



CONCEPT NOTE

UN-SPIDER Bonn International Conference

Space-based Solutions for Disaster Management in Africa: Challenges, Applications, Partnerships

Organized by

**United Nations Office for Outer Space Affairs (UNOOSA) / UN-SPIDER
Centre for Remote Sensing of Land Surfaces (ZFL), University of Bonn**

In cooperation with the

German Aerospace Center (DLR)

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UN Campus
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1. Background

Natural and man-made disasters cause tremendous damage to societies around the world. They lead to loss of lives and property, displace people from their homes and destroy livelihoods, and disrupt sustainable development efforts worldwide. Developing countries are particularly susceptible to the impact of disasters as societies are more vulnerable and exposed, and less resilient to recover when disasters strike.

Convinced that space technologies can play a vital role in supporting disaster management, the United Nations General Assembly (UNGA) established the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) in 2006 as a programme to be implemented by the United Nations Office for Outer Space Affairs (UNOOSA). The General Assembly mandated UN-SPIDER to provide universal access to all countries and all relevant international and regional organizations to all types of space-based information and services relevant to disaster management to support the full disaster management cycle.

In recent years, the quality of satellite sensors, access to and use of satellite imagery and Earth observation services has significantly improved, with more and more space agencies embracing open data policies that facilitate access to archived and up-to-date imagery. Such remotely-sensed data can be combined with in situ information from a variety of sensors and with other data sources

such as crowdsourced geotagged images to generate relevant information. Through Big Data approaches, diverse data sources can be used synergistically to create insights that would not be possible through the exploitation of a single source. The increasing presence of Artificial Intelligence (AI) techniques in remote sensing, such as deep learning, helps mine the massive amounts of big space data more efficiently, for instance to quickly determine whether a road is still passable or not following a disaster.¹

Taking note of these advances in space technologies and other technological advances, the African Union outlined in its *2017 African Space Policy* that space represents a unique opportunity for cooperation in using and sharing enabling infrastructure and data towards the proactive management of responses to natural hazards and disasters, amongst other fields. In this way, the African Union aims to promote the use of space applications for improving weather forecasts and to develop a range of early warning systems, as Africa is subject to various extreme weather, climate, ecosystem and geological events.

Strengthening technical skills and setting up institutional and inter-institutional structures is important to ensure that the benefits of space-based information reach civil protection agencies and other actors involved in disaster management activities. Partnerships can facilitate access to data, for instance through emergency mechanisms such as the International Charter Space and Major Disasters. Recently, the European Union and the Government of Germany identified international cooperation with Africa as one of the priorities as highlighted in the *Marshall Plan with Africa* of the Federal Ministry for Economic Cooperation and Development (BMZ), the *Africa Strategy 2014-2018* of the Federal Ministry of Education and Research and the *G20 Compact with Africa*.

This International Conference will take up the issues raised above and continue identifying challenges, highlight solutions and encourage partnerships for using space technologies for disaster management in Africa.

2. Objectives and expected outcomes

The International Conference aims to contribute to an increased use of big space data approaches and satellite-based application in African countries to respond to challenges posed by natural hazards. More specifically, the event aims to:

- Showcase recent advances and identify challenges to the use of space-based information, big data approaches and artificial intelligence techniques such as machine learning in disaster management in Africa.
- Present and provide a hands-on experience of space-based applications through tutorials on technical solutions ranging from standalone desktop packages to cloud computing environments that facilitate the access to and use of space-based data and information products for disaster management.
- Build on the outcomes of UNOOSA international conferences and symposia² to identify capacity-building needs and opportunities regarding full use of the increasing amount of space-

¹ A. Moutzidou et al, "Road Passability Estimation Using Deep Neural Networks and Satellite Image Patches", in *Proc. of the 2019 conference on Big Data from Space (BiDS'19)*, P. Soille, S. Loekken and S. Albani, eds. (Luxembourg, Publications Office of the European Union, 2019), p. 1.

² United Nations/Austria Symposium on Space for the Sustainable Development Goals: Stronger partnerships and strengthened cooperation for 2030 and beyond. Graz, Austria, 17 – 19 September 2018. Information on this event available at: <http://www.unoosa.org/oosa/en/ourwork/psa/schedule/2018/SDGs-un-austria-Symposium.html>.

based information and new techniques to access, combine, process, analyze and present the data.

- Provide a forum to discuss partnerships to facilitate access to data and applications tailored to the needs of disaster management stakeholders in Africa.

The outcomes, results and key recommendations of this International Conference will be published as a technical report and will be incorporated into the UN-SPIDER plan of work for the coming years.

3. Working modality for the International Conference

The International Conference will have a duration of three days. It will include presentations, panel discussions, plenary discussions as well as hand-on workshops on the use of relevant applications.

The first day of the conference will serve to set the context and highlight:

- Challenges countries face related to natural hazards.
- How international agreements such as the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015-2030 and the Paris Agreement aim to reduce disaster risks and foster adaption to a changing climate.
- How space-based applications can support addressing hazards and implementing these agreements.

Presentations on state-of-the-art applications based on space-based information that are relevant to disaster management community will open the day, followed by sessions on *International Cooperation, Climate Change and Adaptation and Challenges Faced by Countries*.

The second day of the conference will be dedicated to space-based solutions and consist of plenary presentations and hand-on sessions in small groups focussing on specific applications that will be both standalone and cloud-based.

On the third day, participants will provide feedback on the hands-on sessions and specific solutions and discuss challenges and opportunities related to their use. Sessions on *Capacity-Building and Partnerships* will help develop strategies for strengthening institutional capacities, individual skills and collective efforts to path for new applications in disaster management efforts in Africa.

4. Participants

The International Conference is expected to bring together around 80 participants from national, regional, and international public and private organizations and institutions including:

- Decision-makers from government agencies (space agencies, remote sensing centres, civil protection / civil defence agencies, ministries of environment, etc.)
- High-ranking officers from regional and international organizations involved
- Experts from the space and remote sensing community who focus their efforts on environmental monitoring, disaster risk management or emergency response activities, particularly in the context of climate-related extreme events
- UNOOSA/UN-SPIDER National Focal Points

United Nations-China Forum on Space Solutions: Realizing the Sustainable Development Goals, Changsha, China, 24 to 27 April 2019. Information on this event is available at:
<http://www.unoosa.org/oosa/en/ourwork/psa/schedule/2019/2019-un-china-forum-on-spacesolutions.html>

- Experts from the UNOOSA/UN-SPIDER Network of Regional Support Offices
- Experts from the UN-affiliated Regional Centres for Space Science and Technology Education, and other national, regional, and international Centres of Excellence
- Researchers involved in the use of Earth observation in areas related to climate change, environmental management, sustainable development, disaster-risk reduction and emergency response efforts
- Representatives of the private sector (space and Earth observation, disaster management, environment, etc)

5. Language

The working language of the International Conference will be English. No simultaneous translation will be provided.

6. Dates and location of the International Conference

The International Conference will be held at the UN Campus in Bonn, Germany, from 6 to 8 November 2019. All selected participants will receive information with logistical details.

7. Life and health insurance

Life and major health insurance **is the responsibility of each selected participant or his/her nominating institution or government.** UNOOSA and the co-sponsors will not assume any responsibility for life and major health insurance nor for any other expenses related to medical treatment or accidental events.

8. Visas

Participants are responsible for making their own arrangements to secure the visas which may be required when making stop-overs in countries other than Germany due to flight connections and to enter Germany.

9. Point of contact

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