

Bringing Relief to Refugees

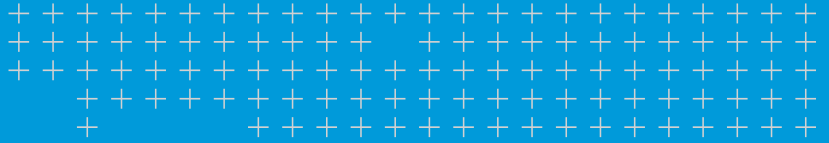


Aid organizations need timely data on populations in refugee camps.

Trimble software helps Doctors Without Borders optimize use of limited resources.

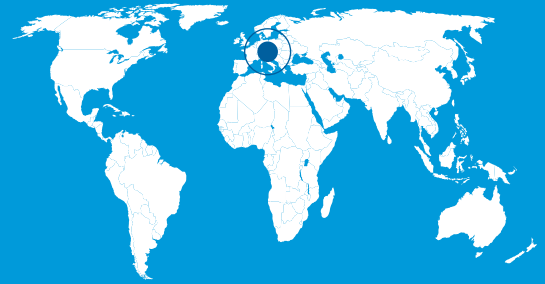
Solution

Trimble eCognition®Software



overview

Each year thousands of people are forced away from their homes by natural disasters or political unrest. They often end up in refugee camps supported by non-governmental organizations (NGOs) that provide food, shelter and medical assistance. To manage their operations efficiently, NGOs and other agencies need to know how many people are in a given camp.



Location
AUSTRIA

Large refugee camps can hold more than one hundred thousand people. NGOs such as Doctors Without Borders (DWB) rely on population data in allocating resources to prevent sickness and malnutrition in the camps. But it is difficult to acquire accurate data on camp populations. While imagery from satellites and aircraft can help, manually extracting population information from aerial photos is slow and expensive. DWB teamed with experts at the University of Salzburg's Department of Geoinformatics (Z_GIS) to find a better approach.

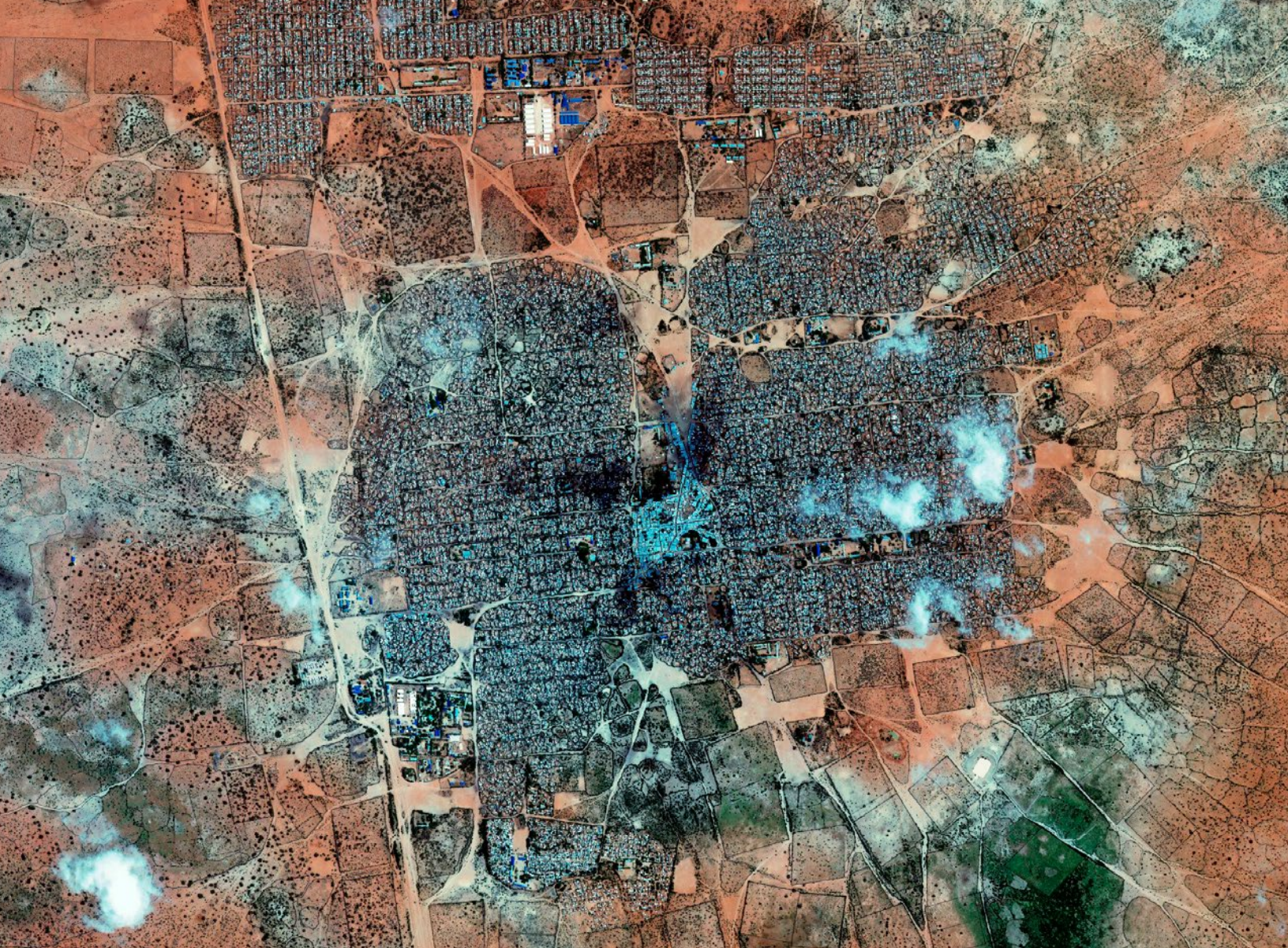
"It's essential to develop accurate data quickly and to repeat the measurements as needed," said Dr. Stefan Lang, division head and associate professor at Z_GIS. "Once we capture a particular area then we can do recursive monitoring. It's important to have tools that we can use to repeat our analysis and not start from scratch."

AUTOMATED ANALYSIS

Z_GIS is developing automated approaches to extract population information from satellite images of refugee camps. Z_GIS obtains very high-resolution (VHR) satellite imagery from commercial providers and processes the photos with Trimble eCognition software to develop estimates on the number of physical dwelling units in a camp. Teams can then add ground data on the average number of residents per dwelling, enabling them to estimate the size and distribution of the population. The process can be repeated to quantify population change and movement within a camp. Because camps can change rapidly during a crisis, the ability to repeat the population analysis quickly is important.

eCognition uses an approach called Object-Based Image Analysis (OBIA) to identify and classify features in an image. According to Dr. Dirk Tiede, one of Lang's colleagues at Z_GIS, OBIA offers greater flexibility and efficiency than earlier pixel-based analysis techniques. Using eCognition rule-sets, Tiede can effectively train

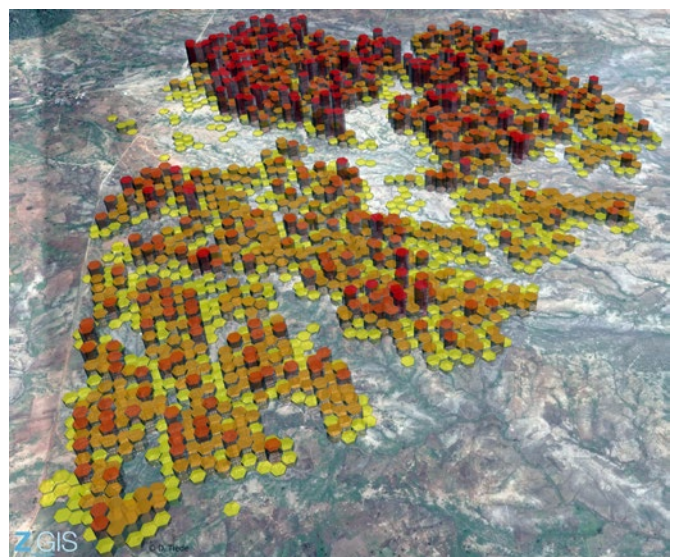




Satellite image of the Dadaab camp in Kenya taken in June 2015, when the camp was home to more than 400,000 Somali refugees. Image © DigitalGlobe

the software to automatically recognize and classify individual features within an image. The software can differentiate dwellings from other camp buildings such as food stations and medical facilities. By revising the rule-sets Tiede can adapt eCognition to account for different conditions in vegetation and colors of tents, structures and the ground.

Polygons and underlying dwelling extraction created by eCognition and inserted into Google Earth. Different colors depict variations in population density at Minawao.





OBIA processing of structures at Minawao refugee camp using eCognition.

RAPID RESULTS

To handle the dynamic conditions in refugee camps population monitoring relies on rapid acquisition and processing of satellite data. Once imagery is acquired Tiede can use the distributed computing possibilities of eCognition Server to analyze an entire VHR satellite scene in just a few minutes. The Z_GIS team has used

the software to provide population estimates for numerous locations, including the massive Dadaab and Bidi Bidi camps in Uganda. They have also used eCognition to help locate water sources for camps and to quickly prepare damage maps following earthquakes.

“We are using satellite imagery and eCognition to count dwellings and come up with population figures. We are mapping an indicator for human presence.”

— Dr. Dirk Tiede, Department of Geoinformatics, University of Salzburg, Austria



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