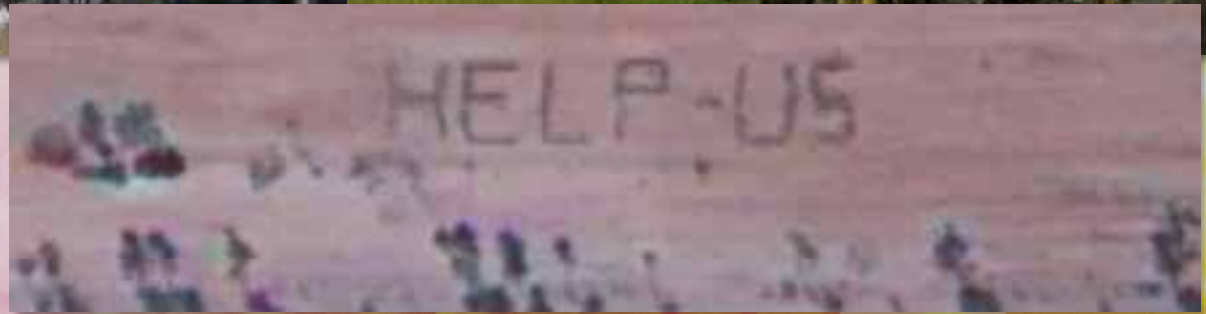




**unitar**

United Nations Institute for Training and Research

# Advances in Remote Sensing for Humanitarian Response and Human Security



Einar Bjorgo, Ph.D

**UNOSAT**

GIS for the United Nations and International Community Conference, Geneva  
3-5 April 2012



## Recent advances

- More details – a lot more details
- Fast image delivery – near real time
- Imagery derived data sharing – feeds to the field
- Engaging the crowd – from the ground up
- Accepted into decision making process
- Coordination through OCHA/GDACS
- Assessing the interplay – the next level

## 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 1000 maps/analyses since 2000, taskings in over 250 emergencies & conflicts; professional training; research & methodology



knowledge, international, participatory approach, m  
diversity, innovation, knowledge sharing, research  
ship; transfer, expertise, new technology  
learning by doing, network  
ship, skills building  
ing, ext

## 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



knowledge, innovation, diversity, initiative, transfer, learning by doing, partnership, skills building, research, technology, networks, training, etc.

## Humanitarian Aid and Relief Coordination

- Crisis & Situational Mapping
- Damage assessment

**OCHA**  
**UNICEF**  
**UNHCR + SHELTER**  
**UNDP + E. RECOVERY**  
**WORLD BANK**

## Human Security

- Monitoring
- Human Rights
- Safety and Security

**DPKO + MISSIONS**  
**OHCHR + PANELS**  
**UNHCR**  
**UNDSS**  
**UNDFS**  
**UNDPA**

## Territorial Planning and Monitoring

- Capacity Development & Technical Assistance
- Project development & Implementation

**UNDP/BCPR**  
**UN-HABITAT**  
**IOM**  
**NTL GVTS**



# How does UNOSAT Support Humanitarian Operations?:

## 1. Activation / Request



2. Satellites collect data over disaster area



3. UNOSAT Staff analyze satellite data



4. UNOSAT Staff Produce maps, reports & databases for field workers



Caprivi, Namibia



Port-Au-Prince, Haiti



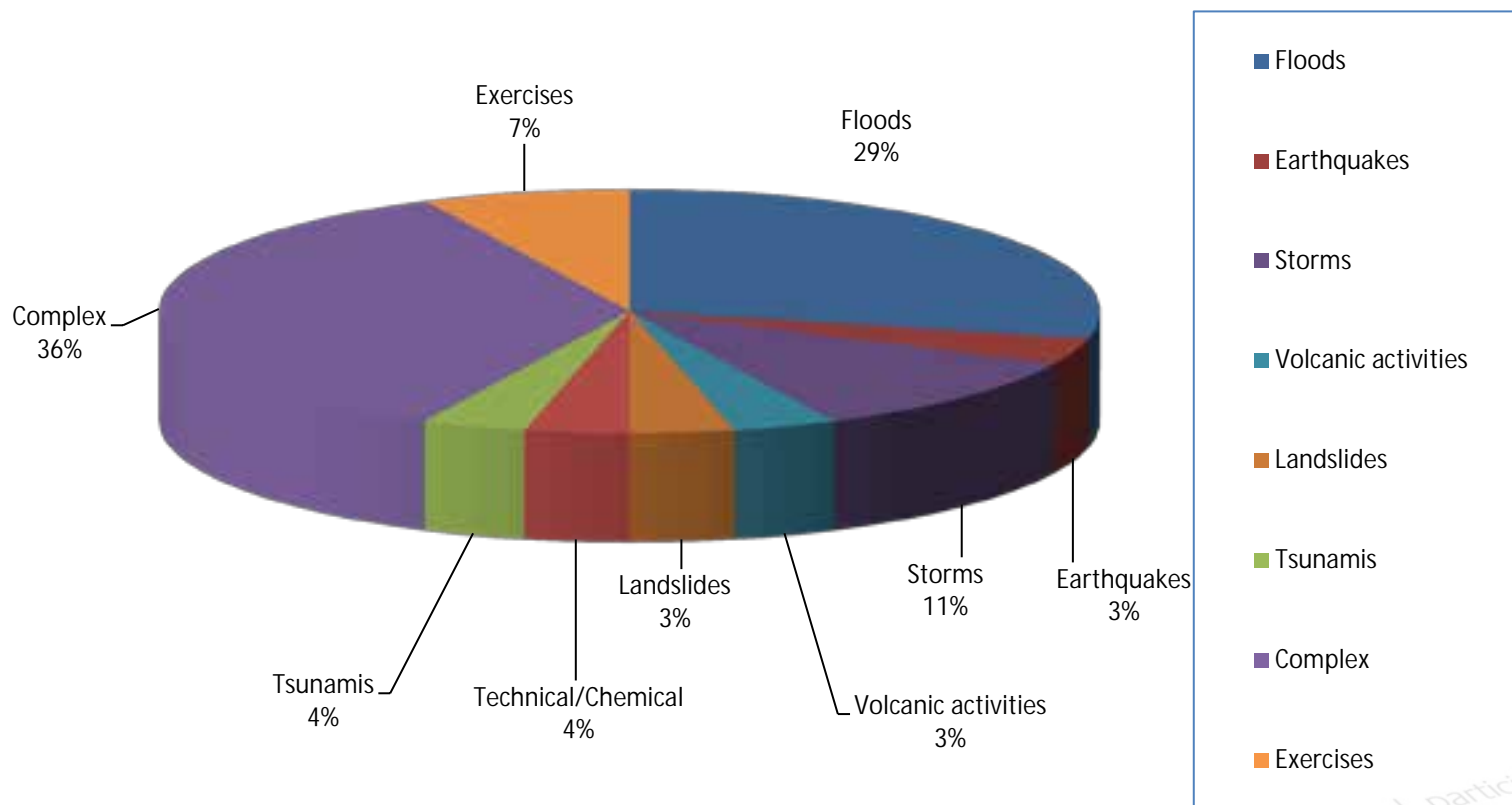
Bihar, India



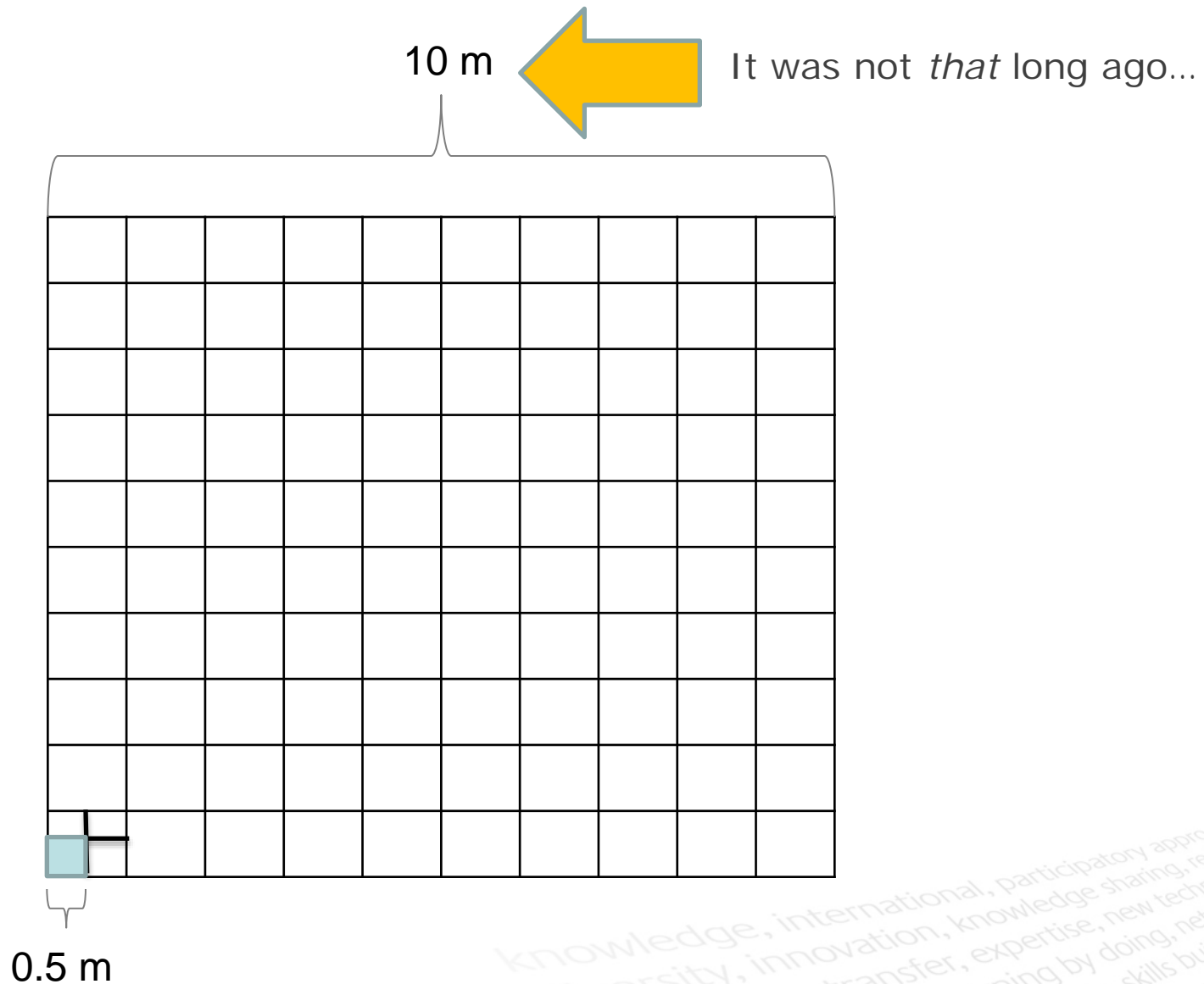
Mogadishu, Somalia

# UNOSAT rapid mapping by type of emergency

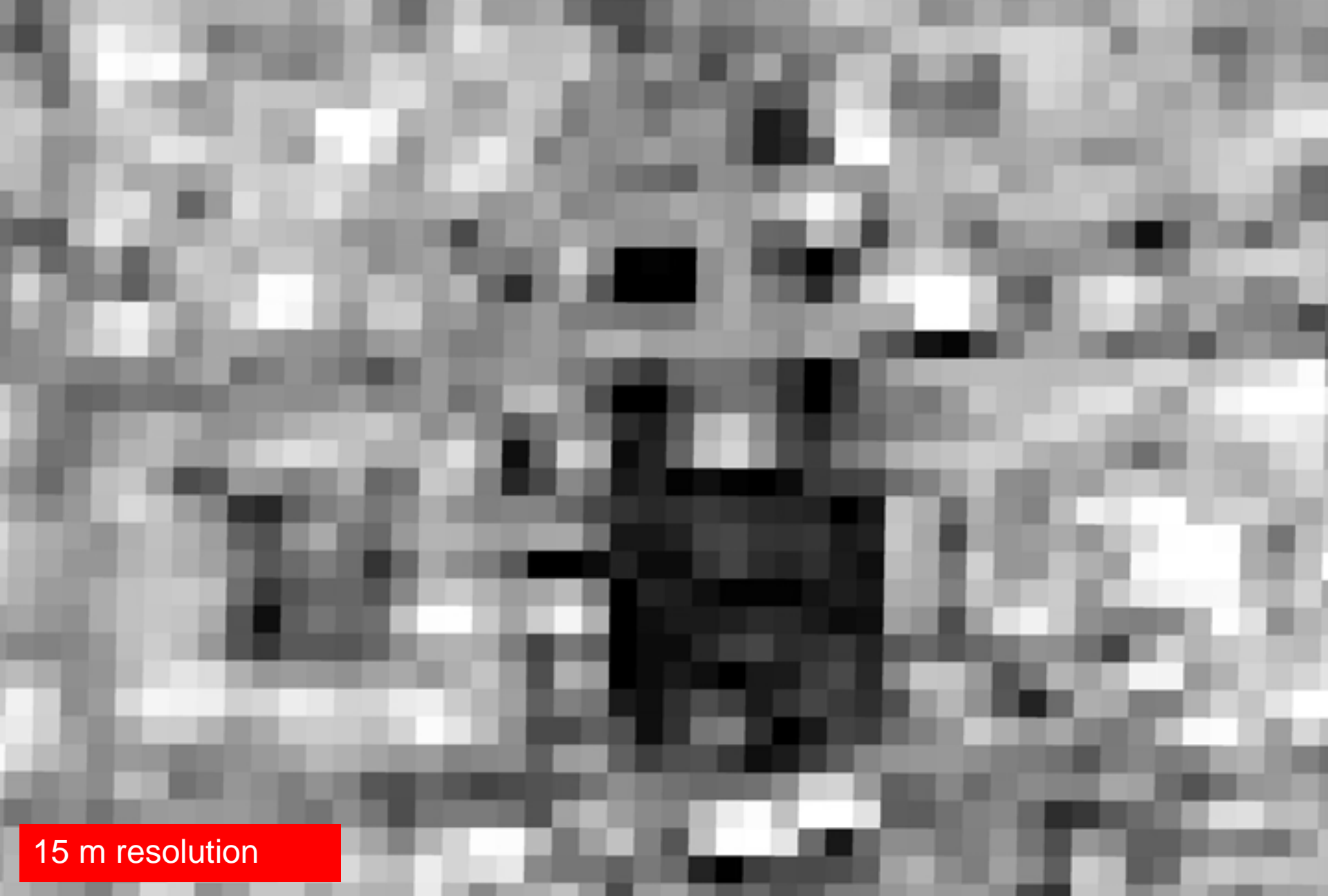
## 2011



## Reassessing the meaning of very high resolution







15 m resolution



0.6 m resolution

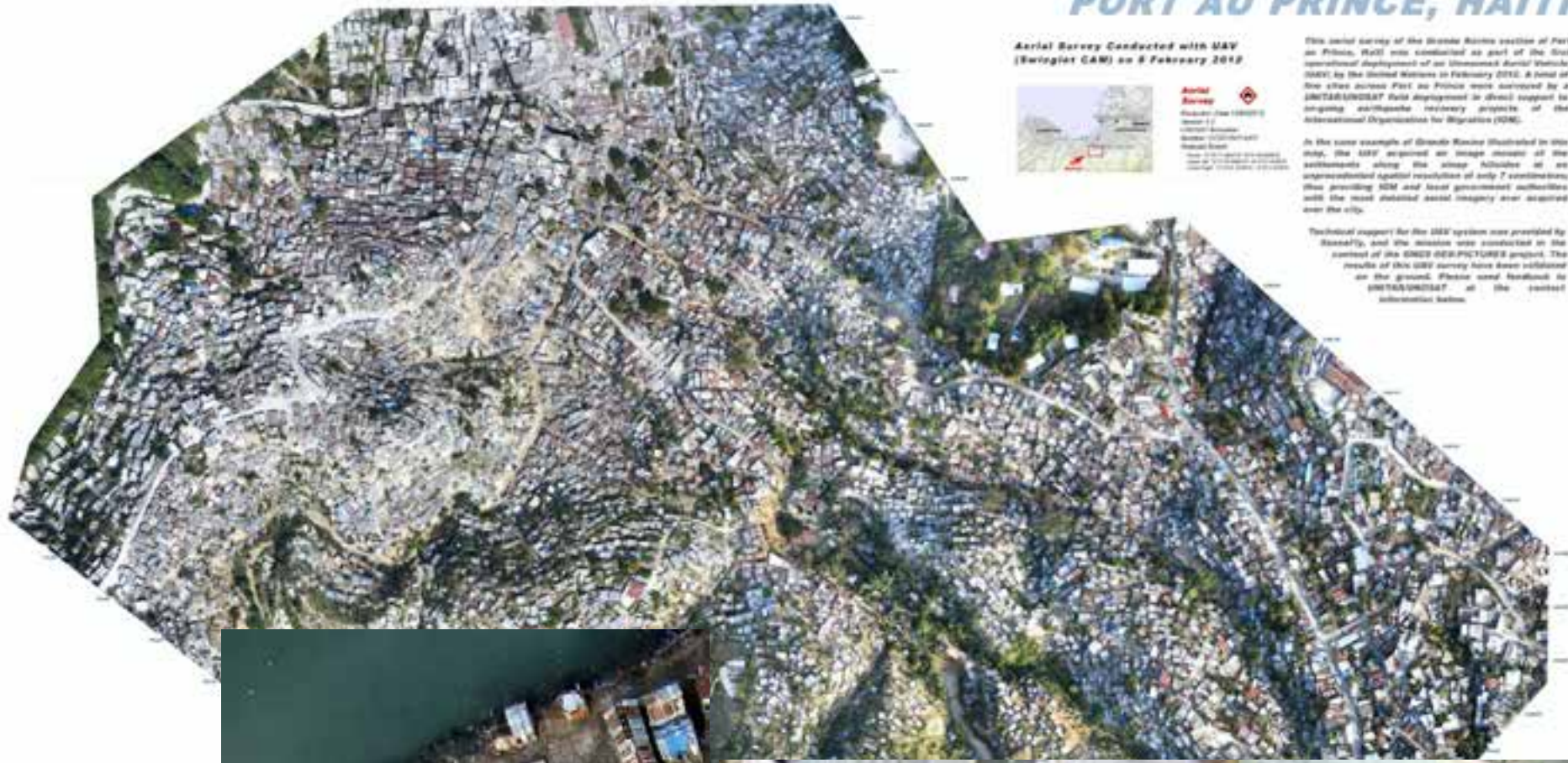
## UNOSAT UAV capacity: Successful deployment to Haiti



knowledge, international, participatory approach, m  
diversity, innovation, knowledge sharing, research  
ship; transfer, expertise, new technologi  
learning by doing, network  
ship, skills building  
ing, ext



# UAV SURVEY OF GRANDE RAVINE, PORT AU PRINCE, HAITI



Aerial Survey Conducted with UAV (Swinglet CAM) on 8 February 2012



**Aerial Survey**  
Operator: Jean-Christophe  
Mission: [...]  
Camera: [...]  
Altitude: [...]

This aerial survey of the Grande Ravine section of Port au Prince, Haiti was conducted as part of the first operational deployment of an Unmanned Aerial Vehicle (UAV) by the United Nations in February 2012. A total of three other areas Port au Prince were surveyed by a UNOSAT/UNOSAT data deployment in direct support to ongoing earthquake recovery projects of the International Organization for Migration (IOM).

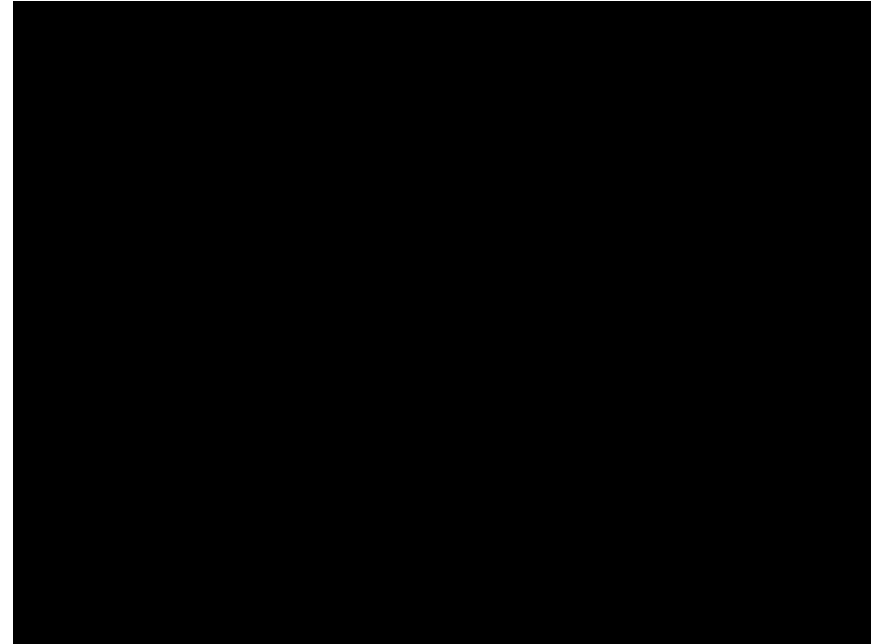
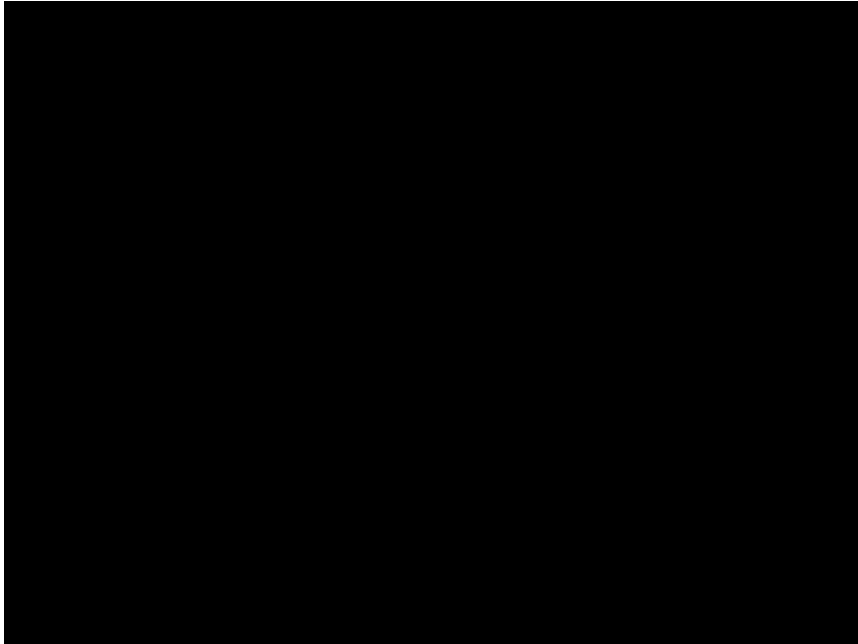
In the case example of Grande Ravine illustrated in this map, the UAV acquired an image mosaic at an unprecedented spatial resolution of only 7 centimeters, thus providing HD and local government authorities with the most detailed aerial imagery ever acquired over the city.

Technical support for the UAV system was provided by GeoEye, and the mission was conducted in the context of the UNOSAT/UNOSAT project. The results of this UAV survey have been validated on the ground. Please visit feedback@UNOSAT/UNOSAT at the contact information below.



Map showing the location of the survey area in Port au Prince, Haiti. Includes a QR code and contact information for UNOSAT/UNOSAT.

## UNOSAT UAV capacity: Quadrocopter w live video feed



Courtesy: microdrones GmbH



# DAMAGE ASSESSMENT: REGIMENT BLINDÉ MUNITIONS EXPLOSION,

Analysis with WorldView-2 Data Acquired 15 March 2012 & 19 March 2012

The map displays the satellite-observed area affected by the Regiment Blindé Munitions explosion on 24 March 2012. Using a satellite image from 15 March 2012 a Primary Blast Zone with a diameter of 1.5 kilometers around the munitions storage facility was identified. Within this zone 1,500 buildings obscured by clouds were identified, of which 6106 were clearly identified as destroyed, 2% had severe damage visible and 20% indicated no damage visible in the

images. Cloudy conditions resulted in a total of 868 buildings being obscured, many of which are likely destroyed or severely damaged. Additionally a total of 102 destroyed or damaged buildings are visible around the periphery of the Primary Blast Zone. The map also includes the designated No-Go Zone in the blast area. This is a preliminary analysis & has not yet been validated in the field. Please send ground feedback to UNOSAT/UNOSAT.

**Munitions Depot Explosion**

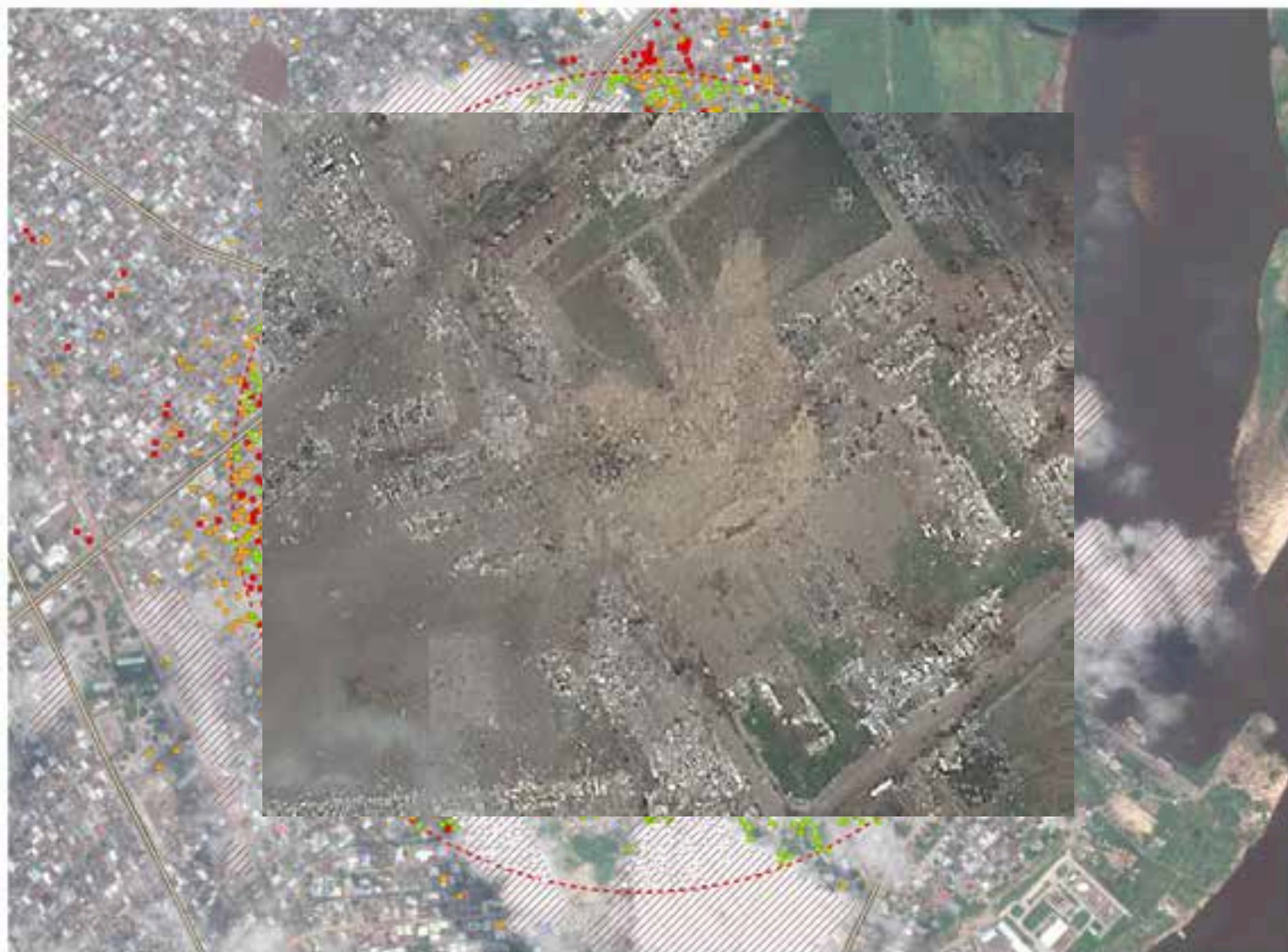


Production Date

19/03/2012

Version 1.1

Slide Number: AC-2012-000036.COG



- Blast Epicenter
- Obscured by clouds
- Destroyed
- Severe Damage
- No Visible Damage
- Main Road
- Secondary Road
- Primary Blast Zone
- No-Go Zone
- Cloud Cover

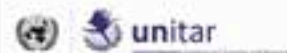
Map Scale for A3: 1:7,000

Satellite Data (1): WorldView-2  
 Imagery Date: 15 March 2012  
 Resolution: 30 m  
 Copyright: DigitalGlobe  
 Source: Pict 001  
 Satellite Data (2): WorldView-2  
 Imagery Date: 19 March 2012  
 Resolution: 30 m  
 Copyright: DigitalGlobe  
 Source: Pict 001  
 Road Data: GDM  
 Other Data: UNOSAT, UNOSAT, NASA, NOAA  
 Analysts: UNOSAT/UNOSAT  
 Producer: UNOSAT/UNOSAT

Coordinate System: WGS 1984 UTM Zone 29S  
 Projection: Transverse Mercator  
 Datum: WGS 1984  
 Unit: Meter

The depiction and use of boundaries, geographic names and related data shown here are not warranted to be accurate nor do they imply official endorsement or acceptance by the United Nations. UNOSAT is a program of the United Nations Institute for Training and Research (UNITAR), providing satellite imagery and related geographic information, research and analysis to UN humanitarian and development agencies and their implementing partners.

This work by UNOSAT/UNOSAT is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.



## UNOSAT

Contact Information: [unosat@unitar.org](mailto:unosat@unitar.org)  
 247 Woodrow: +41 76 847 4000  
[www.unitar.org/unosat](http://www.unitar.org/unosat)

knowledge, diversity, innovation, transfer, expertise, learning by doing, ship, skills building





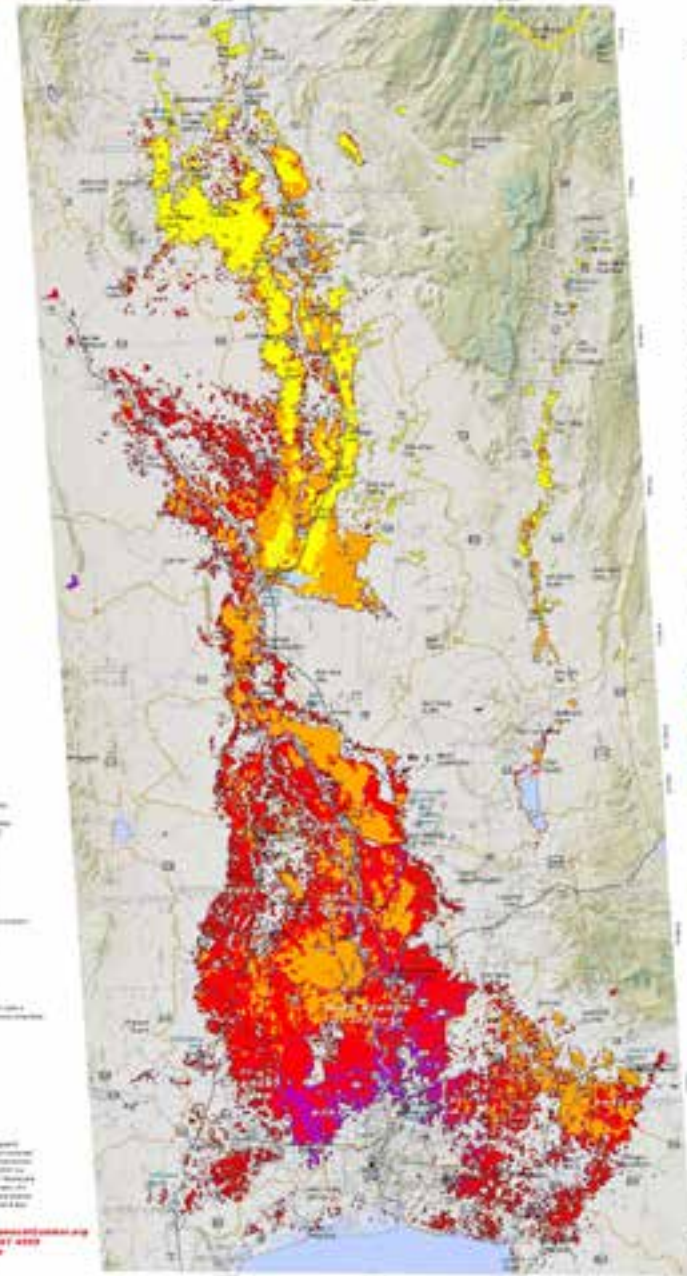
India and WHO polio eradication campaign planning as collaborative approach, Bihar, India.

Satellite imagery provided by UNOSAT through NSPO.

**No polio cases since vaccine campaign in Bihar!**

# Thailand floods 2011

## Near real time satellite image analysis and continued monitoring



The map displays a time series analysis of the 2011 Thailand flooding, showing the progression of flood waters from the central and southern regions of Thailand. The map is color-coded to indicate the extent and depth of the flooding, with yellow representing the most extensive flooding and red representing the deepest flooding. The map also includes a scale bar and a north arrow.

The map displays a time series analysis of the 2011 Thailand flooding, showing the progression of flood waters from the central and southern regions of Thailand. The map is color-coded to indicate the extent and depth of the flooding, with yellow representing the most extensive flooding and red representing the deepest flooding. The map also includes a scale bar and a north arrow.



Unitar  
UNOSAT  
Project title  
UNOSAT  
Version 1.0  
Date created  
11/01/2012 10:00 AM







Osh

Complexity

unitar UNOSAT

20 JUNE 2009 - 07

**DAMAGE ASSESSMENT FOR OSH, KYRGYZSTAN**

Damage Assessment Report on Earthquake (7.9 Magnitude) Occurred on 12 June 2009

unitar UNOSAT

**EMERGENCY ANALYSIS 1: SATELLITE-DETECTED ACTIVE FIRES IN OSH, KYRGYZSTAN**

On 12 June 2009, satellite imagery revealed the presence of active fires in Osh, Kyrgyzstan, following the 7.9 magnitude earthquake. The fires were detected in several areas, including the city center and surrounding residential areas. The fires were caused by gas leaks and electrical shorts triggered by the earthquake. The fires were quickly extinguished by local fire departments.



unitar UNOSAT

**EMERGENCY ANALYSIS 2: SATELLITE DAMAGE ASSESSMENT SUMMARY**

The satellite imagery shows significant damage to buildings and infrastructure in Osh, Kyrgyzstan. The damage is most severe in the city center and surrounding residential areas. The damage includes collapsed buildings, damaged roads, and destroyed infrastructure. The damage is estimated to be worth \$1 billion.



unitar UNOSAT

**CIVILIAN POPULATION AT RISK: SATELLITE-DETECTED ROADBLOCKS AND PROBABLE ETHNIC-UZBEK NEIGHBORHOOD IN DIS LOCATION BETWEEN OVERTAKING AND DOSTI WOODKATSKAYA ROAD, OSH, KYRGYZSTAN**

The satellite imagery shows a roadblock in Osh, Kyrgyzstan, which is a major concern for the civilian population. The roadblock is located between the Overtaking and Dosti Woodkat'skaya roads. The roadblock is a result of the earthquake and is a major obstacle for the civilian population. The roadblock is a major concern for the civilian population.

The satellite imagery shows a roadblock in Osh, Kyrgyzstan, which is a major concern for the civilian population. The roadblock is located between the Overtaking and Dosti Woodkat'skaya roads. The roadblock is a result of the earthquake and is a major obstacle for the civilian population. The roadblock is a major concern for the civilian population.

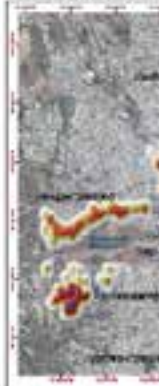


The satellite imagery shows a roadblock in Osh, Kyrgyzstan, which is a major concern for the civilian population. The roadblock is located between the Overtaking and Dosti Woodkat'skaya roads. The roadblock is a result of the earthquake and is a major obstacle for the civilian population. The roadblock is a major concern for the civilian population.

unitar

**EMERGENCY ANALYSIS DAMAGE ASSESSMENT**

The satellite imagery shows significant damage to buildings and infrastructure in Osh, Kyrgyzstan. The damage is most severe in the city center and surrounding residential areas. The damage includes collapsed buildings, damaged roads, and destroyed infrastructure. The damage is estimated to be worth \$1 billion.



The satellite imagery shows significant damage to buildings and infrastructure in Osh, Kyrgyzstan. The damage is most severe in the city center and surrounding residential areas. The damage includes collapsed buildings, damaged roads, and destroyed infrastructure. The damage is estimated to be worth \$1 billion.

unitar UNOSAT

**DAMAGE ASSESSMENT FOR OSH, KYRGYZSTAN**

Damage Assessment Report on Earthquake (7.9 Magnitude) Occurred on 12 June 2009

The satellite imagery shows significant damage to buildings and infrastructure in Osh, Kyrgyzstan. The damage is most severe in the city center and surrounding residential areas. The damage includes collapsed buildings, damaged roads, and destroyed infrastructure. The damage is estimated to be worth \$1 billion.



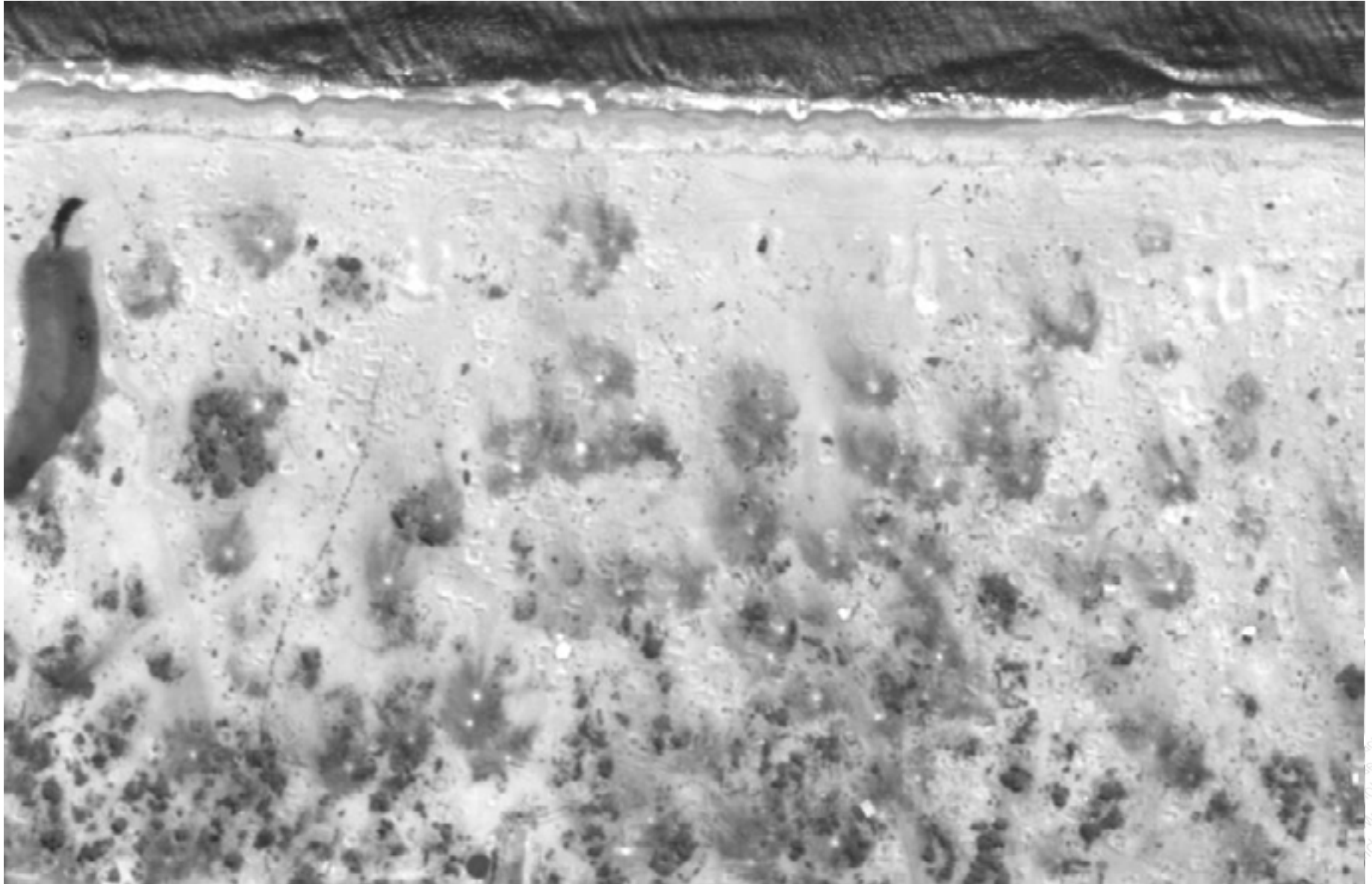
14 June

25 June

Time



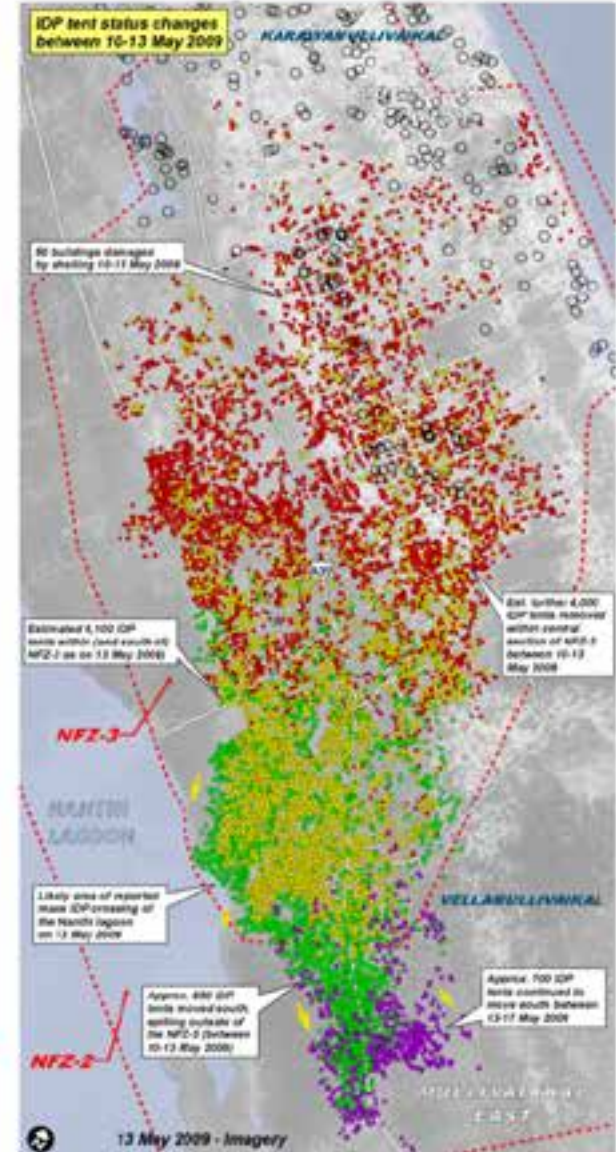
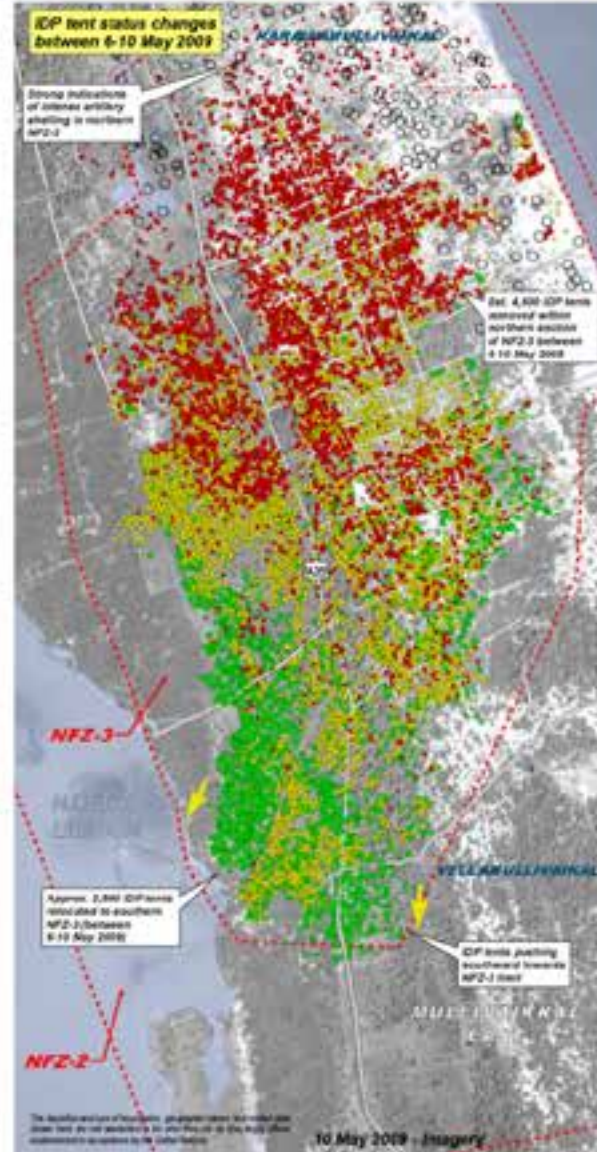
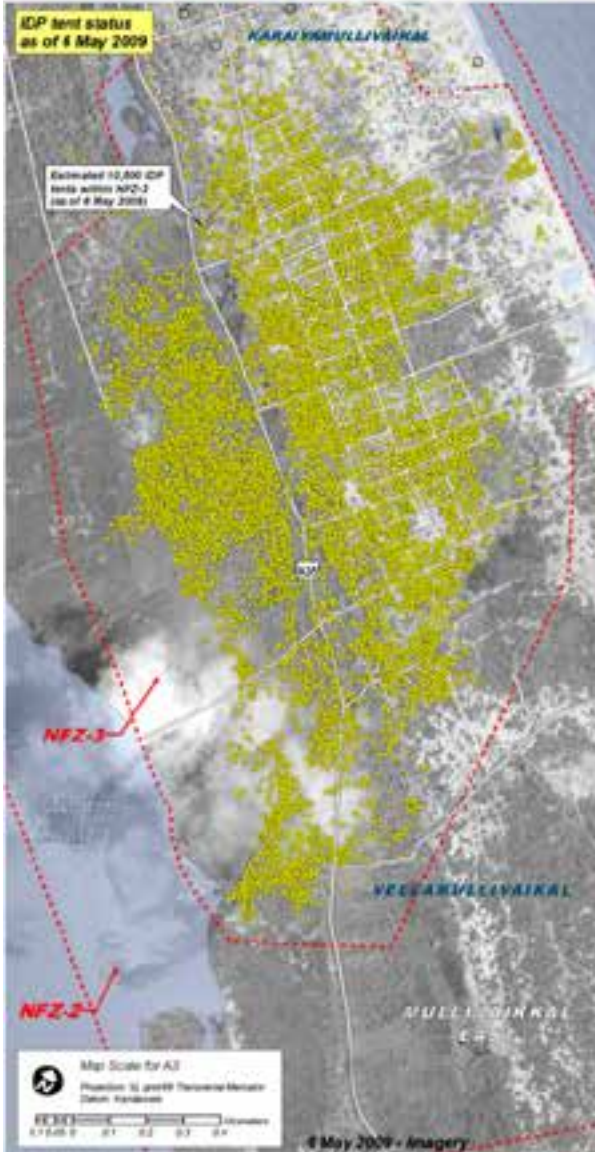
## Artillery shelling in no fire zone





# SPATIAL ANALYSIS OF IDP MOVEMENT WITHIN THE NFZ-3 (BETWEEN 6-17 MAY 2009)

- Artillery shelling damage site
- ↑ Direction of IDP tent shelter movement
- Permanent building
- Removed / Relocated (from previous image date)
- Unchanged (same as previous image date)
- Newly Elected / constructed (new location from previous image date)
- Tent erected between 13 - 17 May 2009 (final tent movement)





GEO-PICTURES Pakistan - Windows Internet Explorer

http://cemunosat05.cem.ch/gp/Files/PKN/index.html

Google

2011 Epi International Use... UNITAR-UNOSAT

GEO-PICTURES, Pakistan

GEO-PICTURES  
UNITAR - UNOSAT - Pakistan

Streets Aerial Topo Relief

Pakistan

Quetta

Baluchistan

Sindh

Hyder

Jaipur

Rajasthan

Flood in pakistan 2010

Latitude: 27.930740 Longitude: 74.789078

Sources: Esri, DeLorme, NAVTEQ, TomTom, USGS, Intermap, AND, Esri Japan, METI, Esri Hong Kong, Esri Thailand, Procalculo, Bross

Local intranet | Protected Mode: On

100%

- Flood extent data sharing

- Social media integration, improved understanding, validation

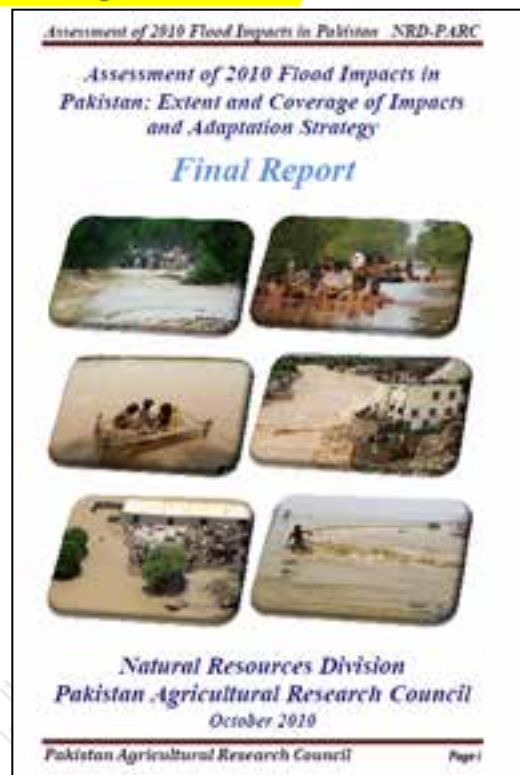
knowledge, international, laboratory approach, diversity, innovation, knowledge sharing, research, transfer, expertise, new technology, learning by doing, network, ship, skills building, ing ext

This is Dr. Bashir Ahmad from Pakistan Agriculture Research Council (PARC), Islamabad.

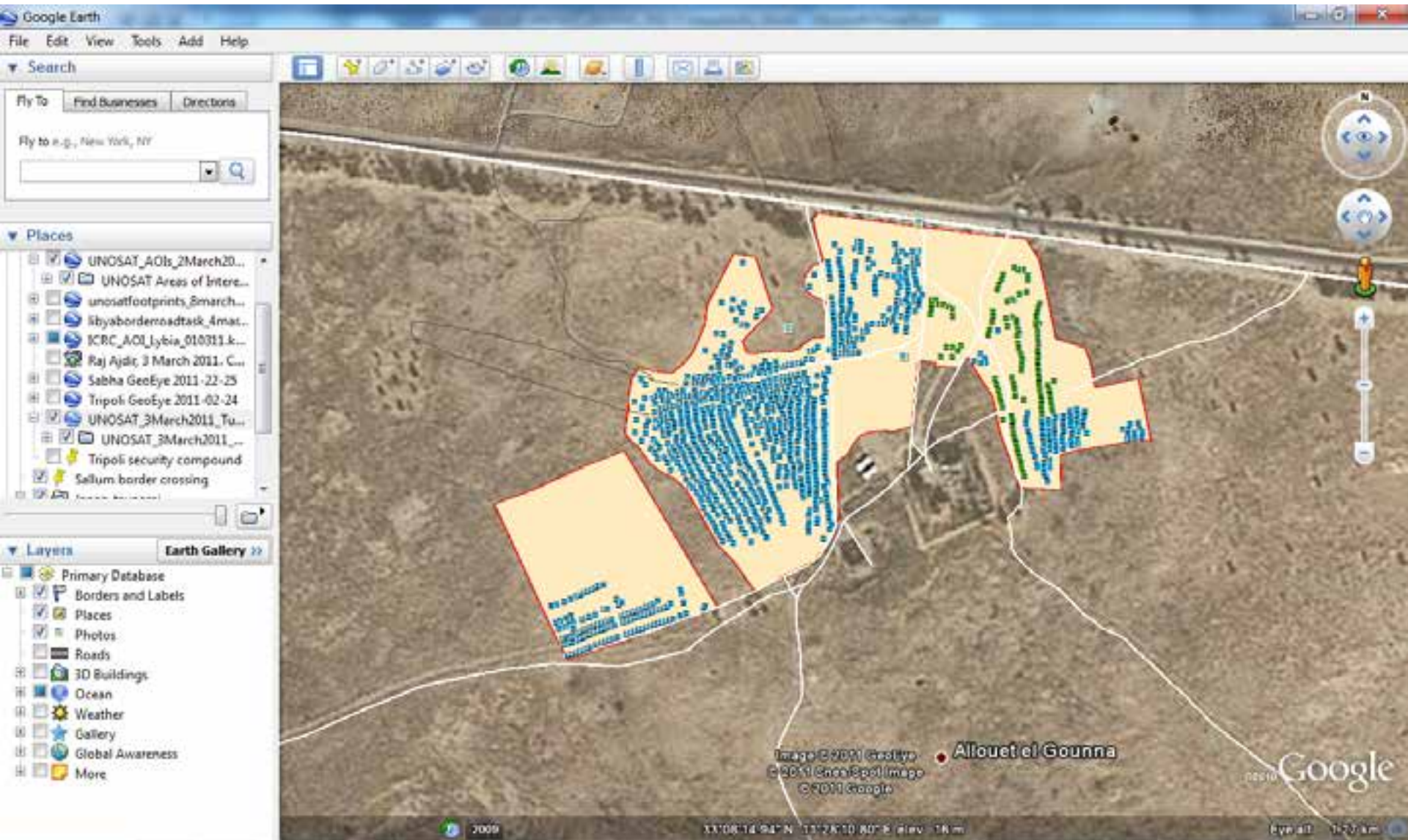
Thanks for providing the UNOSAT maps , its flood extent and all GIS files.

Flood Damage Assessment Cell of Pakistan Agriculture Research Council (PARC), Islamabad has Prepared "Flood Damage Assessment Report " which also covers flood impacts in Pakistan: Extent and Coverage of Impacts and Adaptation Strategy" In stead of developing new flood extent maps, flood extent of UNOSAT has been used which was found quite comprehensive, accurate, updated and was covering the whole flooded area. UNOSAT work is highly valuable, reliable and dependable and its sharing is highly appreciated. We have verified many of its parts in the field and find it accurate.

Dr. Bashir Ahmad  
Director (Environment)  
Natural Resources Division  
Pakistan Agricultural Research Council  
G-5/1, Islamabad, Pakistan







Data sharing during emergencies: Transit camp on Tunisia-Libya border KML, WMS



# SYRIAN REFUGEE CAMP - REYHANLI REYHANLI DISTRICT, HATAY PROVINCE, TURKEY

Analysis with WORLDVIEW 1 - Data Acquired 12 March 2012 & WORLDVIEW 2 - Data acquired 16 September 2011

This map illustrates satellite-based areas of refugee camps and reconstructed tent settlements in Reyhanli district, Hatay province of Turkey between 16 September 2011 and 12 March 2012. An overview of the camp is to the south as well as in the number of detector tents has been observed. Around 350 new tents have been detected between 16 September

2011 and 12 March 2012. This tends to show that the number of settled Syrian citizens in Turkey increases and fluctuates. This is a preliminary analysis & their use will be better indicated in the field. Please avoid ground feedback to UNOSAT / UNOSAT.

Refugee Camps

Production Date:

30/03/2012

Version 1.0

Activation Number:  
CE20127045198



LEGEND

## IDPs Structures

- Tents detected on 12/03/2012
- Tents detected on 16/09/2011

## IDPs Camp Extent

- Camp extent 12/03/2012
- Camp extent 16/09/2011
- Highway/Primary Rd



Map Scale for A3: 1:1,400



Satellite Data (1): WorldView 2  
 Image Date: 16 September 2011  
 Resolution: 0.50 meters  
 Copyright: Digital Globe  
 Source: EarthEye  
 Satellite Data (2): WorldView 1  
 Image Date: 12 March 2012  
 Resolution: 0.50 meters  
 Copyright: Digital Globe  
 Source: Digital Globe  
 Refugee Camps source: Turkish Red Crescent  
 Road Data: Google Map Maker / DSM / DSM  
 Other Data: USGS, UNOSAT, UNOSAT, UNOSAT  
 Analysis: UNOSAT / UNOSAT  
 Production: UNOSAT / UNOSAT  
 Analysis conducted with ArcGIS v10

Coordinate System: World National  
 Projection: UTM  
 Datum: WGS 1984  
 Units: Meter

The depiction and use of boundaries, geographic names and related data shown here are not intended to be authoritative nor do they imply official endorsement or acceptance by the United Nations. UNOSAT is a program of the United Nations Institute for Training and Research (UNITAR), providing satellite imagery and related geographic information, research and analysis to UN humanitarian and development agencies and their implementing partners.

This work by UNOSAT/UNOSAT is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.



# UNOSAT

Contact information: [unosat@un.org](mailto:unosat@un.org)  
 Tel: +39 06 47 94 4930  
[www.unosat.org/unesat](http://www.unosat.org/unesat)



knowledge, diversity, innovation, transfer, expertise, learning by doing, leadership, skills building





Mosque

Tanks





Heavy equipment

Razed mosque area





unitar

United Nations Institute for Training and Research

UNOSAT

Civil Conflict



Production Date: 08/03/2011

Version 1.0

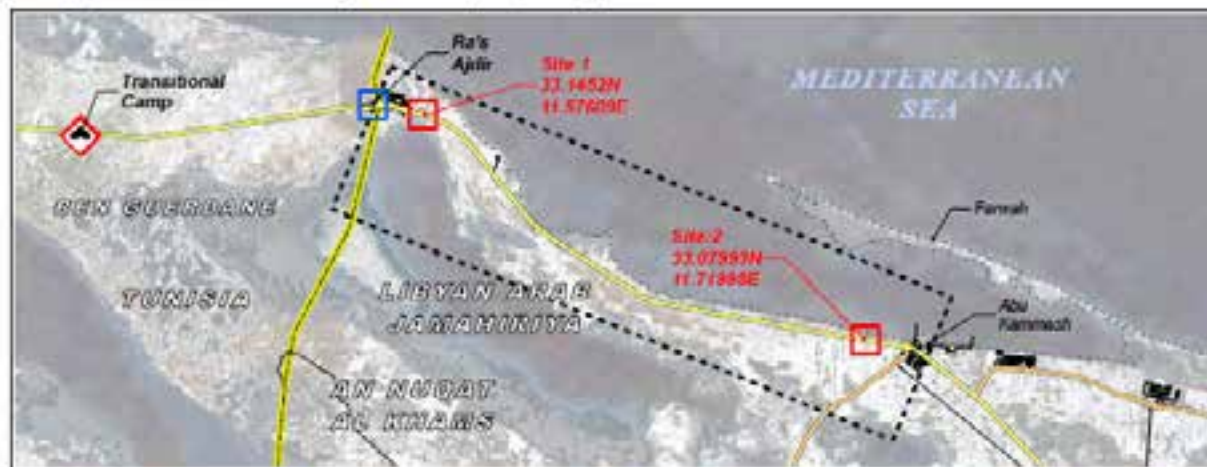
GLIDE: OT-2011-000025-LBY

UNOSAT Activation: CE20110220LBY

## Current Security Checkpoints between Ra's Ajdir Border Crossing and Town of Abu Kammash, Libya (as of 5 March 2011)

**ANALYSIS:** There are two functional security checkpoints along the main road between the Tunisian-Libyan border crossing at Ra's Ajdir and the town of Abu Kammash 19km to the east, as based on an analysis of satellite imagery acquired on 3 and 5 March 2011. Both are likely permanent locations established before the present crisis. Although there are clear indications that these checkpoints are actively controlling road traffic, there are however no associated large concentrations of either people or vehicle traffic leading to the checkpoints, strongly

suggesting that these sites are NOT responsible for the drop in the number of people reaching the border at Ra's Ajdir, as observed on 3 and 4 March 2011. It is possible that there are additional security checkpoints or temporary roadblocks located east of Abu Kammash which could be responsible for the reduction in traffic. UNITAR/UNOSAT will continue to track and analyze additional satellite imagery along this transport corridor leading to the Tunisian border.



participatory approach, research, knowledge sharing, new technologies, expertise, network, learning by doing, network, ship, skills building, etc.





unitar

United Nations Institute for Training and Research

UNOSAT

Civil Conflict



Production Date: 01/04/2011

Version 1.0

GLIDE: OT-2011-000025-LBY

UNOSAT Activation: CF20110220LBY

## Operational Status of Tripoli Military Airport (as of 28 March 2011)

**ANALYSIS** The operational status of the military airport in Tripoli, Libya was assessed from an analysis of satellite imagery collected on 26 February and 28 March 2011. Although there are no visible damages to airport building facilities, flight traffic is currently blocked by multiple unidentified obstructions placed deliberately along the runway and nearby taxi lane between 26 February and 28 March. A total of seven runway obstructions were identified, five along the runway and two along the taxi lane. All identified obstruction sites are marked on the map and two focus insets are provided to illustrate the

range of obstruction types used. This was produced by UNITAR/UNOSAT in support of international humanitarian assistance to the people of Libya. The map is created to respond to the needs of UN agencies and their partners. It is intended to provide objective geographic information and has been designed for easy printing and readability for A4 and A3 prints. This is an initial assessment and has not yet been independently verified on the ground. Please send feedback to UNITAR / UNOSAT.

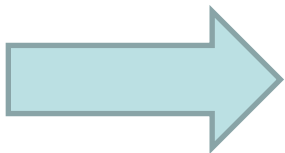


knowledge, innovation, diversity, participatory approach, research, expertise, new technologies, transfer, learning by doing, networks, skills building, etc.

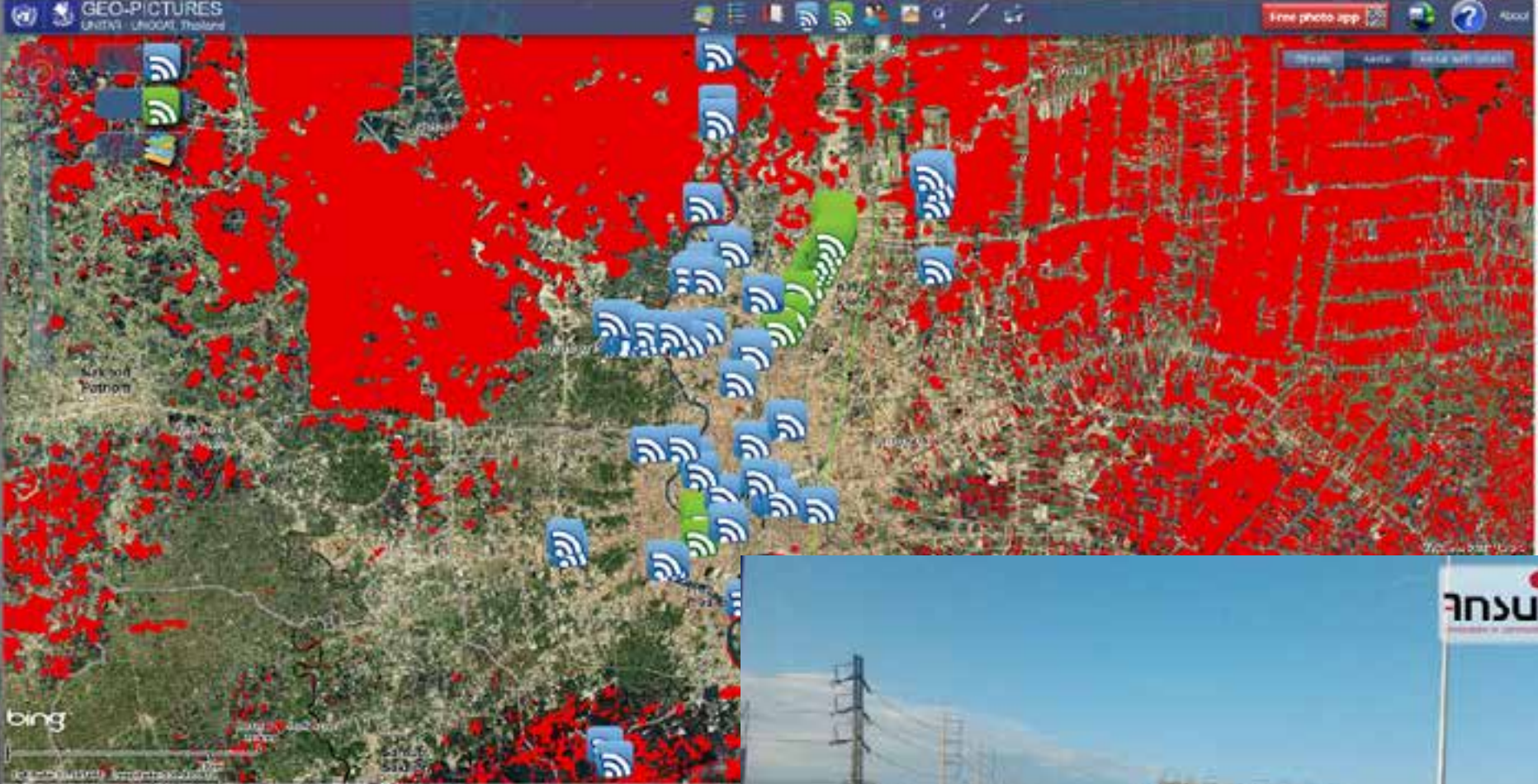


# Improved impact

- ü **Very High Resolution**
- ü **Frequent updates**
- ü **Information accessible when needed**



**Monitoring and analysis in near real time over areas not accessible to humanitarian community. Only source of objective and comprehensive information.**



ge  pictures

Thailand floods 2011  
Sharing of flood extent vectors  
Crowd-sourced geo-photo  
display



cybermappr.unige.ch

Citizen Cyberscience Centre

Sign out Mission Community Tutorials Results

Signed in as: ianbromley2

**Geotag Libya: Help us gather and geotag photos of the conflict in Libya**

- ### 1 Submit Photos

Submit web addresses (URLs) with photos showing damage to buildings caused by the war in Libya.



Submit Photos
- ### 2 Filter Photos

Assess each photo to verify that it shows damaged buildings in Libya and can possibly be georeferenced.



Filter Photos
- ### 3 Link Photos

Match the photos that show the same area or review photos that other people have matched.



Link Photos
- ### 4 Geotag Photos

Choose photos and attempt to geotag them, or review photos that other people have geotagged.



Geotag Photos

## Mission

**Libya: the war is over, but the reconstruction is just starting.**

Acquiring the best available information to inform reconstruction efforts is a huge challenge and is a multi-part process involving many different data sources and tools.

[UNITAR/UNOSAT](#) is a technology-intensive programme delivering imagery analysis and satellite solutions to relief and development organizations within and outside the UN system. UNOSAT is working to inform the many national and international organizations involved in reconstruction with the best possible information sources. One method of damage assessment used by UNOSAT and other organizations is remote assessment via



# UNICEF – UNOSAT Map Your School

Private and public schools aggregated at cadastral level

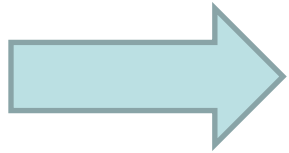
Vulnerability Map ( $V_{sch}$ )



• To II. of students per cadastral block  
• reclassified (0-10)



International, participatory approach, research, innovation, knowledge sharing, new technology transfer, expertise, new technology learning by doing, networking, skills building, leadership, skills building, etc.



**Direct impact on the ground  
together with local actors and  
citizens**

**(crowdsourcing from the ground up)**



# Coordination of humanitarian emergency satellite image analyses: OCHA/Global Disaster Alert and Coordination System

GDACS is a cooperation framework between the United Nations, the European Commission and disaster managers worldwide to improve alerts, information exchange and coordination in the first phase after major sudden-onset disasters.

United Nations and the European Commission

## GDACS

Global Disaster Alert and Coordination System

### Satellite Mapping Coordination System

Welcome to the GDACS Satellite Mapping Coordination System (SMCS),  
Facilitated by UNOSAT

Latest Events

- 2012-03-08 - AC-2012-000035-COG - (UNOSAT)
- 2011-10-19 - TC-2011-000157-SLV - (OCHA)
- 2011-10-17 - FL-2011-000135-THA - (AIT)
- 2011-10-12 - FL-2011-000148-KHM - (UNOSAT)
- 2011-09-26 - TC-2011-000000-VNM - (UNOSAT)

Latest Events | New Event | News | Howto

# UNOSAT-facilitated GDACS Satellite Mapping Coordination System. Operational and agreed tool by OCHA, EC, users, analysis centres

Firefox - GDACS SMCS

unosat-dev.web.cern.ch/unosat-dev/smcsa2/main.php#FL-2011-000135-THA

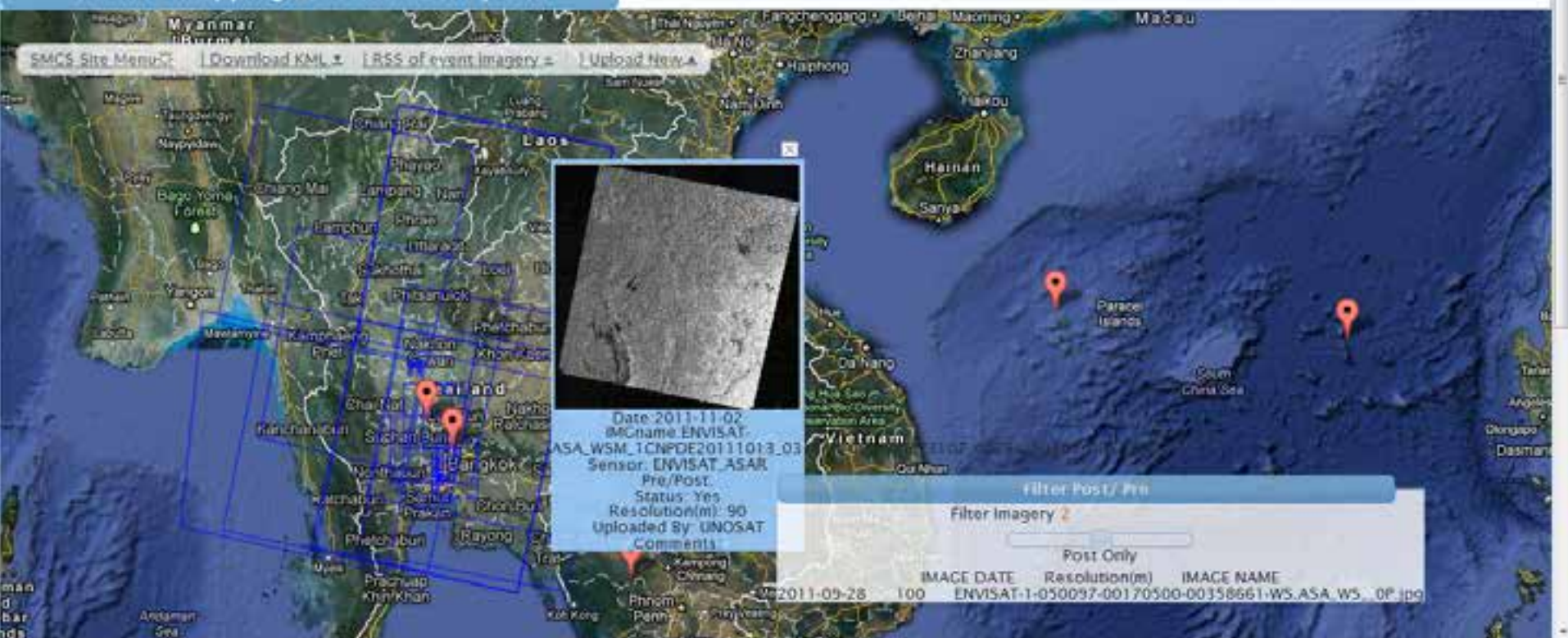
GDACS  
Global Disaster Alert and Coordination System

GDACS is a cooperation framework between the United Nations, the European Commission and disaster managers worldwide to improve alerts, information exchange and coordination in the first phase after major sudden-onset disasters.

United Nations and the European Commission

Satellite Mapping Coordination System

SMCS Site Menu: | Download KML | RSS of event imagery | Upload New



Date: 2011-11-02  
 IMCName: ENVISAT-  
 ASA\_WSM\_1CNPDE20111013\_03  
 Sensor: ENVISAT\_ASAR  
 Pre/Post:  
 Status: Yes  
 Resolution(m): 90  
 Uploaded By: UNOSAT  
 Comments

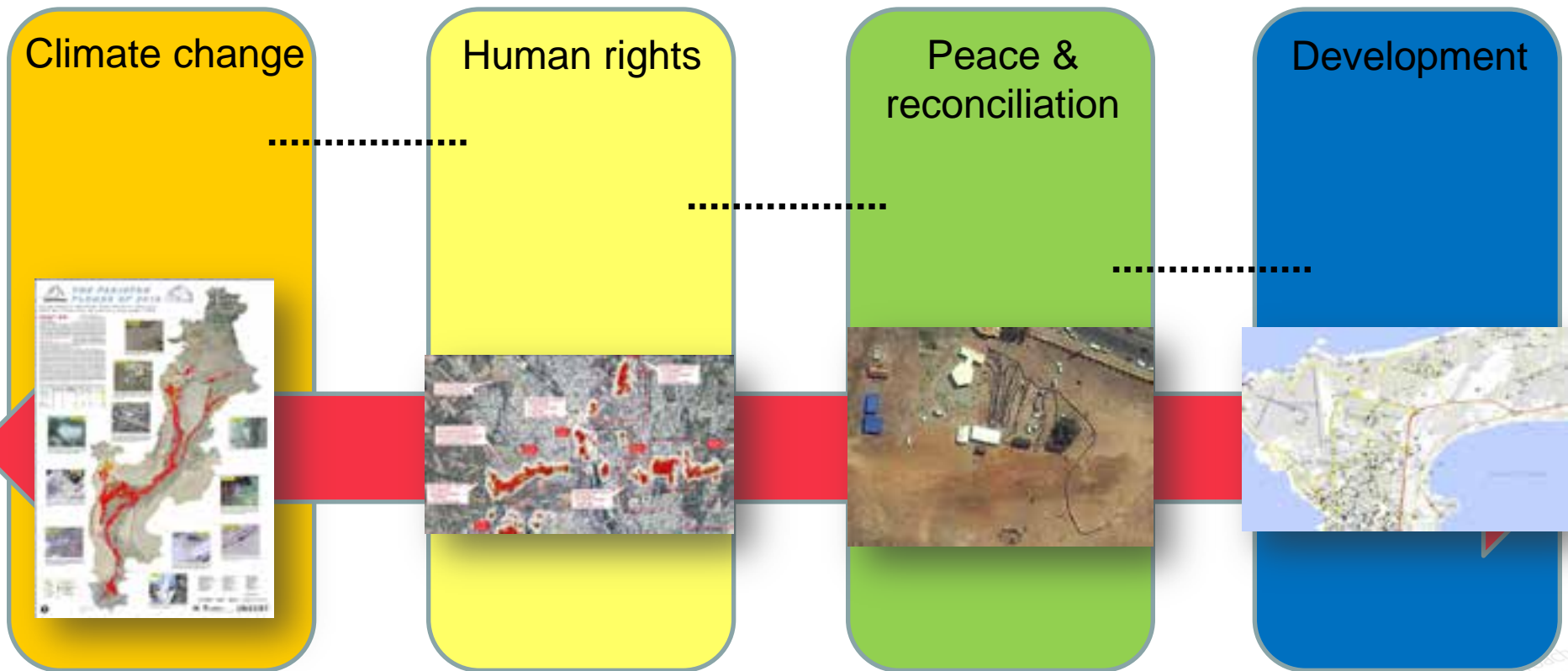
filter Post/ Pin  
 Filter Imagery 2  
 Post Only

IMAGE DATE	Resolution(m)	IMAGE NAME
2011-09-28	100	ENVISAT-1-050097-00170500-00358661-WS.ASA.W5_0P.jpg

Speakers / HP: 29%



# Connecting the dots using satellite imagery and relevant technologies



**From silos to holistic approach**

# ...with support from the top



UN High Commissioner for Refugees: Antonio Guterres

UN High Commissioner for Human Rights: Navi Pillay

Human Rights Watch Deputy Executive Director, Europe: Jan Egeland

International Committee of the Red Cross Director-General: Yves Daccord





# UNOSAT iPad app

April 02, 2012

- News
- Maps
- Podcasts
- UNOSAT TV
- Publications
- Map Request

**UNOSAT**  
UNOSAT Operational Satellite Applications Programme

**unitar**  
United Nations Institute for Training and Research

HumaNav community workshop convenes as service celebrates

Back Topics News UNOSAT

The GIS for the United Nations and the International Community Conference will take place April 30, 2012, at the World Meteorological Organization headquarters in Geneva, Switzerland.

Syrian #refugee

Back Topics Maps UNOSAT

This map illustrates satellite-based areas of refugee camps and semi-automated tents detections in Reyhanli district, Hatay province of Turkey. Between 16 September 2011 and 12 Mars 2012 an extension of the camp in its limits as well as in the

This map illustrates satellite-based areas of refugee camps and semi-automated tents detections in Merkez district, Hatay province of Turkey. An activity has been detected within the Apaydin Camp where the number of tents was reduced. At least 400

Back Topics UNOSAT TV UNOSAT

04/02/2012 UNOSAT CONFERENCE GENEVA

04/02/2012 Syrian Refugee Camps in Reyhanli / Reyhanli District, Hatay Province, Turkey

04/02/2012 Les yeux du ciel  
L'aide humanitaire ne peut plus se passer de «crisis mapping». Après une catastrophe naturelle comme le séisme qui a touché Haïti, la cartographie de crise est devenue un outil indispensable

04/02/2012 Syrian Refugee Camps in Merkez District, Hatay Province, Turkey

04/02/2012 Mandated to Protect – Protection of Civilians in Peacekeeping Operations  
About Unitar  
"The United Nations Institute for Training and Research (UNITAR) delivers innovative training and

04/02/2012 UNOSAT & UNICEF  
UNOSAT rapid mapping for humanitarian response is available to all humanitarian entities at no direct cost since 2003, when it launched a Rapid Mapping Service,

04/02/2012 Introduction to International Charter Space and Major Disasters  
More information at [www.disasterscharter.org](http://www.disasterscharter.org)  
Credit: European Space Agency (ESA) 2010, International Charter Space and Major

04/02/2012 UNOSAT Maps Chronicle Somali Pirate Attacks in Gulf of Aden  
Piracy incidents off the coast of Somalia have captured international attention. See UNOSAT maps to better understand the dynamics. Listen to the podcast at <http://www.esri.com/>

04/02/2012 ICCM 2009 - The UN's Use of Satellite Imagery During Crises  
Bjar Bjorge from UNOSAT gives an Ignite Talk at the First International Conference on Crisis Mapping (ICCM 2009). More information at:

# Conclusions



- We are moving towards true near real time imagery access and analysis for humanitarian relief and human security
- VHR commercial satellite imagery frequently updated is fundamental
- Complementary to field inspection and presence, good for advocacy
- Often only source of information
- Accepted as decision-making tool, but more to be gained through mainstreaming and institutional capacity development
- Partnership is everything!



[www.unitar.org/unosat](http://www.unitar.org/unosat)  
[einar.bjorgo@unitar.org](mailto:einar.bjorgo@unitar.org)



**unitar**

United Nations Institute for Training and Research

United Nations Institute for Training and Research  
Institut des Nations Unies pour la Formation et la Recherche  
Instituto de las Naciones Unidas para Formación Profesional e Investigaciones  
Учебный и научно-исследовательский институт  
Организации Объединённых Наций  
معهد الأمم المتحدة للتدريب والبحث  
联合国训练研究所

Palais des Nations  
CH-1211 - Geneva 10  
Switzerland  
T +41-22-917-8455  
F +41-22-917-8048  
[www.unitar.org](http://www.unitar.org)