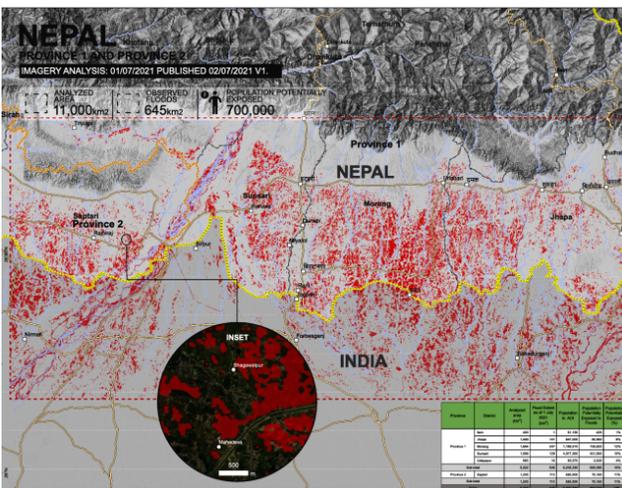


UNOSAT at CERN: Satellite mapping for good of humanity

When UNOSAT was established in 2001, its informational technology infrastructure naturally anchored at CERN. Compiling and manipulating satellite data required the state-of-the-art technologies and servers that the Laboratory's IT department has been able to provide ever since. This year, UNOSAT was recognised as the United Nations Satellite Centre, with the mandate to provide UN's funds, programmes and specialized agencies with satellite imagery analysis, training and capacity development, in the use of

geospatial information technologies, on the basis of voluntary contributions.

Through satellite imaging and geospatial observation, UNOSAT, part of the United Nations Institute for Training and Research (UNITAR), supports humanitarian relief in fields such as refugee protection, human rights and international law, health, security, natural disasters, cultural heritage and climate change. Over the past 20 years, UNOSAT has been able to help local authorities and humanitarian workers to assess damages and map affected areas in crisis situations



Map illustrating satellite-detected surface waters in Province 1 and 2 as observed from a Sentinel-1 image acquired on 1 July 2021 at 05:58 local time and

(Image: UNOSAT)

using an automated analysis with Artificial Intelligence based methods.

such as [flood damages in Pakistan](#) or the [Ebola outbreak in West Africa](#).

Thanks to CERN's excellent bandwidth, computing power and data storage capacities, the UNOSAT team can rapidly operate and download geospatial information and provide analysis within a few hours. All this data feeds directly into other United Nations initiatives, such as the Humanitarian Data Exchange platform of the Office for the Coordination of Humanitarian Affairs. "Our partnership with CERN allows us to benefit from cutting-edge technologies to develop new solutions to support peace, security and climate resilience in yet inaccessible and often vulnerable parts of the world," says Einar Bjørgo, UNOSAT's Director.

Recently, the two organisations strengthened their [partnership](#) by multiplying their ways to collaborate. In May 2020, a partnership between a consortium of European universities, UNITAR and CERN launched [Crowd4SDG](#), a new project to promote the use of citizen science data in monitoring efforts to implement the UN's 2030 Agenda. Based on expertise in crowdsourcing, this project will focus on climate action, namely by keeping track of the impact of extreme climate events and helping strengthen the resilience of communities affected by them.

"Hosting UNOSAT is part of CERN's mission to push the frontiers of science and technology for the benefit of society. Our team is looking forward to work on future innovative projects with such a high humanitarian impact," says Frédéric Hemmer, Head of the IT department at CERN.

Since 2017, UNOSAT partnered with CERN as part of the [CERN openlab](#) collaboration to develop artificial intelligence (AI) algorithms to enhance flood detection or refugee camps simulations through satellite imagery. Using machine-learning techniques, the developers focused on simulating synthetic high-resolution satellite images and developed a dedicated network that can generate realistic satellite images of remote areas to enable optimised logistics in support of refugee camps. Another area of collaboration is the Flood AI algorithm, used in 2020 to monitor the situation after heavy monsoon rains in Bangladesh and Myanmar. In Mozambique, UNOSAT's team works with the authorities to set up an operational AI-based flood detection platform, that would provide national stakeholders with near real time satellite-derived data about potential flood events during the rainy seasons. Similar platforms adjusting the AI solution will be developed for other countries.