

## ISDE 2021 in Salzburg

In the context of the 2021 International Symposium on Digital Earth (ISDE) in Salzburg, a special track was offered to the Christian Doppler Laboratory (CDL) GEOHUM to host and organise a full-day's forum on July 8<sup>th</sup>. The event presented itself as a unique opportunity to reach out to friends, colleagues, and industry leaders who share an interest in solving the challenges related to GeoHumanitarian Action. The ISDE was combined with two other long-standing annual conferences in Salzburg: the GI\_Week and the AGIT, both of which regularly draw hundreds of visitors from the field of geoinformatics.

*Full Programme:* <https://geohum.zgis.at/special-forum-on-geohumanitarian-at-isde/>

## Bringing Together Humanitarians, Researchers, and Service Providers

From the outset, a main intention for the forum was to bring together industry leaders from the field of research, service provision and humanitarian aid. The hybrid-online mode of the conference posed as an ideal facilitator of international and interdisciplinary exchange of ideas, latest research findings, and to simply foster new connections across the board. With this intention in mind, a diverse range of speakers and chairs, evenly representing each of these three core fields, was assembled:

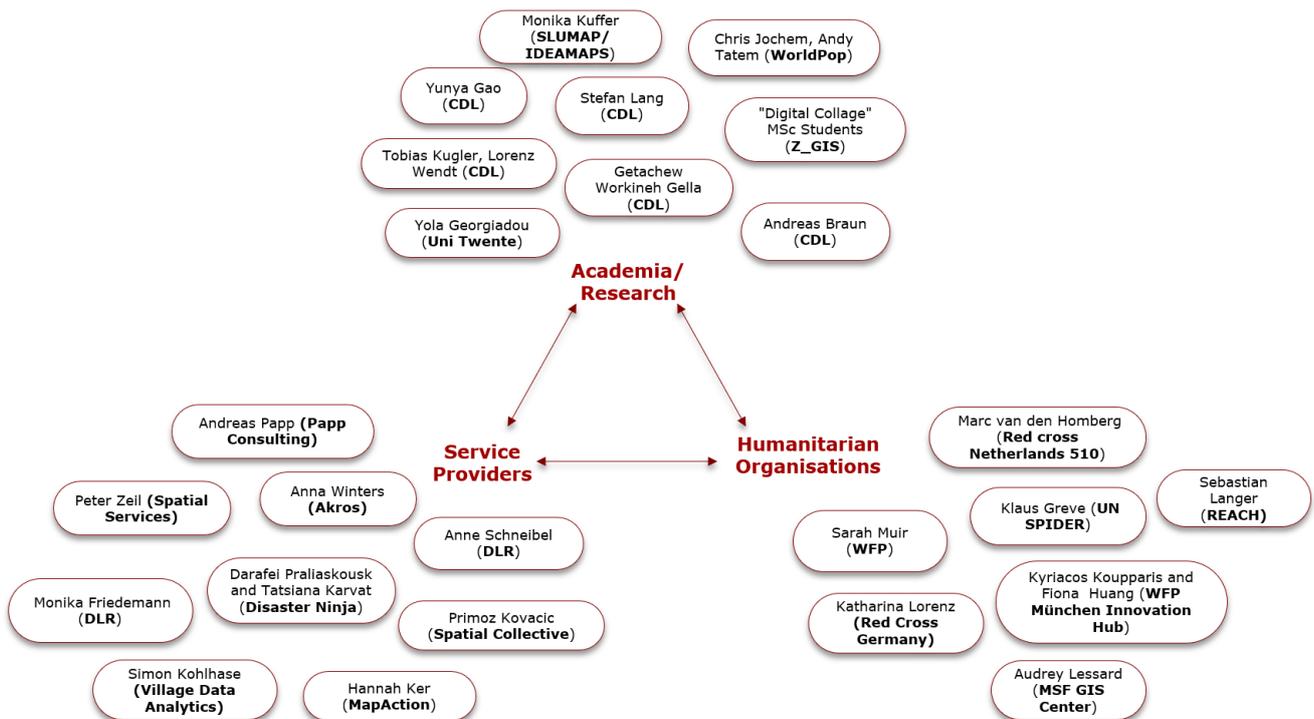


Figure 1: An interdisciplinary forum in the making - notes from the planning stages.

## Connecting Online through a Hybrid Mode

This conference was held during the COVID-19 global pandemic, and was therefore organised as a hybrid event. Though this is often regarded as a drawback for networking and personal interaction, the online mode proved to be a substantial asset for the forum, as it helped bring together international experts in the geohumanitarian field. Many industry leaders, especially those operating in the humanitarian context, find themselves in the field more often than not, thereby making a physical visit to Salzburg near-impossible. Through the conference's online platform AirMeet, access to the event became a mere matter of internet connection. With the geographical limits for potential speakers practically erased, we were able to invite top-tier speakers from other countries and continents. The forum therefore served not only as a platform to exchange latest ideas but also to exchange contact information and make plans for continued collaboration.

*Out of a total of 34 speakers and hosts, 22 joined us online from outside of Austria.*



Figure 2: A map showing the location of the forum's international speakers.

## Addressing Current Topics and Future Challenges in Research, Innovation and Implementation

The field of geohumanitarian action is marked by a wide range of interdisciplinary subtopics. It encompasses issues ranging from the use of cutting-edge technologies such as artificial intelligence (AI) for rapid information extraction and situation assessments, to the user-focused implementation of community-based solutions, all the way to the ethical issues of remote accountability. To address the most current and pressing issues head on, the

programme was designed to give due attention to each of these topics in turn. The day's sessions were broadly divided into 5 blocks that guided the day's presentation topics and discussions:

- *Finding Solutions to Complex Challenges*
- *Innovation in "Data 2 Info"*
- *New Technologies in Practice*
- *Changing Realities and Needs in the Field*
- *Evening Panel: EO/GI in the Humanitarianism of Today and Tomorrow*

## (1) Finding Solutions to Complex Challenges

The first block consisted of two sessions that served as opening and introductory talks. After welcome notes by Stefan Lang (Head of CDL GEOHUM), Peter Zeil (Spatial Services GmbH) and Audrey Lessard (Head of Services, MSF GIS Center), Master's students at the University of Salzburg presented current EO technologies for humanitarian aid, followed by a live discussion on "where we are" and "where we are heading". The session broadcasted from the University's TV studio.

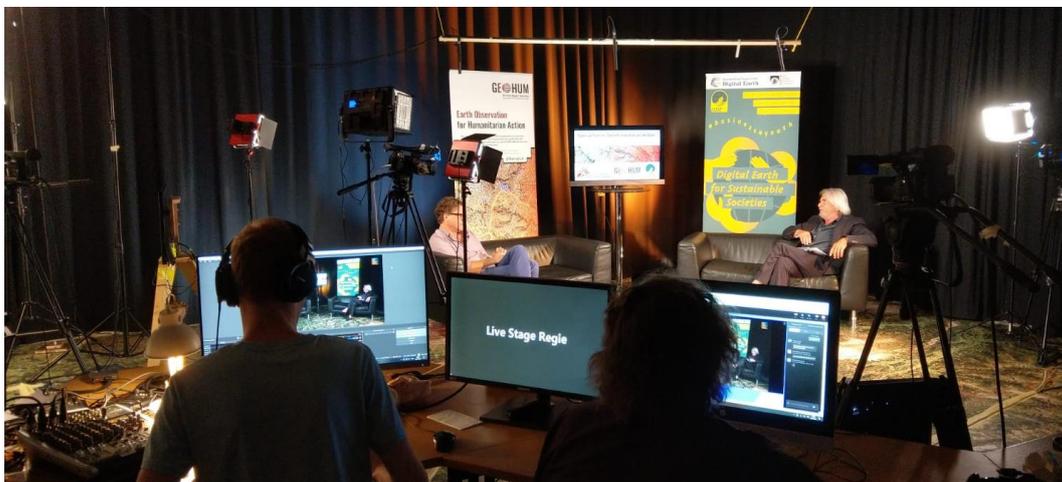


Figure 3: Behind the scenes - Andreas Papp and Peter Zeil discuss the current state of GeoHumanitarian Action.

The day's designated keynote by Yola Georgiadou was also held in this first block to set the scene on one of the field's most neglected and pressing issues: accountability in the digital era. Yola raised critical questions of how humanitarian actors, who work from offices in remote countries, can be held accountable for the actions they help implement on the ground.

*"In the digital era, the power asymmetry between the humanitarian provider and the beneficiaries is radically increased" – Yola Georgiadou, ITC*

Central to her arguments was the notion of a required hybrid accountability that aims to reduce epistemic injustice, defined as a person "being wronged in their capacity as a knower, which is the ultimate human capacity". The road towards epistemic justice requires

humanitarians to implement thick accountability such as that between citizens and local informal institutions.

The keynote was accompanied by practical insights from the Red Cross's 510 Initiative, who work at the forefront of digital humanitarianism to implement predictive analyses and rapid mapping with the use of AI. The institute's scientific lead Marc van den Homberg showcased and explained some of the Red Cross's current methods and collaborations, including early action protocols in the Philippines and rapid tornado damage assessments.

## (2) Innovation in "Data 2 Info"

Next, the "Data 2 Info" block brought the focus of the forum to the newest technologies in earth observation (EO) and geoinformatics (GI). The first session invited some of the largest organisations operating in the geohumanitarian field today, including the German Aerospace Center (DLR) and the World Food Programme (WFP). Experts from these organisations shared some of their latest data services and how they utilise EO technologies for either their own projects or to offer governments, organisations, and individual users access to fast and reliable information. The DLR's new Data4Human initiative also highlighted methods for enhanced rapid mapping through the incorporation of web data from social and news platforms.

Within the "Data 2 Info" block, in-house research at the GEOHUM lab was presented. The GEOHUM lab counts as a front-runner in the research and application of latest EO technologies in humanitarian contexts. The lab's researchers were able to share updates on successful transferability tests of automated dwelling detection methods between camps in Syria and Cameroon, as well as new research into dwelling detection with the use of very high resolution radar imagery. The lab also took the opportunity to give the audience an overview of its structure, aims and objectives and the general strategy of combining knowledge-based with machine learning approaches along the novel hybrid AI paradigm.

## (3) New Technologies in Practice

Following the data-focussed discussions, the forum gradually shifted its focus towards the implementation and use-cases of such technologies in practice. Both the DLR and the WFP's Innovation Accelerator presented their recently launched initiatives. In both cases, strong emphasis was placed on the necessity of collaboration within and beyond the field of remote sensing.

*"In the future we hope WFP damage assessment activity can be involved in human-centric but machine-assisted processes." – Fiona Huang, WFP Innovation Accelerator*

A separate session on "New Technologies in Practice" saw the German Red Cross, REACH, and MapAction discuss a major new field in humanitarian action: predictive analytics, including forecast based financing and the establishment of early action triggers. After presenting a practical example of anticipatory action in Malawi's flood vulnerable regions, MapAction's data scientist shared some experience on day-to-day challenges, especially surrounding the task of finding an appropriate trigger threshold and dealing with oftentimes high levels of uncertainty.

Adding on to MapAction's points, the German Red Cross discussed the importance of operational preparedness for trigger events, i.e. to have information ready on building chatterati's, local businesses, and population spread so that prioritisation and eligibility for re-location can be determined beforehand.

*“Especially in forecast-based-financing or anticipatory action projects, where you're dealing with time, it is very important to identify your beneficiaries in advance” –*

*Katharina Lorenz, German Red Cross*

In light of the recent widespread uptake of predictive analytics, Sebastian Langer, an expert with substantial international experience with REACH offered some general insights and best practice advice, including the importance of applying data and threshold standards and being transparent about uncertainties and indicators.

On the topic of communication with decision-makers who release and allocate funds, recent experiences were shared by Klaus Greve of the University of Bonn who works in close collaboration with UN SPIDER. He described the main concern being capacity building and knowledge production within governments. In that department, the shift towards pandemic-induced online modes of collaboration has proved highly successful.

#### (4) Changing Realities and Needs in the Field

In line with the forum's logical progression from technological innovations all the way to implementation in the field, the next block presented the audience with the work of grass-roots organisations and international initiatives that focus on local communities. Key topics in this block were urbanisation, deprived areas, and community engagement.

Monika Kuffer of the University of Twente introduced the IDEAMAPS initiative and how it combines computer modelling, field mapping, manual digitisation and census or survey data to represent deprived urban areas. A conceptual framework for nine domains of deprivation was presented, including spatial, social, and political indicators that help define urban deprived areas. Future work will see researchers scale up this approach to include secondary cities.

In a closely related topic, researchers at WorldPop shared methods for generating urban area datasets by quantifying the urban morphology of 2D building footprints to derive intra-urban, area-based statistics with which neighbourhoods can be classified. Two GEOHUM researchers further contributed to the discussion of urban mapping with an entirely different method: 3D mapping from stereo images. In a limited resource setting stereo imagery can offer invaluable population insights for cities, especially in areas marked by many multiple-story buildings.

The forum also heard from the grass-roots organisations Akros and Spatial Collective who operate on the community-level across African and Asian countries, accompanied a data scientist of the successful start-up Village Data Analytics. This session zeroed in on community-based engagement and local implementation of technologies.

Both Akros and Village Data Analytics offered insights and even demos of their in-house software and platforms. In the case of Akros, this is an open-source platform (Reveal) which functions as a tool for local field workers to help increase essential healthcare coverage in numerous districts across ten African and Asian countries. In the case of Village Data Analytics, this is a platform combining various EO and machine learning data to assess the need and opportunities for rural, off-grid electricity networks. Through a handful of local examples from Kenya, the CEO of Spatial Collective contributed to the ongoing discussion by demonstrating the value of local knowledge when implementing new technologies.

## (5) Evening Panel: EO/GI in the Humanitarianism of Today and Tomorrow

The final highlight of the forum was an evening panel discussion consistent of six senior experts and industry leaders in both EO and GI. The panel was designed to recap the day's topics to arrive at both conclusions and resolutions. Two central questions that the panel discussed were:

- *Where do we stand today? What did we achieve so far?*
- *Where do we need to advance to? What are the challenges to be addressed?*

Throughout the discussion, several priorities emerged. Moving forward, we have to close the gaps between researchers, service providers, humanitarians in the field, and beneficiaries to enable fluid communication and collaboration channels. Making full use of the new opportunities that come with digitalisation will comprise an essential means towards that end. Humanitarian actors must harmonise their efforts and focus on interdisciplinarity to meet the complex needs in the humanitarian needs of today and tomorrow. We must learn how to make best use of artificial intelligence, including how to be accountable and how to make interventions fair.

## Take-Aways

The Geohumanitarian Action Forum has attracted the attention of a diverse audience, speakers and session chairs. The breadth of topics that we included in the day's programme ensured that all relevant aspects of EO and GI in the humanitarian context were addressed. The forum also served to solidify a common demand for greater interdisciplinarity, collaboration and GEOHUM's place among industry leading institutions. The online mode allowed a variety of international guests to participate and facilitated the creation of many new connections. Moving forward, these lines of communication will serve all participants and stakeholders well to work together on addressing the challenges of the future.

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