UN-SPIDER efforts in the context of the Sendai framework for Disaster Risk Reduction

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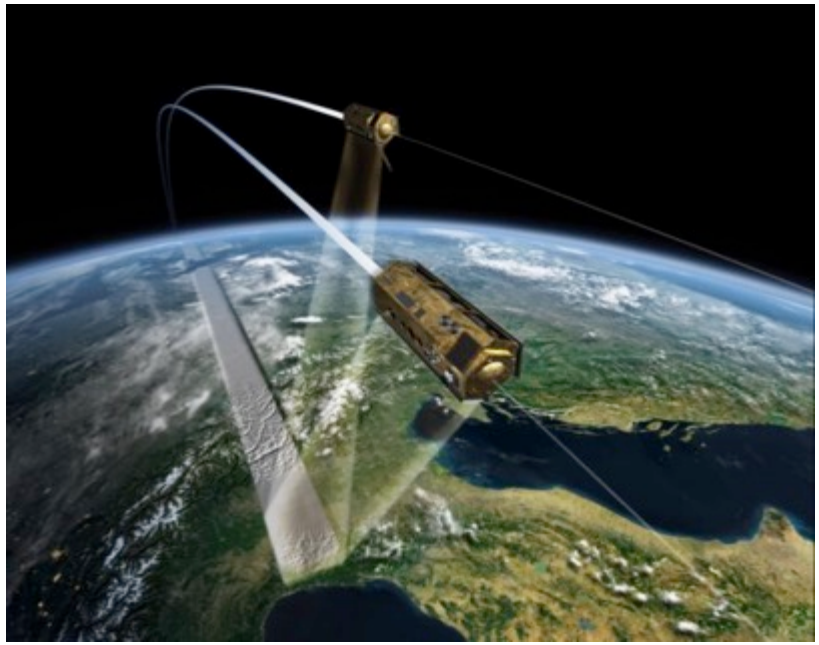
UN-SPIDER: Mission statement



„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**.“

General Assembly Resolution 61/110 (2006)

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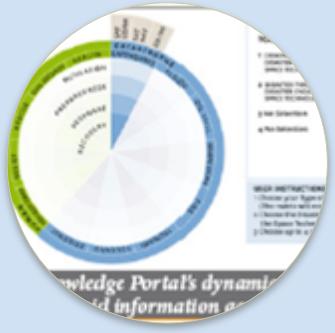

Knowledge Portal

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…

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Network of Regional Support Offices (RSOs)

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Technical Advisory Missions (2008 – 2014)

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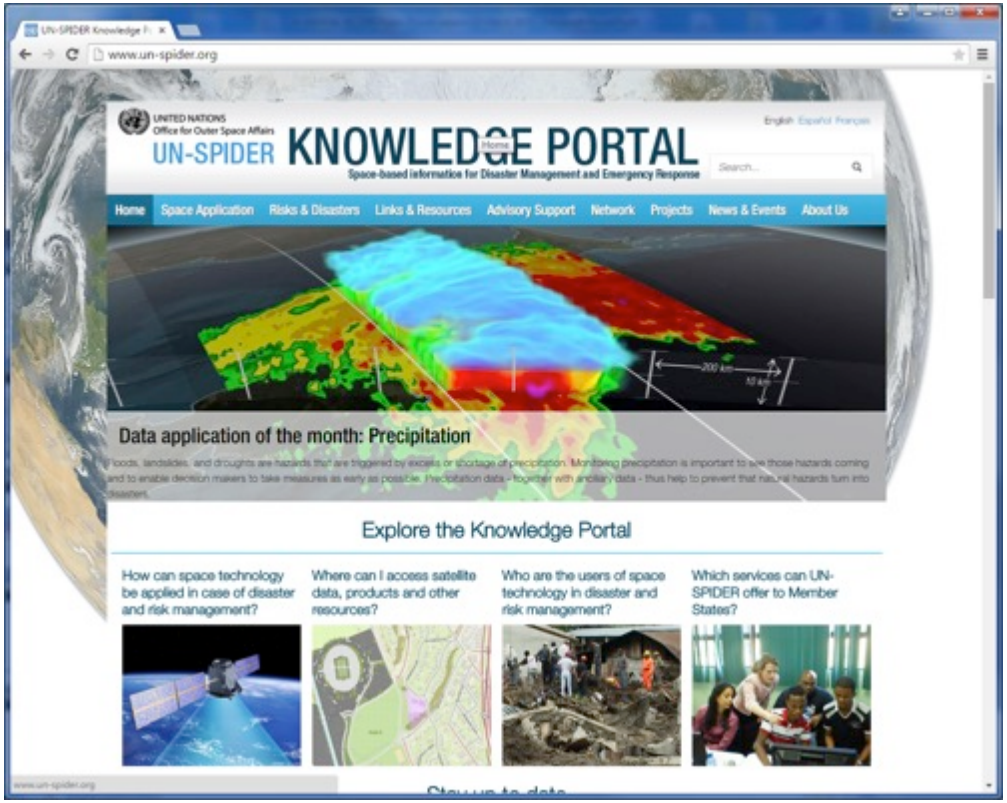
UN-SPIDER Knowledge Portal



http://www.un-spider.org

In a nutshell

1. Gateway to space-based information;
2. Information on space applications, risks and disasters, and UN-SPIDER efforts;
3. Links to websites and portals;
4. Recommended Practices;
5. News from the communities, calendar of events.

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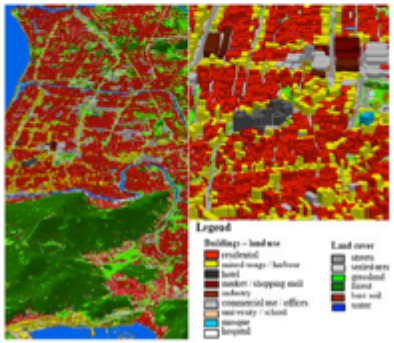
EO contribution to disaster risk assessment

Space applications for disaster risk reduction

How can Space-based information contribute to disaster risk assessment? Four examples of satellite-based applications

Space-based information can significantly support disaster risk assessment by helping to produce hazard assessment and monitoring, as well as exposure and vulnerability assessment. It can furthermore provide valuable input for damage assessment and recovery monitoring. This overview presents four examples of applications.

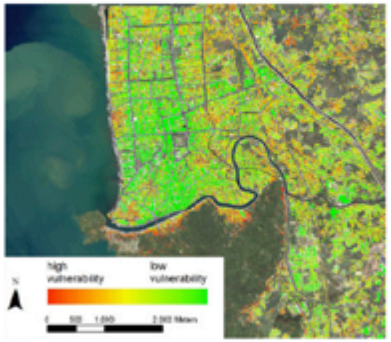
Exposure assessment



Physical exposure and 3-D model of Padang City (Indonesia) as derived from high resolution satellite data and a digital elevation model (Image DLR-DFD)

For disaster risk managers, it is essential to have up-to-date information on elements at risk. This information can be obtained through the assessment of the exposure to hazards. Space-based information has the capability to provide up-to-date and area-wide data capturing the small scale and complex landscape. Particularly important are object-based classification methodologies for the extraction of land cover information like buildings and the derivation of population information, based on very high resolution satellite data in combination with socio-economic and census data. The Global Urban Footprint, a project of the German Aerospace Center DLR for worldwide mapping of settlements with unprecedented spatial resolution, shows the distribution of urban and non-urban areas at a spatial resolution of ~12m. This product can be used to assess built environment and population exposure on a coarse scale level.

Vulnerability Assessment



Area wide seismic building vulnerability assessment (high vulnerability in red to low vulnerability in green) using combined in-situ and satellite remote sensing-derived information for Padang City, Indonesia. (Image DLR-DFD)

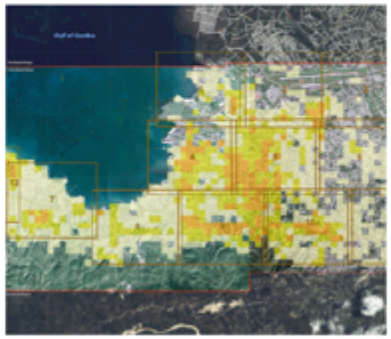
Space-based information can contribute to vulnerability assessments considering the physical, infrastructure and environmental components of vulnerability and also in the social and human vulnerability domain. One example to be highlighted is vulnerability assessment of buildings in the context of earthquakes and tsunamis. An assessment of the structural vulnerability of the building inventory with building-by-building analysis by structural engineers is too resource-intensive to cope with the high spatio-temporal dynamics and extents of urban environments. Remote sensing can greatly support the vulnerability assessment of built environment when combined with in-situ information. The result shown in the image refers to a seismic building vulnerability assessment. In the context of tsunamis, for example, the results gained provide crucial information on buildings featuring no or low vulnerability being potentially suitable for vertical evacuation. This information supports risk assessment, risk reduction, and evacuation planning.

Hazard assessment and monitoring

Sendai, Japan, after the tsunami on March 11, 2011, based on TerraSAR-X radar images. Inundated areas appear in blue, debris in magenta and affected infrastructure in cyan blue. (Image: DLR-DFD, ZKI)

The provision of detailed information on natural and man-made hazard extents and on their spatio-temporal properties such as intensity or probability of occurrence are essential for disaster risk management. In this domain, many relevant applications are available for several hazard types. Multi-scale flood monitoring systems are used to accomplish continuous, near-real time inundation monitoring at a daily interval, for example by using medium resolution (250-500m) satellite data of the MODIS sensor on NASA's Terra Satellite. Based on MODIS information, Synthetic Aperture Radar (SAR) sensors like TerraSAR-X can be programmed to derive more detailed information with improved spatial resolution (~1-14m) on the flood situation (see map of Sendai) for defined areas of interest at local to regional scales.

Damage assessment and recovery monitoring



Rapid damage assessment showing three damage grades (sparse/light yellow – severe/yellow – very strong/orange) based on very high resolution optical satellite imagery for the Haiti Earthquake 2010. (Image: DLR-DFD, ZKI)

In the past, acquiring damage information was limited to field surveys and/or aerial photographs which could not be acquired quickly. By taking advantage of satellite-based remote sensing, the spatial distribution of structural damage can be identified. The advantage of using high resolution optical satellite images for damage interpretation is the possibility of understanding structural damage visually. These images also enable us to comprehend the spatial extent of damage at the regional scale that post-disaster surveys hardly ever cover because of limited survey time and resources. Similarly, recovery processes can be monitored and evaluated through time-series analysis of satellite-based remote sensing data.

UN-SPIDER Newsletter
March 2015

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The Sendai framework for Disaster Risk Reduction

Some details:

1. Provides continuity to the IDNDR (1990-1999) and the Hyogo Framework for Action (2005-2015);
2. Negotiations on the Sendai framework began in 2014;
3. UN-SPIDER, with the support of DLR and other partners, worked with specific governments to incorporate explicit text on the use of Earth observation and space-based technologies in the framework;
4. The framework was launched by 187 Member States during the WCDRR in Sendai, Japan in March of this year.

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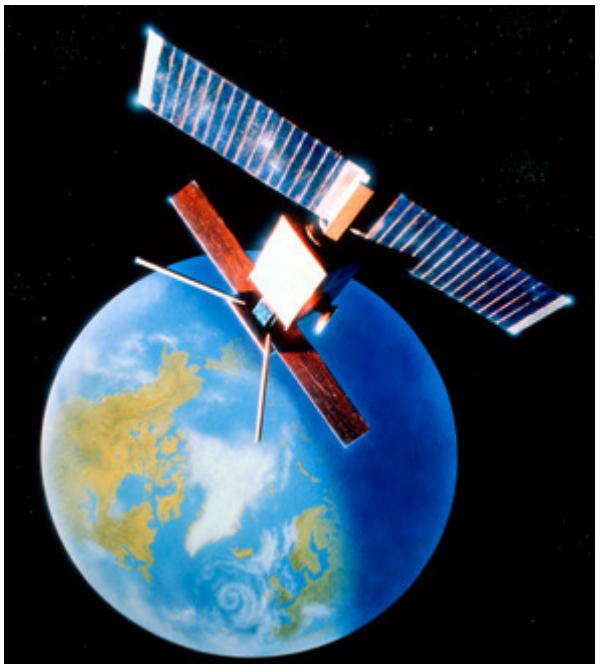
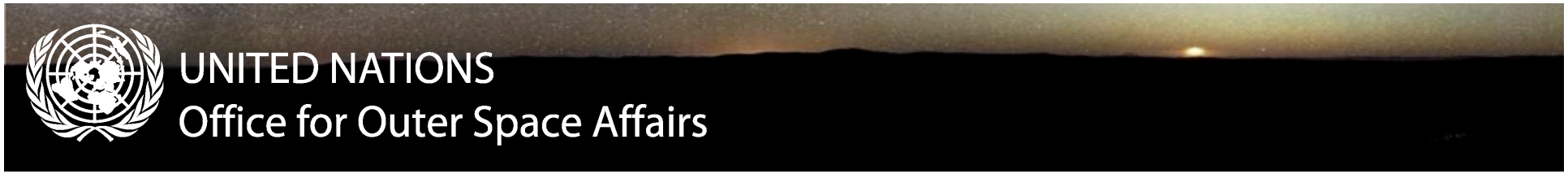
The Sendai framework for DRR (2015 – 2030)



Support from space technologies

Priorities for Action

1. Understanding disaster risk;
2. Strengthening [governance / institutional arrangements / organizational, legal and policy frameworks] to manage disaster risk;
3. Investing in disaster risk reduction for resilience;
4. Enhancing disaster preparedness for effective response, and to Build Back Better in recovery, rehabilitation and reconstruction.



Post-2015 framework for disaster risk reduction
As of 28/01/2015

Priority 1: Understanding disaster risk

National and local levels

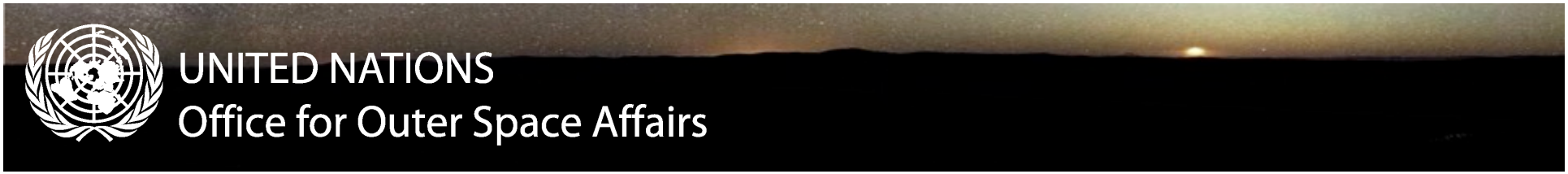
22(f) Promote real-time access to reliable data**, make use of space and in situ information, including GIS**, and use information and communications technology innovations to enhance measurement tools, collection, analysis and dissemination of data;

Global and regional levels

23(c) Promote and enhance, through international cooperation and technology transfer […] access to, and the sharing and use of, […] data, information, […] communication and **geospatial and space-based technologies and related services. Maintain and strengthen in situ and remotely-sensed earth and climate observations. […];**

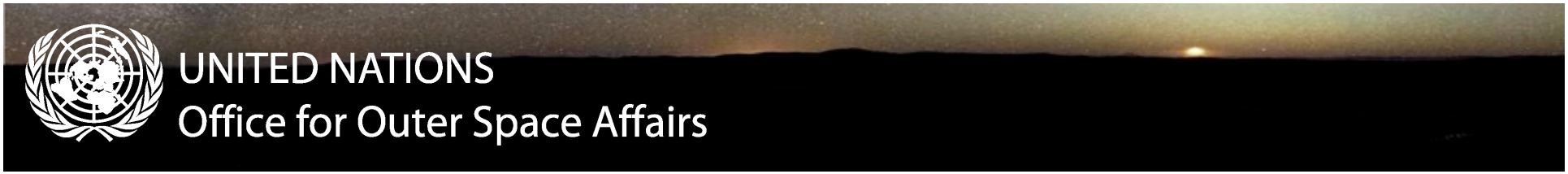
Added value of EO for DRR

- **cost savings** based on reliable risk information that relies in particular on Earth observations.
- The **combinations of satellite EO data with other sources of data** improve the quality of the information provided to end users, including decision-makers
- Satellite EO offers the **consistent coverage and scope to provide a synoptic overview** of large areas, repeated regularly
- Satellite EO can be used to **compare risk across** different countries and time scales
- EO data can be used to **represent complex dynamics and processes** through detailed, unbiased and up-to-date risk maps and models.
- Satellite data offers a **unique means to monitor the progress of the implementation of the post-2015 Framework** for Disaster Reduction, using globally comparable metrics.



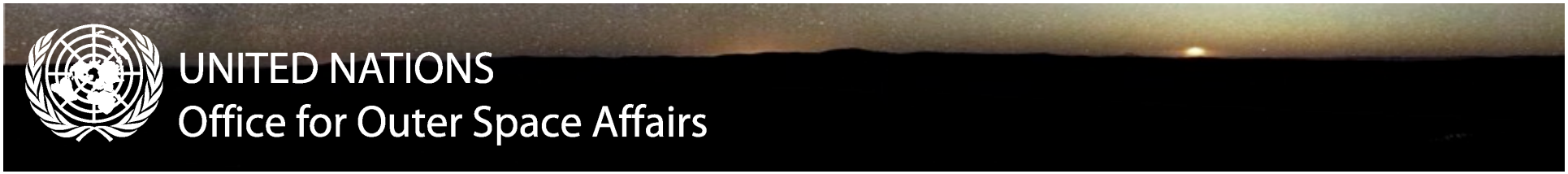
A Global partnership on Earth observation: A Voluntary commitment

- **Continue facilitating the dialogue among stakeholders** in EO, satellite-based technologies and the global community of DRR experts and policy makers;
- **Serve as a collective source and repository of information** on efforts carried out worldwide by the EO and the satellite-based technology communities, including surveys and guidelines to improve the applications of existing and emerging technology to monitor hazards, exposure and risks;
- **Generate policy-relevant advice** to contribute to the integration of EO and satellite-based technologies into development process and public policies relevant to DRR;
- **Facilitate the use of EO and related satellite-based technology** to monitor progress in the implementation of the post-2015 framework for DRR.



Global partnership: A synergy framework for the integration of Earth observation into disaster risk reduction

- **Commitment of partners** involved in space, satellite technology and other Earth observation technologies to work together **to respond to the requirements** of the global DRR community to implement the post-2015 framework for DRR.
- The definition of the priority actions **will be refined following the Sendai conference** in consultation with national and international stakeholders. The partners are committed to work within a synergy framework, open to partners, providers and users equally, so that **specific requirements and user needs can find a collaborative response by mobilising the potential of all EO expertise available globally**.
- The activities can be: technical, scientific, national capacity building, data and information policy, etc.



Global partnership

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CEOS

ICIMOD

NDRCC

GEO

ASIAN DISASTER REDUCTION CENTER

MEXT MINISTRY OF EDUCATION, CULTURE, SPORTS, SCIENCE AND TECHNOLOGY-JAPAN

SDIM

UNOSAT satellite imagery for all www.unosat.org

IWMI International Water Management Institute 30

esa

UNITED NATIONS ESCAP Economic and Social Commission for Asia and the Pacific

DLR Deutsches Zentrum für Luft- und Raumfahrt German Aerospace Center

TOHOKU

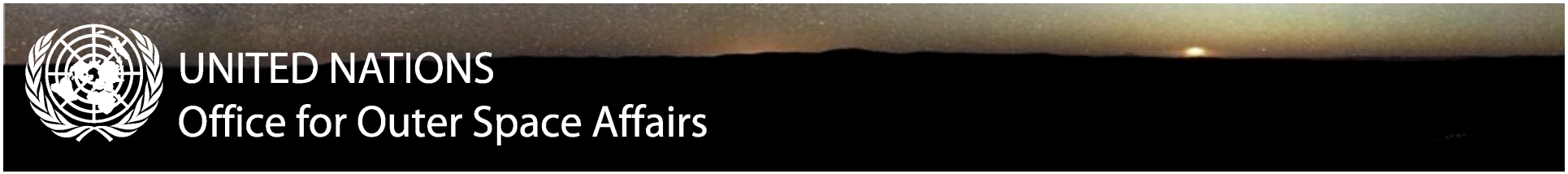
DEFENSA CIVIL REPUBLICA DOMINICANA DC

GFDRR Global Facility for Disaster Reduction and Recovery

JAXA

Copernicus

Disaster Management Centre



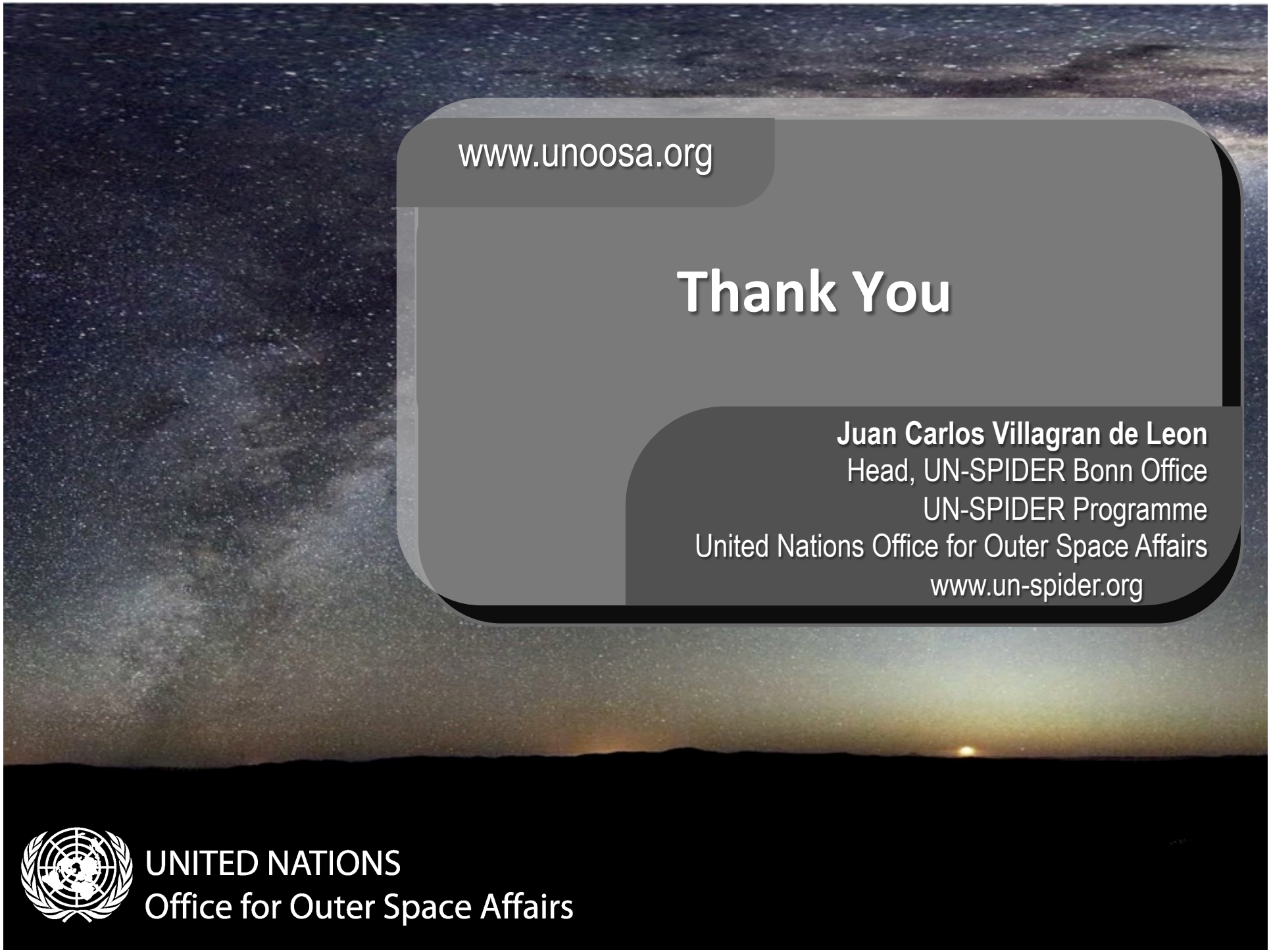
Early Warning – Priority 4

1. Strengthening multi-hazard early warning systems (MHEWS) at all levels and for several sectors;
2. developing the capacities of national and local authorities to deliver early warning services in local communities down to the last mile; and
3. monitoring and reporting on the development of systems and their impact on loss
4. international and regional cooperation in strengthening early warning services over the implementation period of the post-2015 framework for disaster risk reduction.

→ Proposed partnership involving international, regional and national organizations from the disaster-risk reduction and space communities as a way to facilitate the use of space-based applications, including Earth observation.

The way forward:

1. This conference will address the next steps to be undertaken by the partners in the Earth observation partnership;
2. Its important to emerge from this conference with guidance on synergies between international and regional organizations, and national agencies as a way to contribute to the use of Earth observations and space-based applications in DRR;
    1. Guidance on ways to identify and compile needs;
    2. Guidance on efforts to be undertaken (for example step-by-step procedures or recommended practices) to generate specific products which could be used at the national and local levels;
    3. Guidance on capacity building and institutional strengthening.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Thank You
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