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United Nations Institute for Training and Research

UNOSAT Satellite Imagery and GIS Solutions for DRR and Emergency Management

Francesco Pisano
Director, Research, Technology Applications & Knowledge Systems

January 2013

About UNOSAT

- UNOSAT is the Operational Satellite Applications Programme of UNITAR – entirely dedicated to researching and applying solutions in geospatial information, satellite data/imagery analysis, and integrated systems (GIS, navigation, geopositioning)
- Launched in 2000 as a project, it has evolved into a mature UN service with global outreach supported by a network of partners worldwide
- UNOSAT means over 1500 maps/analyses since 2000, taskings in over 260 emergencies & conflicts; professional training; research & methodology

UNOSAT - AREAS OF OUTPUT

Humanitarian Aid and Relief Coordination

- Crisis & Situational Mapping
- Damage assessment

Human Security

Monitoring

Human Rights

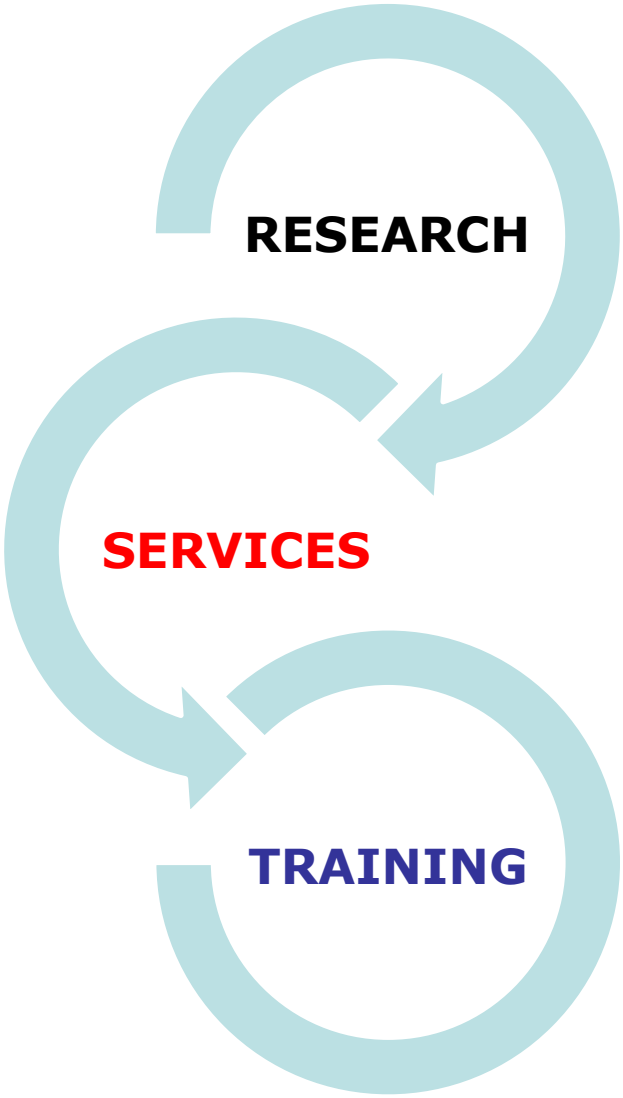
Safety and Security

Territorial Planning and Monitoring

Capacity Development & Technical Assistance

In-country project development

WHAT WE DO



How does UNOSAT make use of satellites?

1. Activation / Request

2. Satellites collect data over area of interest

3. UNOSAT Staff analyze satellite data

4. UNOSAT Staff Produce maps, reports & databases for field workers, practitioners in training sessions

Caprivi, Namibia

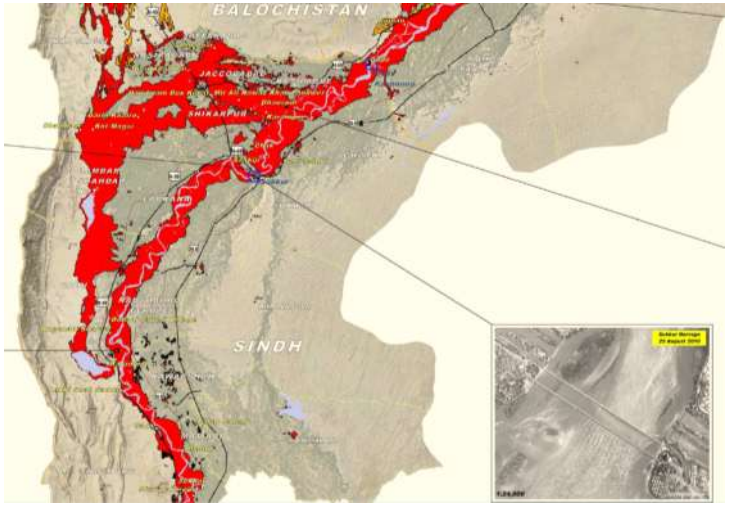
Port-Au-Prince, Haiti

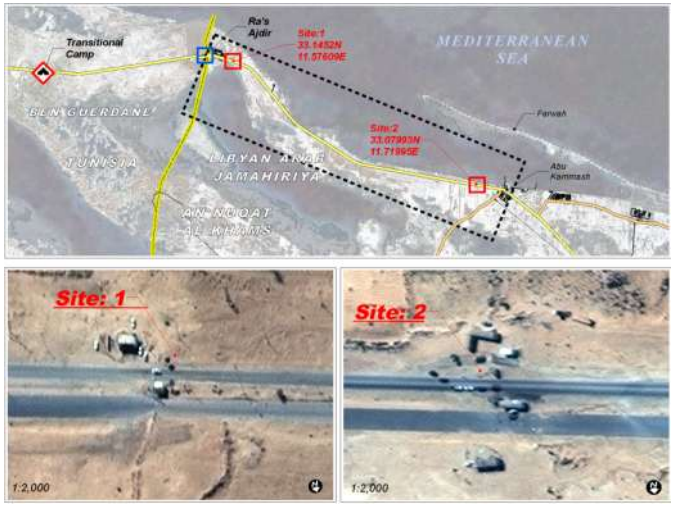
Bihar, India

Mogadishu, Somalia

SATELLITE IMAGERY

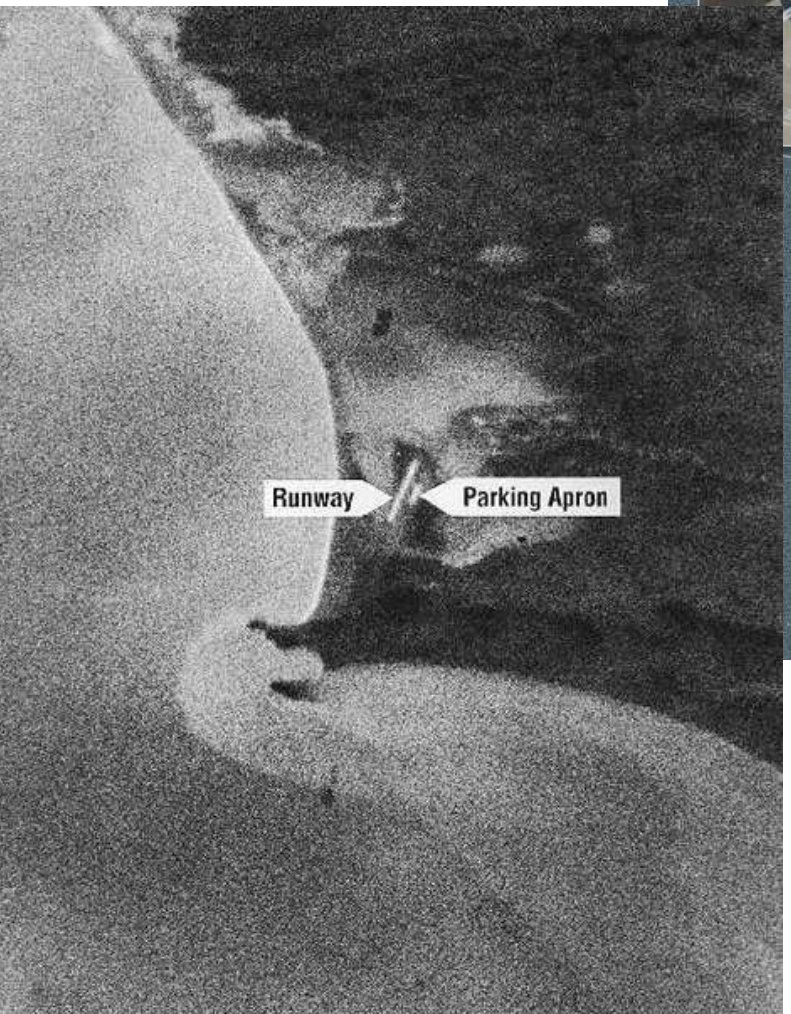
SATELLITE BASED ANALYSIS





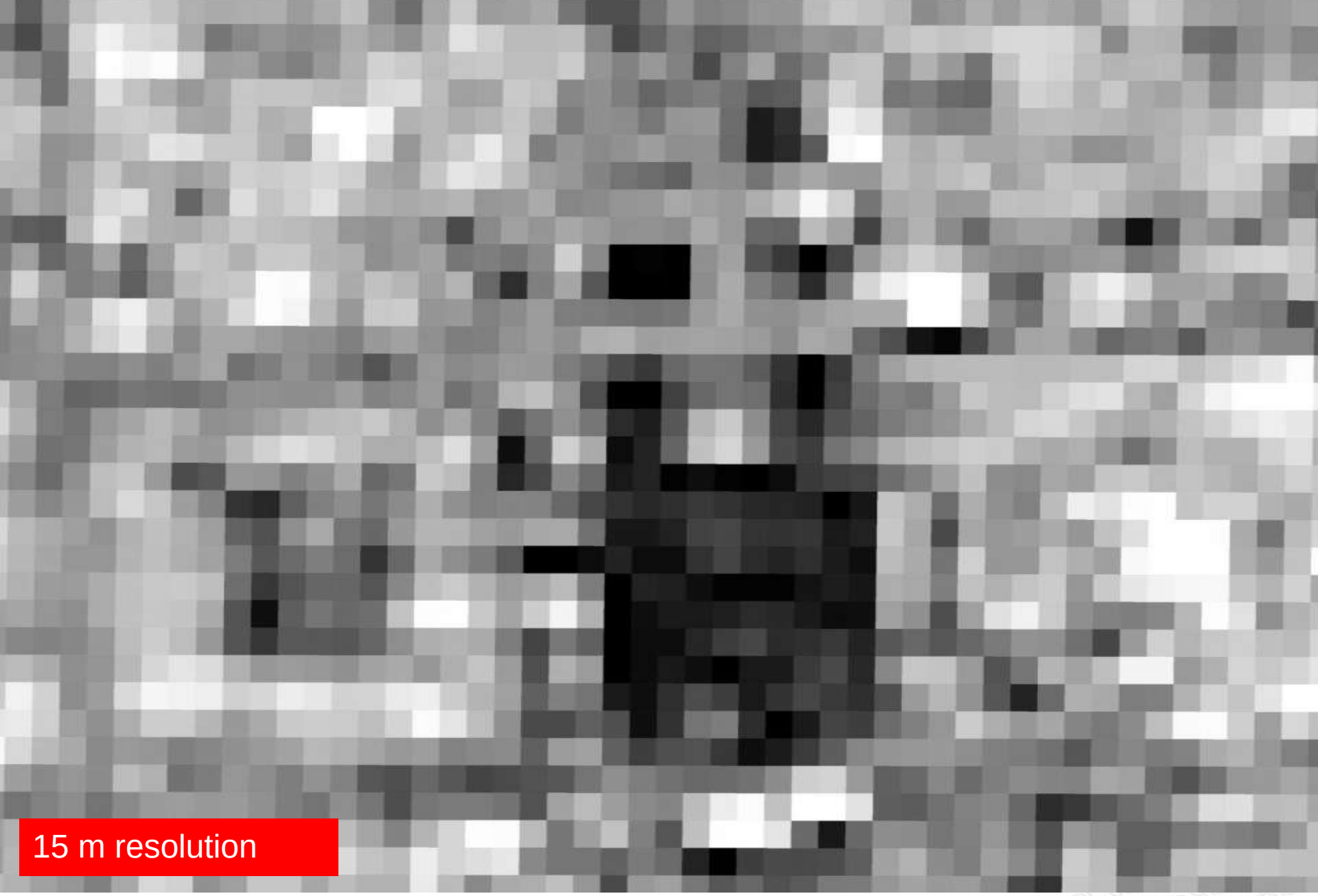
THE POWER OF IMAGERY

1960 (Corona)



SAME LOCATION, 2010, Commercial (GeoEye-1)


0.6 m resolution


15 m resolution

Satellites frequently used by UNOSAT

Satellite	Resolution (m)	Bands	Swath width (km)
GeoEye-1	0.5 (pan), 2 (MS)	Panchromatic + MultiSpectral	15
QuickBird	0.6 (pan), 2.4 (MS)	Panchromatic + MultiSpectral	16
WorldView-1	0.5 (pan)	Panchromatic	16
WorldView-2	0.5 (pan), 2 (MS)	Panchromatic + MultiSpectral	16
Pleiades-1	0.5 (pan), 2 (MS)	Panchromatic + MultiSpectral	20
Ikonos	1 (pan), 4 (MS)	Panchromatic + MultiSpectral	11
TerraSAR-X	1-18	X-band radar	5 - 150
COSMO-SkyMed	1-100	X-band radar	10-200
Radarsat-1	8-100	C-band radar	50-500
Radarsat-2	3-100	C-band radar	18-500
ENVISAT ASAR	12.5-150	C-band radar	58-110
ERS-2 SAR	30	C-band radar	100
SPOT 5	2.5 (pan), 10 (MS)	Panchromatic + MultiSpectral	60
SPOT 4	10 (pan), 20 (MS)	Panchromatic + MultiSpectral	60
SPOT 3	10 (pan), 20 (MS)	Panchromatic + MultiSpectral	60
SPOT 2	10 (pan), 20 (MS)	Panchromatic + MultiSpectral	60
SPOT 1	10 (pan), 20 (MS)	Panchromatic + MultiSpectral	60
EROS A	1.9 (pan)	Panchromatic	14
EROS B	0.7 (pan)	Panchromatic	14
Landsat ETM+	8 (pan), 30 (MS) 60 (IR thermal)	Panchromatic + MultiSpectral	180
IRS-P5 (Cartosat-1)	2.5 (pan)	Panchromatic	30
Cartosat-2	1 (pan)	Panchromatic	10
Resourcesat-1	5.8 (pan), 23 (MS), 60 (MS)	Panchromatic + MultiSpectral	70-740
EO-1 ALI	10 (pan), 30 (MS)	Panchromatic + MultiSpectral	37
RapidEye	5 (MS)	Multispectral	77
DMC constellation	2.5 (pan), 22 (MS)	Panchromatic + MultiSpectral	80-660
Kompsat-2	1 (pan), 4 (MS)	Panchromatic + MultiSpectral	15
FORMOSAT-2	2 (pan), 8 (MS)	Panchromatic + MultiSpectral	24

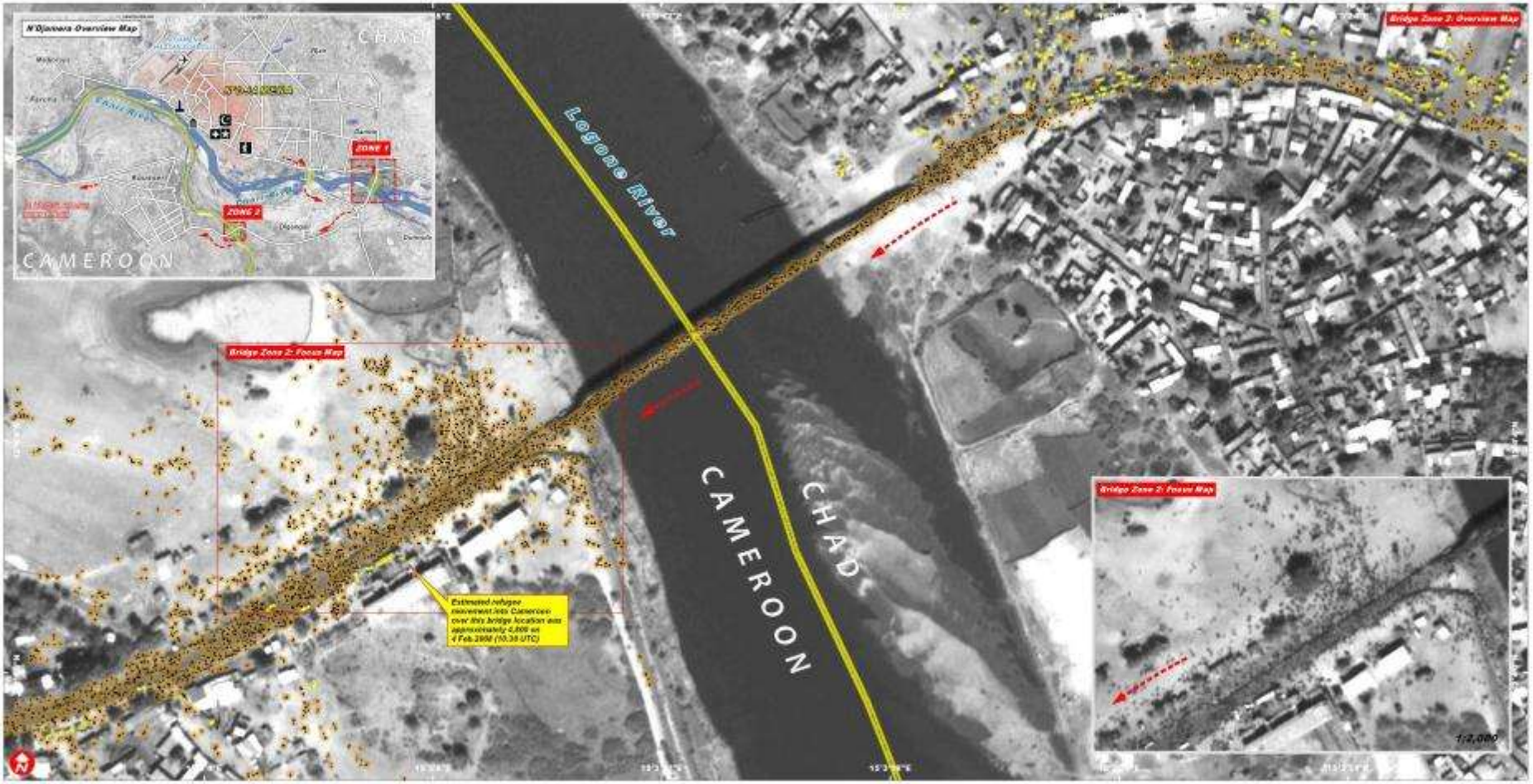
ESTIMATED CIVILIAN POPULATION MOVEMENT FROM N'DJAMENA, CHAD (BRIDGE ZONE 2) ON 4 FEBRUARY 2008

This map presents a satellite-derived estimation of the number of civilians leaving the capital of N'Djamena towards Kousseri, Cameroon on Monday, 4 February 2008. This estimate is based on an crowd density analysis of a WorldView-1 satellite image acquired at a spatial resolution of 50 cm. The resulting estimate of 15,000 people represents only pedestrians at two bridge locations at approximately 10:30 UTC and does not reflect those who crossed earlier or later in the day. This is a preliminary estimate, and has not yet been validated in the field.

Population Analysis with WorldView-1 Satellite Imagery
Recorded on 4 February 2008
(approximately 10:30 UTC)

Security Event

27 February 2008
Version 1.0
Glide No:
CE-2008-000029-TCD



Legend

(Main Overview Map)
- Presidential Palace
- Grand Market
- Main Mosque
- Main Hospital
- National Stadium
- Airport
- National Park / Natural Monument
- Place De Liberte
- Direction of Civilian Movement
- International Border
- Major Road
- Airport Runway
- Population Analysis Extent
- Main Zone of Conflict
- Main Civilian Evacuation Route
- River / Lake

POPULATION ESTIMATE ANALYSIS (4 FEBRUARY 2008)

(For Map Zones 1 & 2)
- Satellite-Detected Vehicles
- Satellite-Detected Locations of Civilians Leaving the Capital

PLACE NAMES
- CAMEROON — Country
- Chari-Baguirmi — Region
- HASSAN DJAMOUS — Airport
- N'DJAMENA — Capital
- Kousséri — Town
- Logone River — River

Map Scale for A3: 1:2,000 (Overview Map)

Meters 0 12.5 25 50 75 100

Satellite Data	WorldView-1
Image Resolution	50 cm (Panchromatic)
Image Date	4 February 2008
Image Time	Approximately 10:30 UTC
Image Copyright	Digital Globe 2008
Population Analysis	UNOSAT
GIS Data	USGS, NGA, UNJLC, SALB
Road Data	Vectorized from Google Earth
Map Production	UNOSAT (27 February 2008)
Projection	UTM Zone 33 North
Datum	WGS 1984

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Overview of Ra's Ajdir, Libya-Tunisia Border Crossing today: 03 March 2011 - 11:26 AM Local

Civil Conflict

Production Date: 03/03/2011
GLIDE Code: OT-2011-000025-LBY
UNOSAT Activation: CE20110220LBY

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Map Scale for A4: 1:10,000

Note: Map has been rotated 175 degrees from North to improve image visualization

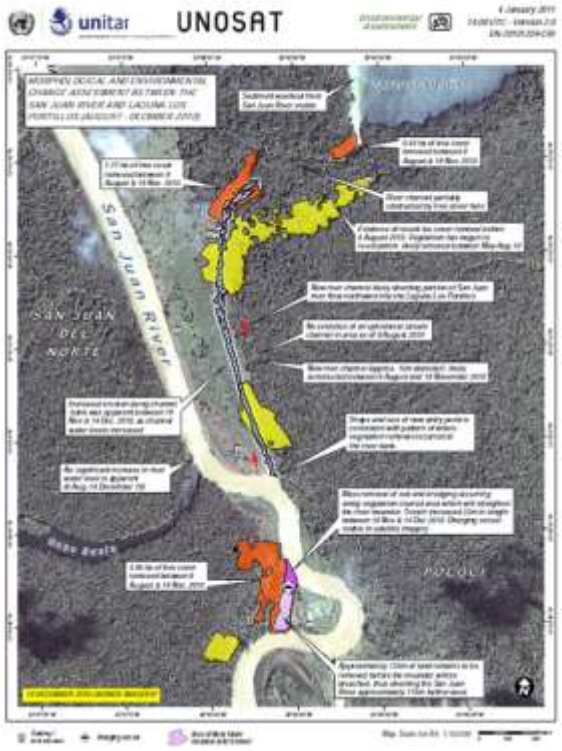
Overview of UAV Benefits – Why in-situ remote sensing is the next phase for field data collection

What are the main strengths of UAVs vs. satellites:

1. ***(Almost) Weather Independent:*** UAVs fly below clouds
2. ***Super High Resolution:*** UAVs can acquire imagery at an unprecedented spatial resolution of less than 4cm, for true urban-scale mapping
3. ***Frequency and cost:*** small UAVs can be deployed within hours at very low operating cost

GIS

THE POWER OF WHERE

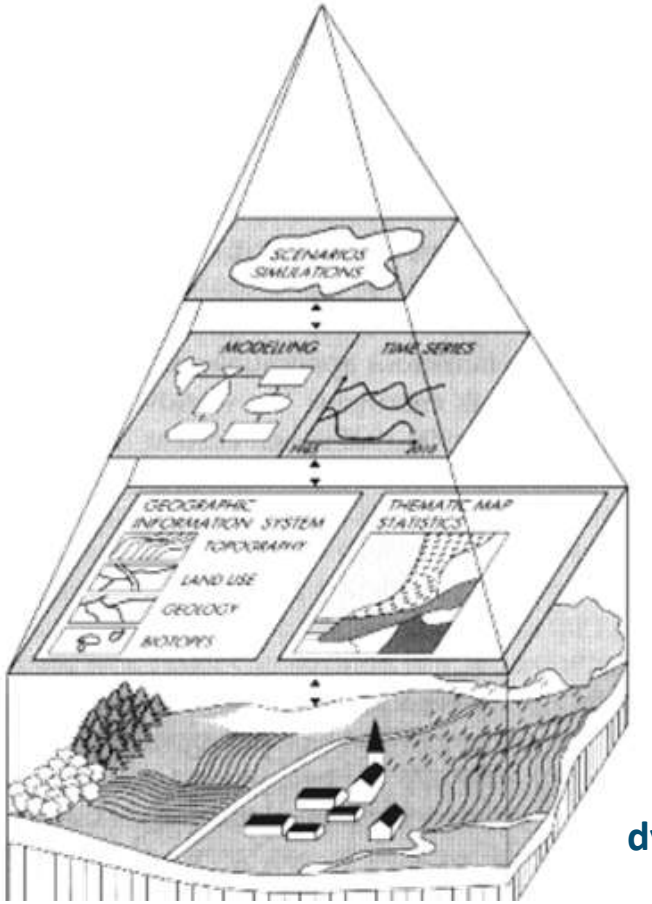


GIS: rendering information in geographic layers

strategic level

data collection and management

real world



decision making

scenario generation

analysis and processing

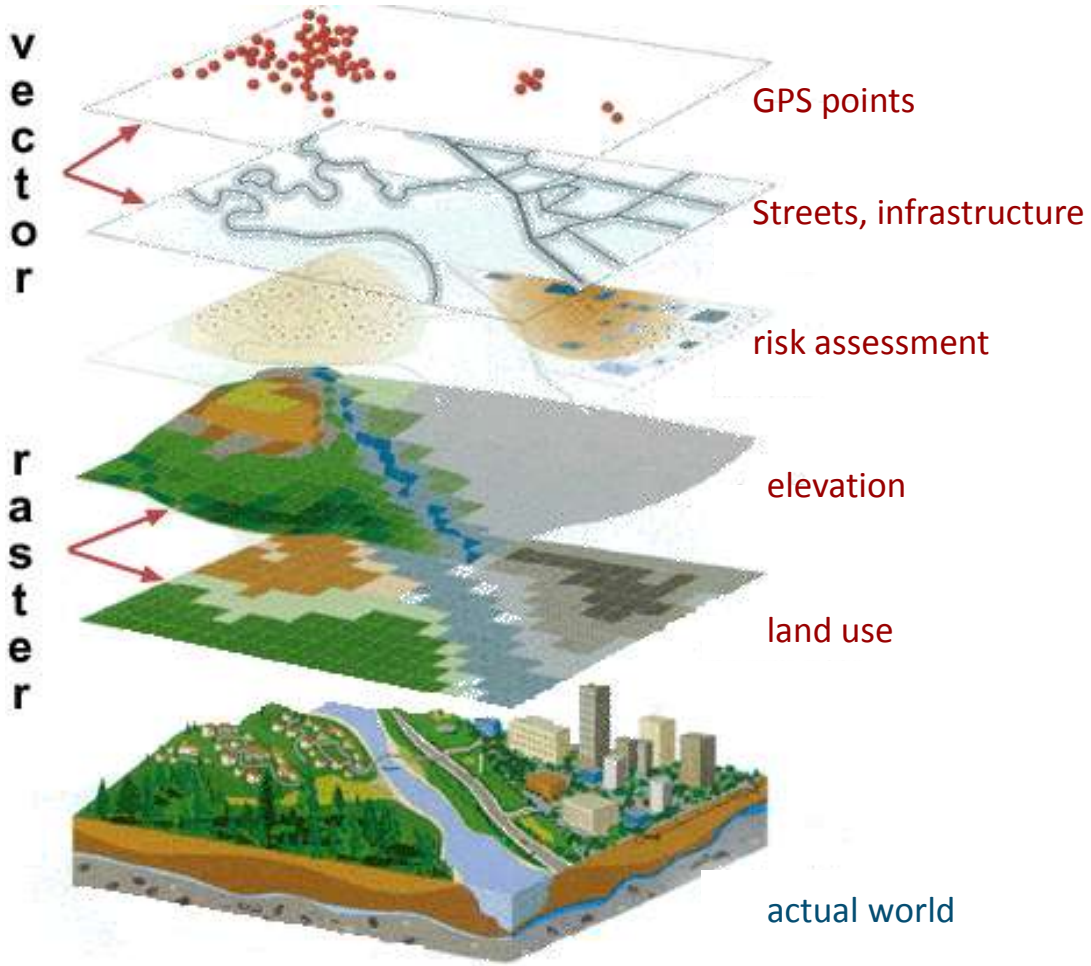
dynamic phenomena and processes

By using a GIS a simplified world can be visualised in a dynamic way to simplify decision making

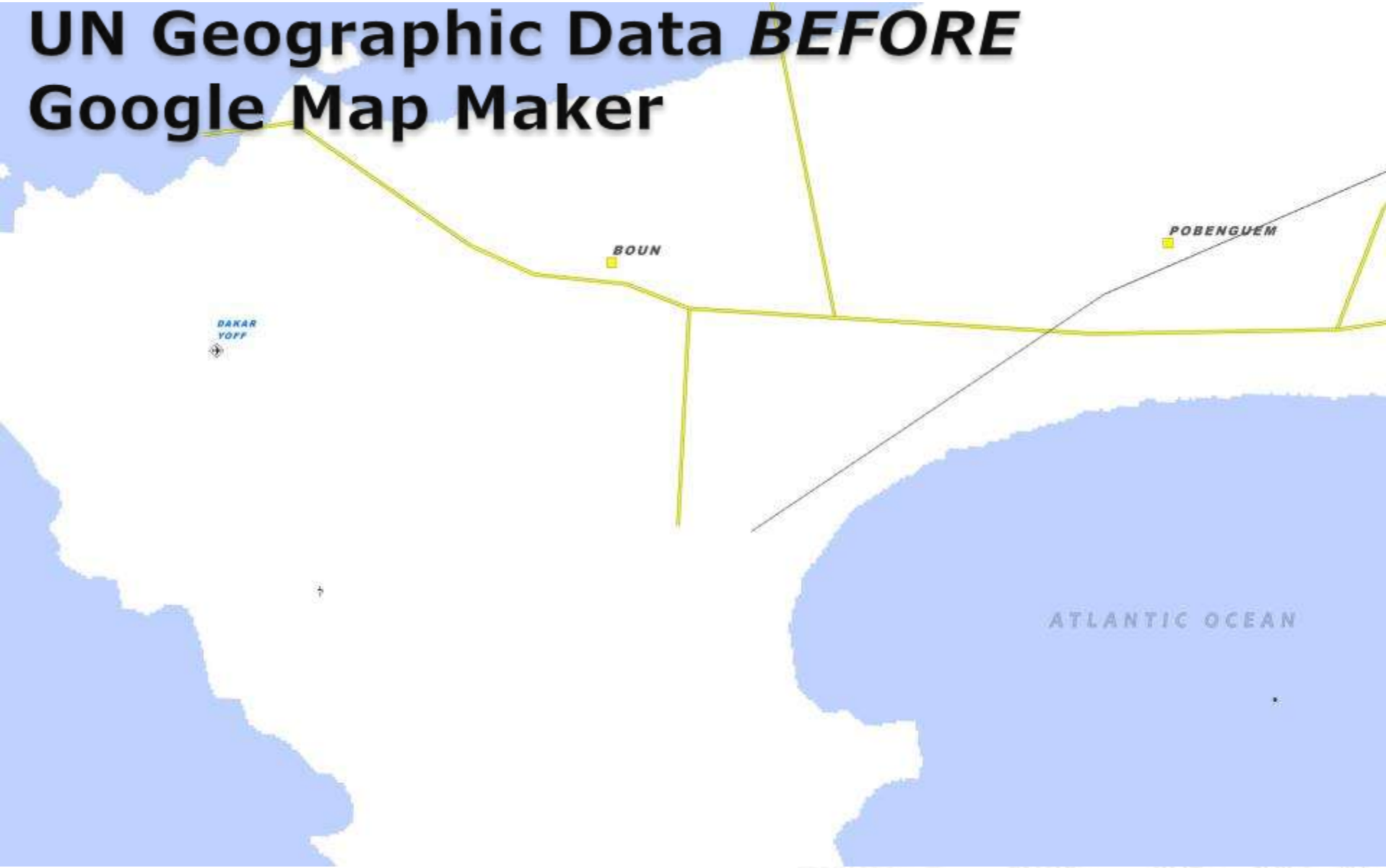
GIS data integration

GIS integrates a variety of data layers (spatial datasets) from different sources and digital formats (e.g. satellite images, topographic maps, spreadsheets, etc.).

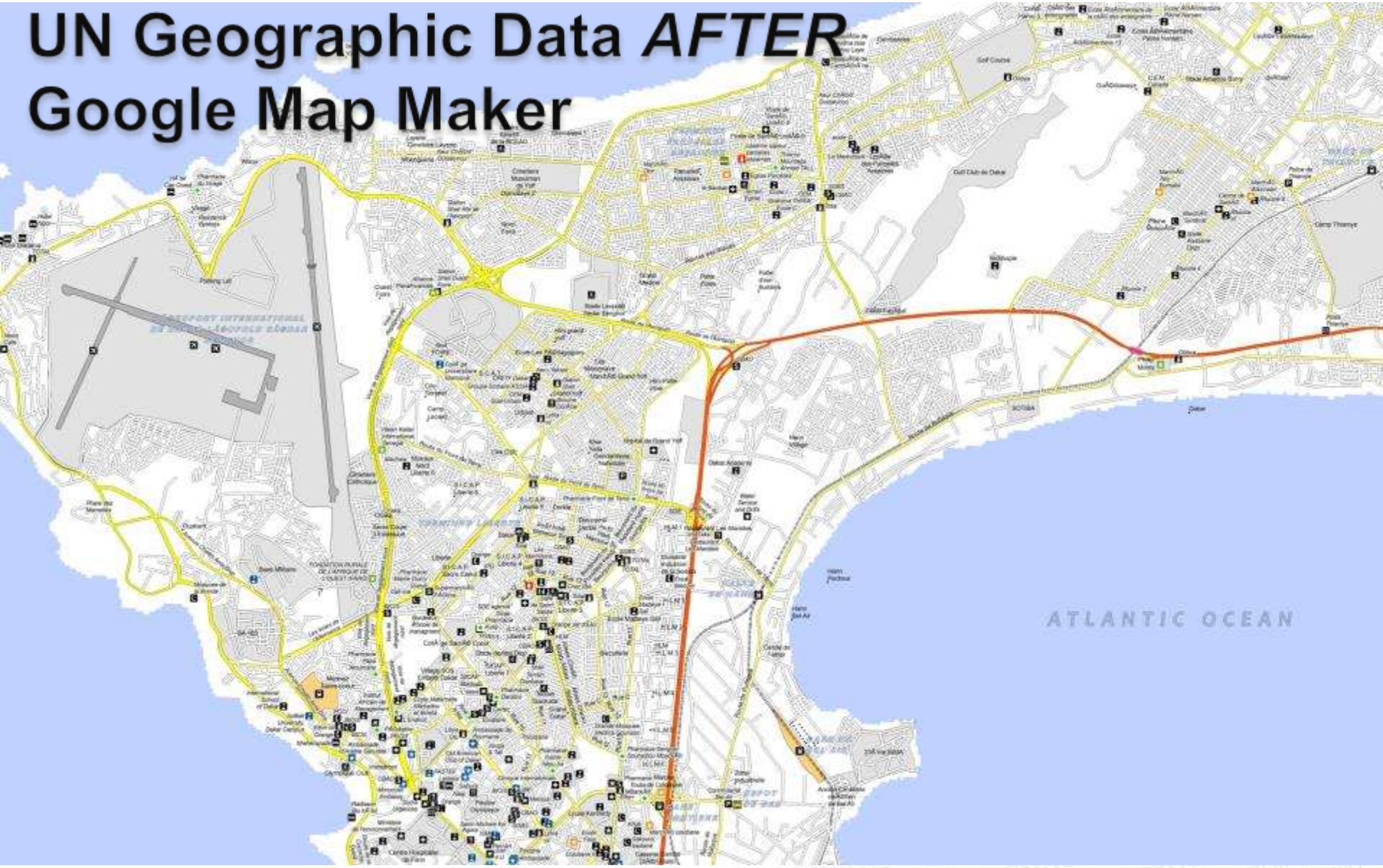
Condition for data integration within a GIS is that all data are geo-referenced in a given coordinate system with a known datum.



UN Geographic Data *BEFORE* Google Map Maker



UN Geographic Data *AFTER* Google Map Maker

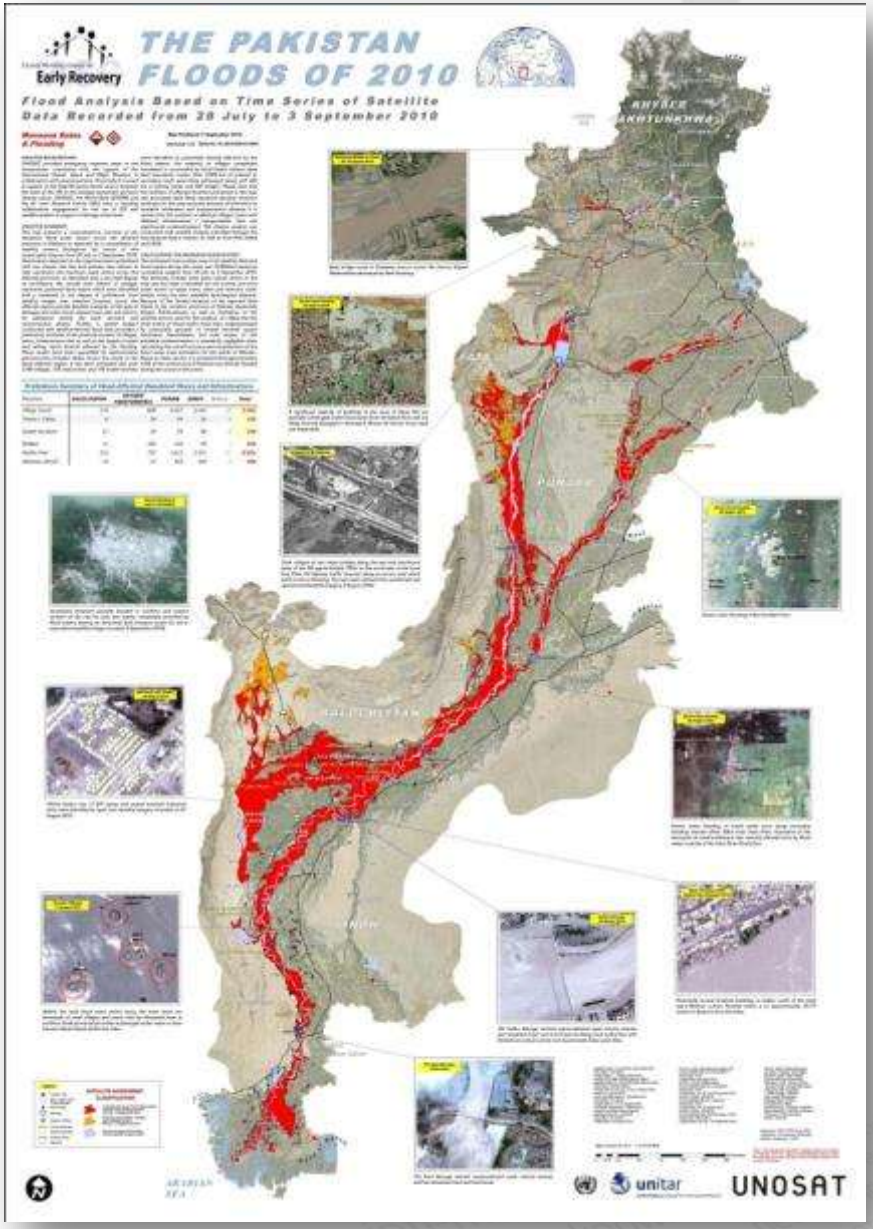


- **Volunteers & Participatory Mapping**

RAPID MAPPING

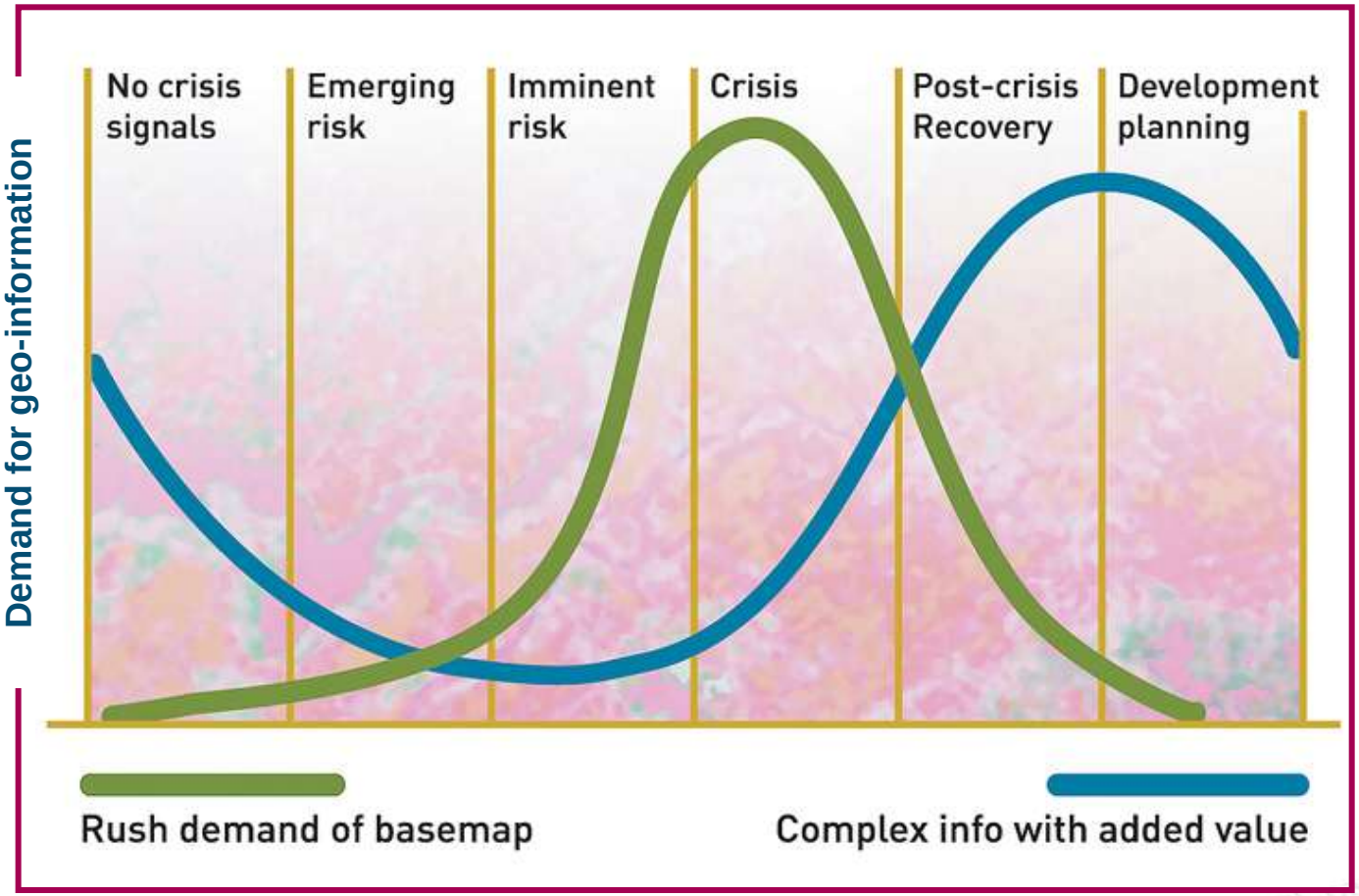
for

EMERGENCY MANAGEMENT




KEY
Emergency or Disaster
Media Focus
Risk Assessment
Mitigation/Prevention
Preparedness
Warning/Evacuation
Saving People
Providing Immediate Assistance
Assessing Damage
Ongoing Assistance
Restoration of Infrastructural Services
Reconstruction (Resettlement/Relocation)
Economic & Social Recovery
Ongoing Development Activities
Risk Assesment Mitigation/Prevention
PRE-DISASTER
RESPONSE
POST-DISASTER

UNOSAT integrated response model for humanitarian relief and development

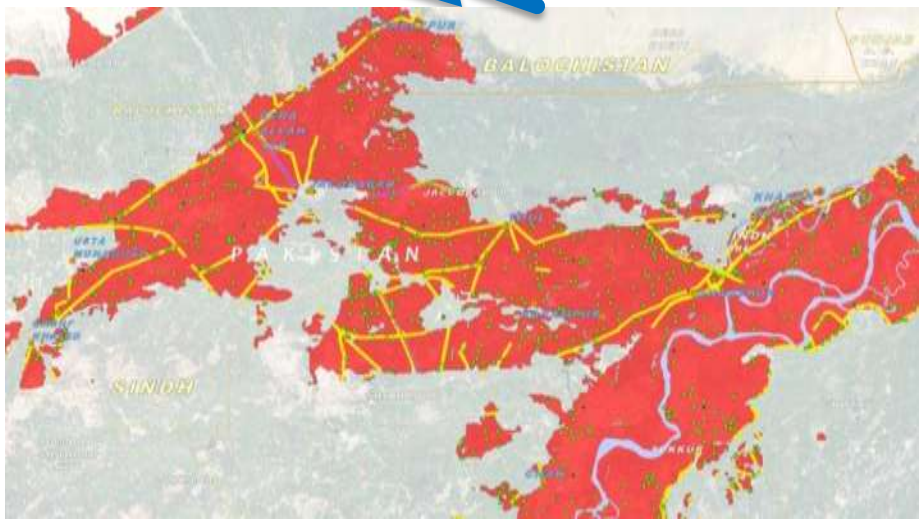


Baseline geographic data + satellite analysis

Google Map Maker Data for Pakistan

+

UNOSAT Flood extent analysis



Impact: Detailed and comprehensive preliminary damage analysis, monitoring, into DRR

OVERVIEW OF WILDFIRES IN NORTHERN ALGERIA

Analysis with DMCii Data Acquired 22 August 2012

This map illustrates satellite-detected areas of wildfires, in the northern provinces of Algeria, from DMCii imagery taken 22 August 2012. Starting in June 2012 numerous wildfires have burned pine and oak forests within northern Algeria, likely resulting from a heat wave. The wildfire burn scars cover and approximate area of 1,524 square km. Subset one details satellite detected fire scars south of Blinda city and north of Medea city. Subset two details fire scars detected north of Setif city. This is a preliminary analysis & has not yet been validated in the field. Please send ground feedback to UNITAR /

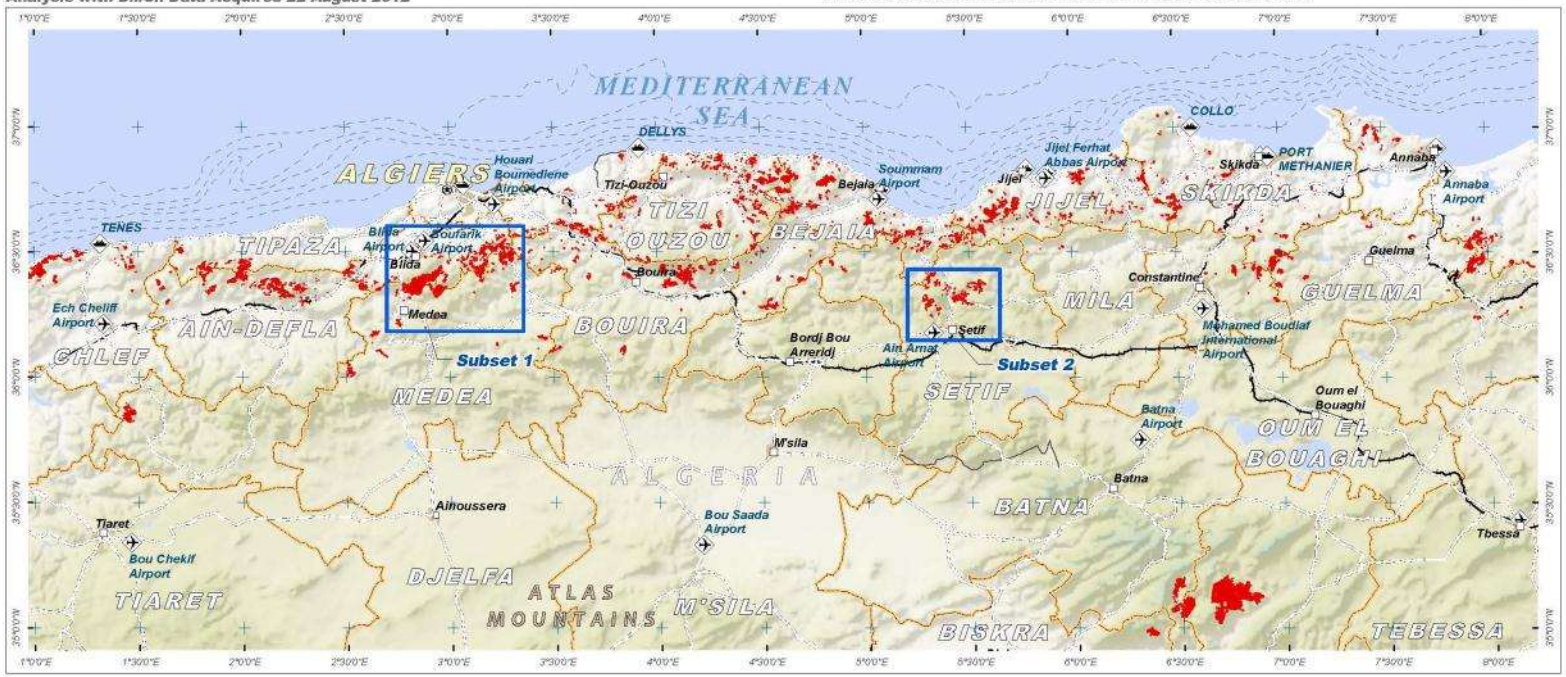
Disaster coverage by the International Charter 'Space and Major Disasters'. For more information on the Charter, which is about assisting the disaster relief organizations with multi-satellite data and information, visit www.disasterscharter.org

Wild Fires

Production Date: 21/09/2012

Version 1.0

Activation Number: FR-2012-0816-DZA



LEGEND

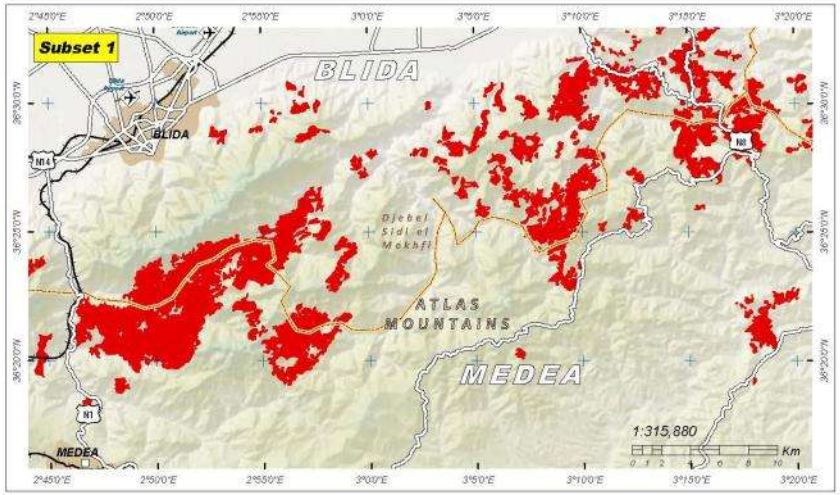
- Fire Scar Extent
- Urban Area
- Capital
- City/Town
- Airport
- Port
- Province Boundary
- Primary Road
- Secondary Road
- Railroad

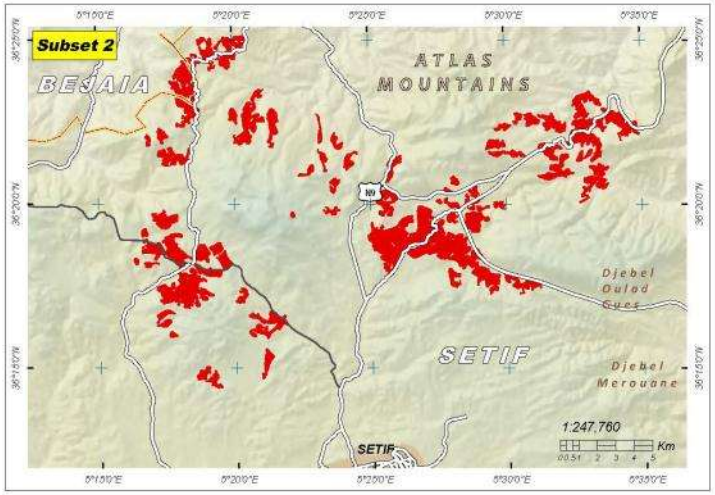
Map Scale for A3: 1:1,946,960

0 5 10 20 30 40 50 Km

Satellite Data: DMCii
Imagery Dates: 22 August 2012
Resolution: 22m
Source: DMCii
Road Data : Google Map Maker / OSM / ESRI
Other Data: USGS, UNCS, NASA, NGA
Analysis : UNITAR / UNOSAT
Production: UNITAR / UNOSAT
Analysis conducted with ArcGIS v10.1

Coordinate System: World Robinson
Projection: Robinson
Datum: WGS 1984
Units: Meter





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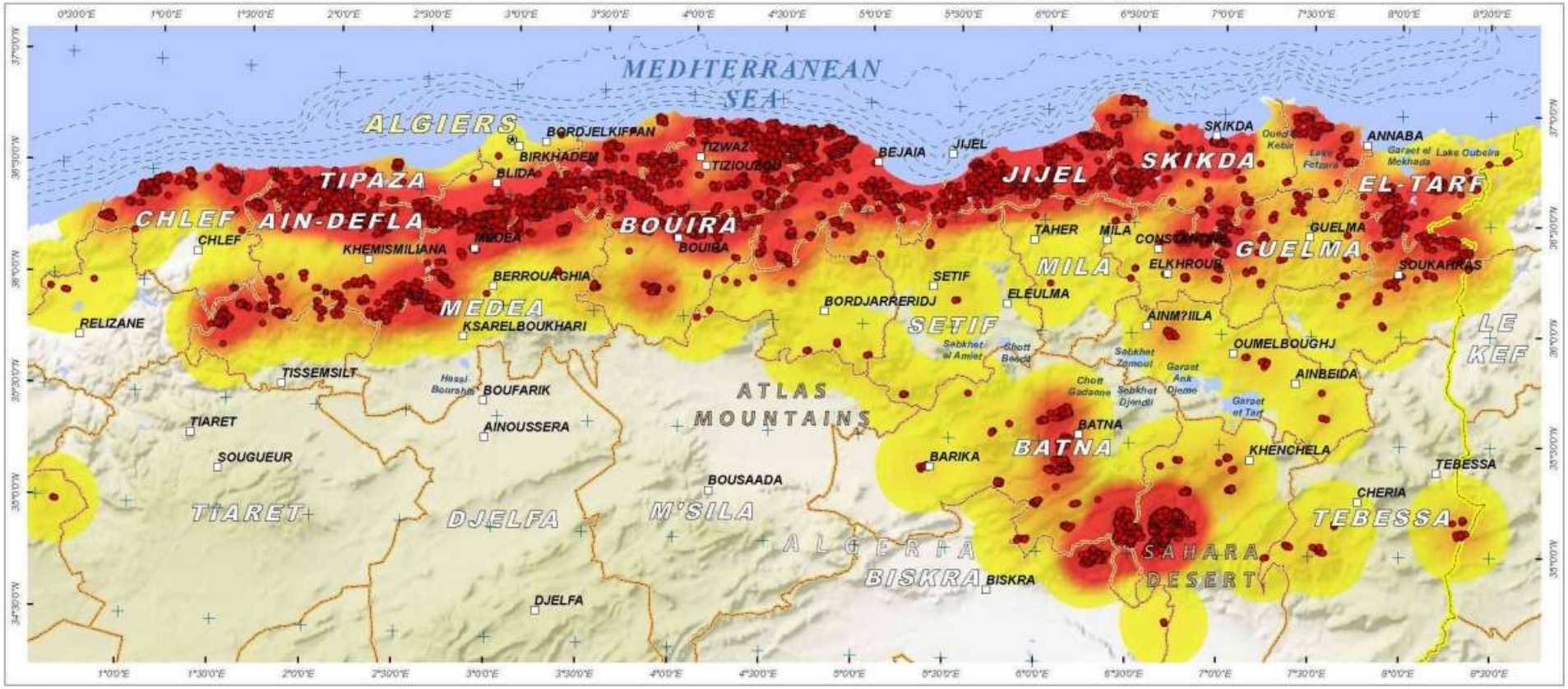
DENSITY OF FIRE EVENTS IN NORTHERN ALGERIA BETWEEN 1 JUNE - 23 AUGUST 2012

Analysis with data collected by the NASA Moderate Resolution Imaging Spectroradiometer, accessed via NASA FIRMS

This map illustrates satellite-detected fire detections, collected by the NASA Moderate Resolution Imaging Spectroradiometer and accessed via NASA FIRMS, from 1 June - 23 August 2012 and historical fire detections from 1 January 2000 - 23 August 2012. The graph on the left represents a complete history of MODIS fire detections from an aggregate of the Charter AOI, summarized by daily total fire detections during 1 January 2000 - 23 August 2012. The graph on the right represents MODIS fire detections from the Charter AOI summarized by daily total fire detections since 1 June - 23 August 2012. This is a preliminary analysis & has not yet been validated in the field. Please send ground feedback to UNITAR / UNOSAT.

Disaster coverage by the International Charter 'Space and Major Disasters'. For more information on the Charter, which is about assisting the disaster relief organizations with multi-satellite data and information, visit www.disastercharter.org



OVERVIEW OF FLOOD WATERS, N'DJAMENA, CHAD

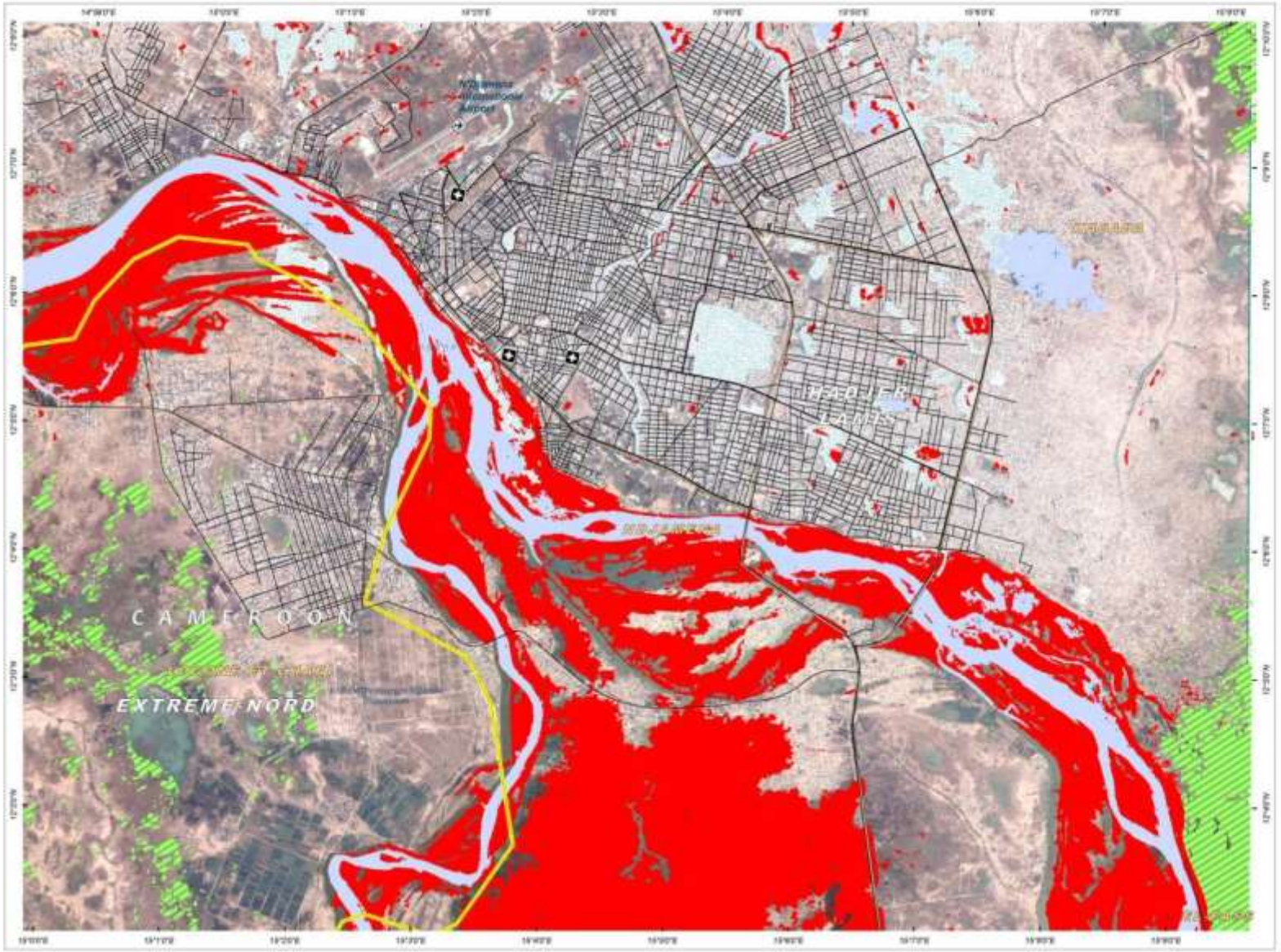
Analysis with KOMPSAT Data Acquired on 14 October 2012 & AVNIR-2 Data Acquired on 24 January 2010

This map illustrates satellite-detected standing flood waters over affected districts in N'Djamena, Chad. Eastern and southern parts of the country have been hit by floods caused by heavy rains.
It is likely that flood waters have been systematically underestimated along highly vegetated areas along main river banks, and within built-up urban areas because of the special characteristics of the satellite data used. This analysis has not yet been validated in the field. Please send ground feedback to UNITAR/UNOSAT.

Disaster coverage by the International Charter 'Space and Major Disasters'. For more information on the Charter, which is about assisting the disaster relief organizations with multi-satellite data and information, visit www.disasterscharter.org

Flooding

Production Date: 15/10/2012
Version 1.0
Activation Number: FL10102012TCD



LEGEND

- Health facility
- Road
- Main Airport
- International Border

FLOOD WATER EXTENT ANALYSIS
(Satellite-Based Classification)

- Pre-crisis water extent
- Probable standing flood water
- Wet agricultural land/soil moisture
- Flood-risk area

Map Scale for A3: 1:55,000

Map frame rotated 348 degrees from North

Satellite Data (1): AVNIR-2
Imagery Date: 24/01/2010
Resolution: 10m
Copyright: JAXA
Source: JAXA
Satellite Data (2): KOMPSAT
Imagery Date: 14/10/2012
Resolution: 6m
Copyright: KARI
Source: KARI
Road Data: Google Map Maker / OSM / ESRI
Other Data: USGS, UNCS, NASA, AGA, IGN
Analysis: UNITAR / UNOSAT
Production: UNITAR / UNOSAT
Analysis conducted with ArcGIS v10 & v10.1

Coordinate System: WGS 1984 UTM Zone 33N
Projection: Transverse Mercator
Datum: WGS 1984
Units: Meter

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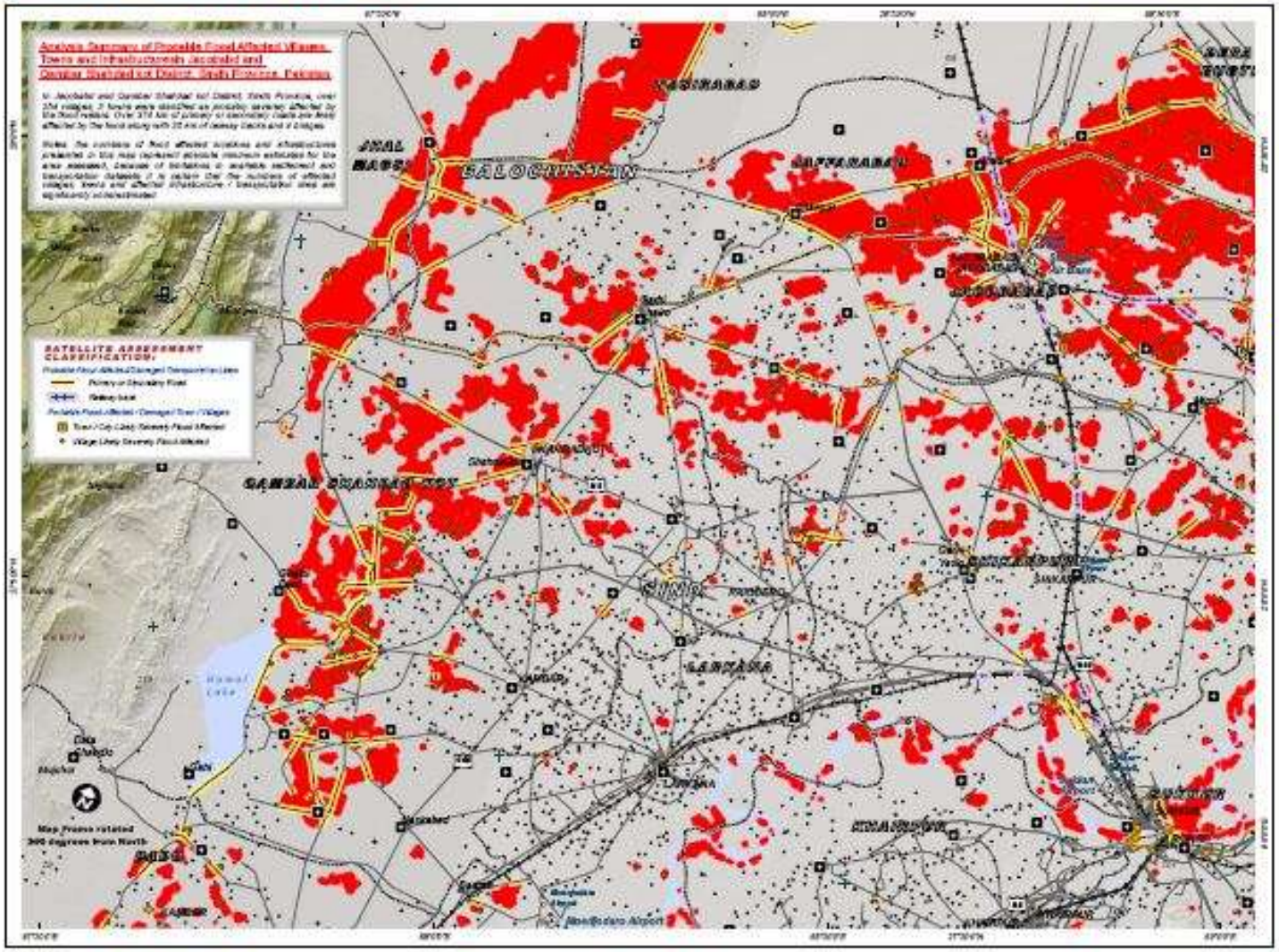
OVERVIEW OF FLOOD WATERS IN JACOBABD AND QAMBAR SHAHDAD KOT DISTRICT, SINDH PROVINCE,PAKISTAN

Analysis with MODIS Data Acquired on 14 September 2012



Flooding

Production Date: 20/09/2012

Version 1.0

Activation Number: FL20120918PAK

LEGEND

FLOOD WATER EXTENT ANALYSIS

Map Scale for A3: 1:500,000

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UPDATE 2: FLOOD WATER OUTFLOW FROM INDUS NEAR SUKKUR BARRAGE ENTERING BALOCHISTAN PROVINCE, PAKISTAN

Flood Analysis Based on Satellite Data Recorded on 18 August 2010

ANALYSIS SUMMARY: Flood waters have continued to rapidly advance southwest into Balochistan Province as part of the massive outflow from the Indus River caused by a ruptured canal breach on 6-8 August 2010, south of Sukkur barrage. South Province. Between 4 and 18 August, this outflow body of water has advanced over 120km from the original flooded, as are additional road and rail

Disaster coverage by the International Charter 'Space and Major Disasters'. For more information on the Charter, which is about assisting the disaster relief organizations with useful satellite data and information, visit www.disastercharter.org

Monsoon Rains & Flooding

18 August 2010

Version 3.0

Glide No: FL-2010-000141-PAK

This map presents an updated flow series analysis of the dramatic expansion of flood water outflow from the Indus River immediately south of the city of Sukkur, Sindh Province, Pakistan covering the period from 6 to 18 August 2010. This analysis is based on post-disaster satellite imagery collected by Radarsat-1 on 10 August 2010 and Radarsat-2 data on 18 August 2010. Please note that the numbers of affected locations presented in this map represent minimum estimates because of limitations in satellite coverage and interpretation datasets. It is certain that the numbers of affected villages, towns and affected infrastructure / transportation lines are underestimated. Also note that detected water bodies likely reflect an underestimation of all flood-affected areas within the map extent. This analysis has not yet been validated in the field. Please send ground feedback to UNITAR / UNOSAT.

Legend

- Town / City
- Health Facility
- Airport / Airfield
- Train station
- Barrage
- Bridge
- Hydrodam Site
- Province Boundary
- District Boundary
- Tehsil Boundary
- Primary Road
- Secondary Road
- Railroad
- Irrigation Canal

MAP SCALE FOR A3: 1:500,000

0 2.5 5 10 15 20 Kilometers

Cross Satellite Data (1)	RADARSAT-2
Resolution	25 meters
Image Date	6-10 August 2010
Source	MDA Geospatial Services
Cross Satellite Data (2)	RADARSAT-2
Resolution	25 meters
Image Date	5 August 2010
Copyright	Radarsat-2 © MDA 2010
Source	Canadian Space Agency
GIS Data	WSA, DCAR, USGS, CSM
Transport Data	Google Map Maker
Transport Data Copyright	© 2009 Google - Imagery with Google Map Maker
Refugee Data	UNHCR
Hospital Data	WHO
Flood Analysis	UNITAR / UNOSAT
Map Production	UNITAR / UNOSAT
Projection	UTM Zone 42N
Datum	WGS 84

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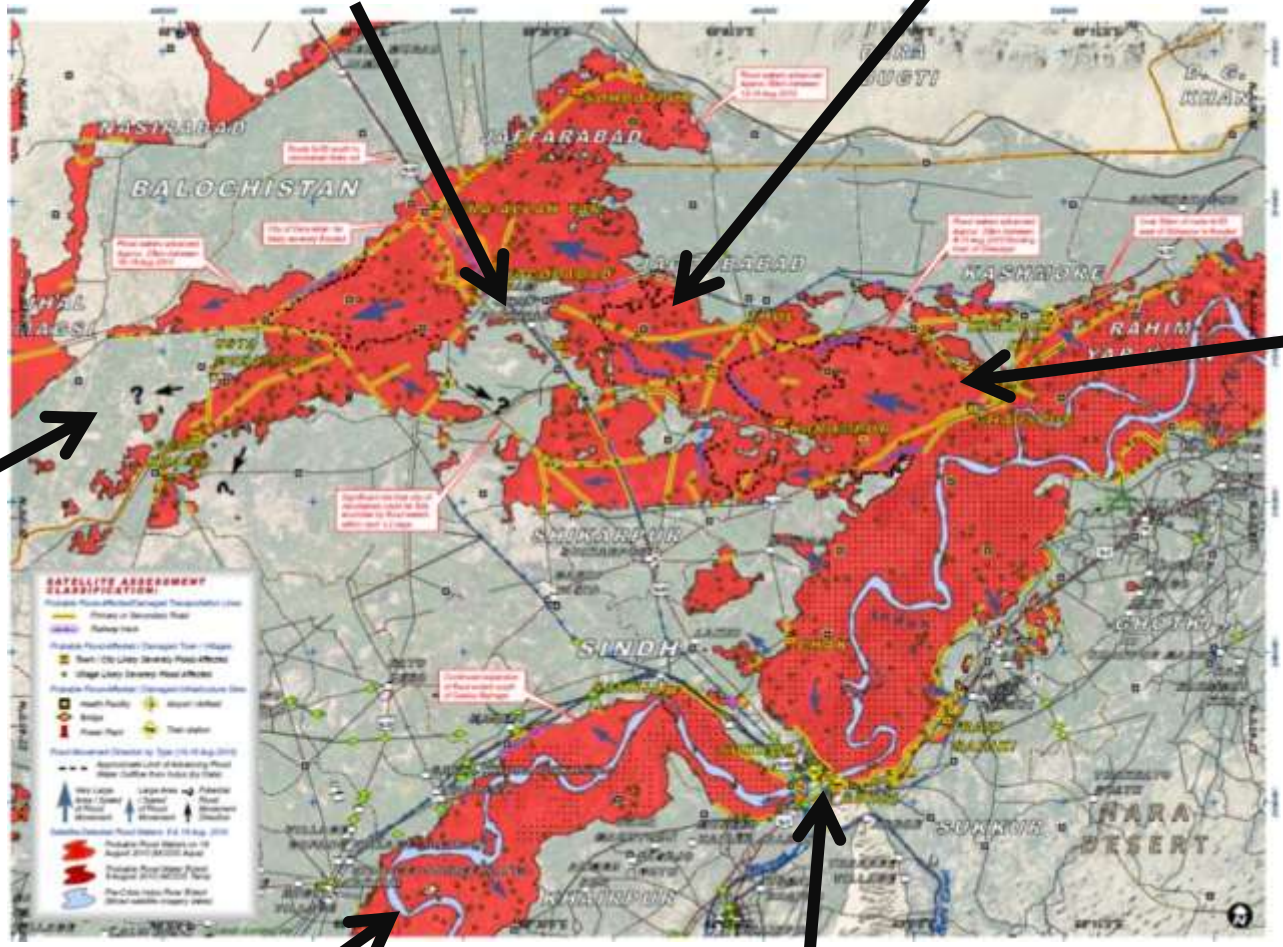
Large Cities like Jacobabad are affected

Progress within 10 days
120 – 150km



Flood prognosis for the next day

Start of Water Overflow

Flooding further downstream

Sukkur Barrage causes retaining water further upstream

SEWAGE TREATMENT PLANT DAMAGE & OUTFLOW DETECTION, AZ ZAITOUN

Damage Analysis with QuickBird Satellite Imagery Recorded 16 January 2009 - Ground Survey Photos by UNEP 30 January 2009

This map illustrates damages to the sewage treatment plant located along Road Number 10, immediately west of az Zaitoun. A single impact crater (occurring sometime before 10 January 2009) to the eastern section of a holding pond (70m x100m) caused a massive outflow of sewage, moving an estimated total distance of 1.2km. The estimated area affected by the outflow is approximately 5.5 ha. An area affected by a suspected secondary flow further west has also been marked as well as damage buildings and impact craters in the region. This analysis has been made with imagery at a reduced spatial resolution of 2 meters. Affected buildings were classified either as destroyed or severely damaged by standard image interpretation methods. Ground survey data and photos provided by UNEP from mission 30 January 2009.

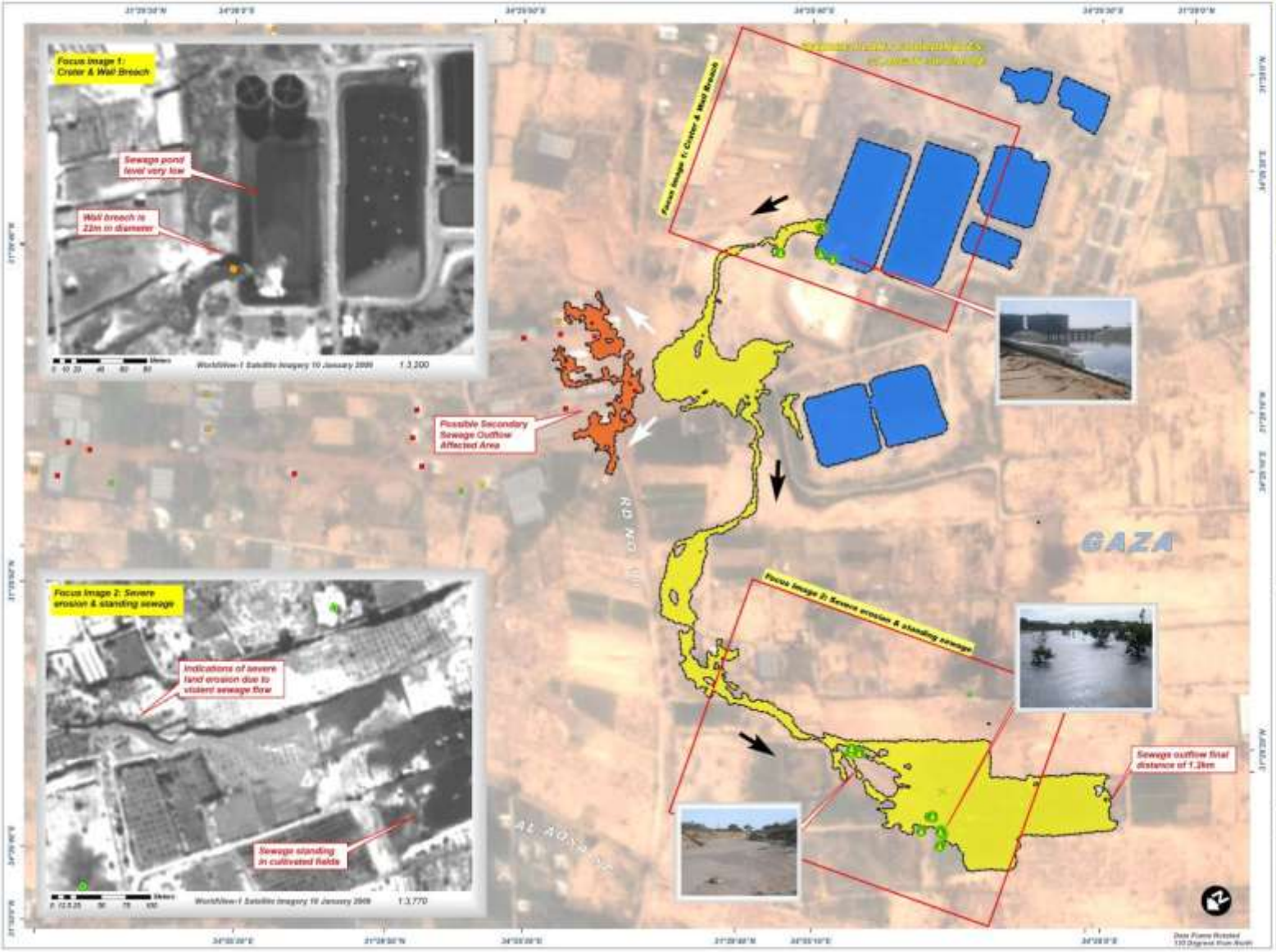
Early Recovery Cluster Network

Security Event

19 February 2009

Version 1.1

UNOSAT-2009-000020



Map Legend

BUILDING SITE DAMAGE ASSESSMENT

- Building Likely Destroyed
- Impact Crater (Road)
- Building Likely Severely Damaged
- Impact Crater (Field)

PLANT DAMAGE ASSESSMENT

- UNEP Ground Survey Site 30 January 2009
- Main Sewage Outflow Direction
- Possible Secondary Sewage Direction
- Sewage Outflow Affected Area
- Contained, Normal Sewage Level
- Possible Secondary Sewage Outflow Affected Area

Map Scale for A3: 1:4,750

Survey Photos	UNEP 30 Jan09
Satellite Image (1)	QuickBird-02
Resolution	2m (Reduced Resolution)
Imagery Dates	16 January 2009
Copyright	Digital Globe (2009)
Satellite Image (2)	Worldview-1
Resolution	2m (Reduced Resolution)
Imagery Copyright	Digital Globe (2009)
Imagery Date	6 & 10 January 2009
Damage Analysis	UNOSAT
GIS Data	UNRWA, OCHA, UNOSAT
Projection	UTM Zone 36 North - WGS84

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satellite solutions for all

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DENSITY OF BRIDGE & ROAD OBSTACLES IN PORT-AU-PRINCE AND CARREFOUR, HAITI (UPDATE 2)

Operational Analysis with GeoEYE-1 Data Acquired 13 January 2010 and QuickBird data aquired 4 March 2008

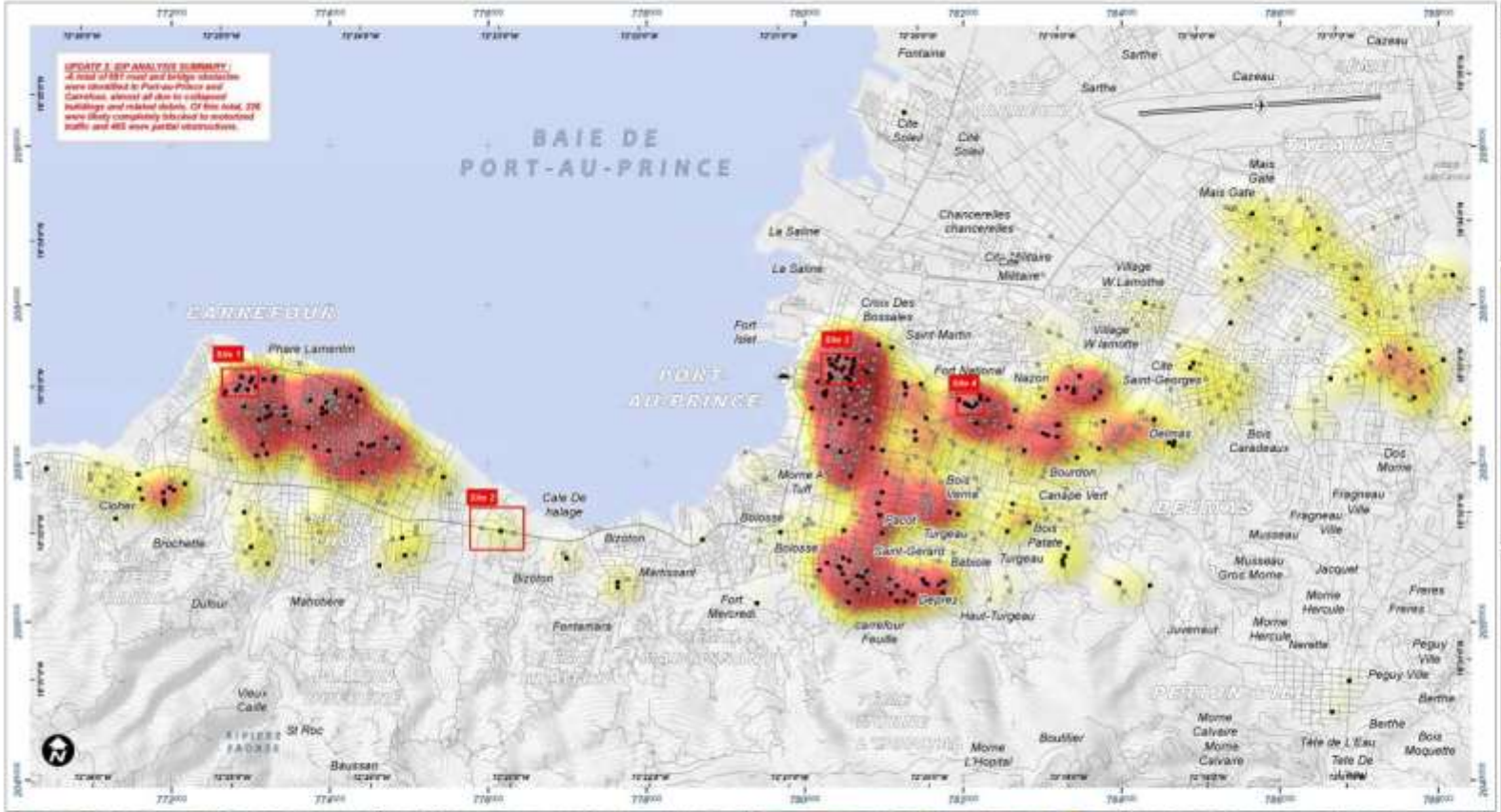
This map illustrates the relative spatial density of major road and bridge obstructions in Port-au-Prince and Carrefour, as identified in satellite imagery recorded on 13 January 2010. A total of 891 obstacles were identified, almost all due to collapsed buildings and related debris, in only a few cases were the obstructions the result of landslides. Of this total, 226 were likely completely blocked to motorized traffic and 465 were partial obstructions restricting vehicle across. Four case examples of specific road obstructions are shown in the imagery. This is a preliminary analysis & has not yet been validated in the field. Please send ground feedback to UNITAR / UNOSAT

Earthquake 7.0M

18 January 2010 (20:00:00 UTC)

Version 2.0

Glide No: EQ-2010-000009-HTI



Legend

Bridge & Road Obstacles (MAIN MAP FRAME)

Probable Operational Status

- Likely Closed by Debris
- Likely Restricted by Debris

Bridge & Road Obstacles (SATELLITE FOCUS MAPS)

Probable Operational Status

- Likely Closed by Debris
- Likely Restricted by Debris

Relative spatial density of major obstacles

Density increases from yellow to red

- Airfield
- Port
- Primary Road
- River
- Secondary / Urban Road
- Railroad

Map Scale for A3: 1:55,000

UTM grid coordinates given in 5km intervals

Elevation contour lines in 50 metre intervals

Background satellite imagery GeoEye-1 13 January 2010

0 250 500 1,000 1,500 2,000 2,500 Meters

Satellite Data (1)	GeoEye-1
Imagery Dates	13 January 2010
Resolution	50cm
Copyright	GeoEye 2009
Satellite Data (2)	QuickBird-2
Imagery Date	4 March 2008
Copyright	DigitalGlobe
Source	Google Earth
Road & Urban Data	Open Street Map
Place Names	Google Map Maker
Other Data	BNGS/SHH, USGS, NGA
Elevation Data	ASTER GDEM
Source	METI & NASA 2009
Analysis	UNITAR / UNOSAT
Map Production	UNITAR / UNOSAT
Projection	UTM Zone 18 North
Datum	WGS-84 (EGM-96)

Map Data © 2009 Google - Improve with Google Map Maker

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MAKING BETTER DECISIONS

GIS to support Strategic territorial planning

Where are things located ?	Where should they be ?	How to move them?

awareness phase		analytical phase	implementation and good governance phase
PREPAREDNES	DIAGNOSTIC	PLANNING	IMPLEMENTATION AND FOLLOW UP
knowledge of the territory (information gathering)	identification and assessment of the current situation and trends (SWOT analysis)	definition of a local development strategy according to the diagnostic plan	implementation and evaluation and monitoring

Geographic Information System

India and WHO polio eradication campaign planning as collaborative approach, Bihar, India.

Satellite imagery provided by UNOSAT through NSPO.

No polio cases since vaccine campaign in Bihar!

Tropical Storm Sendong 2011
ShelterCluster.org

Cagayan de Oro - Satellite assessment map 2/6

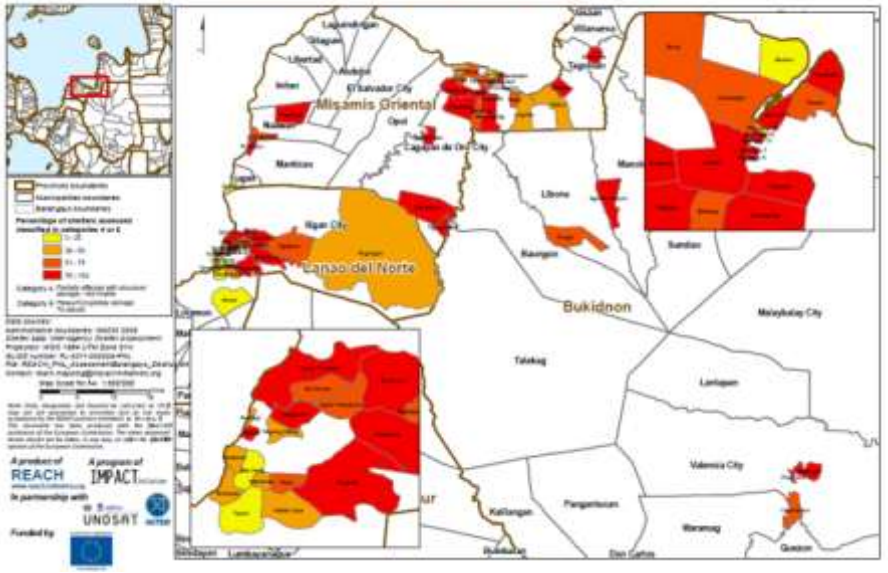
For humanitarian relief purpose only

Production date: 25 january 2012

Tropical Storm Sendong 2011

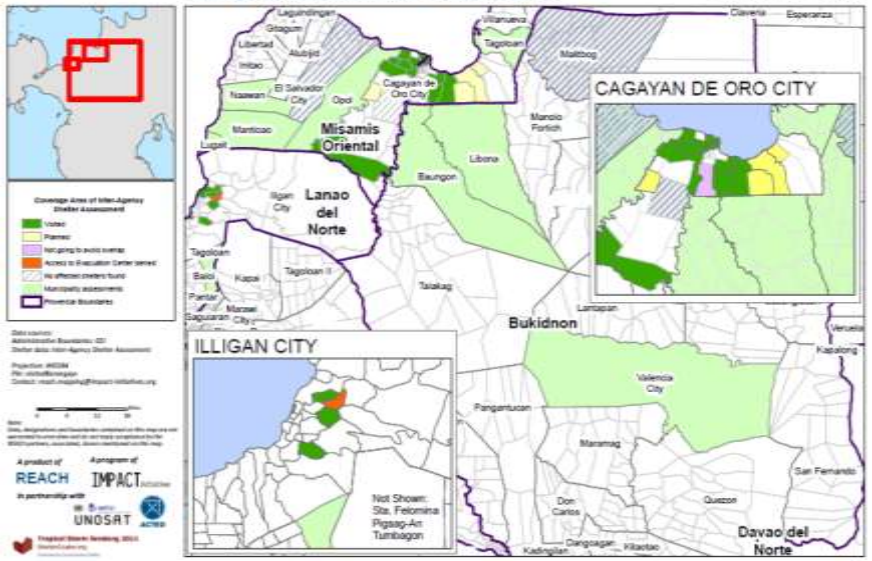
Inter-Agency Shelter Assessment - January 2012
Assessed barangays; percentage of categories 4 and 5

For humanitarian relief purpose only
Production date: 30 January 2012

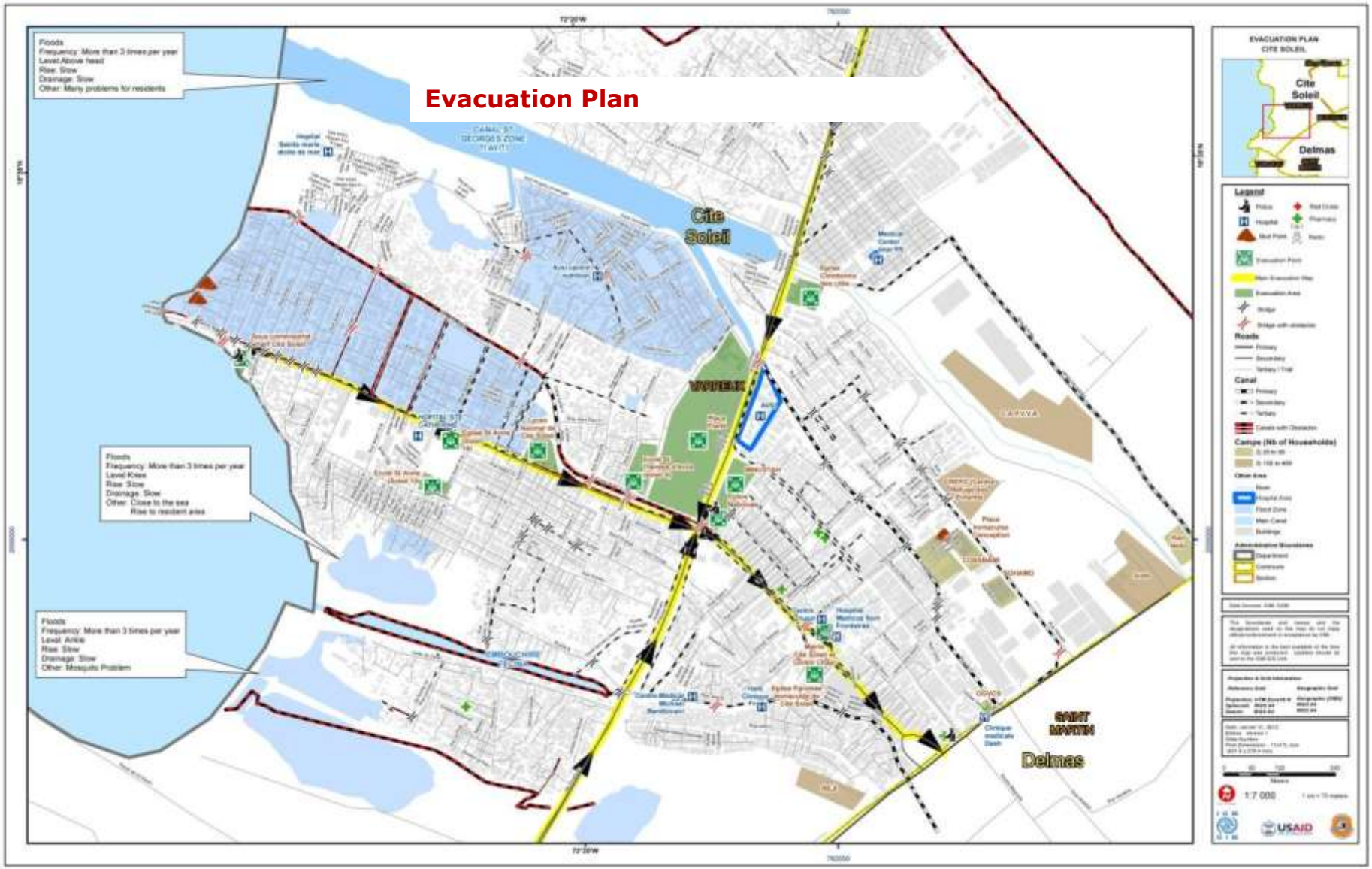


PHILIPPINES - Tropical Storm Washi (Sendong)
Inter-Agency Shelter Assessment - Visited Locations

For humanitarian relief purpose only
Production date: 26 January 2012

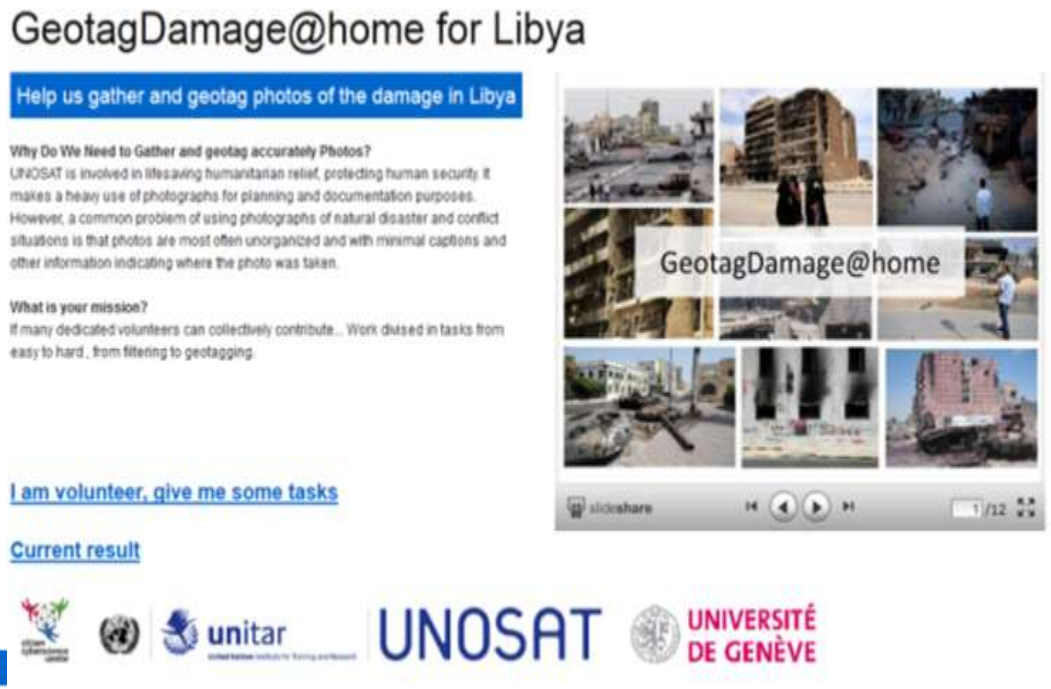


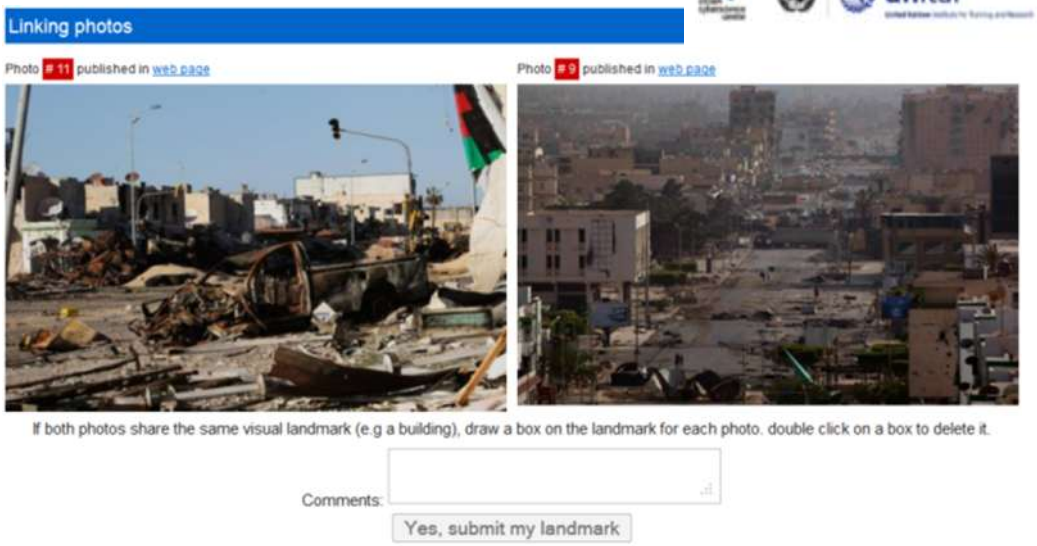
Planning and Risk Reduction maps: Cite Soleil



WORKING WITH PEOPLE

- Social Media
- Crowd Sourcing
- and the power of collaborative thinking





Mapping risks in Schools : UNOSAT & UNICEF + Kids

- Into school curricula
- Mapping school location and relevant school data
- Identifying risk areas for DRR targeted to children

Linking photos

random

Photo # 46

Photo # 53

reviewed by **4 volunteers**
People Uncertainty: **5/10**

A volunteer indicates that both photos have a shared visual landmark (red boxes). Do you agree?

Yes No

Geotagging System

http://cybermappr.unige.ch/geotagging_tasks/178

Most Visited | Getting Started | Latest Headlines

home | tasks | community | larsbromley sign out

Geotag this photo accurately | Next task | Explore photos

Task state: waiting more accurate area Accuracy (?):

Photo # 44

Task: recommend a more accurate area

At this stage of the investigation , **the task is difficult.** We have to recommend a more accurate area than the proposed one. You can also contribute to another task ('next task' button at the top).

I like challenge, let me try

Approved Tripoli street in Misrata (the whole street) Accuracy: AVERAGE

from the web page publishing the photo – 4 days ago

Add a comment | Dividing area

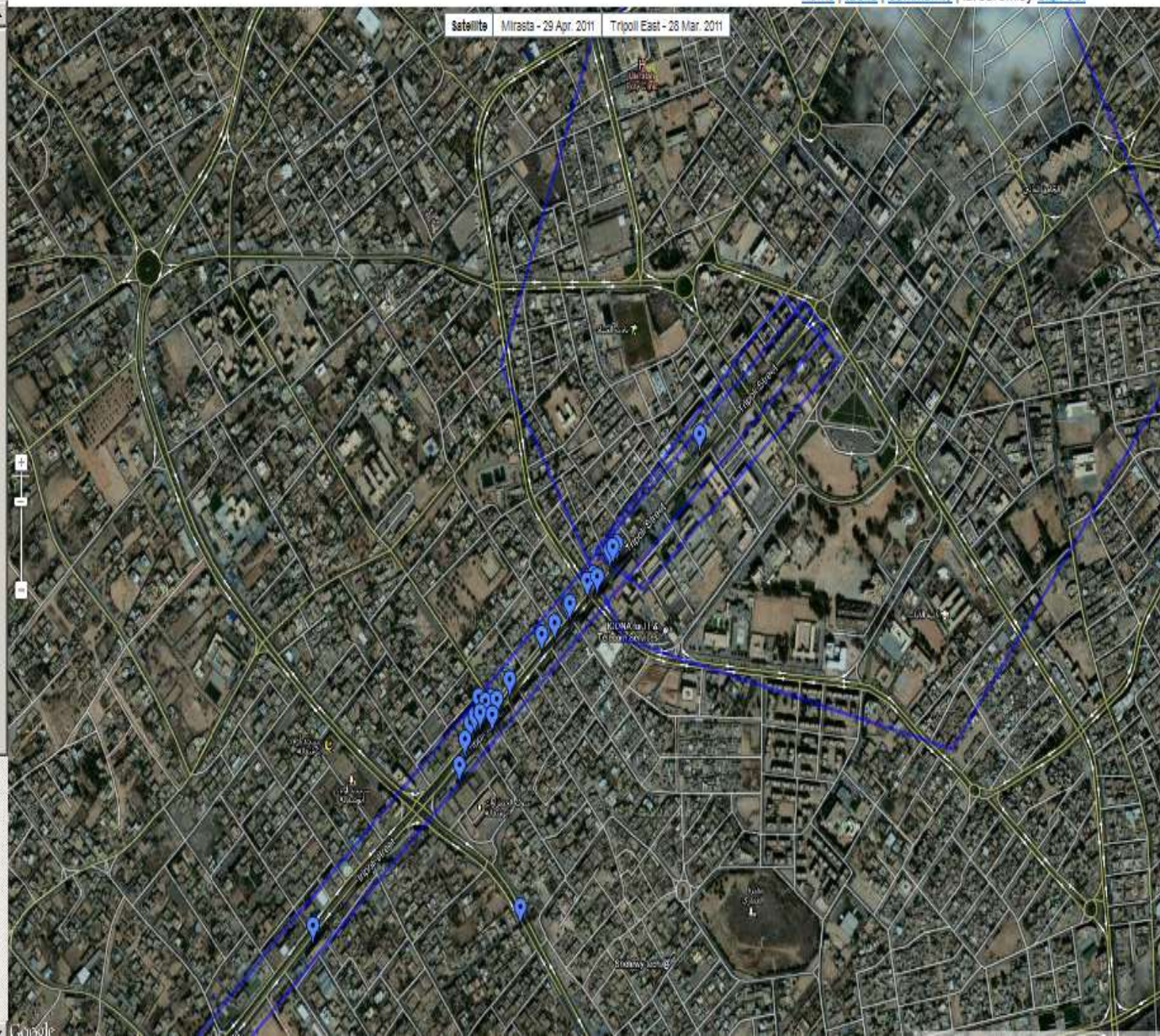
Search area: or

Create/draw area

Justification (Tips: writing '#36' displays the photo # 36)

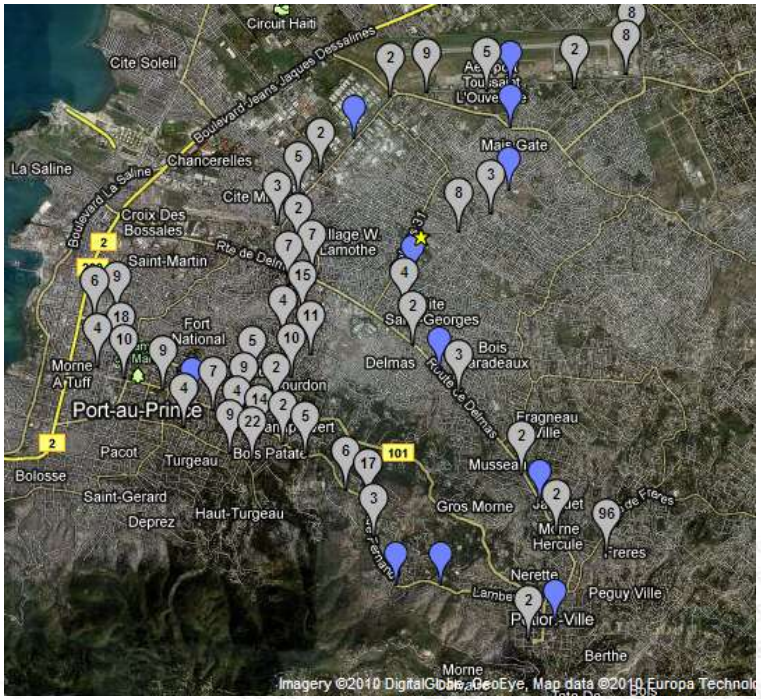
From the web page publishing the photo

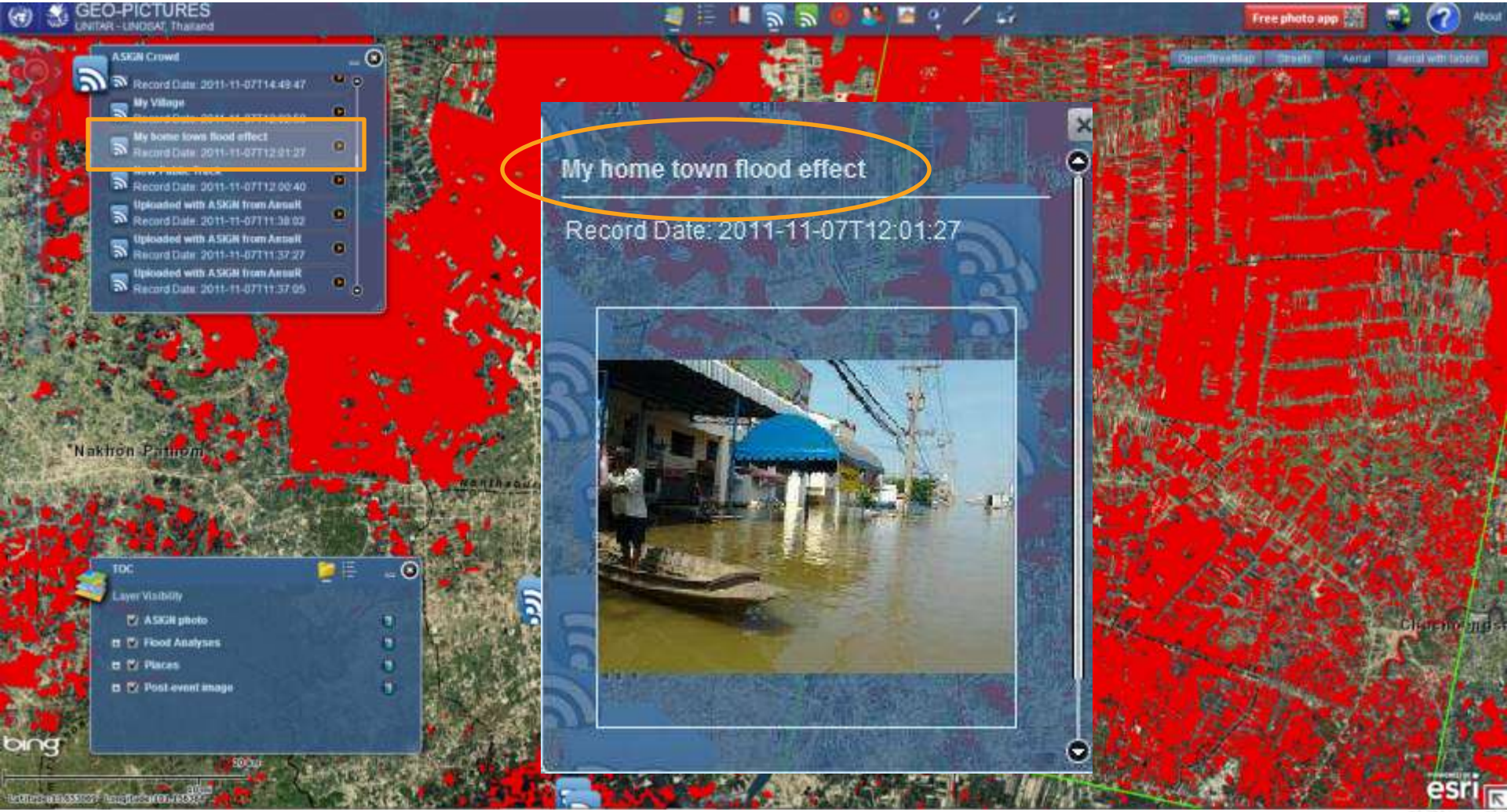
Cancel | submit



geo pictures

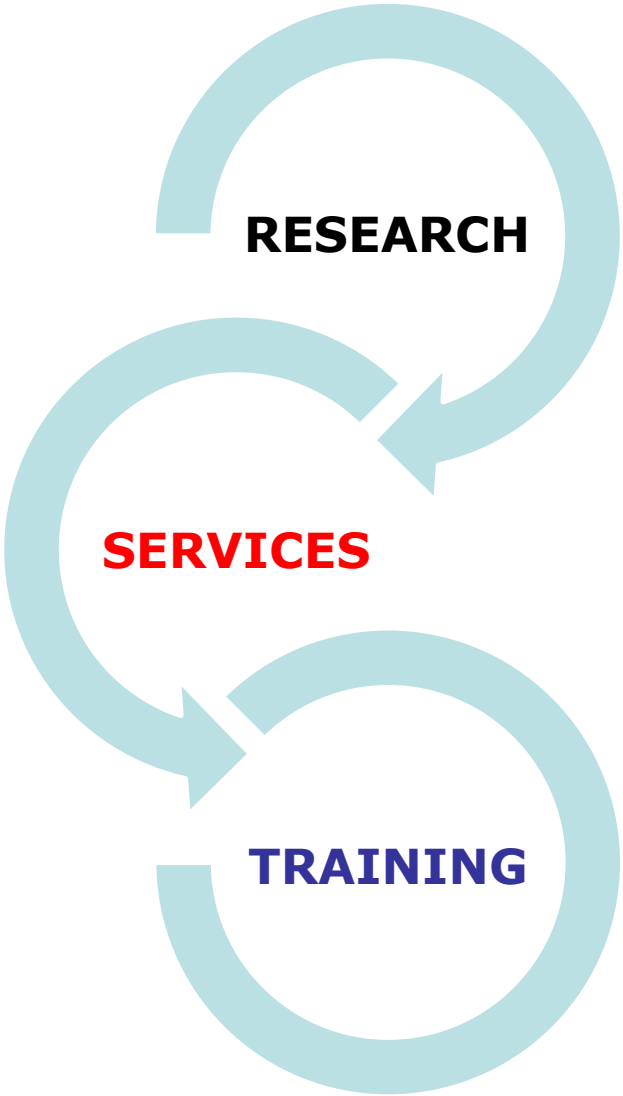
- Automatic geo-positioning and mapping of photos, videos, text, voice (Android+)
- Cost-efficient solutions (smart compression)
- Tested in exercises, used in Haiti, Nigeria, Pakistan, Thailand
- GPS cameras, mobile phones (Android, iPhone)



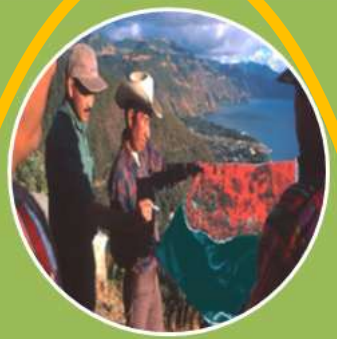

GEO-PICTURES
UNITAR - UNOSAT, Thailand
Free photo app
About
ASIGN Crowd
Record Date: 2011-11-07T14:49:47
My Village
My home town flood effect
Record Date: 2011-11-07T12:01:27
Record Date: 2011-11-07T12:00:40
Uploaded with ASIGN from Ansuit
Record Date: 2011-11-07T11:38:02
Uploaded with ASIGN from Ansuit
Record Date: 2011-11-07T11:37:27
Uploaded with ASIGN from Ansuit
Record Date: 2011-11-07T11:37:05
My home town flood effect
Record Date: 2011-11-07T12:01:27
Nakhon Pathom
TOC
Layer Visibility
ASIGN photo
Flood Analyses
Places
Post-event image
bing
esri

Training & Capacity Development

SHARING OUR KNOWLEDGE


RESEARCH
SERVICES
TRAINING

Training and capacity building portfolio of activities



	Humanitarian Aid and Relief Coordination	Human Security	Territorial Planning/DRR
3 Days	Basic course on the use of satellite imagery for emergency response.	Basic course on the use of satellite imagery for human security.	Basic course on the use of satellite imagery for territorial planning.
1 Week	Advanced course on the use of satellite imagery for emergency response.	Advanced course on the use of satellite imagery for human security.	Advanced course on the use of satellite imagery for territorial planning.
1 Day – 3 Weeks – More..	Master level Course on the use of satellite imagery for emergency response mapping.		In-country capacity building programmes to strengthen local capacities on the use of satellite imagery for territorial planning.
TBD	e-learning training course in the area of geospatial information technology		
1-2 Days	Workshops and information sharing sessions on the use of geospatial information technology for decision makers		

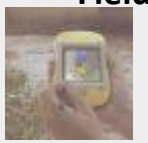

2011/11/28

Agriculture
Transport
Water Resource
Education
Environment
Health
Housing
Works
Land and Survey
Urban Development
Information
Others..

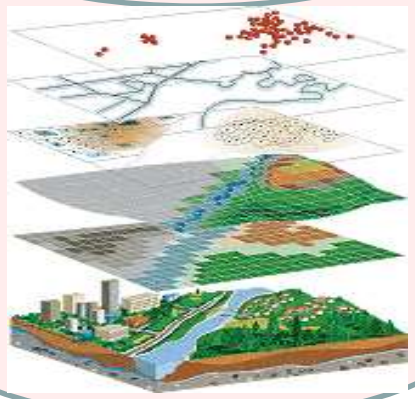
Thematic Data

Aerial/Satellite Data


Field Data



Situation Room



Maps
Analysis

Communication
Web

Decision Making

Planning

Evaluation Monitoring

UNOSAT iPad app

Thank you

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