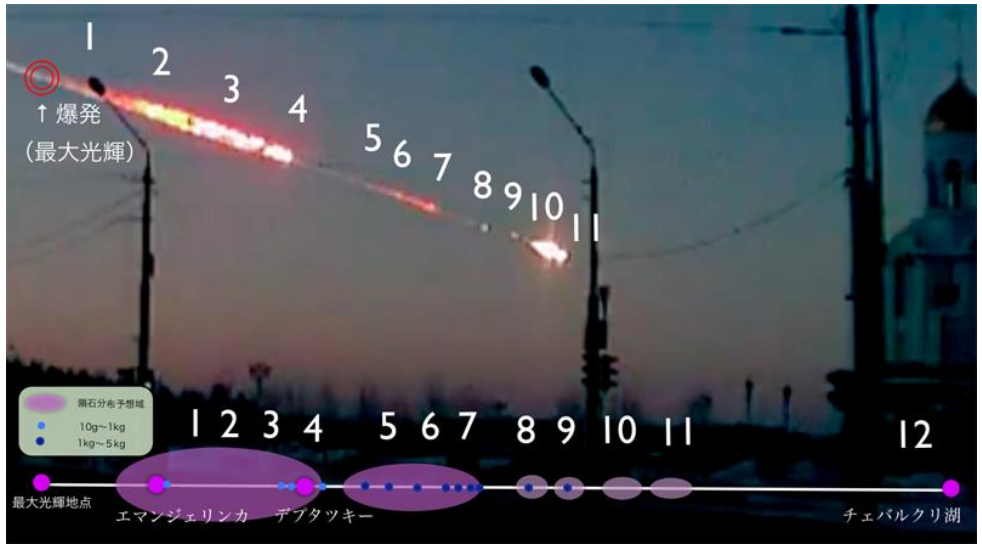
Video credit: Marvin Coloma, from Tuguegarao City (Philippines)

Disaster caused by a meteorite- Chelyabinsk Meteorite in 2013

15 Februrary 2013, 09:20 AM (local time)

- A meteorite fell on western areas of Chelyabinsk, Russia
- The size of the colliding asteroid was about 17m.
- Approximately 1500 injured people
- Over 7000 buildings damaged
- Estimated loss: USD 33 million





The need for preveionion of disasters in advance.

⇒ **Planetary defense**

What we should do for planetary defense

Step 1

Discover NEOs

⇩

Follow-up observations for precise orbit determination

⇩

Check of Earth collision by orbit calculations

Investigate the physical characteristics of NEOs

NEO : Near Earth Object

Step 2

Avoid collision or Minimize damage

Evacuate from the region where NEO collides

keep people from panicking

Make international law / international coordination

Planetary Defense: Step 3? – Disaster Response and Recovery

- **On mid/long-term basis, Step-1 and Stpe-2 approaches can be implemented. However, on short-term basis, if an asteroid is discovered shortly before the predicted collision, it is difficult to avoid collision and to prevent disaster.**
- **The failure of collision avoidance and disaster prevention results in matters of "Disaster Response and Recovery" -familiar and relevant to the Sentinel Asia community, and Sentinel Asia EOR could play the pivotal role!**

International fora of Planetary Defense and the participation of disaster management community

United Nations

COPUOS/UNOOSA

IAWN ：International Asteroid Warning Network

SMPAG：Space Mission Planning Advisory Group

Technical Advisory Mission addressing issues including PD led by **UNOOSA/UN-SPIDER**

International conference

PDC：Planetary Defense Conference

International outreach

ASTEROID DAY 30 JUNE

Attended by space agencies, disaster management organizations, and international organizations.

Participation of the disaster management community in the PD

Outcome paper for the Planetary Defense Conference from the viewpoint of **disaster risk** authored by a representative from **UNOOSA/UNSPIDER**, co-authored by representatives from such as UNITAR/UNOSAT, Federal Emergency Management Agency (USA)

Int J Disaster Risk Sci (2022) 13:151–159
https://doi.org/10.1007/s13753-021-00389-9
www.ijdrs.com
www.springer.com/13753

SHORT ARTICLE

When It Strikes, Are We Ready? Lessons Identified at the 7th Planetary Defense Conference in Preparing for a Near-Earth Object Impact Scenario

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Abstract Near-Earth object (NEO) impact is one of the examples of high impact and low probability (HILP) event, same as the Covid-19 pandemic the world faces since the beginning of 2020. The 7th Planetary Defense Conference held by the International Academy of Astronautics (IAA) in April 2021 included an exercise on a hypothetical NEO impact event, allowing the planetary defense community to discuss potential responses. Over the span of the 4-day conference this exercise connected disaster response and management professionals to participate in a series of panels, providing feedback and perspective on the unfolding crisis scenario. The hypothetical but realistic asteroid threat scenario illustrated how such a short-warning threat might evolve. The scenario utilized during the conference indicates a need to prepare now for what might come in the future, because even with advance notice, preparation time might be minimal. This scenario chose Europe for the impact, which may likely cope with such a disaster, through the Union Civil Protection Mechanism (UCPM) and other solidarity and support mechanisms within the European Union (EU), as well as with potential support from international partners. This short article raises concern about other areas in the world on how they may access NEO impact information and cope with such disasters. It also provides an idea on vast scale of such disaster vis-à-vis the current capacity of response systems to cope with a larger event in Europe or elsewhere. This scenario showed that planetary defense is a global endeavor. Constant engagement of the planetary defense and disaster response communities is essential in order to keep the world safe from potential disasters caused by NEO impacts.

Keywords Asteroid threats · Disaster risk reduction · Planetary defense · Risk management and prevention

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1 Realizing the Reality of High Impact and Low Probability Events: From Pandemics to Near-Earth Object Impacts

The world is experiencing a once in a century pandemic event. The memories of past pandemics, such as the 1918 Spanish Flu that is estimated to have killed over 50 million people from 1918 to 1920 (Taubenberger and Morens

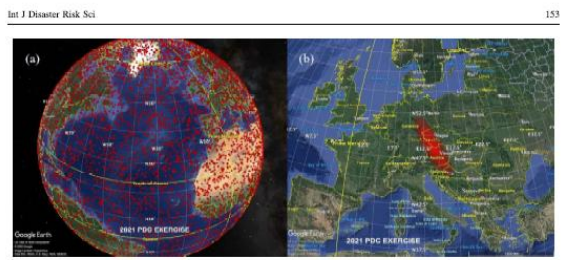

Fig. 1 Maps taken from the hypothetical scenario exercise for a near-Earth object impact "2021 PDC Exercise" during the 2021 7th Planetary Defense Conference (PDC) held by the International Academy of Astronautics (IAA). **a** The map shows the initial estimates for impact locations (red dots) based on early modeling during the scenario exercise; **b** map of the final expected impact corridor as constructed by continued modeling during the scenario exercise. *Source* https://cneos.jpl.nasa.gov/pd/cs/pdc21/

community members. A holistic approach to such exercises ensures all voices and values are considered, while also adding realism to the scenarios.

The hypothetical scenario of a NEO being discovered and its probable impact being a few months or less away raised the following questions for disaster management specialists:

- Are we prepared to provide accurate information to the public about such an event?
- If the impact area were to involve several nations, how will their disaster management organizations coordinate responses?
- Can large populations be evacuated quickly from an area where impact would end all life and destroy all infrastructure?
- Is there relevant experience from planning for and responses to volcanic eruptions, hurricanes, earthquakes, tsunamis, and other natural hazards and disasters?
- Is there relevant experience from disasters at critical infrastructure locations (for example, nuclear power plants, chemical plants, oil/gas facilities)?
- How has the public reacted in the case of past disasters?

The exercise discussions that took place during the conference brought together a panel of disaster management specialists to deal with these questions. They also offered disaster response specialists the opportunity to become more acquainted with disasters and risks posed by asteroids and comets as natural hazards. Lastly, the discussions took into account lessons learned from building resilience, providing early warning, and offering responses to other disasters, and their perspective was provided with a focus on HILP disasters such as a NEO impact and the Covid-19 pandemic.

4 Preparedness Lessons Learned from the 7th Planetary Defense Conference

Through a series of expert discussions, the critical nature of applying principles of disaster management to a NEO impact was apparent. Key points and considerations to further action from the perspective of disaster management are discussed in this section.

4.1 Detection and Early Warning

Large asteroid impacts are a global threat and the right early warning information, its effective dissemination, and positive messages are powerful tools to counter irrational responses and panic.

4.1.1 Large Asteroid Impacts Are a Global Threat, Always, and Observation Networks and International Collaboration are Important

Due to the difficulties of determining precise asteroid orbits, it is often difficult to precisely predict the impact location ahead of time. Through well-established observation networks and international collaboration, the time needed to reduce the many uncertainties of the impact parameters can often be shortened significantly. But even when an impact location is known for large events, dealing

https://link.springer.com/article/10.1007/s13753-021-00389-9

Participation of the disaster management community in the PD

NEOs are addressed by the UNDRR in the context of disaster risk management!

UNDRR United Nations Office for Disaster Risk Reduction

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Home > Sendai Framework Terminology on Disaster Risk Reduction

Near-Earth Object

Unique identifier / Notation ET0009 **Synonyms** Not identified.

A near-Earth object (NEO) is an asteroid or comet whose trajectory brings it to within 1.3 astronomical units of the Sun and hence within 0.3 astronomical units, or approximately 45 million kilometres, of the Earth's orbit (UN OOSA, no date).

Primary reference(s)

UN OOSA, no date. UN-SPIDER knowledge Portal, Near-Earth Objects. United Nations Office for Outer Space Affairs (UN OOSA). Accessed 14 October 2020.

Additional scientific description

The definition above includes objects that will come close to Earth at some point in their future orbital evolution. Near-Earth objects (NEOs) generally result from objects that have experienced gravitational perturbations from nearby planets, moving them into orbits that allow them to come near to Earth.

Metrics and numeric limits

A near-Earth asteroid is said to be a potentially hazardous asteroid when its orbit comes within 0.05 astronomical units of the Earth's orbit and it has a measured absolute magnitude H<22 mag (an estimated diameter greater than 140 meters) (NASA, no date).

Key relevant UN convention / multilateral treaty

The Committee on the Peaceful Uses of Outer Space (COPUOS) was set up by the United Nations General Assembly in 1959 to govern the exploration and use of space for the benefit of all humanity: for peace, security and development (COPUOS, no date)). The Committee was tasked with reviewing international cooperation in peaceful uses of outer space, studying spacerelated activities that could be undertaken by the United Nations, encouraging space research programmes, and studying legal problems arising from the exploration of outer space.

Examples of drivers, outcomes and risk management

The International Asteroid Warning Network (IAWN) was established in 2013 as a result of the UN-endorsed recommendations for an international response to a potential NEO impact threat, to create an international group of organisations involved in detecting, tracking, and characterising NEOs. IAWN is tasked with developing a strategy using well-defined communication plans and protocols to assist governments in the analysis of asteroid impact consequences and in the planning of mitigation responses. Currently, IAWN includes members from Europe, Asia, South and North America (IAWN, 2020).

IAWN has proposed the following definition of an NEO: An asteroid, meteoroid, or a comet as it passes near Earth, enters the Earth's atmosphere, and/or strikes the Earth, or provokes changes in inter-planetary conditions that affect the Earth's magnetosphere, ionosphere, and thermosphere. The criteria and thresholds related to this definition are as follows (UN OOSA, no date):

- The probability that an NEO will impact Earth (either 1% for warning and 10% for terrestrial preparedness planning).
- The probable size, or at least its luminosity in the night sky (greater than 10 meters or at least absolute magnitude 28).
- How far in the future the NEO will impact Earth (20 years).

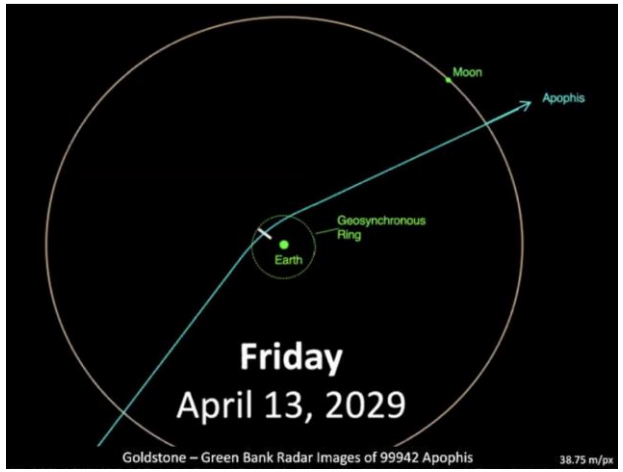
https://www.undrr.org/understanding-disaster-risk/terminology/hips/et0009

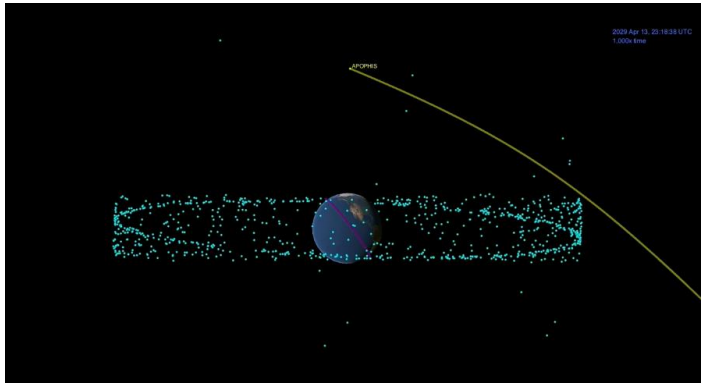
"Words Into Action – A Guide to Multi-hazard Early Warning Systems" published by UNDRR

Further International Outreach
UN-designated International Year for Planetary Defense 2029

(Asteroid 99942) “Apophis”

- The asteroid “Apophis” will pass in very close proximity to the Earth, at about 32,000 kilometres above the surface of Earth on 13 April 2029.
- The size is about 350m
- Visible to billions of peoples with naked eyes





draft **UN General Assembly Resolution** to declare **2029** to be "**the United Nations-designated International Year of Asteroid Awareness and Planetary Defense**“

(submitted by the government of Romania, reaching consensus by member states of COPUOS)

A/AC.105/2024/CRP.11/Rev.1

28 June 2024

English only

Committee on the Peaceful Uses of Outer Space
Sixty-seventh session
Vienna, 19–28 June 2024
Item 7 of the provisional agenda*
Report of the Scientific and Technical Subcommittee on its sixty-first session

Paper submitted by Romania

1. The present conference room paper containing draft resolution on a proposal for United Nations-designated International Year of Asteroid Awareness and Planetary Defence, 2029, is submitted by Romania and co-sponsored by Armenia, Austria, Belgium, Chile, Czechia and Mexico, as well as from the International Astronomical Union (IAU) and the European Astronomical Society (EAS), following the preparations outlined in conference room paper A/AC.105/C.1/2024/CRP.20, which the Scientific and Technical Subcommittee had before it at its sixty-first session, held from 29 January to 9 February 2024.

* A/AC.105/L.337.

V.24-11711 (E)

Please recycle

A/AC.105/2024/CRP.11/Rev.1

Draft resolution on a United Nations-designated international year of asteroid awareness and planetary defence in 2029 [A/AC.105/L.339]

1. At its sixty-first session, held from 29 January to 9 February 2024, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space recommended to the Committee that 2029 be declared a United Nations-designated international year of asteroid awareness and planetary defence, dedicated to a worldwide campaign to raise awareness regarding asteroids and to highlight the collaborative efforts being undertaken by the Committee to mitigate the potential hazard posed by the impact on the Earth of near-Earth objects, and as an excellent opportunity for a global educational campaign about near-Earth objects.

2. In that regard, the Subcommittee took note of the guidelines for the proclamation of international years, contained in the annex to Economic and Social Council resolution 1980/67 and the related General Assembly resolutions 53/199 and 61/185 (A/AC.105/1307, para. 151).

* * * * *

Draft resolution

International Year of Asteroid Awareness and Planetary Defence, 2029

The General Assembly,

Recognizing the unique platform at the global level for international cooperation in space activities represented by the Committee on the Peaceful Uses of Outer Space and its Scientific and Technical Subcommittee and Legal Subcommittee and assisted by the Office for Outer Space Affairs of the Secretariat, [Omnibus resolution, preambular para. 3]

Recalling the "Space2030" Agenda: space as a driver of sustainable development[1] and its implementation plan, in which Member States acknowledged that the exploration and peaceful uses of outer space had enriched our collective knowledge and revolutionized life on Earth, that space science and technology had become intrinsic to our daily lives and brought an abundance of unique and fundamental benefits to Earth, and that, as the space community moved forward with its space exploration endeavours, space would continue to serve as a source of inspiration and innovation and to provide applications for the benefit of humankind,

Recalling also its resolution 54/68 of 6 December 1999 on the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), organized by the Committee, and the resolution adopted by the Conference entitled "The Space Millennium: Vienna Declaration on Space and Human Development"[2], in which participating States called for, inter alia, improving the international coordination of activities related to near-Earth objects, harmonizing the worldwide efforts directed at identification, follow-up observation and orbit prediction, while at the same time giving consideration to developing a common strategy that would include future activities related to near-Earth objects, [3] [A/CONF.184/6, para. 1.(c)(iii)]

[1] Resolution 76/3.
[2] *Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19–30 July 1999* (United Nations publication, Sales No. E.00.I.3), chap. I, resolution 1.
[3] A/CONF.184/6, para. 1.(c)(iii).

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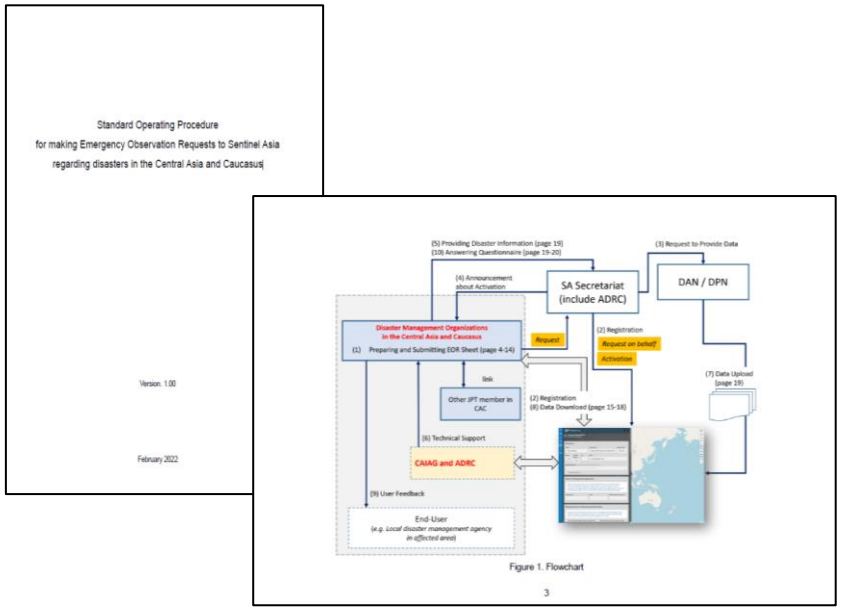
V.24-11711

Proposal for future possible cooperation
- Sentinel Asia SOP for EORs-

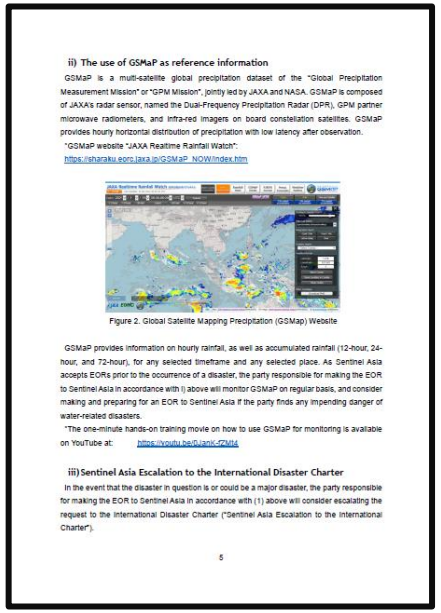
"SOPs for making Emergency Observation Requests to Sentinel Asia regarding disasters in Viet Nam, Myanmar, Thailand, Cambodia, Laos, Central Asia and Caucasus countries, and Pacific Islands countries

- **Prompt and EORs to Sentinel Asia** including escalation to the Charter:
- Pre-definition of criteria and roles as to, such as, under which circumstances and which organization should make EORs to Sentinel Asia
- Regional Organizations such as ADPC, SPC, CAIAG, AHA Centre are to play hub roles in making EORs through close communication with local DMOs
- Institutionalized use of Global Satellite Mapping of Precipitation (GSMaP) for monitoring (reference information for making EORs)
- Easy and real-time provision of local information on the disaster via web-based mobile application developed by AIT

SOP for making EORs concerning disasters in the Central Asia and Caucasus countries

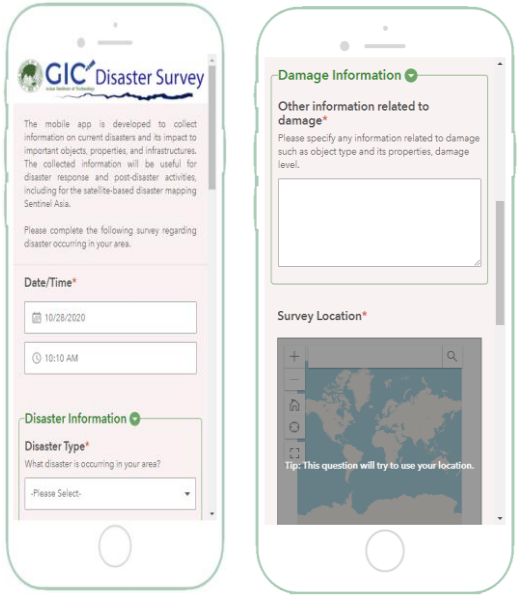


Institutionalized use of GSMaP



Mobile application developed by AIT

- Web link: https://arcg.is/1HWGWX0
- QR Code:



Proposal for future possible cooperation
- Sentinel Asia SOP for EORs (continued)-

(e.g.) SOP for Central Asia and Caucasian region

2. Preparing and Submitting EOR

2-1. About EOR

i) Outline

If a disaster occurs, or is expected to occur, parties hereto will consider making an Emergency Observation Request (EOR) to Sentinel Asia. If the disaster could cause severe damage that meets the following criteria, parties will promptly make an EOR to Sentinel Asia.

[Criteria]

- Flood : (i) an accumulated 24-hour rainfall amount of 200 mm or more; or (ii) an accumulated 72-hour rainfall amount of 400 mm or more
- Earthquake : Modified Mercalli Intensity (MMI) VII or more

[Main requestor of each disaster]

- Flood: Disaster Management Organization in disaster affected country
- Earthquake: Disaster Management Organization in disaster affected country

In the event that an EOR is not made promptly despite the fact that (a) the criteria stated above seem to have been fulfilled, or (b) the occurrence of a disaster and possible need for rescue and relief aids are already reported by the foreign and international media, including relief.web and floods.list, ADRC will contact and urge the competent organization in accordance with this SOP to make an EOR, in which case Parties agree hereby in advance, that International Organizations of the Sentinel Asia community, including the CAIAG and ADRC, will make an EOR on behalf of the competent organization, unless explicit rejection is expressed within 2 hours of contact by ADRC.

*Note: The criteria above are intended to be conditions under which parties will make EORs on a "general principle" basis, and are not intended to exclude EORs in case of non-fulfillment hereof. This means that the Sentinel Asia community will assume EORs will be made, and prepare for their support when these criteria are fulfilled. Parties may also make EORs in case of disasters even if these criteria are not fulfilled.

~As part of future updates or newly establishment of EORs:

- **A disaster caused by asteroids /meteorites** could be **included in the SOP** as a type of disasters to be addressed by Sentinel Asia
- The **organization(s) responsible for making EORs** to Sentinel Asia in the case of asteroids/meteorites-induced disasters could be also **pre-defined.**

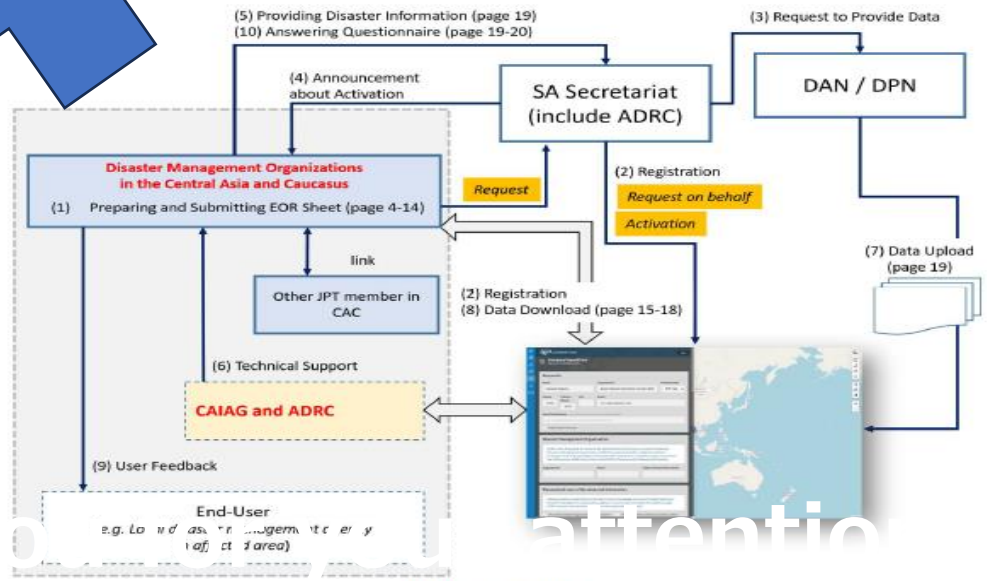


Figure 1. Flowchart


Thank you for your attention