IMPACT STORIES

From Space to Humanitarian Response

OCHA OPT and UNOSAT Collaborative Efforts in Gaza

OCHA

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Institute for Training and Research

UNOSAT
United Nations
Satellite Centre

EMERGENCY MAPPING SERVICE
OF THE UNITED NATIONS SATELLITE CENTRE (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.

The **Emergency Mapping Service** (EMS) at the United Nations Satellite Centre (UNOSAT) supported by funding from the Norwegian Ministry of Foreign Affairs (NMFA), delivers satellite image analysis during humanitarian emergencies/crises that stem from disasters, complex emergencies and conflicts. 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.

| Cover Picture Credits: UN Photo/Eskinder Debebe

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 the 7th 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 coordinating the assessment of humanitarian needs, so that aid reaches those who need it most, developing humanitarian response plans, and monitoring the situation.

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

"Without UNOSAT, it would be difficult to obtain accurate and up-to-date information on the level of destruction" 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 the 7th October 2023, OCHA OPT requested over 25 products including comprehensive building and infrastructure damage assessment, baseline damage assessment, night light damage assessment, satellite imagery provision and agricultural damage assessment (Figure 1).

FIGURE 1: UNOSAT'S OUTPUTS

TYPE OF UNOSAT'S ANALYSIS DELIVERED TO OCHA	RELEVANT DATA PROVIDED BY UNOSAT
BUILDING AND INFRASTRUCTURE COMPREHENSIVE DAMAGE ASSESSMENT (PAGE 5)	• **STRUCTURES DAMAGED (%)** • **STATUS OF DAMAGE (DESTROYED, SEVERELY DAMAGED, MODERATELY DAMAGED)** • **SCHOOLS, UNIVERSITIES, HOSPITAL AND INDUSTRIAL FACILITIES DAMAGED** • **ROAD SECTIONS AFFECTED** • **MOST AFFECTED NEIGHBORHOODS** • **AGRICULTURAL DAMAGED AREA IN SQ KM** • **DAMAGE 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

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

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UNOSAT United Nations Satellite Centre

34°30'E

31°30'N

INSET
Rafah city, Rafah Governorate
15 October 2023

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06 July 2024

© 2024 MAXAR

Armistice Demarcation Line
International boundary
Governorate boundary
Damage density
Sparse
Dense

Spatial Reference
Name: WGS 1984 UTM Zone 36N
PCS: WGS 1984 UTM Zone 36N
GCS: GCS WGS 1984
Datum: WGS 1984

Satellite Imagery : WorldView-3
Imagery Date: 06.07.2024
Resolution: 30 cm
Copyright: © Maxar 2024
Source: Department of State, HIU

Boundaries: OCHA oPt
Analysis: UNOSAT
Product: UNOSAT

N

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

34°30'E

OCCUPIED PALESTINIAN TERRITORY

NIGHTLIGHT ANALYSIS

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

11 OCT 2023

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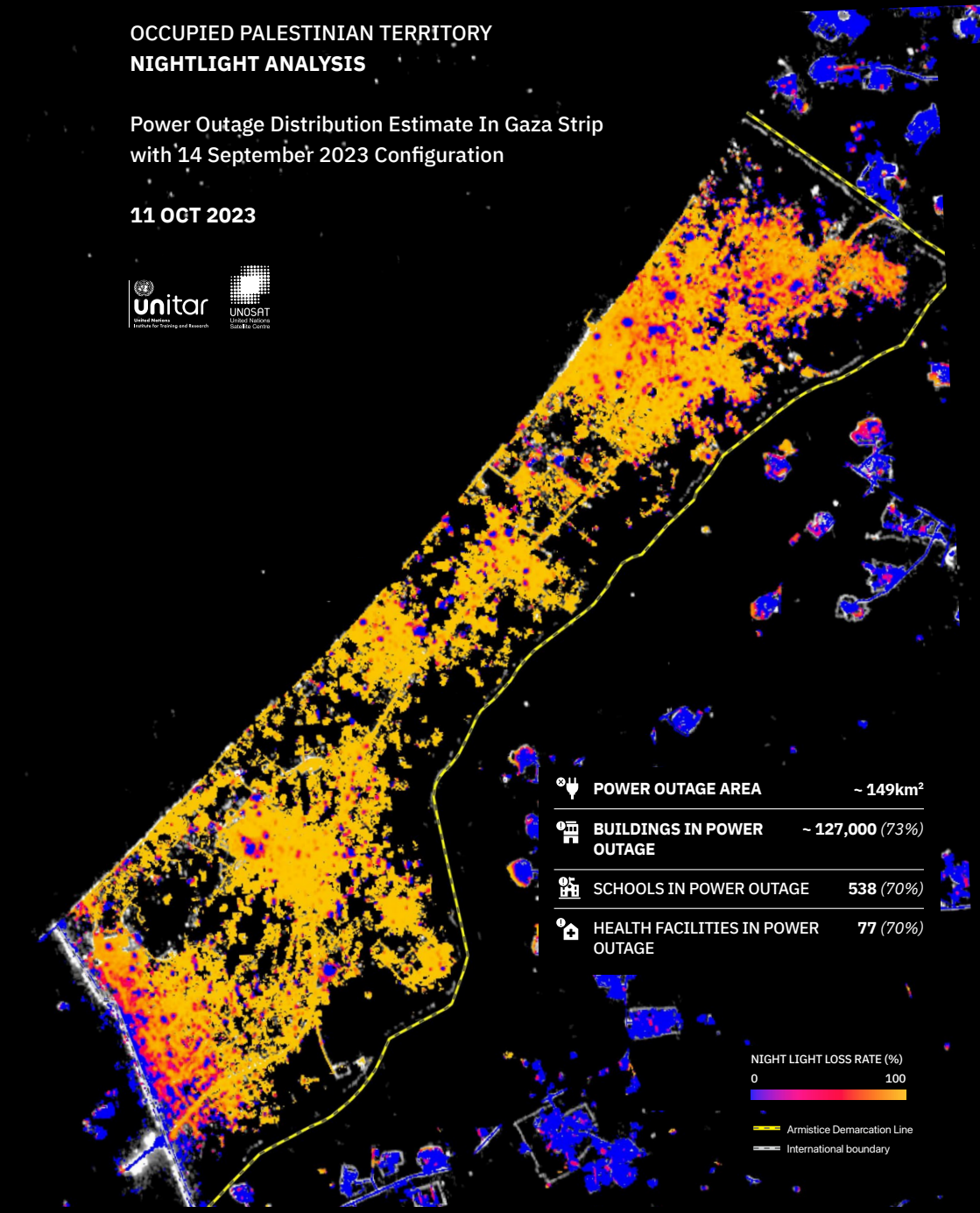


Satellite Data : Yangwang-1 Space Telescope night-time data
Imagery Date : 11 October 2023 & 12 October 2023 & 14 October 2023 & 19 October 2023 & 21 October 2023
Resolution: 40 m
Copyright : Origin Space Co., Ltd., China
Source : Origin Space Co., Ltd., China

Satellite Data : SDGSAT-1
Imagery Date : 14 September 2023 & 17 October 2023
Resolution : 40 m
Copyright : International Research Center of Big Data for Sustainable Development Goals (CBAS)
Source : International Research Center of Big Data for Sustainable Development Goals (CBAS)

6 km

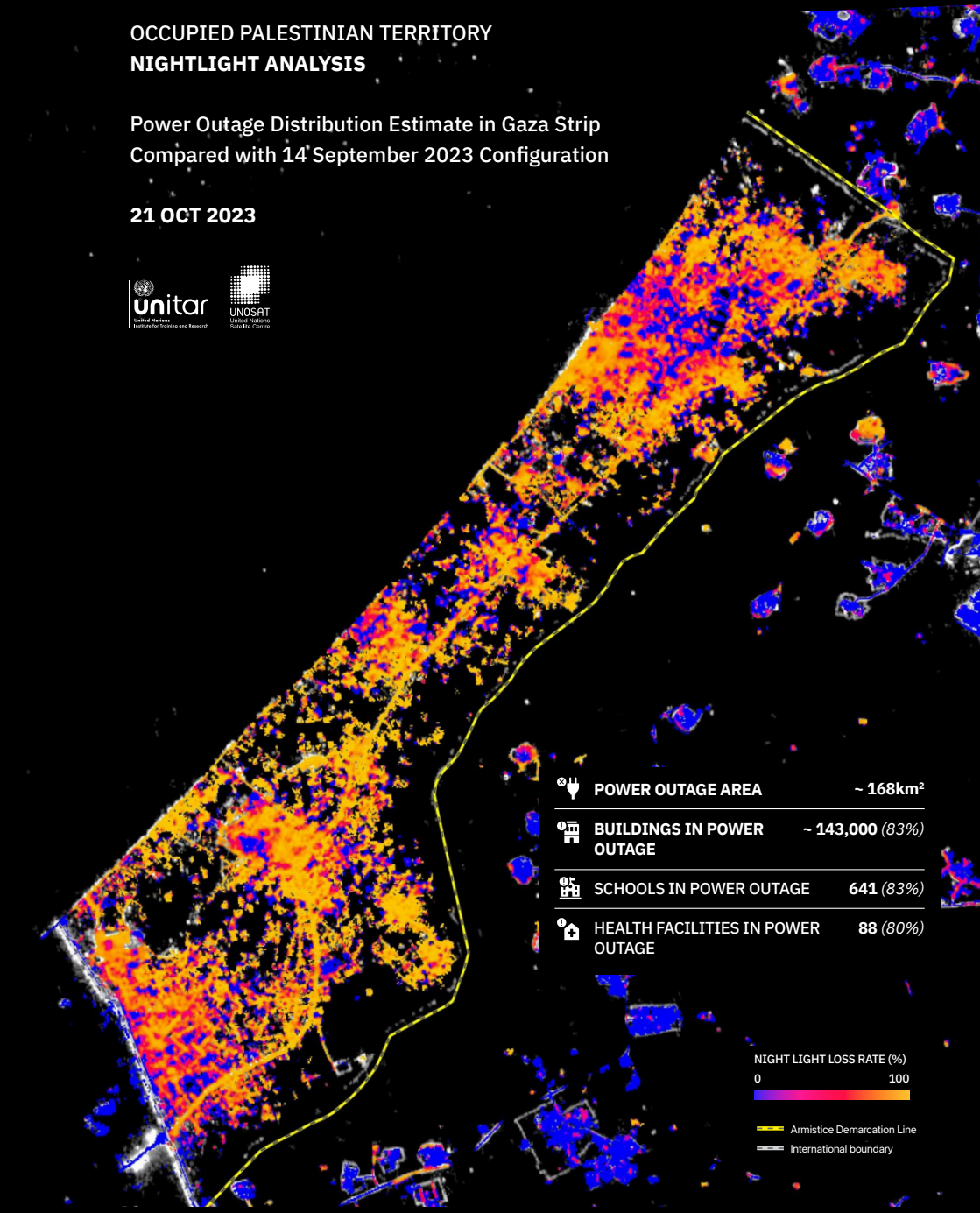
N

OCCUPIED PALESTINIAN TERRITORY

NIGHTLIGHT ANALYSIS

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

21 OCT 2023



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Imagery Date : 14 September 2023 & 17 October 2023
Resolution : 40 m
Copyright : International Research Center of Big Data for Sustainable Development Goals (CBAS)
Source : International Research Center of Big Data for Sustainable Development Goals (CBAS)

6 km

N

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

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. As explained by Abuqubu, ***"If the level of destruction is over 60 or 70 per cent, we could easily estimate the percentage of those people who have already left."*** 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 observed that, ***"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."***

2. IMPROVED COORDINATION AND PLANNING

UNOSAT's analysis of affected road sections was instrumental in OCHA OPT's field visit preparations. Abuqubu specified that, ***"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 Gaza-Rafah Governorate 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 noted,

OCCUPIED PALESTINIAN TERRITORY

COMPREHENSIVE ROAD DAMAGE ASSESSMENT, GAZA STRIP

Imagery Analysis: 29 May 2024

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United Nations Satellite Centre

34°30'E

31°30'N

INSET
Salah Al Deen Road, Gaza Governorate.
15 Oct 2023

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29 May 2024

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Road Damage Assessment
- Destroyed
- Severely affected
- Moderately affected
- No visible damage
- Armistice Demarcation Line
- International boundary
- Governorate boundary

Spatial Reference
Name: WGS 1984 UTM Zone 36N
PCS: WGS 1984 UTM Zone 36N
GCS: GCS WGS 1984
Datum: WGS 1984

Satellite Imagery : WorldView-3
Imagery Date: 6 July 2024
Resolution: 30 cm
Copyright: © Maxar 2024
Source: Department of State, HIU

Boundaries: OCHA oPt
Analysis: UNOSAT
Product: UNOSAT

N

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

34°30'E

"We were able to show the new entry points and the logistical facility using satellite images." The temporal analysis of humanitarian aid channels 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 Occupied Palestine Territory. According to the Appeal Plan, around 3.3 million people in OPT 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, 48 per cent of the Plan is funded, amounting 1.6 billion USD. This funding is sourced from various donors, with contributions from the Government of United Arab Emirates, European Commission, Government of Germany and the Government of Japan, collectively contributing 55 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. (Figure 2)

FIGURE 2: ESCALATION OF HOSTILITIES IN THE OPT FLASH APPEAL 2024

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

$3.4B

TOTAL REQUIREMENTS (US$)

	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	$297.6M

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

CLUSTER	FUNDING REQUIREMENTS	TARGETED PEOPLE
FOOD SECURITY	930.4M	2.6M
SHELTER AND NON-FOOD ITEMS	525.2M	1.5M
HEALTH	510.6M	2.9M
WATER, SANITATION AND HYGIENE	378.2M	3.0M
MULTI-PURPOSE CASH ASSISTANCE	293.4M	1.4M
COORDINATION AND SUPPORT SERVICES	196.0M	-
PROTECTION INCLUDING AORS	188.6M	2.6M
EDUCATION	175.5M	0.8M
NUTRITION	159.9M	1.2M
SITE MANAGEMENT	39.7M	1.0M
LOGISTICS	23.2M	-
EMERGENCY TELECOMMUNICATION	2.2M	-

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

4. REINFORCED SYNERGIES AND COORDINATION AMONG HUMANITARIAN ACTORS

To improve coordination, a centralized data hub was established for Information Management (IM) officers to share information with cluster coordinators, information managers, and the civil-military coordination team, enabling access to 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 that provides access to UNOSAT's geospatial data for the Gaza Strip. It features interactive dashboards that show damage assessments. The available data includes UNOSAT's analysis products, such as assessments of building and road damage, cropland analyses, and additional layers showing locations of healthcare facilities and schools

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 could not 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

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