

Global Partnership on Space Technology Applications for Disaster Risk Reduction (GP-STAR)

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Selected DLR Activities and Contributions

Günter Strunz, Earth Observation Center, DLR

Jens Danzeglocke, Space Administration, DLR

Christiane Lechtenbörger, Strategy and International Relations, DLR

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Knowledge for Tomorrow



Sendai Framework

Priority 1: Understanding disaster risk

National and local levels

- 24(f) To 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

- 25(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. [...]**;



Sendai Framework

Priority 4: Enhancing Disaster Preparedness

National and local levels

- 33(b) Invest in, develop, maintain and strengthen people-centred multi-hazard, multi-sectoral forecasting and **early warning systems**, disaster risk and emergency communications mechanisms, social technologies and hazard-monitoring telecommunications systems ...

Global and regional levels

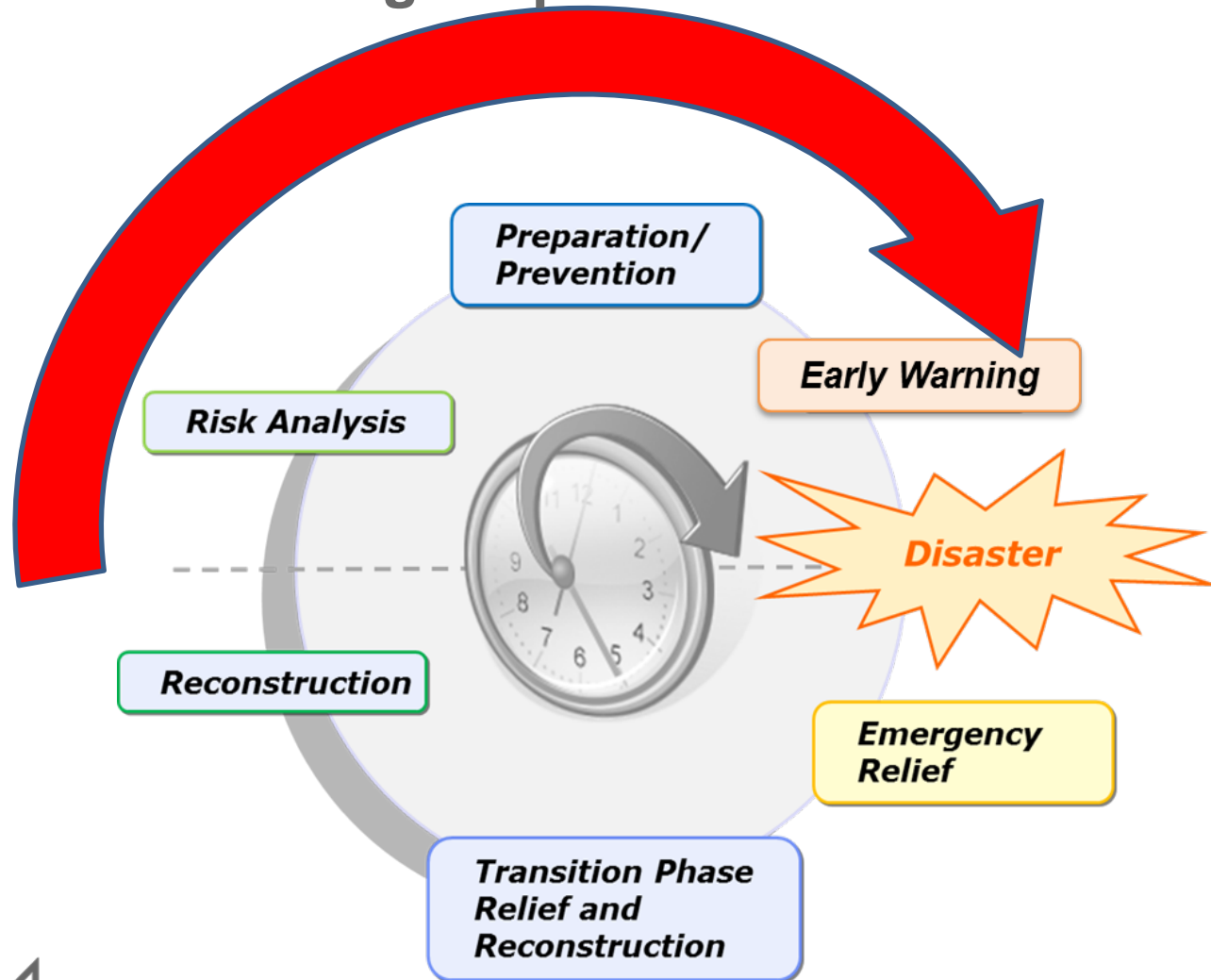
- 34(a) Develop and strengthen, as appropriate, coordinated regional approaches and **operational mechanisms to prepare for and ensure rapid and effective disaster response** in situations that exceed national coping capacities;



Selected Activities and Contributions of DLR



Focus on Risk Assessment, Prevention, Early Warning and Enhancing Preparedness for effective Response



Risk Assessment for Disaster Mitigation, Prevention and Preparedness

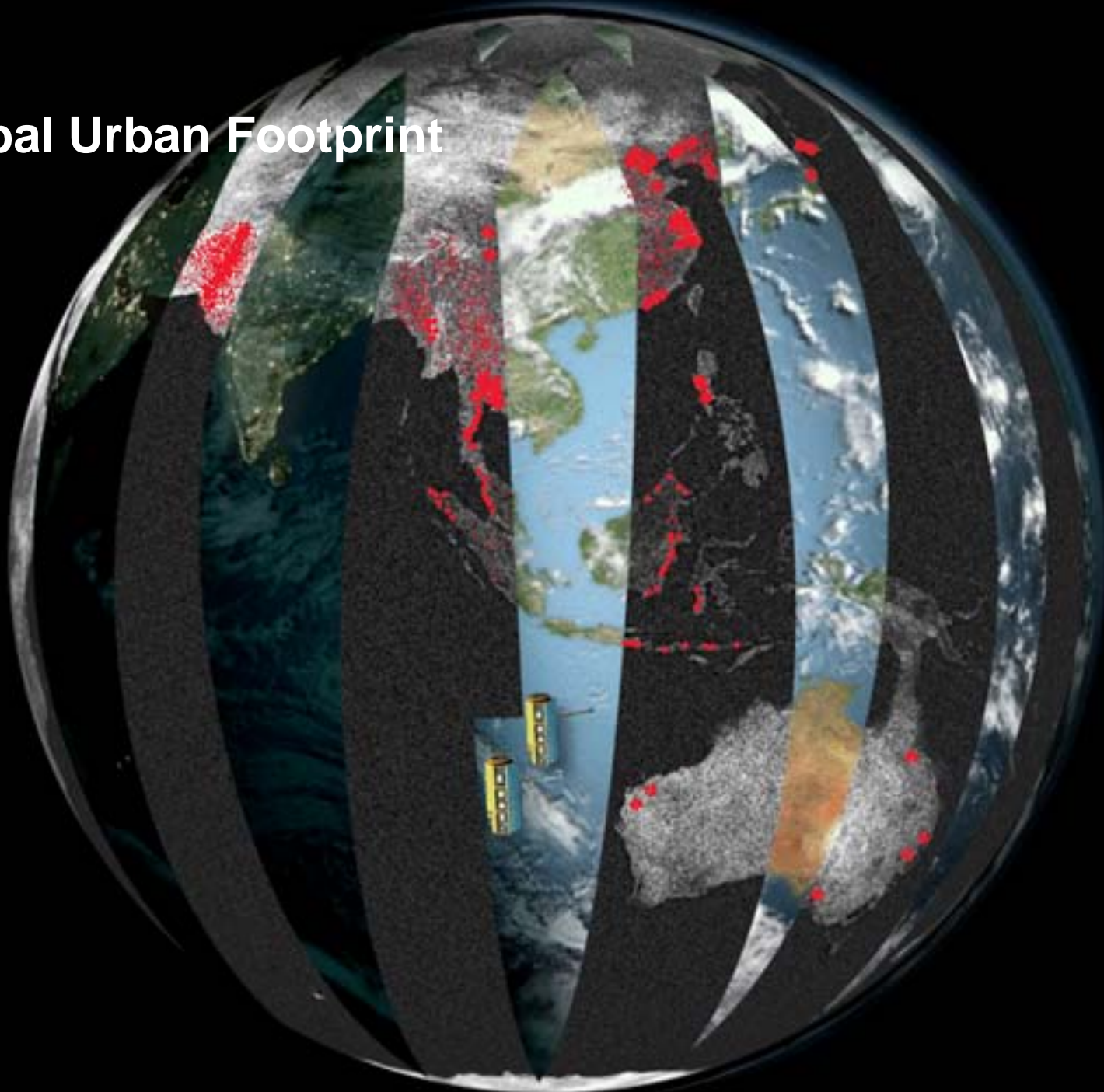


Risk Assessment

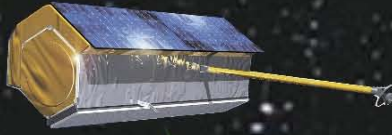
- What are the probable dangers and their magnitude? *Hazard Identification*
- How often do the dangers of a given magnitude occur? *Hazard Assessment*
- What are the elements at risk? *Identification of Elements at Risk (Exposure Mapping)*
- What is the possible damage to the elements at risk? *Vulnerability Assessment*
- What is the probability of damage? *Risk Estimation*
- What is the significance of the estimated risk? *Risk Evaluation*
- What should be done? *Risk Management*



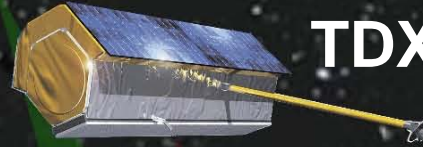
Global Urban Footprint



TSX

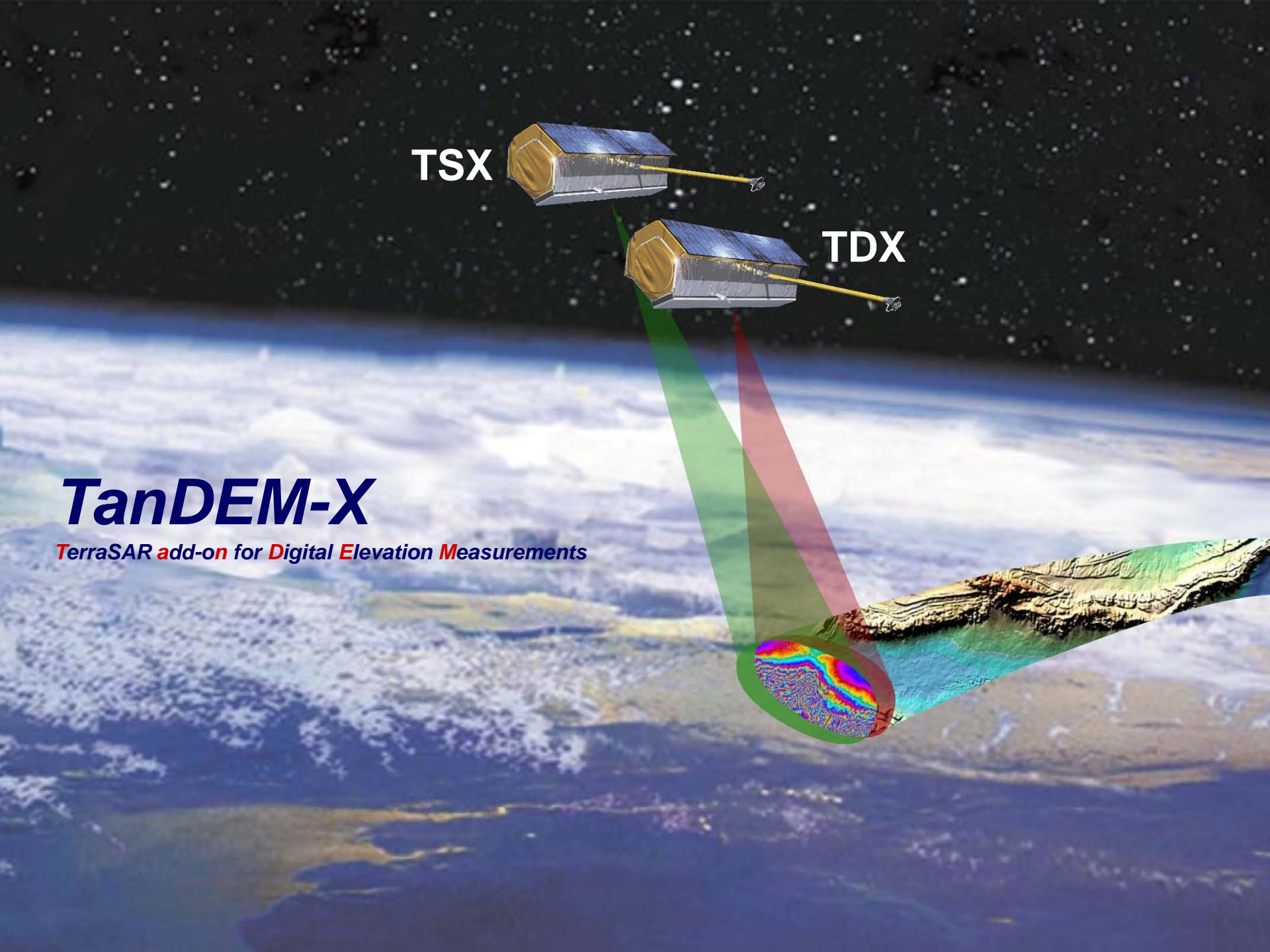


TDX

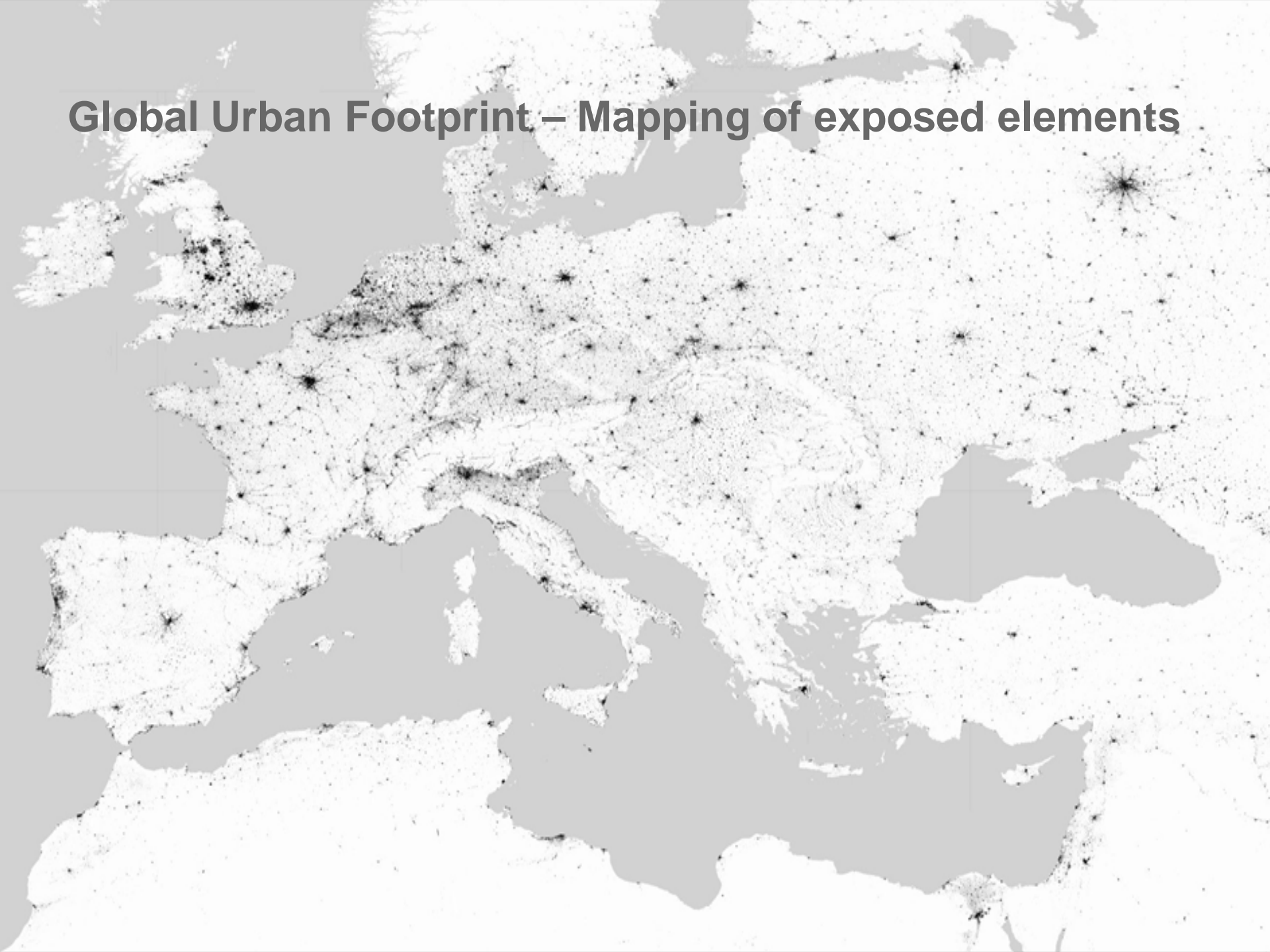


TanDEM-X

TerraSAR add-on for Digital Elevation Measurements



Global Urban Footprint – Mapping of exposed elements



Develop and strengthen operational mechanisms
to ensure rapid and effective disaster response

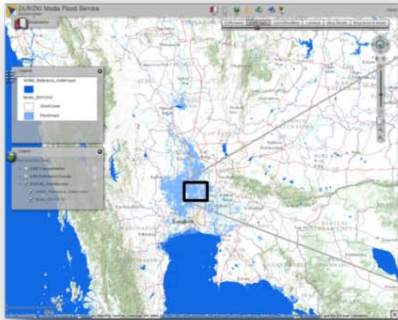


DLR Center for Satellite Based Crisis Information

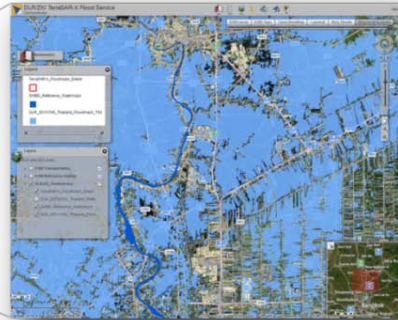


Reduced Response Time by Automated Flood Mapping

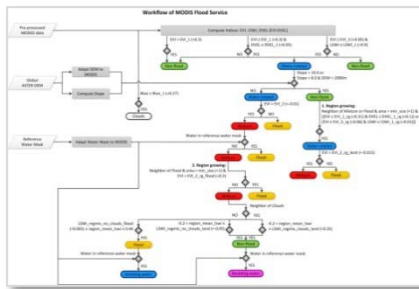
Operational Processing Chains



MODIS Flood Service



TerraSAR-X Flood Service



Future: Sentinel Missions



Sentinel-1



Sentinel-2



Sentinel-3



Develop and strengthen people-centred multi-hazard forecasting and early warning systems



Tsunami Early Warning System in Jakarta



Early Warning System for Wildland Fires

A satellite-style map of Europe and the Mediterranean region. The landmasses are shown in shades of brown and green, indicating vegetation and terrain. The surrounding oceans are a deep blue. Several white, wispy plumes of smoke or haze are visible, originating from various points across the continent and drifting towards the west and southwest. The text 'Early Warning System for Wildland Fires' is overlaid in white at the top left.

DLR'S involvement in relevant international activities



International Charter on Space and Major Disasters

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



DLR's engagement in the international Charter Space & Major Disasters



- DLR is full member of the Charter since 2010
- Main assets:
 - TerraSAR-X/TanDEM-X SAR data & Optical RapidEye data
 - Active role in all committees and functions
 - Charter Board, Executive Secretariat, Emergency-on-Call Officer, Mission Planning / Data Delivery, Project Management, Communications Group
 - Internal realisation in collaboration between DLR Space Administration and DLR Center for Satellite-based Crisis Information (ZKI)



Supported by:



on the basis of a decision
by the German Bundestag



Involvement in GEO/CEOS Disaster Activities



- The Committee on Earth Observation Satellites (CEOS) is an international organisation with > 30 members, predominately space agencies. The aim of CEOS is to pool expertise and capacity in the field of Earth observation.
- CEOS represents the “space arm” within the Group on Earth Observations (GEO), a voluntary partnership of governments and organizations that envisions “a future wherein decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations and information.”
- **DLR has been a CEOS member since 1986.**
- **DLR participates in the CEOS Working Group Disasters**, which was set up in 2013, in order to bring together existing activities and start new projects
 - **complementary to activities limited to the response phase (Charter etc.)**



Involvement in GEO/CEOS Disaster Activities: Geohazard Supersites

- The Geohazards Supersites and Natural Laboratories (GSNL) are areas of outstanding science & research interest and shall serve a better understanding of geological risks:
 - Hawaii,
 - Iceland,
 - the Marmara area in Turkey,
 - New Zealand,
 - volcano sites in Ecuador and Italy,
 - New: Greece (most seismically active area in the country)
- Space agencies and other institutions collaborate with the goal to make both space-based and in-situ data easily accessible for international groups of participating scientists.
- **DLR contributes TerraSAR-X data and facilitates data sharing among scientists through a dedicated data platform**
(<https://supersites.eoc.dlr.de/>)



Involvement in GEO/CEOS Disaster Activities: projects about Volcano and Seismic Risk monitoring

- The WG Disasters set up some activities to demonstrate that space-based EO data can contribute more to systematic monitoring of risks (floods, seismic risk, volcanoes, landslides).
- **DLR supports the Volcano/Seismic Risk activities with data of TerraSAR-X and TanDEM-X and intends to also support the new Landslide activity.**
- Very encouraging results on volcano monitoring: an international team of scientists has been able to demonstrate the great potential of SAR data for detecting unrest of volcanoes in Latin America.
 - invaluable information for local authorities and decision-makers – especially in less-developed countries.
 - today, only a small fraction of all hazardous volcanoes worldwide is monitored on a regular basis, although many of them pose a tremendous threat to people, settlements, and agricultural production.



Global Partnership on Space Technology Applications for Disaster Risk Reduction



What is the mission of GP-STAR in your view?

- Contribute Earth Observation expertise to support the implementation of the Sendai Framework on DRR
- Foster the cooperation between members of the partnership



What activities, projects, programs can you affiliate / contribute to GP-STAR?

- Risk Assessment for Disaster Mitigation, Prevention and Preparedness
- Operational mechanisms to ensure rapid and effective disaster response
- Multi-hazard forecasting and early warning systems



What outcomes (procedures, products, information, knowledge, know-how) can you contribute?

- Knowledge and know-how achieved in ongoing research projects



What role and working field in GP-STAR do you foresee for your organisation?

- Provide scientific input to the partnership
- Contribute experience on operational activities
- Provide input from national, European and international stakeholders

