



# Role of UN-SPIDER in Enhancing Disaster Preparedness for Effective Emergency Response

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United Nations Office for Outer Space Affairs

United Nations Offices at Vienna

[www.unoosa.org](http://www.unoosa.org)



# United Nations Office for Outer Space Affairs (UNOOSA)

## Vision

Bringing the benefits of space to humankind

## Mission Statement

Promote international cooperation in the peaceful uses of outer space to achieve sustainable development goals



Image credit: Digital Globe/Maxar Technologies



## Our Work

### Main programmes and platforms

- Secretariat to UN Committee on the Peaceful Uses of Outer Space (COPUOS)
- Works with Member States, IGOs, NGOs
- Programme on Space Applications
- UN-wide coordination on space affairs - UN-Space
- UN Register of Space Objects
- UN-SPIDER (Disaster Management and Emergency Response)
- International Committee on Global Navigation Satellite Systems (ICG)
- Space Mission Planning Advisory Group (SMPAG)



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UN-SPIDER

[www.un-spider.org](http://www.un-spider.org)



International Committee on  
Global Navigation Satellite Systems

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## Space for SDGs

All countries and all stakeholders act in **collaborative partnership to implement the 2030 Agenda** for Sustainable Development.

**UNOOSA** is currently developing new approaches to address the targets enshrined in the SDGs including the **Space Solutions Compendium**

**One joint vision** has to be employed to protect space as a limited resource **for the benefit of humankind.**



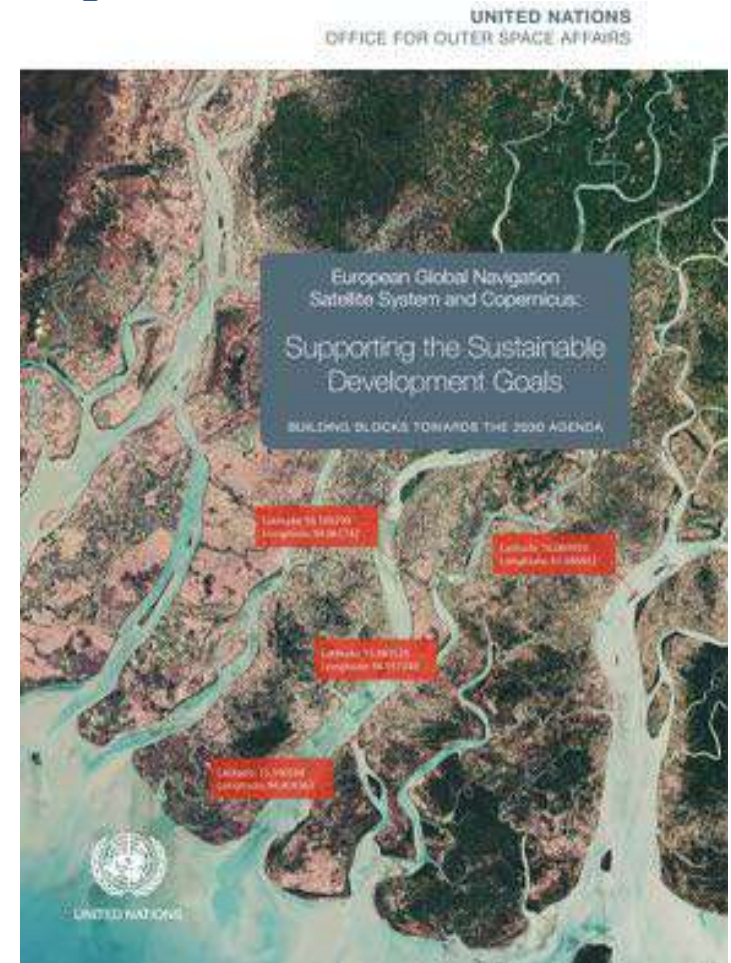




## UNOOSA Publication

### Supporting the Sustainable Development Goals: Building blocks towards the 2030 agenda

- In January 2018, UNOOSA joined with European GNSS Agency (GSA) to publish a report that investigates the role of space technologies in fulfillment of SDGs
- Research found that 65 of the 169 SDG targets (**almost 40%**) are reliant on the use of space
- This report is **supported by 38 cases and best practices** exemplifying how space technologies contribute to achieving the SDGs
- If these practices were implemented on a larger scale, they would contribute to the achievement of **SDG targets ahead of their deadlines**





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**800 participants including 30 head or high ranking representatives of Space Agencies attended**

**Live in-flight call with astronauts on the International Space Station**

**UNOOSA signed several agreements with governments, space agencies and private companies**

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June 2018

**Major step for global space governance and towards the successful fulfilment of SDG targets and Space2030**





## UNISPACE+50 Thematic Priority 6: International cooperation towards low-emission and resilient societies

- Climate change mitigation (*Paris Agreement*)
- Disaster risk Reduction (*Sendai Framework*)
- Integrated space application approaches – interoperability with ground/in-situ systems

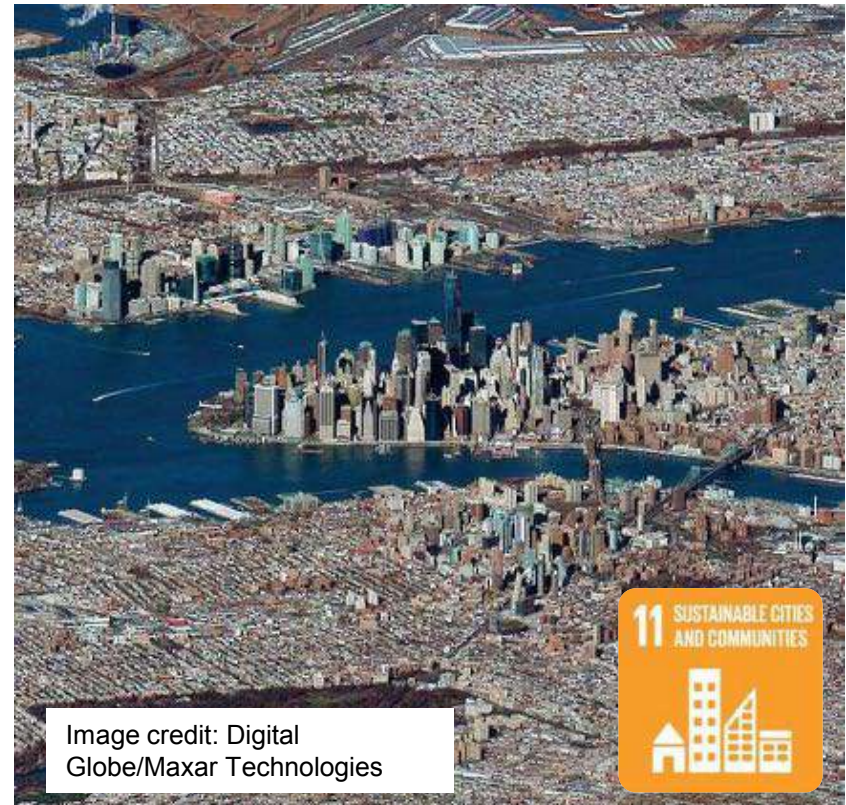


Image: Jeddah, Saudi Arabia. Image Credit: NASA



## SDG 11: Make cities inclusive, safe, resilient and sustainable

- Access for all to adequate, safe and affordable housing and basic services
- Access to safe, affordable, accessible and sustainable transport systems for all
- Sustainable human settlement planning and management
- Protect and safeguard the world's cultural and natural heritage
- Reduce the number of deaths and the number of people affected and substantially decrease the direct







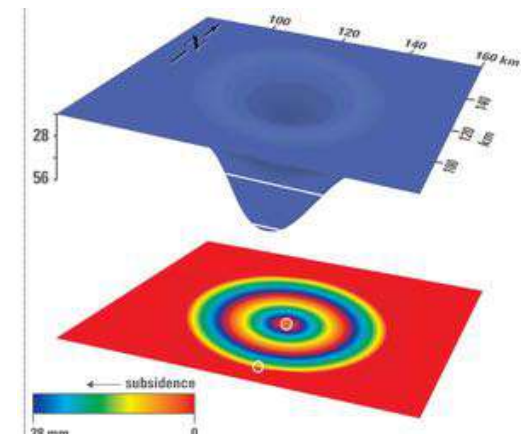
## Sustainable cities: Understanding risks to cities that are invisible to the human eye

**Land subsidence over cities –**  
Multi-Sensor InSAR Analysis can  
accurately detects land subsidence:  
Jakarta, Ho Chi Minh City, Bangkok and  
numerous other coastal cities will sink  
below sea level.



Unprecedented floods in 2011 in Bangkok  
is an eye opener example

- Over 800 deaths
- USD 46.5 billion economic loss



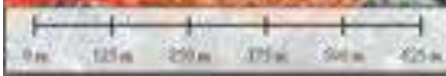


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Image credit: Digital Globe/Maxar  
Technologies



Mexico City - 2007





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Image credit: Digital  
Globe/Maxar Technologies

Mexico City - 2010





**Providers of Earth  
observation information**



**Decision makers  
(Disaster managers)**



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# UN-SPIDER Mission statement

Ensure that all countries have access to and develop the capacity to use all types of **space-based information** to support the **full disaster management cycle.**





... to support the **full disaster management cycle**

**Geoinformation for Hazard, exposure, vulnerability, and risk assessment**

Prevention and Mitigation



Preparedness

**Geoinformation for Early Warning systems**

**Disaster management cycle**

Recovery



**Disaster**

**Geoinformation for Post Disaster Needs Assessment (PDNA)/ Damage and Loss Assessment (DaLA)**

Response

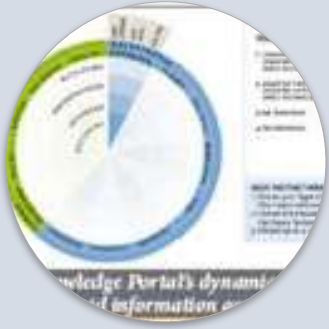


**Geoinformation for Rapid mapping: Extent and impact**





# UN-SPIDER



## Knowledge Portal

The UN-SPIDER Knowledge Portal is a web-based tool for information, communication and process support



## Fostering Cooperation

UN-SPIDER fosters alliances and creates forums where both space and disaster management communities can meet



## Capacity Building

UN-SPIDER facilitates capacity building and institutional strengthening, including the development of curricula and an e-learning platform (e-SPIDER)



## Technical Advisory Support

UN-SPIDER provides support to countries in assessing national capacity and in evaluating disaster and risk reduction activities, policies and plans

and many more...

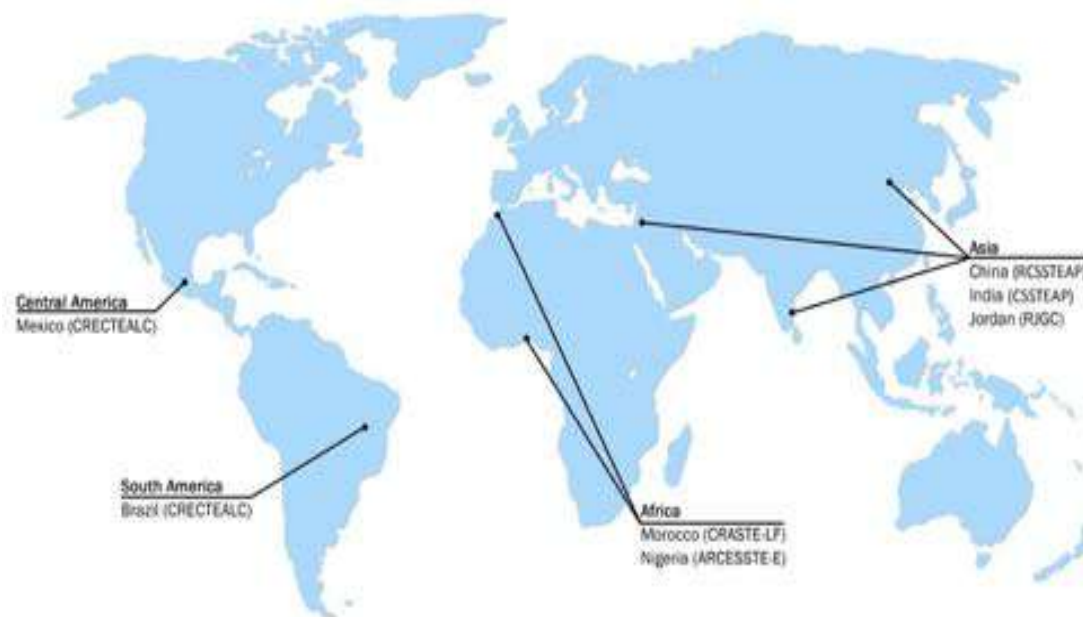


# Network of Regional Support Offices





## Regional Centres for Space Science and Technology Education (affiliated to the United Nations)



Free education

Post graduate diploma and degree courses in

- Remote Sensing and GIS
- Satellite communication
- Satellite navigation
- Satellite meteorology
- Space law

Short course on specific themes





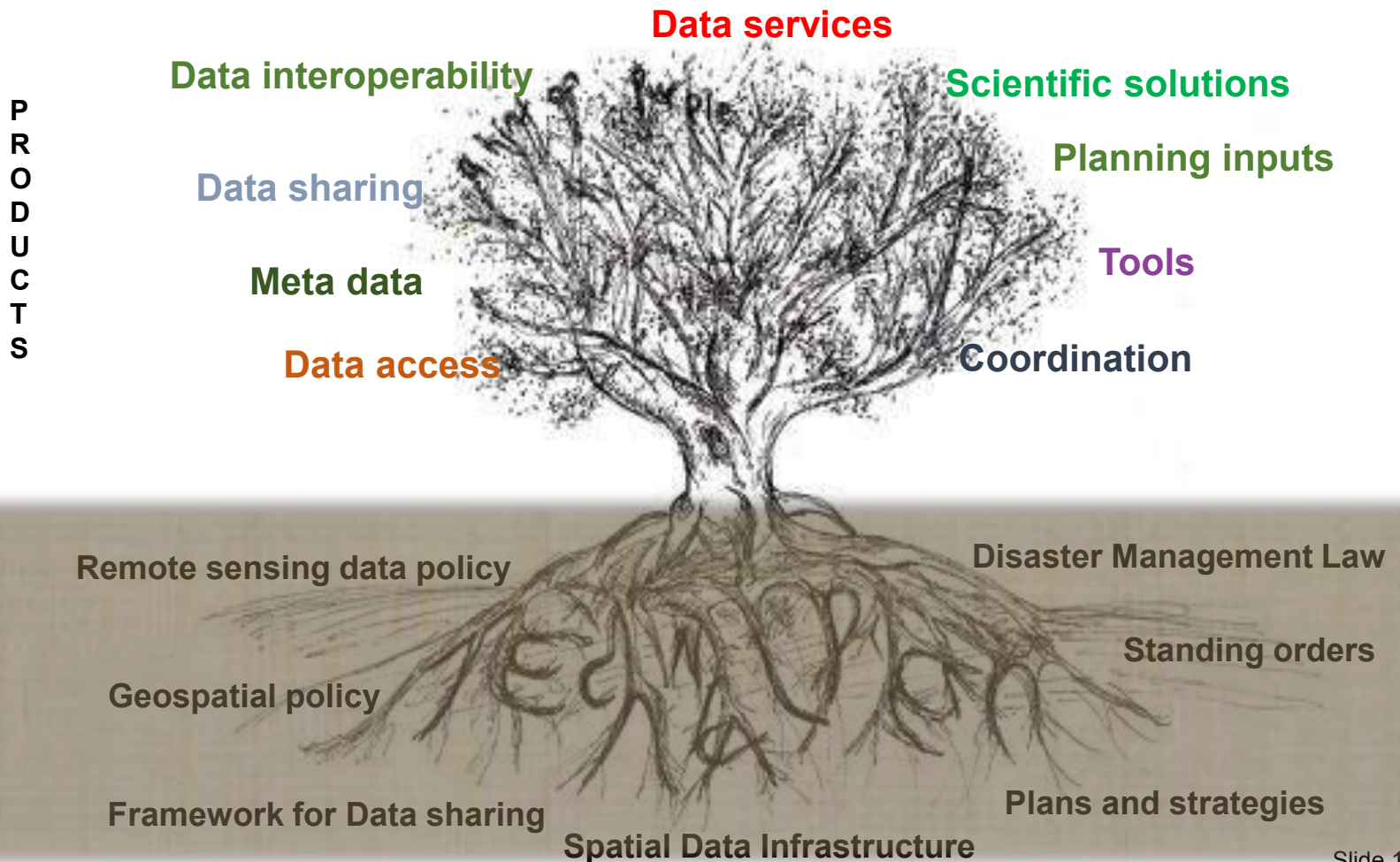
# Technical Advisory Support

- Over **55 countries** supported
- **34** national Technical Advisory Missions
- Over **350** recommendations





# UN-SPIDER **Technical Advisory Missions** offer interventions at policy and coordination level





# Myanmar

- 2012 – UN-SPIDER Technical Advisory Mission
- Key recommendation: Establishment of Hazard Response and Operations Centre
- Follow up programmes jointly with Government, UNDP, OCHA and HABILITAT
- Impact:
  - Emergency Operation Centre (EOC) established with Remote Sensing Unit;
  - Trained personnel in remote sensing/GIS are available at EOC;
  - Disaster Management Training Centre conducts courses in remote sensing/GIS
  - NSDI and one map policy under consideration
  - Over 100 personnel trained
  - RRD became Authorised User of the International Charter



2012

Technical Advisory Mission

2012

Meeting of donors and partners, and training on "Geo-Informatics for Disaster Risk Management in Myanmar"

2013-2015

Establishment of a remote sensing unit in the Ministry of Social Welfare, Relief and Resettlement (MSWRR)

2016

TAM follow-up and training on the "Use of Earth Observation Data and GIS Techniques for Landslide Hazard Mapping"

2017

TAM follow-up and training on "Post-Disaster (Earthquake) Rapid Damage Assessment"

2017

Ministry of Social Welfare, Relief and Resettlement (MSWRR) becomes an Authorized User of the International Charter



# Sri Lanka

- 2011 – UN-SPIDER **Technical Advisory Mission** strongly recommended **NSDI**
- 2012, 2014, 2017, 2018 – Follow up and capacity building activities
- 2013 – **Sri Lanka Spatial Data Infrastructure (SL SDI)** approved by the Cabinet of Ministers
- 2018 – SL SDI structure is ready
- 2017 - Sri Lanka Disaster Management Centre became Authorized User of the International Charter



2011

Technical Advisory Mission

2012

TAM follow-up and training on "Space Technology for Improving Hazard Mapping in Sri Lanka"

2014

TAM follow-up and training on "Earth Observation Technologies for Flood Risk Mapping, Modelling and Management"

2017

Disaster Management Centre of Sri Lanka implements a National Spatial Data Infrastructure (NSDI) and becomes an Authorized User of the International Charter

2017

TAM follow-up and training on the "UN-SPIDER Knowledge Portal and Recommended Practices on Floods and Droughts"

2018

TAM follow-up and training on "Application of Disaster Risk Assessment for Development Planning and Effective Emergency Response"

# Vietnam

- 2013 – UN-SPIDER Technical Advisory Mission
- 2014 – 2018 : Series of customized training programmes and simulation exercises
- Outcomes
  - Establishment of Geoinformatics Division
  - MoU between WRD - VAST – JAXA to benefit Disaster Management
  - SOPs for emergency mapping
  - About to become authorized user of the International Charter







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# Knowledge Portal [www.un-spider.org](http://www.un-spider.org)

**Space Application Guides** including scientific papers, best practices and experience reports

**News and Events** from the space and the disaster/risk management community

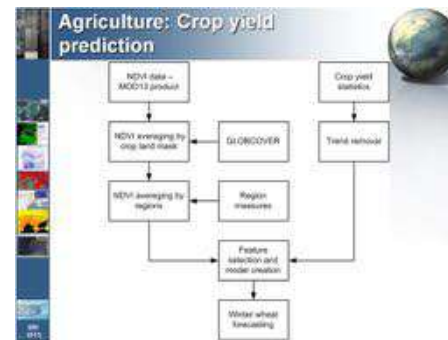
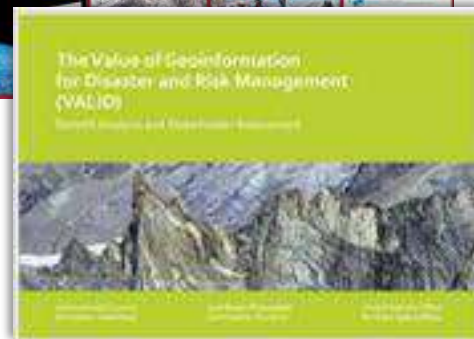
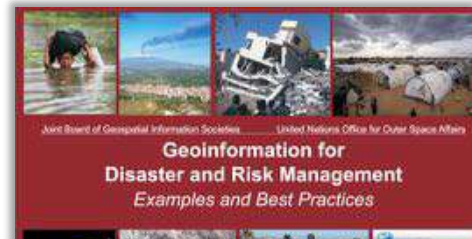
Guides on **Technologies, institutions** and **organizational mechanisms**







# Knowledge Generation



Training material,  
tutorials

Publications

Recommended  
practices

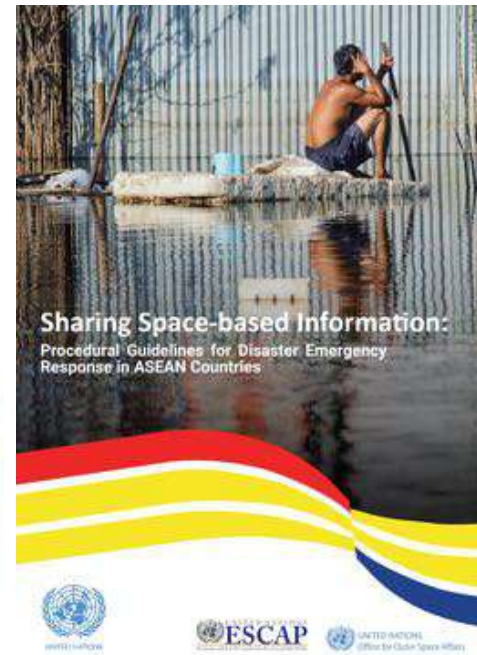
Lessons  
learned



# Emergency response mapping support



International Charter  
Space and Major  
Disasters







# International Charter Space and Major Disasters



What is the Charter?

An International agreement among participating Agencies to provide space-based data and information in support of response efforts during emergencies caused by major disasters.

## Activations by UNOOSA in 2018

- Collapse of hydroelectric dam in Lao PDR, 24 July 2018
- Typhoon Bebenca in Vietnam, 17 August 2018
- Charter activation for floods in Sri Lanka
- Eruption of volcano in Guatemala, 3 June 2018

## Universal Access efforts

- 2017: Myanmar and Sri Lanka;
- 2016: Guatemala and Uruguay; and
- 2015: El Salvador, Honduras, Colombia and the Dominican Republic.





## Voluntary basis initiative led by the APRSAF (Asia-Pacific Regional Space Agency Forum)

### 12/Oct/2018 Tropical cyclone in United Arab

28/Sep/2018 Earthquake in Indonesia

17/Sep/2018 Typhoon in Vietnam

15/Sep/2018 Typhoon in Philippines

05/Sep/2018 Earthquake in Japan

29/Aug/2018 Flood in Myanmar

27/Aug/2018 Flood in Vietnam

25/Aug/2018 Flood in Taiwan

09/Aug/2018 Flood in India

29/Jul/2018 Flood in Thailand

05/Aug/2018 Earthquake in Indonesia

29/Jul/2018 Earthquake in Indonesia

26/Jul/2018 Flood in Myanmar

23/Jul/2018 Flood in Laos

18/Jul/2018 Flood in Vietnam

09/Jul/2018 Others in Thailand

07/Jul/2018 Flood in Japan

23/Jun/2018 Flood in Vietnam

20/May/2018 Flood in Sri Lanka

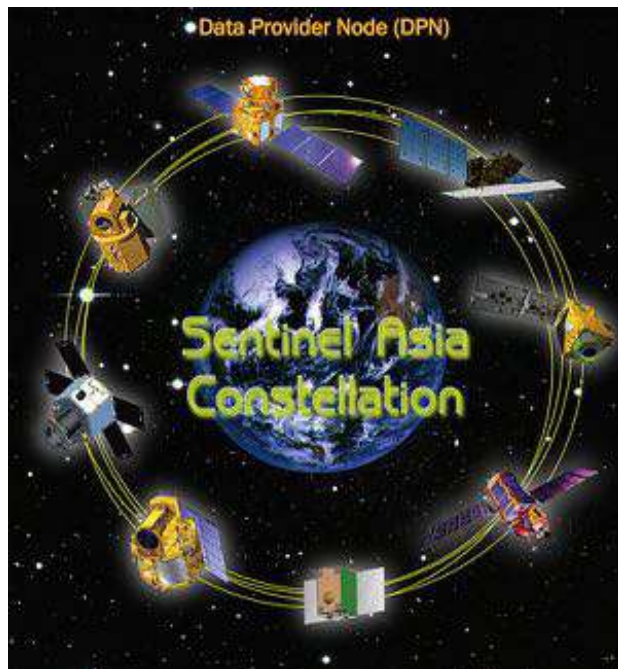
12/Feb/2018 Tropical cyclone in Tonga

10/Feb/2018 Earthquake in Korea

07/Feb/2018 Earthquake in Taiwan

05/Jan/2018 Volcano eruption in Papua New Guinea

15/Jan/2018 Volcano eruption in Philippines



UN-SPIDER is Joint Project Team Member

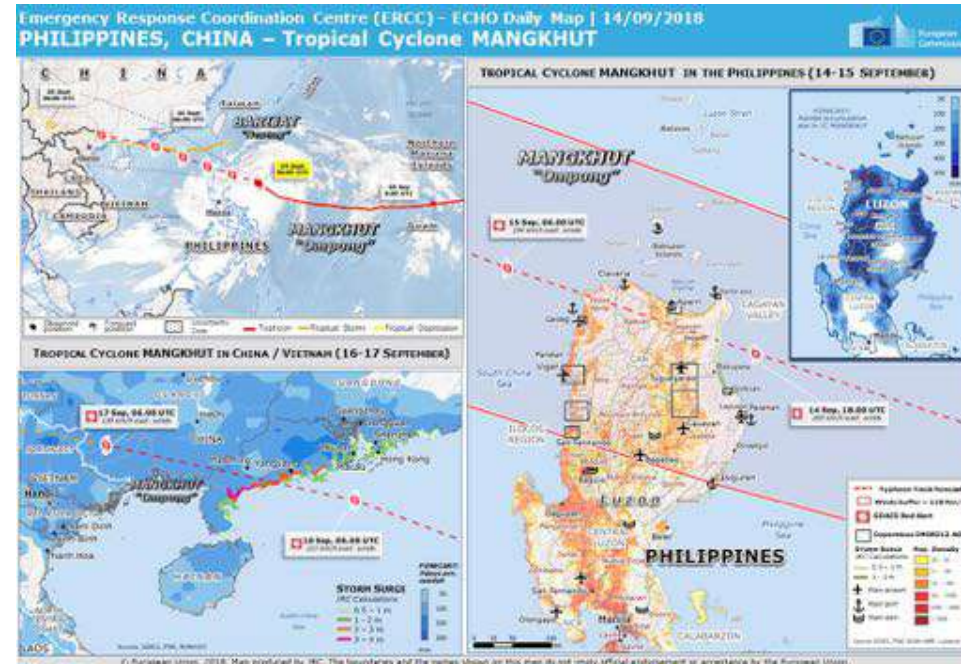


## Copernicus Emergency Mapping Services

Support all phases of the emergency management cycle: preparedness, prevention, disaster risk reduction, emergency response and recovery.

## UN-SPIDER is authorised to activate Copernicus EMS

- Mapping for Niger floods Mon Sep 11 2017
- Hurricane Irma in Haiti Fri Sep 8 2017



Monitoring typhoon Mangkhut aftermath over the northern Philippines, September 2018 by Copernicus EMS



# EMERGENCY MAPPING GUIDELINES

Working Paper:

Draft Version 1.0 - March 2014

**IWG-SEM working group meeting on 26 October (14:00-20:00)**



## International Working Group on Satellite based Emergency Mapping



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## Outcome of 4 workshops

- 1<sup>st</sup> Workshop: 15-16 April, Yogyakarta, Indonesia
- 2<sup>nd</sup> Workshop: 4-5 June 2015, Hangzhou, China
- 3<sup>rd</sup> Workshop/expert meeting: December 2015, Sriracha, Thailand
- 4<sup>th</sup> Workshop: April 2016, Bogor, Indonesia

### Sharing Space-based Information:

Procedural Guidelines for Disaster Emergency Response in ASEAN Countries



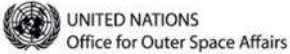
UN ESCAP



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THE ASEAN WORKSHOP ON "DEVELOPMENT OF MECHANISMS FOR ACQUISITION AND UTILIZATION OF SPACE-BASED INFORMATION DURING EMERGENCY RESPONSE"



# Enhancing Disaster Preparedness for Effective Emergency Response

## Activation of the

- Charter,
- Copernicus EMS,
- Sentinel Asia

## Provision of Earth Observation data through bilateral agreements with

- China National Space Administration
- Airbus
- DigitalGlobe

## Policy level interventions

## Institutional capacity building

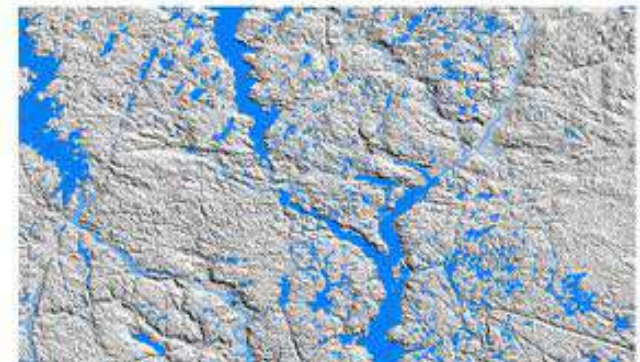
Inundation modelling for Tsunamis, storm surges

Sea level rise (SRL) modelling for SRL between 0.5m -5m



Flood Hazard Mapping

WorldDEM incl. Rivers and lakes as input for HEC RAS modeling



**AIRBUS: The Global Digital Elevation Dataset  
WorldDEM for Disaster and Risk Management**





## Themes of the UN-SPIER Conferences

**United Nations International Conference on Space-based Technologies for Disaster Risk Reduction**

**2011 Best practices for risk reduction and rapid response mapping**

**2012 Risk assessment in the context of global climate change**

**2013 Disaster risk identification, assessment and monitoring**

**2014 Multi-hazard disaster risk assessment**

**2015 A consolidating role in the implementation of the Sendai Framework on Disaster Risk Reduction 2015-2030**

**2016 Understanding disaster risks**

**2017 Building resilience through integrated application**





## 2018 Enhancing Disaster Preparedness for Effective Emergency Response

	Wednesday 24 October 2018	Thursday 25 October 2018	Friday 26 October 2018
<b>Morning</b>	<p>08:30 Registration</p> <p>09:00-10:00 Opening session and group photo</p> <p>10:00-11:00 Keynote speeches China, UNOOSA</p> <p>11:00-12:30 Session 1 Institutional strengthening and preparedness for improving emergency response using space technologies</p>	<p>09:00-10:30 Session 3 Earth observation for assessing resiliency of ecosystem as an instrument for disaster risk reduction</p> <p>11:00-12:30 Session 4 Demonstrating advances in Earth observation to build back better</p>	<p>09:00-10:30 Session 5 Networking and engagement with the UN-SPIDER network</p> <p>11:00-12:00 Concluding session (Chairs/Co-chairs of each plenary session will present the conclusions)</p> <p>12:00-12:30 Closing session</p>
<b>Lunch</b>	12:30-14:00 Fusion Court Cafe, 1st floor	12:30-14:00 Fusion Court Cafe, 1st floor	12:30-14:00 Fusion Court Cafe, 1st floor
<b>Afternoon</b>	<p>14:00-17:45 Session 2 International mechanisms for rapid response mapping (with support from International Working Group on Satellite based Emergency Mapping (IWG-SEM))</p>	<p>14:00-17:00 Breakout sessions</p> <ol style="list-style-type: none"> <li>1. Multi-hazard early warning;</li> <li>2. Enhancing capacity of community in providing emergency mapping;</li> <li>3. Earth observation for achieving targets of Sendai Framework.</li> </ol> <p>17:00-17:30 Breakout session outcomes</p>	<p>Institutional visit</p> <p>Group 1: National Disaster Reduction Centre of China</p> <p>Group 2: National Satellite Meteorological Centre</p> <p>IWG-SEM working group meeting</p>
<b>Evening</b>	18:30 Icebreaker by the Ministry of Emergency Management, P.R.C		



**Failing to prepare is Preparing to fail**





# THANK YOU

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United Nations Office at Vienna

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