From Space to Humanitarian Response
OCHA OPT and UNOSAT Collaborative Efforts in Gaza

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EMERGENCY MAPPING SERVICE
OF UNITED NATIONS SATELLITE CENTRE PROGRAMME UNIT (EMS-UNOSAT)

The increase in disaster occurrences and the high numbers of victims resulting from conflicts are urgent issues that require effective and rapid action. Satellite imagery analysis is a vital tool essential in this response, as it can cover large areas and provide accurate information in near real time.

UNOSAT's Emergency Mapping Service (EMS), funded by the Norwegian Ministry of Foreign Affairs (NMFA), provides satellite image analysis during humanitarian emergencies related to disasters, complex emergencies and conflict situations. With a 24/7 year-round availability to process requests, the team of experienced analysts ensure timely and tailored delivery of satellite imagery derived maps (both web and static maps), reports and data ready for direct inclusion in Geographic Information Systems (GIS) for evidence-based decision making and operational planning.

The Crucial Role of UNOSAT in Supporting OCHA's Humanitarian Efforts in Gaza

THE CRUCIAL ROLE OF UNOSAT IN SUPPORTING OCHA'S HUMANITARIAN EFFORTS IN GAZA

OCHA OPT (Office for the Coordination of Humanitarian Affairs in the Occupied Palestinian Territory) activated the Emergency Mapping Service due to the escalation of conflict in Gaza since 7 October 2023. OCHA's mandate includes mobilizing and coordinating effective humanitarian action in partnership with national and international actors. In complex emergencies like the Gaza conflict, OCHA OPT is tasked with assessing needs, developing humanitarian response plans, monitoring the situation, and ensuring that aid reaches those most in need.

UNOSAT's satellite imagery analysis became a crucial source of primary objective information for humanitarian responders facing the unprecedented crisis in Gaza. As traditional on-the-ground data collection became impossible due to security concerns, OCHA turned to UNOSAT's expertise to guide their efforts.

"Without UNOSAT, it would have been Mission Impossible" says Majed Abuqubu, head of Information Management at OCHA OPT. *"Given the level of insecurity and attacks against humanitarian organizations, where many of our colleagues have been under huge security risk, UNOSAT's satellite analysis proved to be indispensable."*

Since 7 October 2023, OCHA OPT requested over 25 products which includes, for example, comprehensive building and infrastructure damage assessment, baseline damage assessment, night light damage assessment, satellite imagery provision and Agricultural damage assessment (Figure 1).

TYPE OF UNOSAT'S ANALYSIS DELIVERED TO OCHA	RELEVANT DATA PROVIDED BY UNOSAT
BUILDING AND INFRASTRUCTURE COMPREHENSIVE DAMAGE ASSESSMENT (PAGE 5)	• **STRUCTURES DAMAGE (%)** • **STATUS OF DAMAGE (DESTROYED, SEVERELY DAMAGE, MODERATELY DAMAGE)** • **SCHOOLS, UNIVERSITIES, HOSPITAL AND INDUSTRIAL FACILITIES DAMAGED.** • **ROAD SECTIONS AFFECTED.** • **MOST AFFECTED NEIGHBORHOODS** • **DAMAGE AGRICULTURAL AREA IN SQ KM** • **PERCENTAGE OF CHANGE**
NIGHT-TIME LIGHT ANALYSIS (PAGE 6-7)	**POWER SUPPLY LOSS** GENERAL RATE AND IDENTIFYING POWER SUPPLY TO UNIVERSITIES, SCHOOLS, AND HOSPITALS.
INTERNALLY DISPLACED PEOPLE	**DETECTS SHELTER CAMPS AND POPULATION MOVEMENTS.**
SATELLITE IMAGERY PROVISION	GOVERNORATE ANALYZED: • **GAZA STRIP (ALL)** • **NORTH OF GAZA GOVERNORATE** • **DEIR AI-BALAH** • **RAFAH GOVERNORATE**

OCCUPIED PALESTINIAN TERRITORY
COMPREHENSIVE BUILDING DAMAGE ASSESSMENT, GAZA STRIP

| Imagery Analysis: 06 July 2024

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📍	**AREA OF INTEREST**	**361km²**
🏛	**DAMAGED BUILDINGS**	**156,409**
⊗	**DESTROYED** INDIVIDUAL BUILDINGS	46,223
!	**SEVERELY DAMAGED** INDIVIDUAL BUILDINGS	18,478
!	**MODERATELY DAMAGED** INDIVIDUAL BUILDINGS	55,954

Armistice Demarcation Line
International boundary
Governorate boundary

Damage density
Sparse
Dense

The boundaries and names shown and the
designations used on this map do not imply
official endorsement or acceptance by the
United Nations.

Map scale for A3: 1:125,000
0 0.5 1   2 KM

34°30'E
31°30'N

OCCUPIED PALESTINIAN TERRITORY
NIGHTLIGHT ANALYSIS

Power Outage Distribution Estimate In Gaza Strip
with 14 September 2023 Configuration

11 OCT 2023

	POWER OUTAGE AREA	~ **149km²**
	BUILDINGS IN POWER OUTAGE	~ **127,000** *(73%)*
	SCHOOLS IN POWER OUTAGE	**538** *(70%)*
	HEALTH FACILITIES IN POWER OUTAGE	**77** *(70%)*

NIGHT LIGHT LOSS RATE (%)

0   100

5 km

OCCUPIED PALESTINIAN TERRITORY
NIGHTLIGHT ANALYSIS

Power Outage Distribution Estimate in Gaza Strip
Compared with 14 September 2023 Configuration

21 OCT 2023

⚡	**POWER OUTAGE AREA**	**~ 168km²**
🏢	**BUILDINGS IN POWER OUTAGE**	**~ 143,000** *(83%)*
🏫	SCHOOLS IN POWER OUTAGE	**641** *(83%)*
🏥	HEALTH FACILITIES IN POWER OUTAGE	**88** *(80%)*

NIGHT LIGHT LOSS RATE (%)

0   100

5 km

N
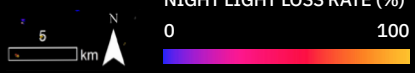
The partnership between OCHA-OPT and UNOSAT yielded several significant outcomes:

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1. ENHANCED EVIDENCE-BASED DECISION MAKING

UNOSAT's Comprehensive Damage Assessment provided OCHA OPT with detailed reports on destruction at governorate and municipality levels, including the status of critical structures and lifeline facilities. This granular data enabled OCHA to make informed decisions about resource allocation. Abuqubu explained, *"If the level of destruction over 60 or 70 per cent, we could easily assume that 60 per cent of those people have already left. If not, most of those people."* This precise information allowed OCHA to prioritize areas with the highest needs effectively.

UNOSAT's night light analysis offered crucial insights into power supply loss and population movements. Abuqubu noted, *"The night light analysis, at the beginning of the crisis, gave us a good indication where people have moved [...] It gave us an indication about the provision of electricity and services."*

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2. IMPROVED COORDINATION AND PLANNING

UNOSAT's analysis of affected road sections was instrumental in OCHA OPT's field visit preparations. Abuqubu detailed, *"UNOSAT has helped us in identifying the best routes and where the rubble is blocking roads. We were trying to send humanitarian convoys from the southern part of the city where the services were functional and most of the humanitarian organizations were based to the north – Gaza and north Gaza Governorates."*

This information enabled OCHA to recommend optimal routes for medical evacuations and delivery of supplies. A notable example was the successful evacuation of 39 newborn children from incubators to Arish Hospital outside Gaza.

UNOSAT's timely imagery and analysis also provided assessments of new crossings and newly established military roads and checkpoints. Abuqubu
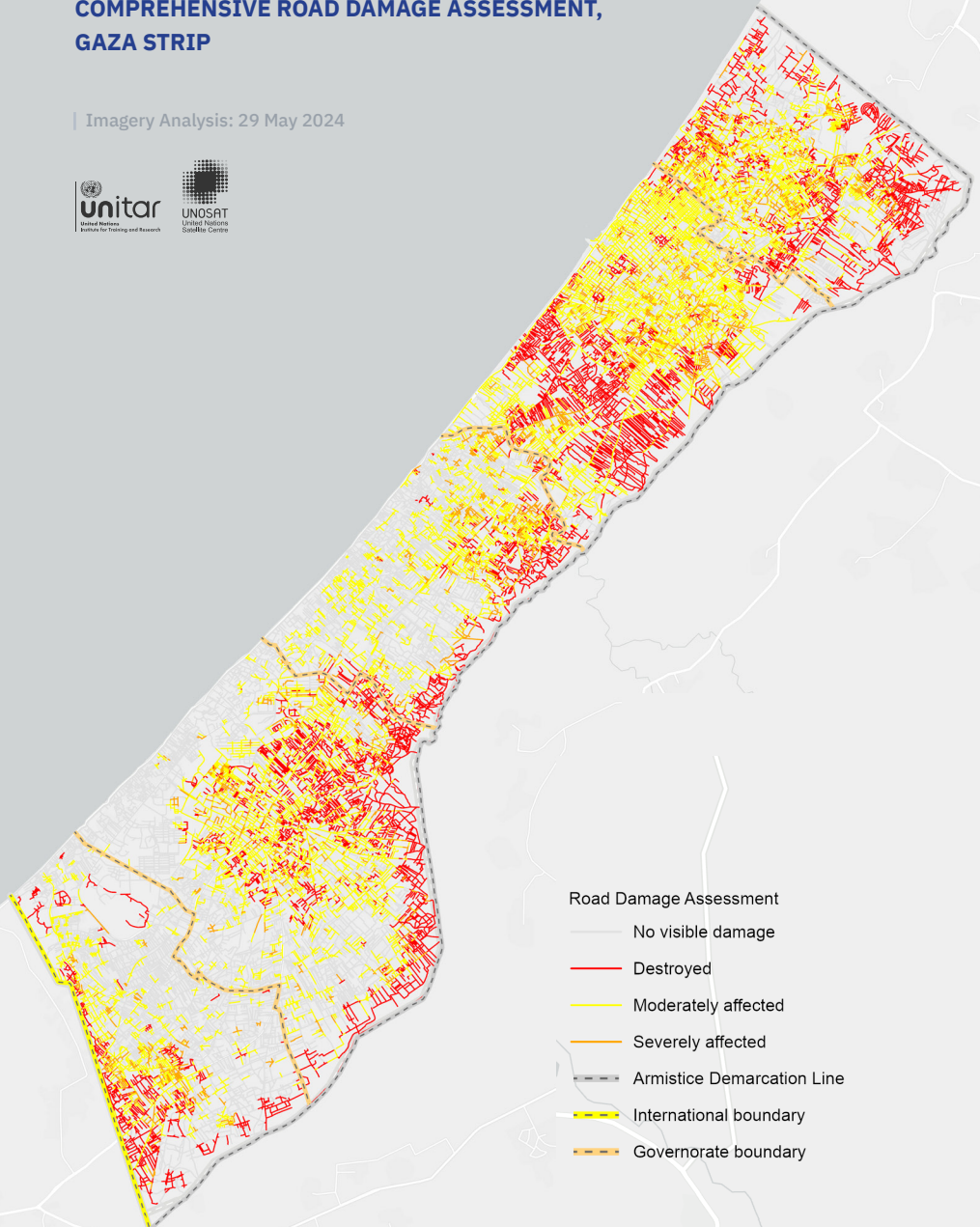
34°30'E

OCCUPIED PALESTINIAN TERRITORY
COMPREHENSIVE ROAD DAMAGE ASSESSMENT, GAZA STRIP

| Imagery Analysis: 29 May 2024

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31°30'N

31°30'N

Road Damage Assessment

———— No visible damage

———— Destroyed

———— Moderately affected

———— Severely affected

‑ ‑ ‑ Armistice Demarcation Line

‑ ‑ ‑ International boundary

‑ ‑ ‑ Governorate boundary

Map scale for A3: 1:125,000

0   0.5   1   2 KM

N

noted, *"We were able to show the new entry points and the logistical facility using satellite images."* The temporal analysis of humanitarian aid channels, particularly monitoring the construction of a floating pier, provided OCHA with crucial information for planning and coordinating aid delivery.

IMG1   Source: OCHA, World Health Organization and partners bring supplies to Shuhada al-Aqsa Hospital in the middle of the Gaza Strip on 10 February.

3. TARGETED RESOURCE ALLOCATION AND STRATEGIC PLANNING

UNOSAT's analysis was used as one of the credible sources of information to inform the flash appeal on critical needs and the level of destruction" Escalation of Hostilities in the OPT Flash Appeal 2023-2024".This plan outlines the estimated resource requirements to reduce human suffering and prevent further loss of life in Gaza and the West Bank. According to the Appeal Plan, around 3.3 million people in Gaza are in need in 2024, with plans to assist 3.1 million people, requiring a budget of 3.4 billion USD.

As of the latest update, 35 per cent of the Plan is funded, amounting 1.2 billion USD. This funding comes from various donors, with the Government of United Arab Emirates, European Commission, Government of Germany, Government of Japan, collective contributing 44 per cent of the funding received. The plan encompasses multiple sectors including education, food security, health, nutrition, protection, water sanitation and hygiene, among others, ensuring a holistic approach to addressing the crisis.

ANNUAL OVERVIEW OF REQUIREMENTS, PEOPLE IN NEED AND TARGETED
IN 2024

$3.4B

TOTAL REQUIREMENTS (US$)

$600M — Jan-Mar

$2.8B — Apr-Dec

	PEOPLE IN NEED	PEOPLE TARGETED	REQUIREMENTS (US$)
OPT	3.3M	3.1M	$2.8B
GAZA	2.3M	2.3M	$2.5B
WEST BANK	1.0M	0.8M	$297.6B

TOTAL PEOPLE TARGETED AND FUNDING REQUIRED (BY CLUSTER IN OTP)

CLUSTER	FUNDING REQUIREMENTS	TARGETED PEOPLE
FOOD SECURITY	782.1M	2.6M
SHELTER AND NON-FOOD ITEMS	423.1M	1.5M
HEALTH	408.5M	2.9M
WATER, SANITATION AND HYGIENE	305.6M	3.0M
MULTI-PURPOSE CASH ASSISTANCE	244.1M	1.4M
COORDINATION AND SUPPORT SERVICES	165.8M	-
PROTECTION INCLUDING AORS	163.9M	2.6M
NUTRITION	150.9M	1.2M
EDUCATION	119.6M	0.8M
SITE MANAGEMENT	39.7M	1.0M
LOGISTICS	17.8M	-
EMERGENCY TELECOMMUNICATION	1.8M	-

| Source: Flash appeal: Occupied Palestinian Territory, 2023- 2024

4. REINFORCED SYNERGIES AND COORDINATION AMONG HUMANITARIAN ACTORS

To enhance coordination, a centralized data hub for Information Management (IM) officers was created to share information with the cluster coordinators, information managers, and the civil-military coordination team to access the data provided by UNOSAT. Abuqubu highlighted *"We have a provision of services map. [..]on food, health, IDPs sites, and lifeline facilities level of destruction and functionality."* The "UNOSAT Gaza Emergency Response Data Hub", is a comprehensive platform offering interactive web portals and dashboards showcasing geospatial data and analysis for the Gaza Strip. This portal allows users to download and interact with UNOSAT's geospatial data for Gaza, including interactive dashboards displaying damage assessments and comparing high-resolution satellite images captured on different dates against specific locations or critical facilities such as medical facilities or telecommunication towers.

This data hub served as a common reference point for various humanitarian organizations operating in Gaza, fostering better coordination, and leading to a more coherent and efficient overall response.

5. ENHANCED AWARENESS OF SATELLITE IMAGERY'S VALUE

The collaboration demonstrated the power of geospatial technology in humanitarian response, especially in complex emergencies where traditional methods fall short. Abuqubu concluded, *"I couldn't imagine myself delivering and doing what I have done for the Gaza operation without having UNOSAT. I think this is a new era or new type of emergencies where the satellite damage analysis proved to be valuable and indispensable in such a situation."*

This increased awareness extended beyond OCHA to other UN agencies and NGOs involved in the Gaza response, leading to a growing recognition of the value of satellite imagery in crisis response.

6. INCREASED PROTECTION AND HUMAN RIGHTS MONITORING

The detailed damage assessments and analysis of military checkpoints contributed to human rights monitoring efforts, offering objective evidence of the conflict's impact on civilian infrastructures for use by human rights organizations and UN bodies in their reporting, investigative and advocacy work.

The satellite imagery-based analysis provided by UNOSAT were critical to OCHA-OPT humanitarian coordination in the field. They provided accurate, timely, actionable data which have allowed them to respond more effectively to the needs of the affected population in Gaza. This collaboration exemplifies the crucial role of innovative geospatial technologies in modern humanitarian efforts, particularly in complex emergencies where access to the ground is impossible.

References

1   **United Nations Satellite Centre (UNOSAT). (n.d.). UNOSAT's Emergency Mapping Service (EMS).** Retrieved from **www.unosat.org/services/**

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2   **United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA). (2024, April 17). Flash appeal: Occupied Palestinian Territory, April - December 2024.** Retrieved from **www.unocha.org/publications/report/occupied-palestinian-territory/ flash-appeal-occupied-palestinian-territory-april-december-2024**

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3   **United Nations Satellite Centre (UNOSAT). (n.d.). UNOSAT Gaza Emergency Response Data Hub [Data portal].** Retrieved from **www.gaza-unosat.hub.arcgis.com/**

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