

SATELLITE DATA IN ACTION

How GIS & Earth Observation Support MSF's Humanitarian Work

Sources: Spatial Services GmbH, includes modified Copernicus Sentinel data (2022) and data from OpenStreetMap. Overview maps: © GAUL



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When an earthquake strikes, an epidemic breaks out or thousands of displaced people seek shelter: how do we locate and reach those in urgent need of help?

We do not have detailed maps of many crisis-hit areas. We often do not know exactly where villages are located, which roads are passable, or how many people are affected by a disaster. That is why, at MSF, we have our own GIS Centre, i.e. a centre for Geographic Information Systems. It supports our activities by producing maps, managing geographic data, developing dashboards and remote-sensing to inform our projects on the ground. Our Earth Observation team in Vienna is a part of the GIS centre.

WHAT DOES OUR EARTH OBSERVATION TEAM DO?

Our Earth Observation team works with geodata: information relating to the Earth's surface. It primarily visualises and analyses satellite imagery. To do this, it can use existing imagery. Our team can also request satellites to take specific images – this can take a few days, depending on cloud cover. These images and analyses provide concrete support for our missions: to better plan and adapt aid, or to make decisions.

HOW DOES THE EARTH OBSERVATION TEAM SUPPORT OUR OPERATIONS?

Our Earth Observation team provides vital information on our operational areas. In doing so, it primarily responds to requests arising from our projects. In 2025, 25 countries where we operate requested information, such as analyses of flooding, housing conditions or settlement patterns. At the same time, our team also proactively offers forecasts, for example on climate-related risks in our countries of operation.

ACTIVITIES

- **EMERGENCY RESPONSE:** In the event of floods, earthquakes or hurricanes, satellite data helps us to plan and rapidly adapt our operations. We determine the extent to which a disaster is affecting the population, where emergency shelters are being set up, how best to reach people and what infrastructure is needed to support them. When conflicts escalate, we need to know where displaced people are fleeing to in order to be able to help them.
- **EPIDEMICS:** Following floods or during the rainy season, there may be an increased risk of outbreaks of cholera, malaria or dengue fever. Using geodata, we can see which areas are flooded or where seasonal water sources are forming. This enables us to prevent diseases in a targeted manner and combat epidemics.
- **POPULATION MONITORING:** To plan our aid, we need to know how many people require it and how to reach them. We count shelters, determine population density and use this to calculate the population. This figure can change rapidly, particularly in refugee camps. We map some areas monthly to obtain long-term observations, for example, the refugee camps in Gaza, helping us plan both aid delivery and logistics.
- **EVIDENCE:** On satellite images, we see damaged or destroyed buildings, for example following attacks on hospitals. We use this data for documentation, for the public, or even in court. This allows us to corroborate witness statements and support our advocacy work.
- **ASSESSING RISKS:** We make proactive assessments to better plan our operations and prepare for upcoming natural disasters. This allows us to identify where floods, droughts or cyclones are likely to occur.

Materials and analyses such as these enable us to plan operations more efficiently, respond rapidly to evolving circumstances, and safeguard the wellbeing of our patients and staff.



EMERGENCY RESPONSE

Massive destruction caused by the magnitude 7.8 earthquake in southeastern Turkey and northwestern Syria (February 2023).



WorldView-2, ©Maxar Technologies provided by European Space Imaging

HOW IS OUR GIS CENTRE ORGANISED?

The GIS Centre is organized as a coordinated network, with specialized teams for data management, mapping and Earth Observation (in Vienna). In parallel, around 40 GIS specialists are directly supporting our projects in the field (either permanently or through short-term deployments), ensuring that geographic information is effectively integrated into our humanitarian work.

PARTNERS AND COLLABORATIONS

We use external data from several agencies and work with various initiatives and organisations to achieve the best possible results and share knowledge.

For example:

- HACE (Humanitarian Action for climate and environment): Initiative of MSF Canada, providing climate and environmental risk data for our projects
- Missing Maps: An initiative in which volunteers create digital maps that are freely accessible to everyone. Find out more at <https://www.missingmaps.org/>
- Research & Development: Close collaboration with the University of Salzburg
- Spatial Services and Geograma: Contractors helping us provide daily support to MSF missions

EVIDENCE

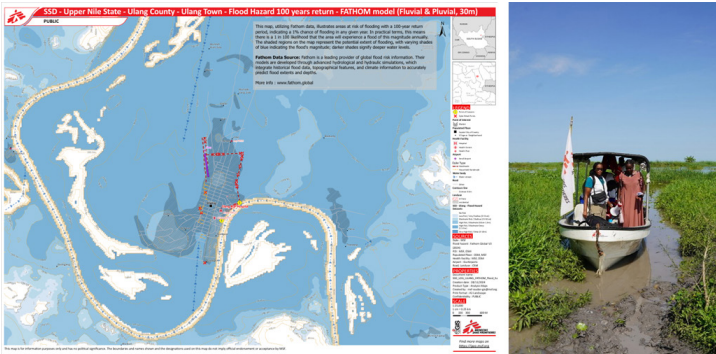
The Jabal Amel Hospital in Sour, Southern Lebanon, was severely damaged on June 1, 2026, by an Israeli airstrike in its immediate vicinity (including a strike on the hospital's parking lot).



Left: July 2025, Google Earth Imagery (Airbus), Right: June 4, 2026 © Airbus DS, provided by the Airbus Foundation

ASSESSING RISKS

Flood risk assessment (forecast) in Ulang, South Sudan



Left: Flood risk in Ulang, South Sudan, Right: Mission in Ulang, © Nasir Ghafoor/MSF, Südsudan 2024



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<https://geo.msf.org>