

**e-geos**  
AN ASI / TELESPAZIO COMPANY

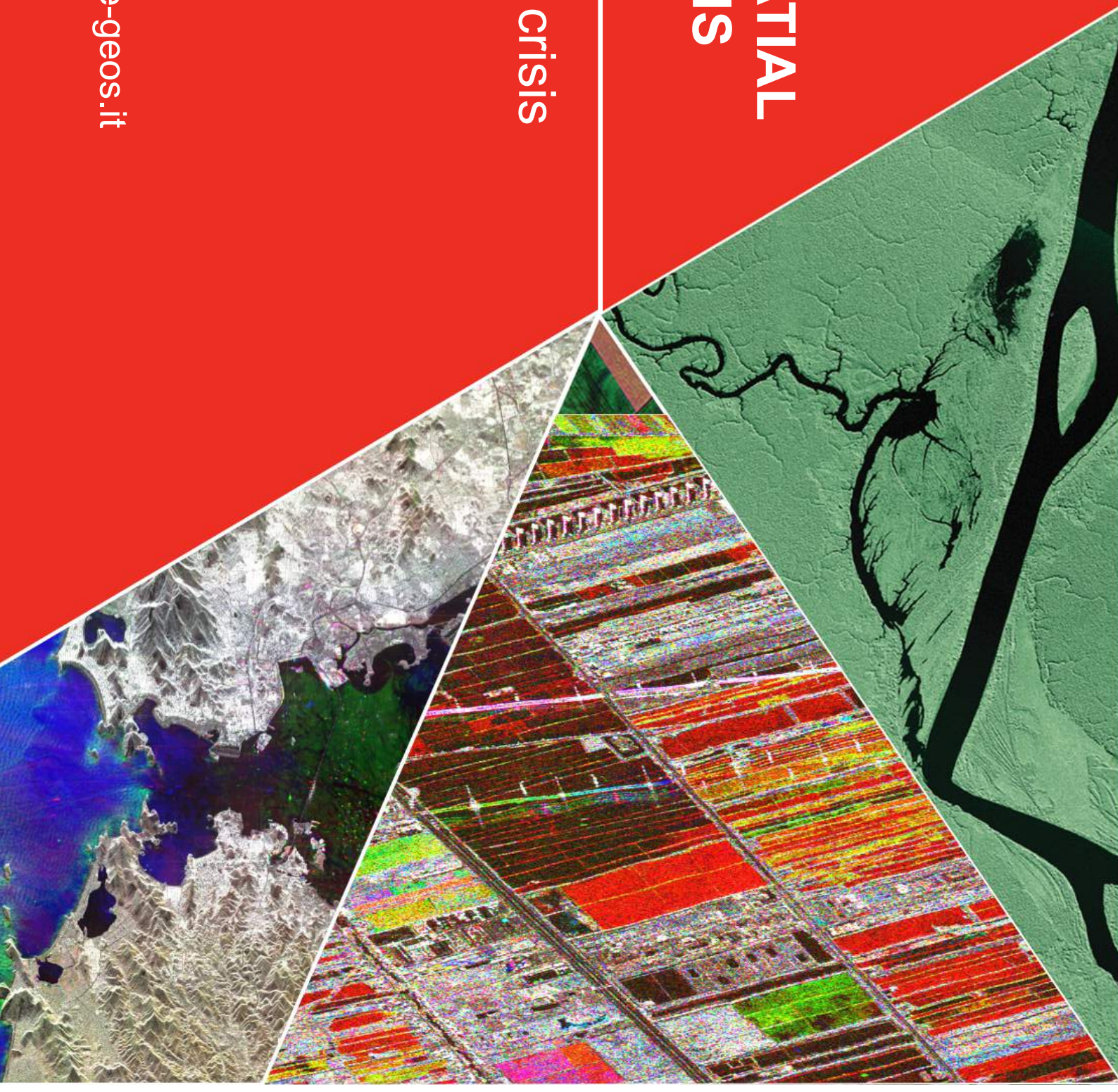
# YOUR HUB FOR GEOSPATIAL APPLICATIONS

Copernicus and crisis  
management

PSCE Conference

Domenico Grandoni  
Product Manager

[domenico.grandoni@e-geos.it](mailto:domenico.grandoni@e-geos.it)



# Copernicus at a glance – What is it?

A source of information for policymakers, scientists, businesses and the public at large

A European response to global needs to manage the environment, and to ensure civil security



A user-driven programme of

An integrated Earth Observation system of systems (combining space-based and in-situ data with Earth System Models and



# Copernicus at a glance - Objectives



Source: Copernicus Days Rome, 7-8 October 2014

# Copernicus at a glance – Components



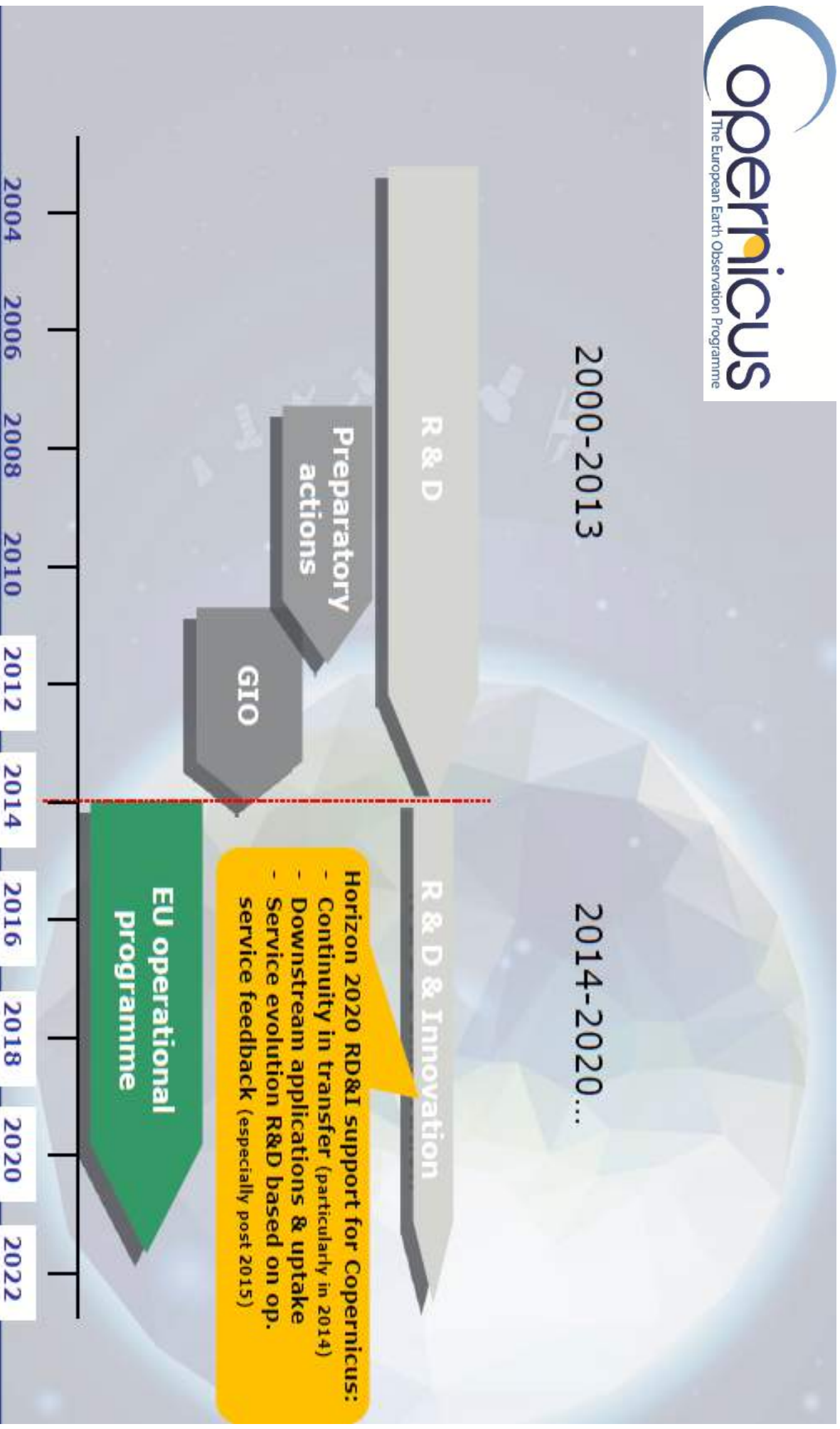
e-geos

AN ASI / TELESPAZIO COMPANY

Source: Copernicus Days Rome, 7-8 October 2014

All rights reserved © 2014 e-GEOS

# Copernicus at a glance – From R&D to Operations



e-geos

AN ASI / TELESPAZIO COMPANY

Source: Copernicus Days Rome, 7-8 October 2014

All rights reserved © 2014 e-GEOS

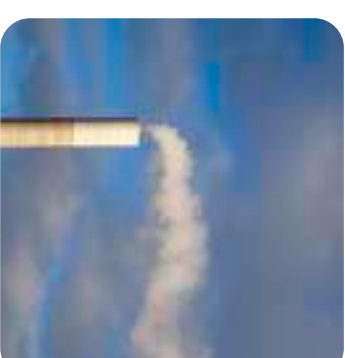
## Services monitoring Earth systems



Land



Marine



Atmosphere

## Horizontal services



Emergency

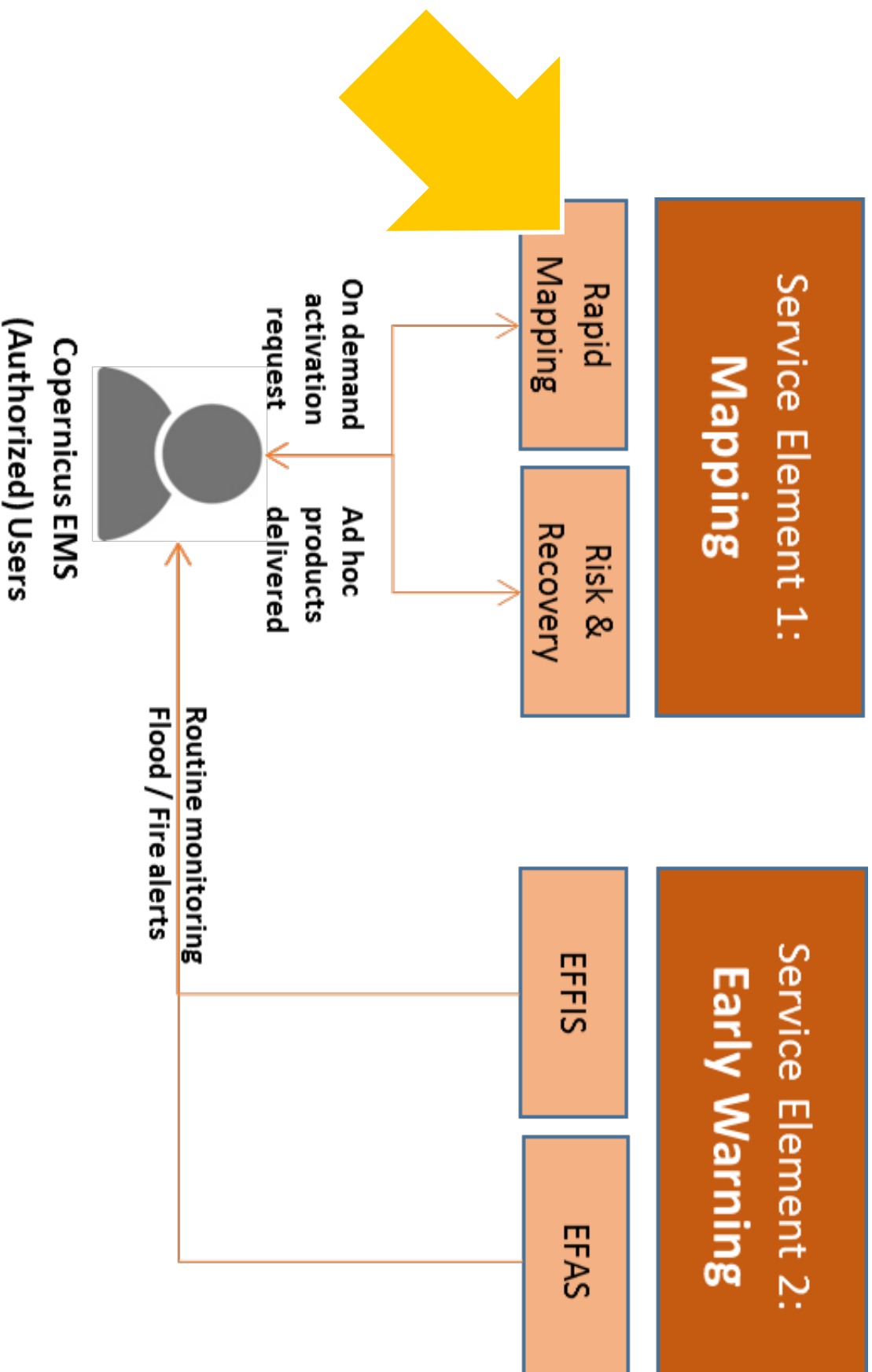


Security



Climate Change

# Copernicus EMS - Overview



# Copernicus EMS Rapid Mapping - Overview

**What:** a EU Copernicus Service providing geo-information products (i.e. maps) to support civil protection and humanitarian aid operators in their tasks related to the prevention, preparedness and reaction to natural/man made disasters.

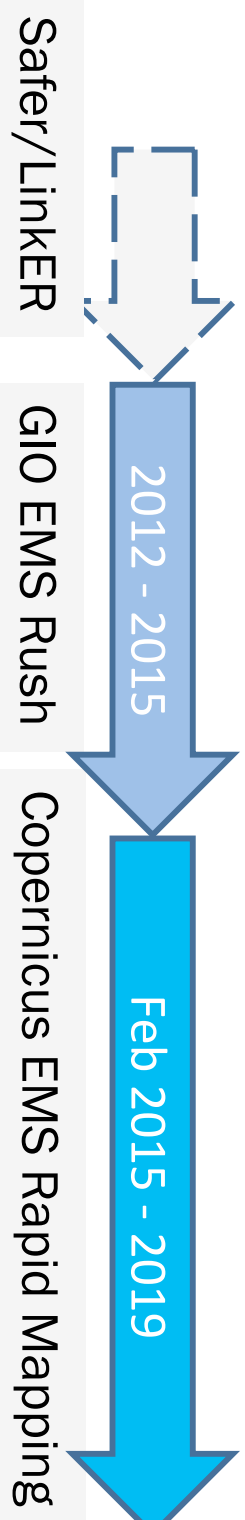
**Users:** authorities entitled to manage civil security related aspects in the different European Member States as well as international organizations such as the United Nations, the World Bank or other NGOs.

QUICK FACT SHEET	
<b>NAME</b>	<b>COPERNICUS EMERGENCY MANAGEMENT SERVICE – RAPID MAPPING</b>
<b>Coordinator</b>	Joint Research Center (European Commission)
<b>Provided info</b>	Several types of maps over crisis area
<b>Area</b>	Worldwide
<b>Source</b>	Satellite data, integrated with other geodata
<b>Delivery</b>	Few hours after satellite acquisition
<b>Service availability</b>	All-year-round 24/7

The screenshot shows the website for Copernicus EMS - Mapping. At the top, there is a navigation bar with the European Commission logo and the text 'COPERNICUS EMERGENCY MANAGEMENT SERVICE' and 'GIO EMS - Mapping'. Below this, there is a section titled 'EMS - Mapping' with a list of bullet points: 'who can use the service', 'How to use the service', 'Products: Rapid Mapping', 'Products: Risk and Recovery', 'Quality control / Feedback', and 'User guide'. To the right of this list is a '24/7 365' logo, which is a clock face with the numbers 24, 7, and 365, and it is highlighted with a red box. Below the navigation bar, there is a section titled 'Copernicus Emergency Management Service - Mapping' with the subtitle 'A service in support of European emergency response'. This section features a world map with various regions labeled (AMERICA, NORTH AMERICA, SOUTH AMERICA, AFRICA, ASIA) and a 'Project Management Office' box. The 'Project Management Office' box contains the text 'On Duty Operator e-geos GAF AG' and an image of a globe with a headset, also highlighted with a red box. At the bottom right of the screenshot is the 'copernicus' logo.



# Copernicus EMS Rapid Mapping – Brief history



- Continue of GIO EMS Rush Service (2012 – 2015)
- Provision of geo-information in emergency situations so far 162 activations worldwide
- 24/7/365 availability
- Standardized products



# Copernicus EMS - Stakeholders

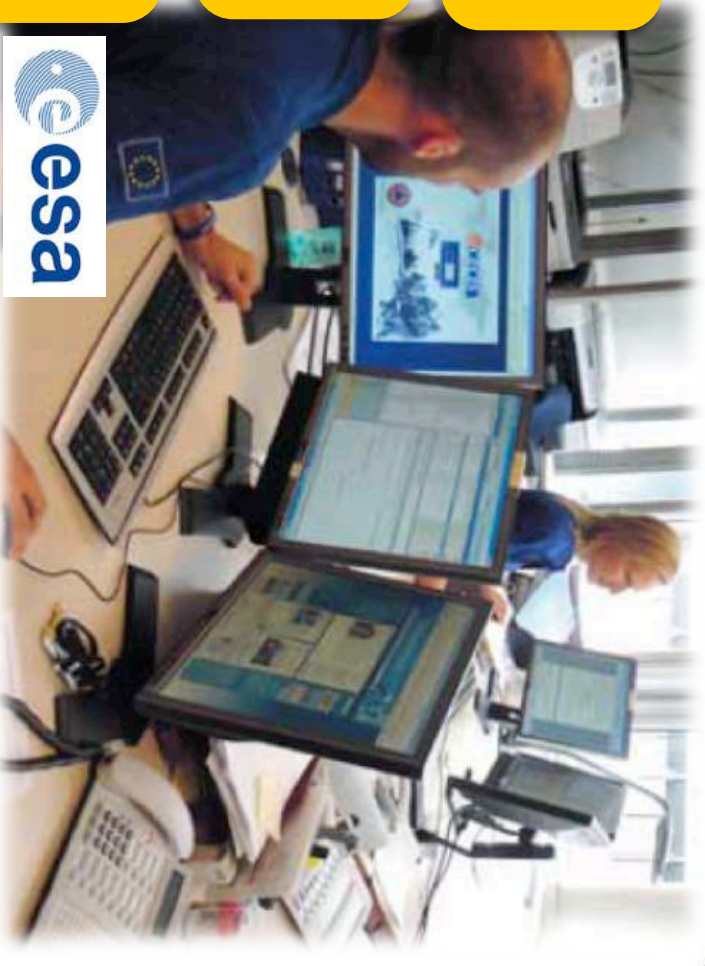
**DG JRC**  
Technical supervision of operations and Contract management

**DG ECHO**  
24/7 Emergency Response Coordination Centre (ERCC) accepts / denies requests for activation

**ESA**  
EO data via a delegated act from the Commission (GSC-DA Program)

**Authorised Users:**  
National Focal Points, they can submit a request for activation to the ERCC

**DG GROW Copernicus Unit**  
Overall program coordination and political steer



## Reference Map

Pre event map



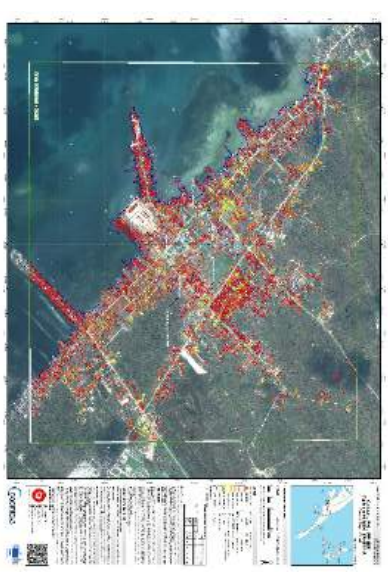
## Delineation Map

Post event disaster extent



## Grading Map

Post event damage extent



## PRODUCT TYPE

### ➤ Digital raster data products

- Full-colour, Format ISO A1
- Resolution 100 – 200 – 300 dpi
- JPG + World-File
- GeoTiff
- GeopDF
- Metadata

### ➤ Digital vector data products

- Depending on the requirements (Crisis Information, administrative boundaries, toponyms, water, settlements, ...)
- ESRI shape Format
- Google Earth KML Format

## PRODUCT FORMAT

## SERVICE LEVEL

### Service Level 1 (SL1) delivery time

- Reference maps: 9 hours
- Delineation/Grading maps: 3 hours (FAM), 12 hours (Final)

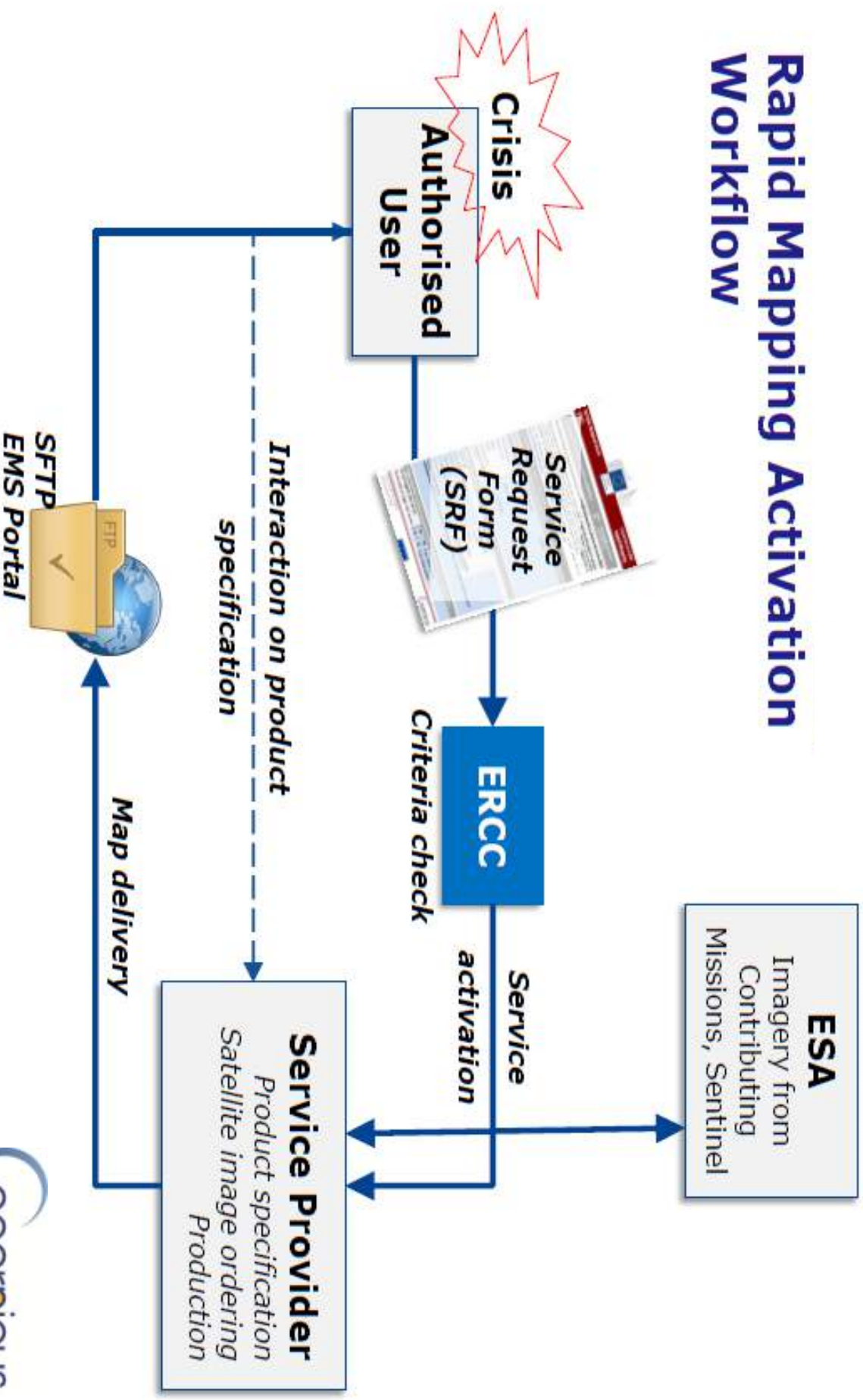
### Service Level 5 (SL5) delivery time

- Reference maps: 5 working days
- Delineation/Grading maps: 5 working days

**All times are considered starting from the availability of suitable satellite data**

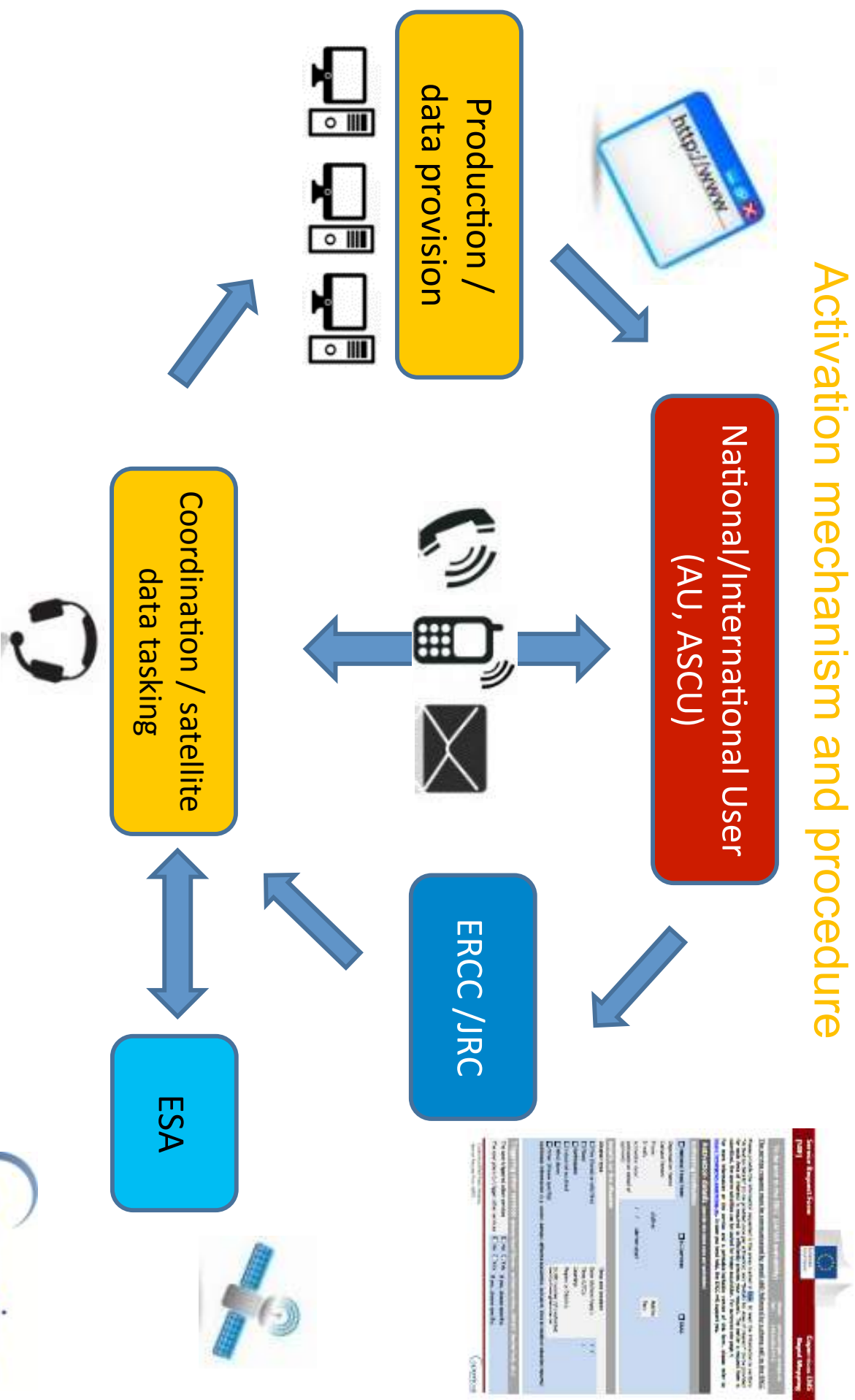
# Copernicus EMS Rapid Mapping – Workflow

## Rapid Mapping Activation Workflow



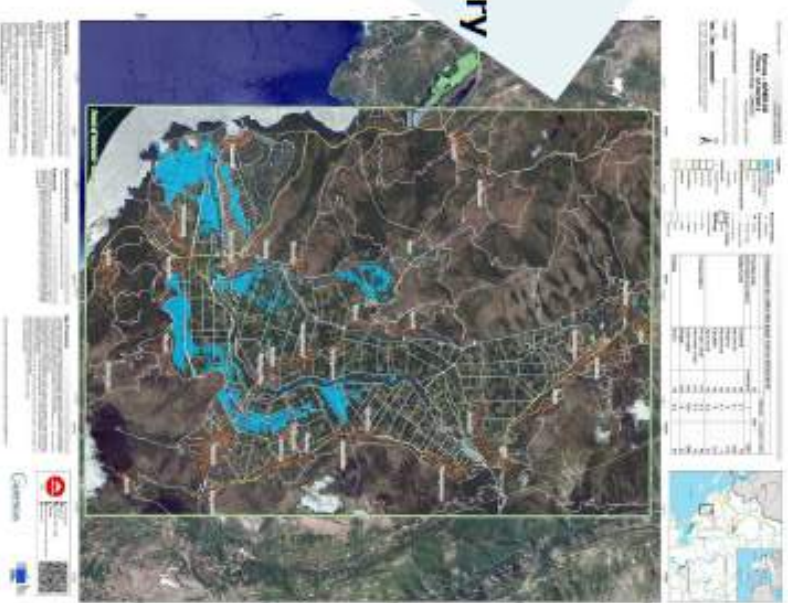
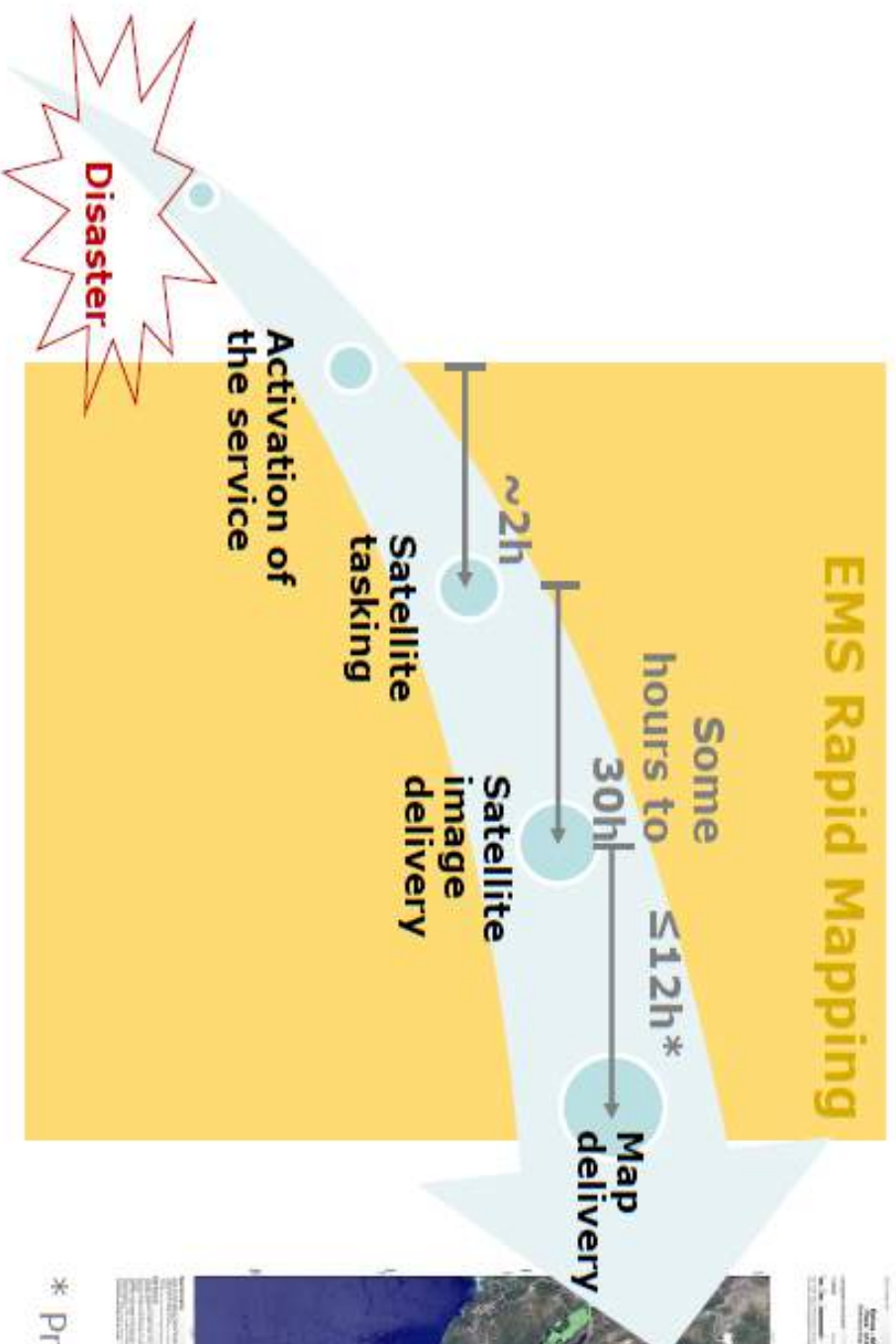
# Copernicus EMS Rapid Mapping – Workflow

## Activation mechanism and procedure



# Copernicus EMS Rapid Mapping – Timeline

## Typical Timeline



\* Production time in service level 1

# Copernicus EMS Rapid Mapping – Activation



Word or PDF version to be sent as an e-mail attachment and followed by a phone alert to the ERCC.

## Copernicus EMS – Mapping Rush Mode Service Request Form (SRF)



To be sent to the ERCC (24/365 availability)

Any service request must be communicated by email AND phone call

By email: [echo-ercc@ec.europa.eu](mailto:echo-ercc@ec.europa.eu)

Contact tel: +32-2-29-21112

This form is available in printable/ editable format: <http://emrgency.copernicus.eu>

To be completed by the Service Requestor:

National Focal Point  EU Focal Point  Other Authorised User  
(please tick the pertinent option)

Organisation Name:

Focal point (if applicable):

Contact Person:

Phone (Office):

Phone (Mobile):

E-mail:

Date (dd/mm/yyyy):

/

/

/

/

:

:

:

Type of disaster

Forest fire, wild fire

Flood, tsunami

Wind storm

Earthquake

Industrial accident

Other (Please specify):

Details on the disaster

Date (dd/mm/yyyy):

/

/

/

/

:

:

:

Time (UTC):

:

:

:

:

:

:

:

Country:

:

:

:

:

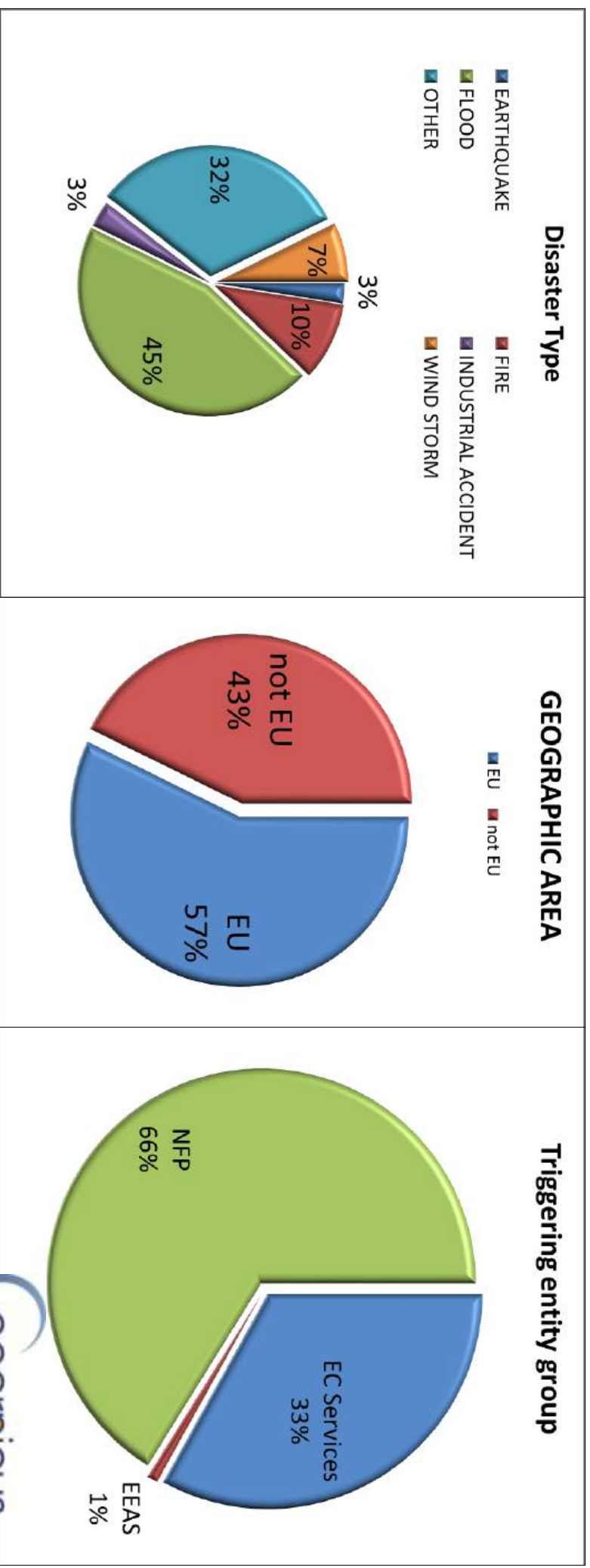
:

:

:

## Summary of the Copernicus EMS RM since April 2012

Service was activated **162** times, more than **1700** maps produced (approx. 40 activations per year). More than **50 countries** worldwide involved, of which **22 EU MS**. Serving more than **40** different Users





# Activation – Earthquake in Nepal



Karim Prasad Ngachui / UNDP Nepal

## **Event description:**

A violent earthquake with a magnitude of 7.9M, 10Km depth has hit central Nepal at 6.11 UTC on the 25th of April. The epicenter is located between the capital city Kathmandu and the city of Pokhara, and the tremor was felt also in several city in the northern parts of India. Several aftershocks as strong as M7.1 were also recorded. Extensive damage to buildings and injuries have been reported.

## **Triggering entity: DG ECHO ERCC (European Commission)**

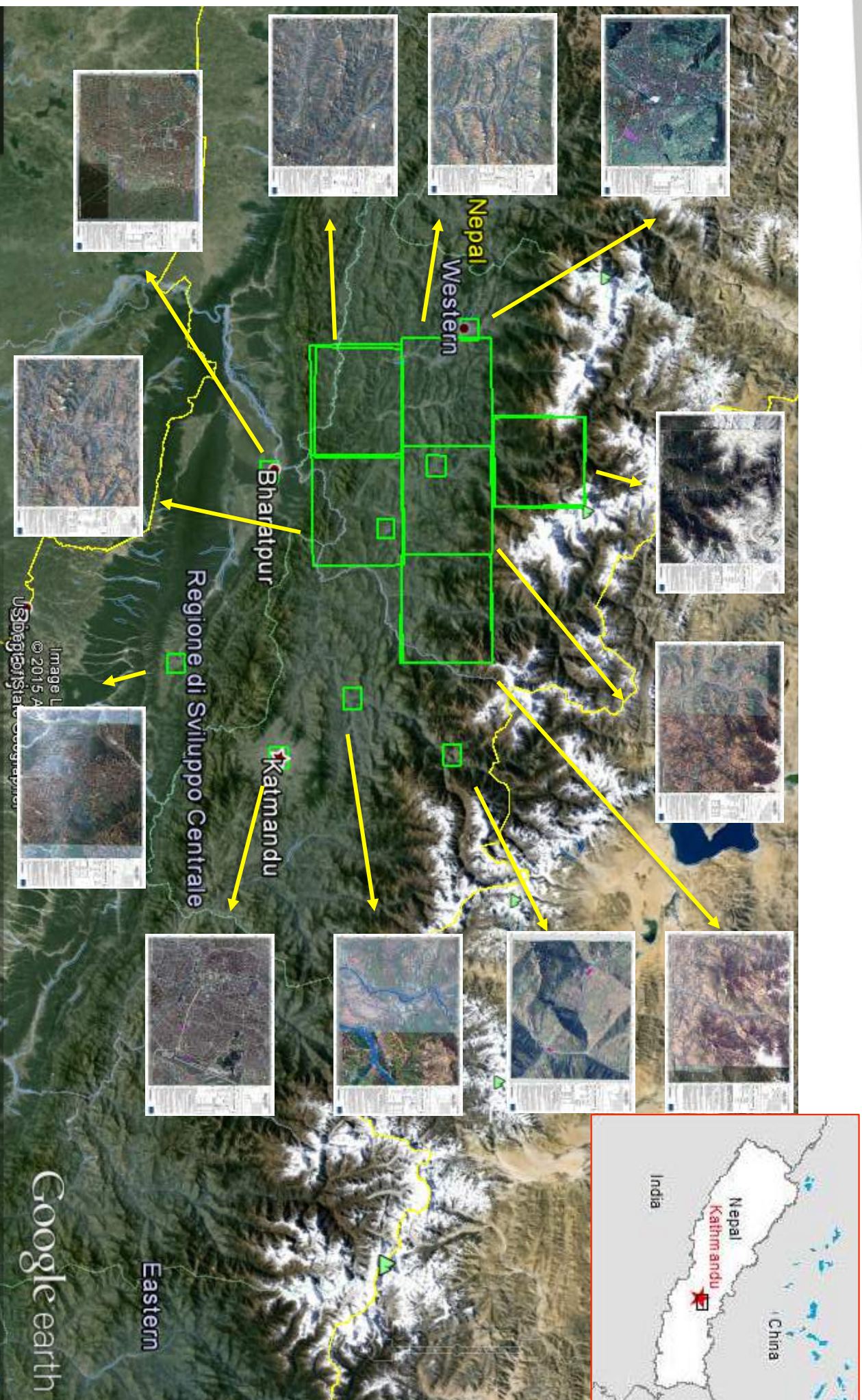
- Copernicus Emergency Management Service in Rapid Mapping mode was activated by the EU Emergency Response Coordination Center (ERCC) on April 25th, 2015 requesting detailed damage assessment over 16 areas of interest spread across the country.
- A wide set of optical very high resolution images were acquired to cover the sparse affected areas, showing damages to buildings, landslides, road blocks and spontaneous gathering areas.

**e-geos**

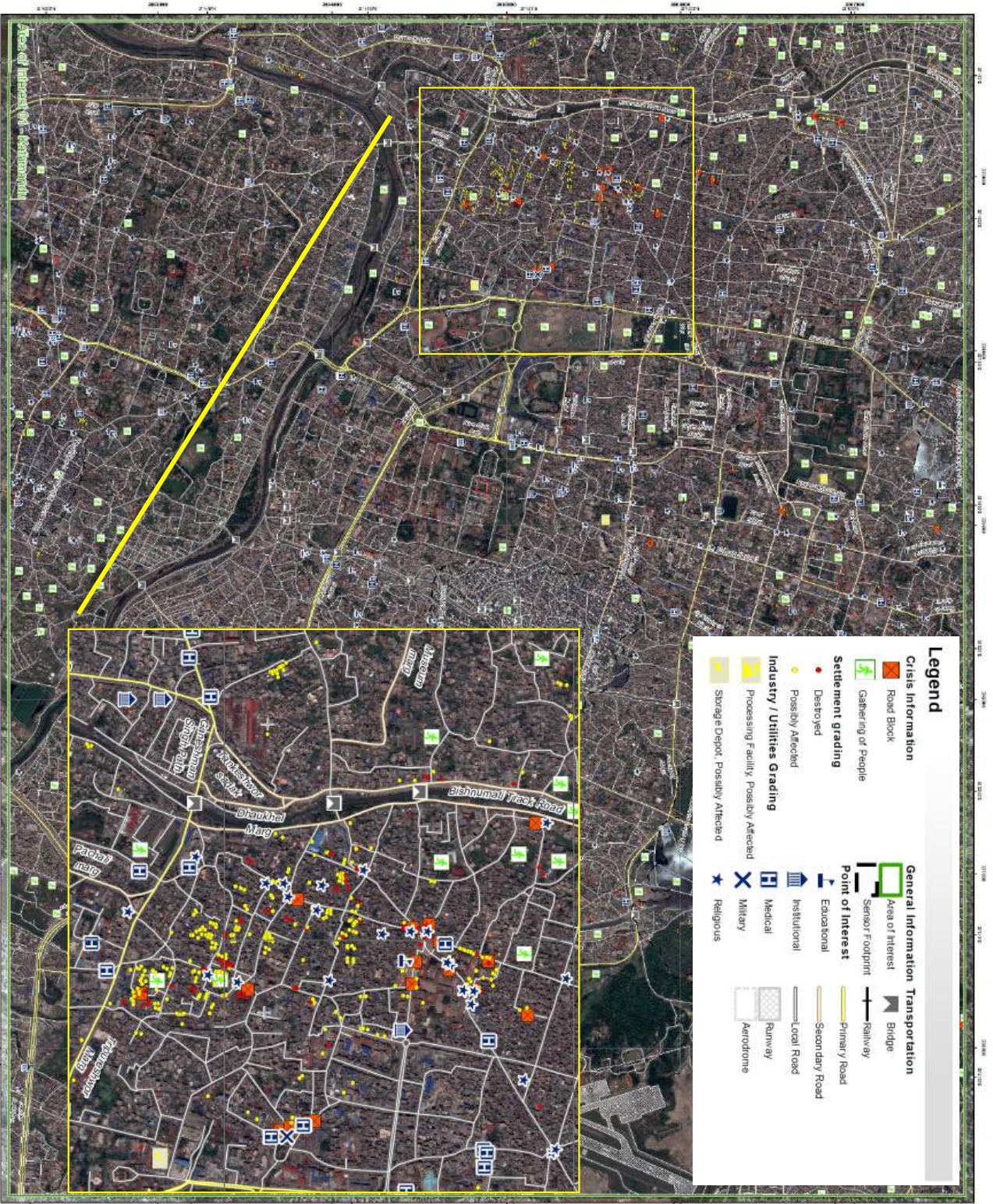
AN ASI / TELESPAZIO COMPANY

All rights reserved © 2014 e-GEOS

# A widespread disaster, 16 Areas Of Interest



# Mapping damages and gathering of people in Kathmandu



**Kathmandu - NEPAL**  
**Earthquake - 25/04/2015**  
 Grading Map

Scale: 1:10000

**Legend**

- Area of Interest
- Sensor Footprint
- Point of Interest: Educational, Institutional, Medical, Military, Religious
- Transportation: Bridge, Railway, Primary Road, Secondary Road, Local Road, Runway, Airpotome
- Crisis Information: Road Block, Gathering of People, Settlement grading, Industry / Utilities Grading, Storage Depot

**Data Sources**

Source	Product	Resolution	Projection
OpenStreetMap	OpenStreetMap	30m	WGS 1984
OpenStreetMap	OpenStreetMap	30m	WGS 1984
OpenStreetMap	OpenStreetMap	30m	WGS 1984

**Map Information**

Map Date: 2015-04-25 10:00:00  
 Map Time: 2015-04-25 10:00:00  
 Map User: 10.10.10.10

**Contact**

WorldView-3  
 29/04/2015



Earthquakes



Nepal



29/04/2015



WorldView-3



# Activation examples – UK Floods (2014)



## Event description:

Since the end of January 2014 heavy rainfall have caused severe floods in different districts of southern England. Two severe flood warnings remained in place in the Somerset Levels and river levels were expected to continue rising along the Thames.

## Triggering entity: **UK Cabinet Office**

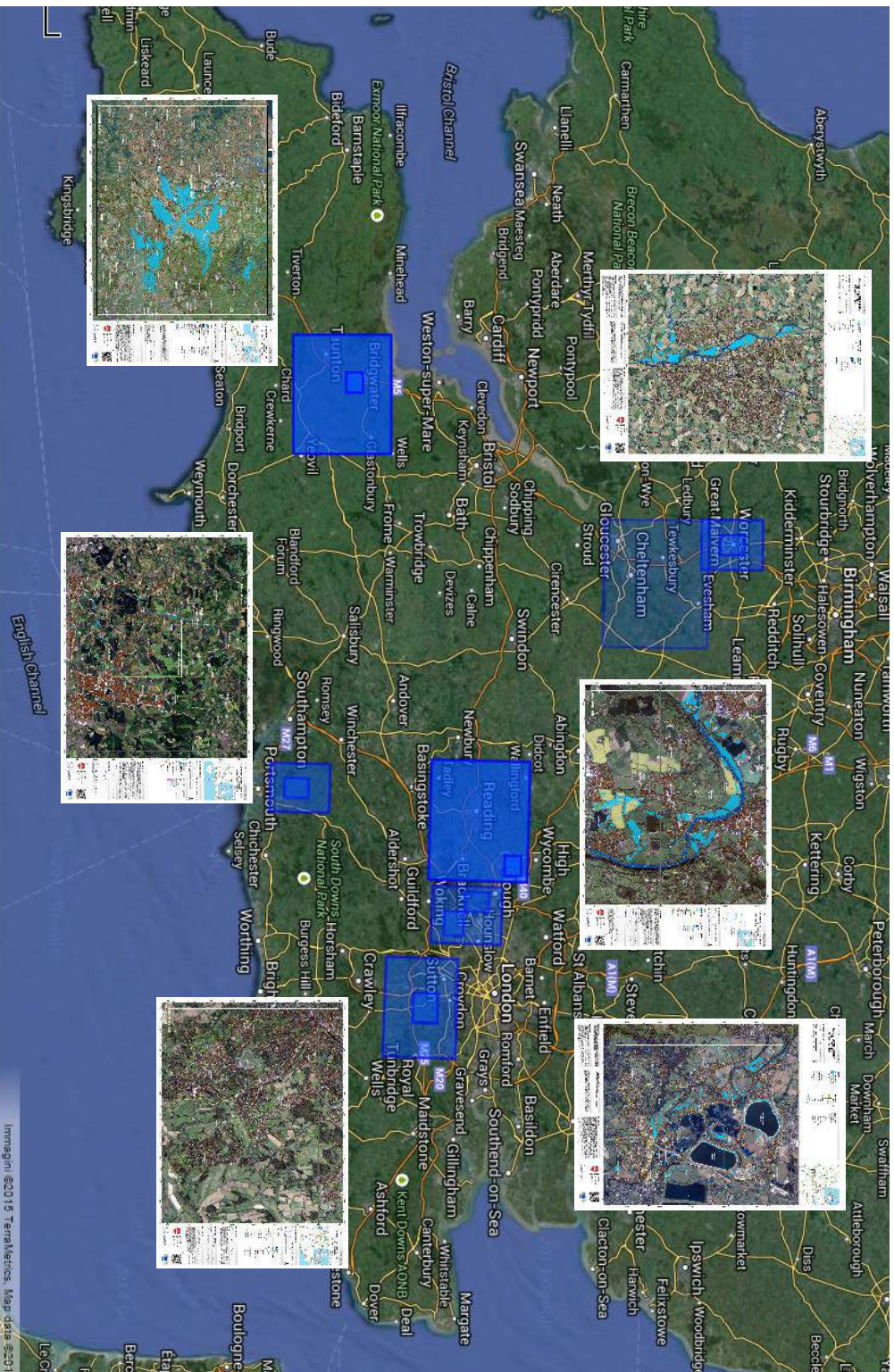
- Copernicus Emergency Management Service was activated on Feb. 10<sup>th</sup>, 2014 by the UK Cabinet Office to provide satellite based flood maps over 14 Areas Of Interest in Southern and Western UK.
- COSMO-SkyMed and Radarsat-2 data were used to map the flood extent over most affected areas

**e-geos**

AN ASI / TELESPAZIO COMPANY

All rights reserved © 2014 e-GEOS

# Extensive flood mapping activity



The Service was activated over 6 different macro

AOI:

- **Maidenhead**
- **Bridgwater**
- **Staines**
- **Worcester**
- **Kenley**
- **Hambleton**

Flood maps were delivered on average **within 24 hours** after service request

**e-geos**

AN ASI / TELESPAZIO COMPANY

All rights reserved © 2014 e-GEOS

# An example – Bridgwater area



**Floods**



**United Kingdom**



**12/02/2014**



**COSMO-SkyMed**

# Activation – Guinea Ebola epidemic



**Event description:**  
2014 Ebola epidemic is the largest in history, affecting multiple countries in West Africa.  
Several European countries are actively contributing to relief operations, providing in situ medical support.

## Triggering entity: Civil Security - Belgium

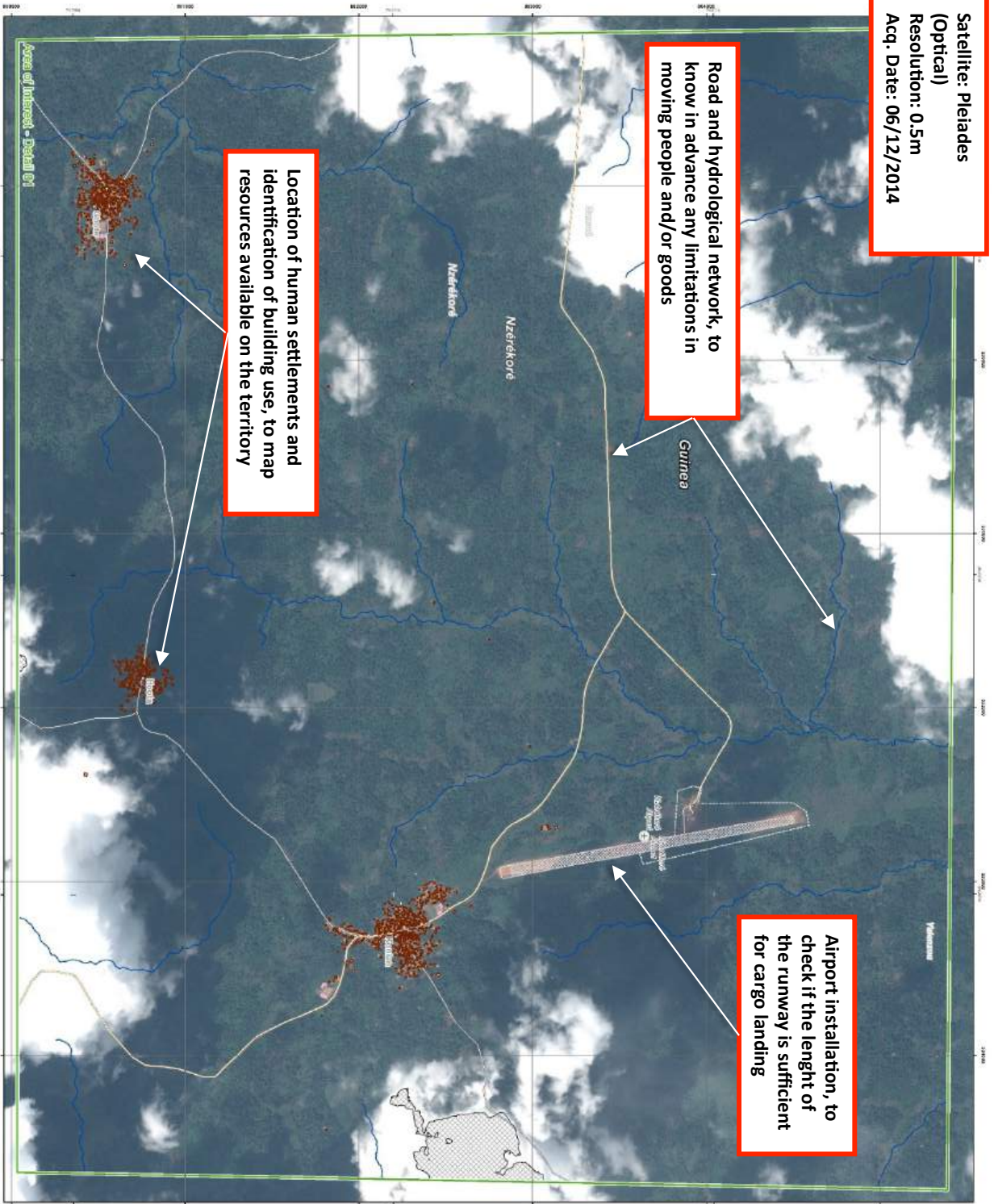
- Copernicus Emergency Management Service in RUSH mode was activated by the Belgian Civil Security Agency on 22<sup>nd</sup> November, 2014 in order to provide an updated cartography of the area in Guinea where the Belgian medical support unit is going to be deployed in the near future.

Satellite: Pleiades  
(Optical)  
Resolution: 0.5m  
Acq. Date: 06/12/2014

Road and hydrological network, to know in advance any limitations in moving people and/or goods

Location of human settlements and identification of building use, to map resources available on the territory

Airport installation, to check if the length of the runway is sufficient for cargo landing



**Cartographic information**  
Scale: 1:110000  
Projection: UTM  
Datum: WGS 1984  
Units: Meter

**Legend**  
Roads: National Road, District Road, Local Road, Rural Road, Pathway, Footpath, Unimproved Road, Road under construction  
Hydrology: River, Stream, Canal, Dam, Reservoir, Lake, Pond, Marsh, Wetland, Swamp, Shallow water, Deep water, Ice, Snow, Perennial water, Seasonal water, Intermittent water, Dry watercourse, Watercourse under construction

**Coordinates & Area Data**

Parameter	Value
Longitude	12° 15' 00" W
Latitude	9° 00' 00" N
Area (km²)	110000
Scale	1:110000

**Map Production**  
Map scale: 1:110000  
Map projection: UTM  
Map datum: WGS 1984  
Map units: Meter  
Map coordinate system: UTM  
Map projection: UTM  
Map datum: WGS 1984  
Map units: Meter  
Map coordinate system: UTM

**Map Information**  
Map scale: 1:110000  
Map projection: UTM  
Map datum: WGS 1984  
Map units: Meter  
Map coordinate system: UTM

**Map Production**  
Map scale: 1:110000  
Map projection: UTM  
Map datum: WGS 1984  
Map units: Meter  
Map coordinate system: UTM



# Activation – Typhoon in The Philippines

## **Event description:**

In the early morning of Friday November 8<sup>th</sup>, 2013 typhoon Haiyan made landfall over Guianan in Eastern Samar. It continued its route over the Philippines causing severe flash floods, destruction and casualties in several areas.



## **Triggering entity: EU Emergency Response Coordination Center**

- Copernicus Emergency Management Service in RUSH mode was activated by the EU Emergency Response Coordination Center (ERCC) on November 8th, 2013 requesting detailed damage assessment over 10 areas of interest spread across the typhoon track.

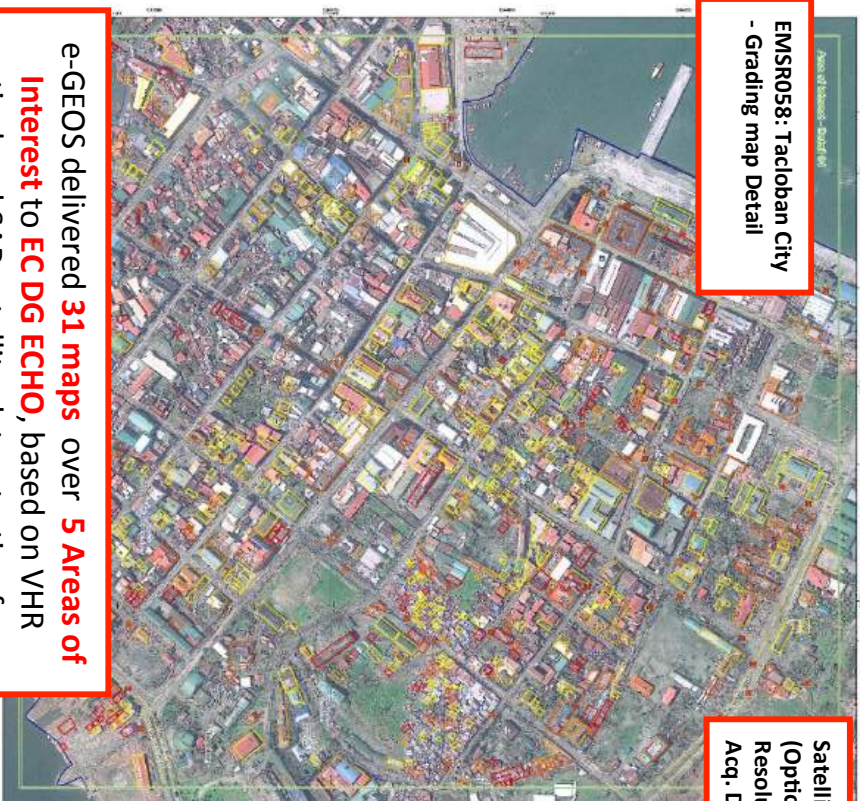
# Damage assessment maps



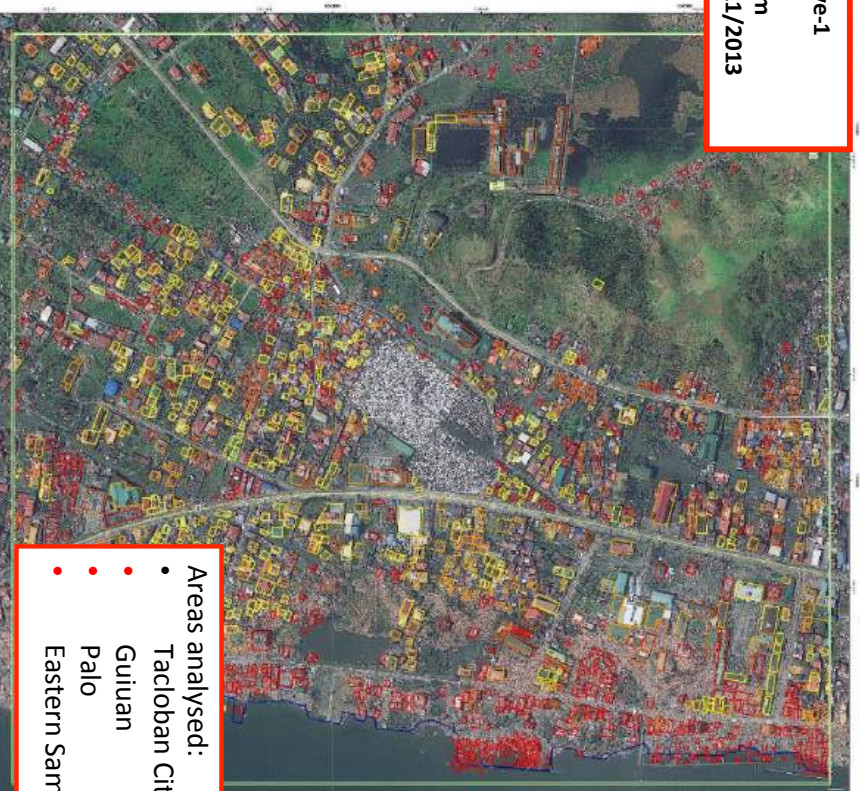
**EMSR058: Tacloban City**  
- Grading map Detail



**Satellite: GeoEye-1**  
(Optical)  
Resolution: 0.5m  
Acq. Date: 10/11/2013



e-GEOS delivered **31 maps** over **5 Areas of Interest** to **EC DG ECHO**, based on VHR optical and SAR satellite data, starting from **20 hours** after activation



- Areas analysed:
- Tacloban City
  - Guiuan
  - Palo
  - Eastern Samar

## The New York Times

www.nytimes.com/interactive/2013/11/11/world/asia/typhoon-haiyan-map.html?\_r=0



levelled by the storm surge, which  
water over half a mile inland  
in some places.

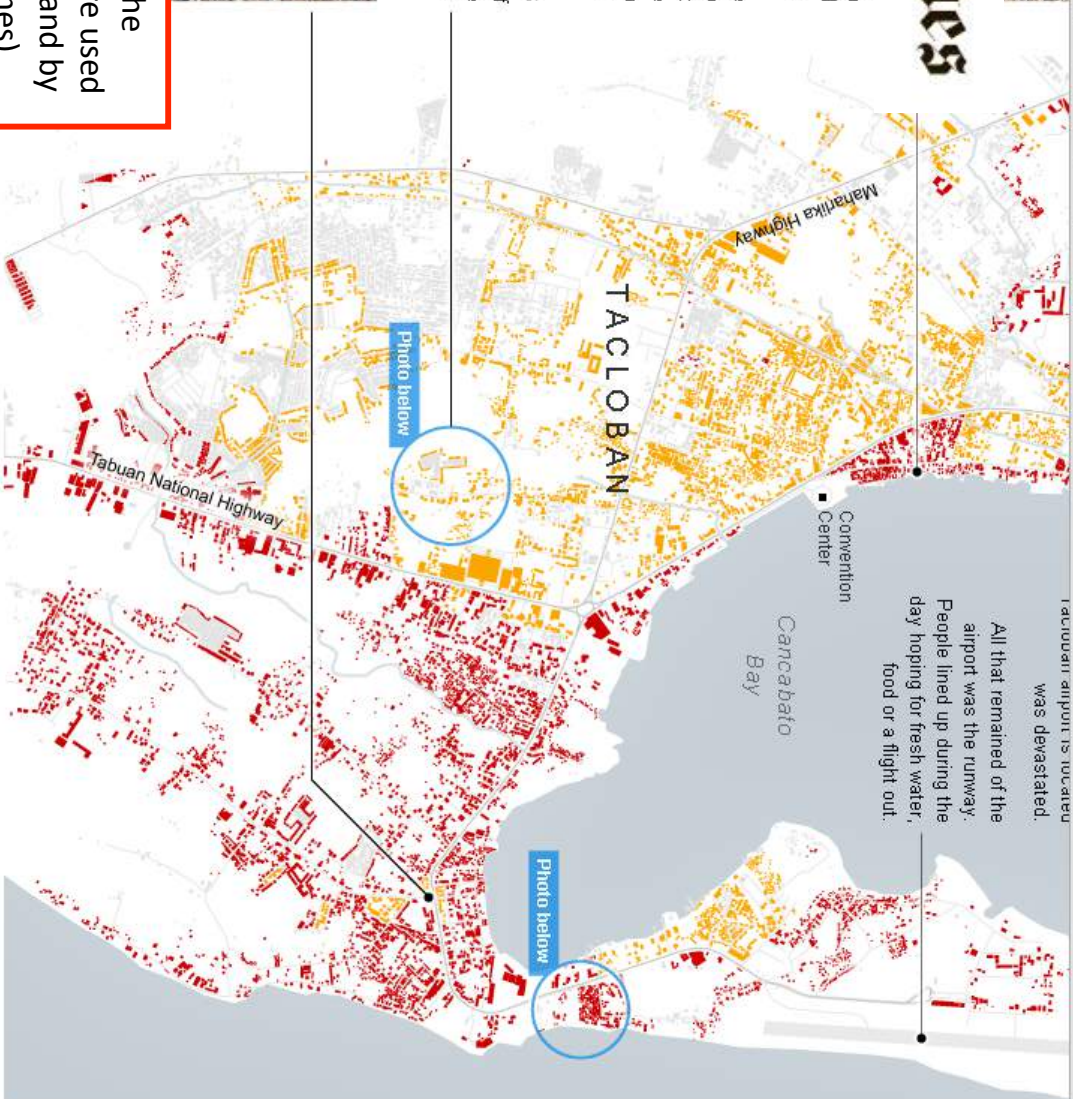
Homes all along the coast were  
completely destroyed. According to

us office, about  
in the city have  
alls, and one in  
ave grass roofs.

**LOODED AREAS**  
hoods south of  
downtown were  
aled with water.



Maps and data published in the  
Copernicus Emergency portal were used  
both by humanitarian operators and by  
mass media (e.g. New York Times)



Sources: European Commission Copernicus Emergency Management Service; OpenStreetMap

# Activations – Refugees in Jordan



## Event description:

- Since August 2012 the conflict in Syria has been forcing civil population to migrate towards the border with the nearby Jordan
- A IDP camp has been set up by UNHCR in Al Mafraq area

## Triggering entity: **German BBK on behalf of THW (through EC MIC)**

- e-GEOS has been activated by the German BBK on behalf of THW (German entity for humanitarian aid operations) to regularly monitor the evolution of Al Mafraq IDP camp.
- e-GEOS has been regularly acquiring both optical and SAR data over more than six months, providing constant updates to the relief operators involved.

# Optical based monitoring



EMSR-014 – Refugee camp in Jordan |  
 Monitoring period: August 2012 – September 2012  
 AI Mafraq | User: BBK - THW

Al Mafraq - JORDAN  
 Refugee camp authorized area  
 Reference Map - Data from 2012

Scale: 1:6,000  
 Full color 100 m, high resolution 1000 m

Legend

General Information	Building
AOV/Subsiste Footprint	Center of Unknown
Transportation	Residential
Primary Road	Built-Up Area
Local Road	Refugee camp
Other	Residential
Aerodrome	
Railway	

**Cartographic Information**  
 Full color 100 m, high resolution 1000 m  
 Scale: 1:6,000  
 Data: Unpublished, Source: CBK, 11/04/2012, 2000, 3000  
 Orientation: WGS 84, Spheroid: Everest, Datum: Everest

**Legend**

General Information	Building
AOV/Subsiste Footprint	Center of Unknown
Transportation	Residential
Primary Road	Built-Up Area
Local Road	Refugee camp
Other	Residential
Aerodrome	
Railway	

**MAP INFORMATION**  
 The content of this map is the property of the publisher and is not to be used for any other purpose without the express written consent of the publisher. The publisher is not responsible for any errors or omissions in the map. The publisher is not responsible for any damage or loss resulting from the use of the map. The publisher is not responsible for any changes in the map. The publisher is not responsible for any changes in the map.

**Data Sources**  
 The data for this map is derived from the following sources: CBK, 11/04/2012, 2000, 3000. The data is derived from the following sources: CBK, 11/04/2012, 2000, 3000. The data is derived from the following sources: CBK, 11/04/2012, 2000, 3000.

**Distribution/Publication**  
 The map is published by the publisher. The map is published by the publisher. The map is published by the publisher. The map is published by the publisher. The map is published by the publisher.

**Logos:** gmes, Swiss Red Cross, UNHCR, EU

# Optical – SAR integration

28/11/2012 – 07:05 UTC | WorldView-2 optical acquisition

28/11/2012 – 18:05 UTC | COSMO-SkyMed SAR acquisition



EMSR-014 – Refugee camp in Jordan |

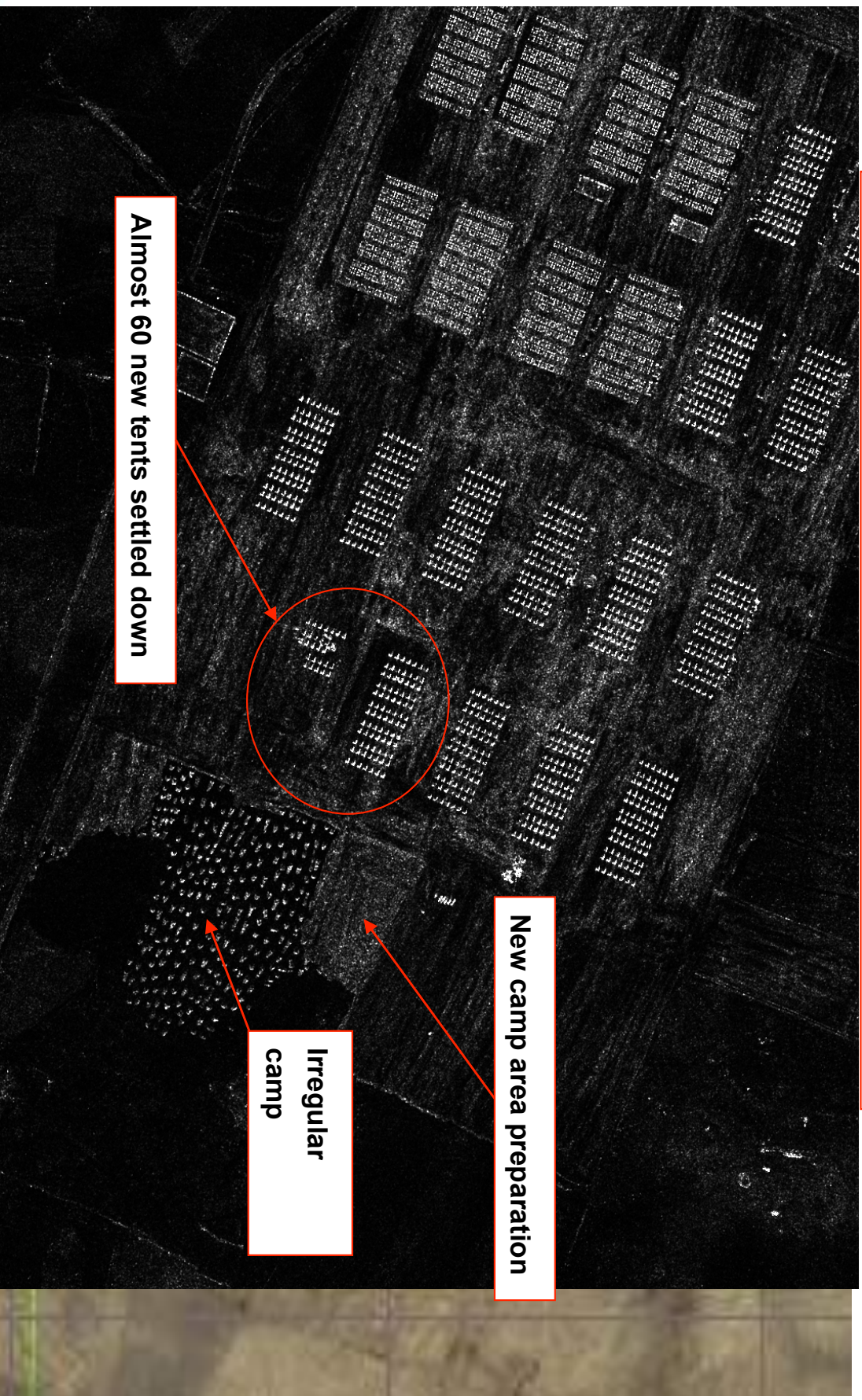
Last update: November 2012

Change detection (12 hours interval) COSMO-SkyMed - World View 2

Al Mafrag | User: BBK - THW

# Very frequent change detection

What happened in 12 hours?



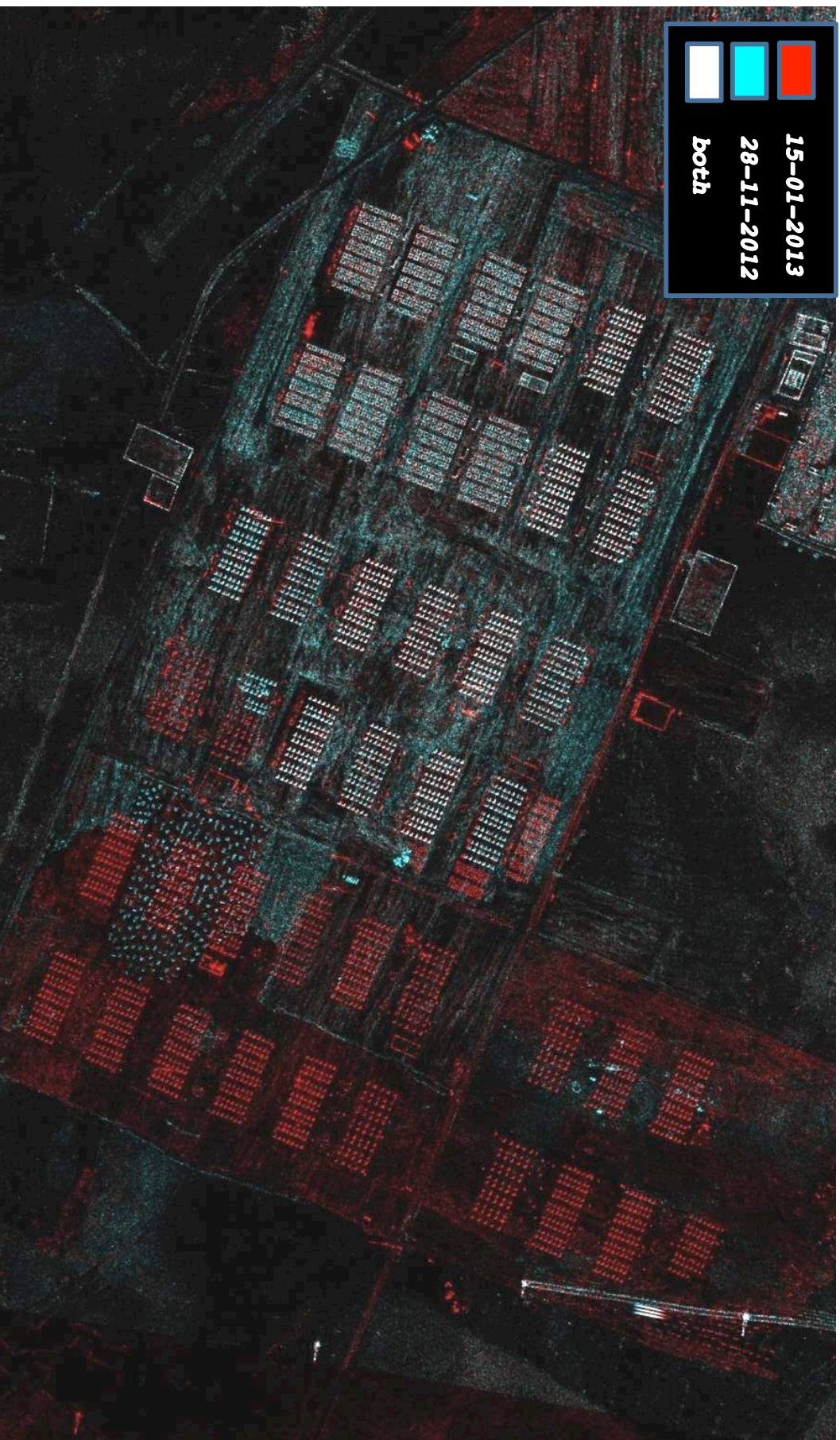
Almost 60 new tents settled down

New camp area preparation

Irregular  
camp

# Change detection over months

Two months later.....





# Fogo Island (Cape Verde) volcanic eruption



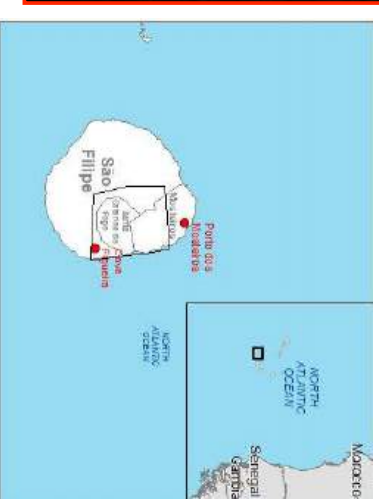
## **Event description:**

The volcano on the island of Fogo, Cape Verde, started erupting on 23 November at 10.00 UTC, emitting gas and lava.

The National Authorities ordered the evacuation of the community of Chã das Caldeiras (700 - 1000 people), located approximately 3km from the erupting peak, Pico do Fogo.

Significant volcanic activity and lava flow continued up until the end of 2014.

It is the first time the volcano on the island of Fogo has erupted since 1995.



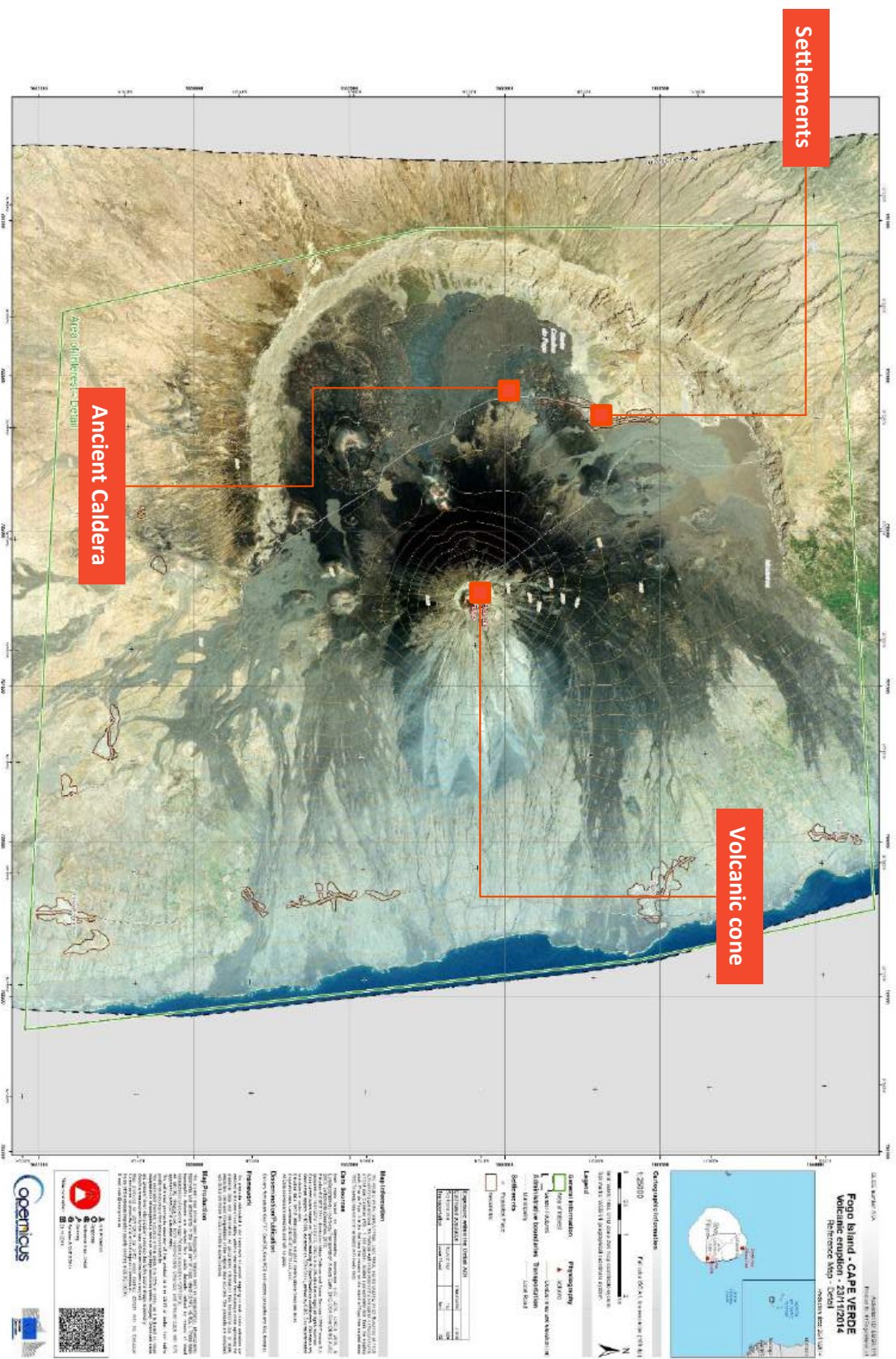
Event: volcanic eruption in Fogo Island (Cape Verde)

**e-geos**

AN ASI / TELEPAZIO COMPANY

All rights reserved © 2014 e-GEOS

# Fogo Island – Reference map



Event: volcanic eruption in Fogo Island (Cape Verde)



# Activation – Cyclone Pam in Vanuatu



## **Event description:**

Tropical Cyclone Pam made land fall on Vanuatu on 13 March 2015 with wind speed superior to 320 km/h, causing widespread damage. Up to 90% of buildings in Port Vila and most of the communication were affected by the storm. Cyclone Pam is the strongest storm to make land fall since the Typhoon Haiyan hit the Philippines in 2013. The full force of Pam was dramatically worse than the predictions, and the humanitarian impact was high.

## **Triggering entity: EU Emergency Response Coordination Center**

➤ Copernicus Emergency Management Service in Rapid Mapping mode was activated by the EU Emergency Response Coordination Center (ERCC) on March 17th, 2015 on behalf of the World bank Global Fund for Disaster Risk Reduction (GFDRR) requesting detailed damage assessment over 9 areas of interest spread across the typhoon track.

# Several Areas of Interest analyzed and positive user feedback



## Areas of Interest:

- Tanna Isangel
- Port Vila South West
- Port Vila South East
- Erromango - Ipota
- Port Vila North
- Tanna - Airport
- Tanna - Sulphur
- Erromango - Unpongkor
- Aneityum - Anelgauhahat

## User feedback (World Bank GFDRR):

- "The grading products allowed validation of ground surveys"
- "The team was happy with the product. We would like to engage with EMS for future events. Thank you for your assistance."
- Overall, the products were rated "very useful"

# Tanna Island – Pre/Post satellite view



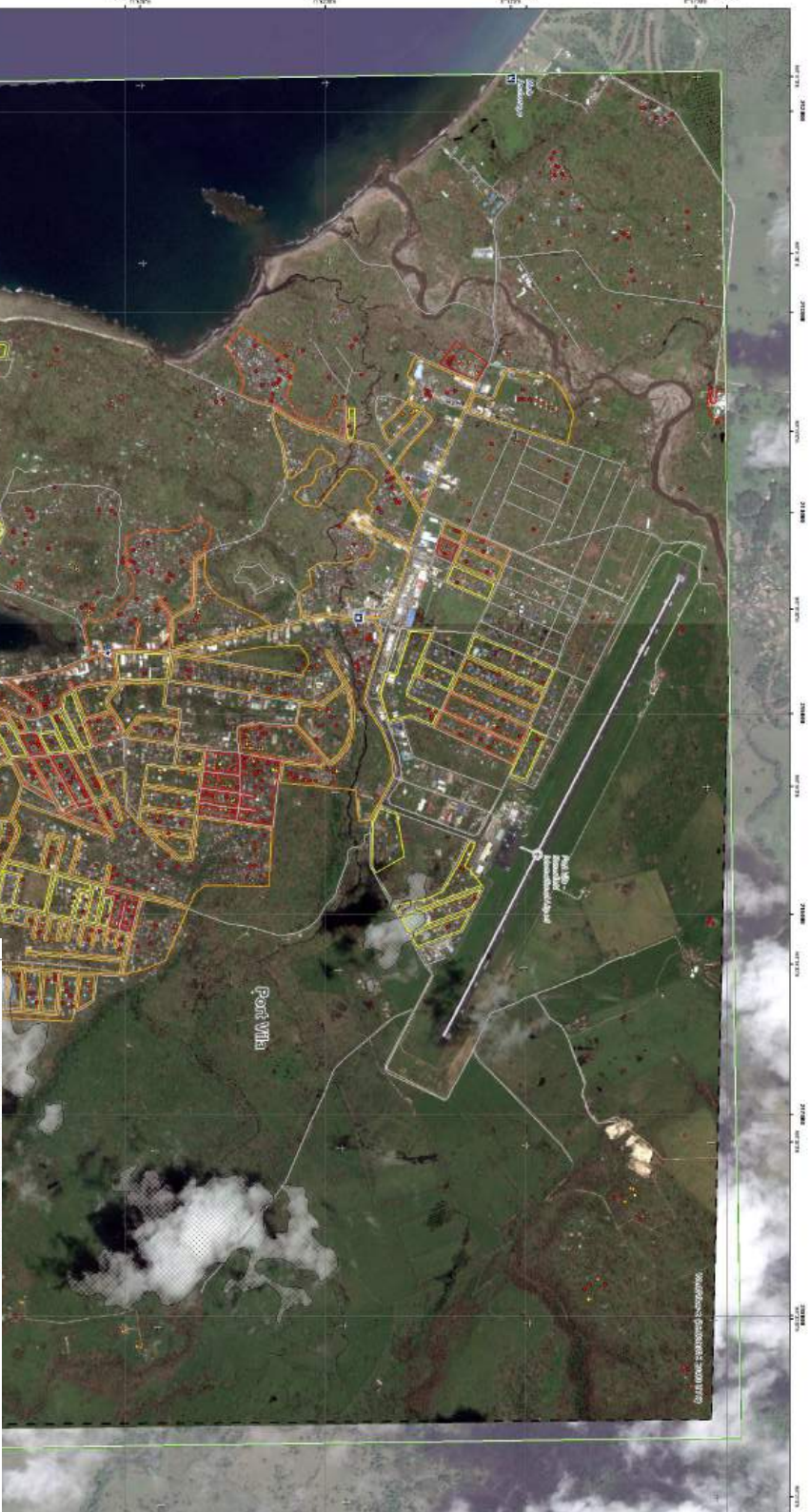
Post event image 17/03/2015 Pleiades 2.5m

e-geos

AN ASI / TELESPAZIO COMPANY

All rights reserved © 2014 e-GEOS

# Damage assessment in Port Vila



### Consequences within the AOI on 17/03/2015

Settlements	Inhabitants in related areas				Destroyed	Highly affected	Moderately affected	Possibly affected	Total affected	Total in AOI
	Residential	Urbanized Multi-functional	Transportation	Agricultural						
	ha	ha	ha	ha	18	61	244	78	401	11737
					2	0	31	61	94	140.1
					0	0	0	0	0	1.1
					0	0	11	0	11	11.0
Transportation										
Secondary roads	km									2.9
Local roads	km									73.5
Runway	km									2.6
Aerodrome	No									1
Crisis Information	Affected settlement	No			423	166	55	10	653	

DATE: 17/03/2015 08:20:21 VIT  
 PROJECT: PORT VILA VANUATU  
**Port Vila North - VANUATU**  
 Wind storm - 14/03/2015  
 Grading Map

Cartographic information  
 1:11,000  
 Full size 100 Mm, max resolution 100 Mm  
 0 0.25 0.5 1 Km  
 Data: VICT 1982 UTM Zone 52S, 2007 coordinate system  
 TMS file: Model: gray, system: UTM, units: meters

Legend  
 Contour lines: 10m, 20m, 30m, 40m, 50m, 60m, 70m, 80m, 90m, 100m, 110m, 120m, 130m, 140m, 150m, 160m, 170m, 180m, 190m, 200m, 210m, 220m, 230m, 240m, 250m, 260m, 270m, 280m, 290m, 300m, 310m, 320m, 330m, 340m, 350m, 360m, 370m, 380m, 390m, 400m, 410m, 420m, 430m, 440m, 450m, 460m, 470m, 480m, 490m, 500m, 510m, 520m, 530m, 540m, 550m, 560m, 570m, 580m, 590m, 600m, 610m, 620m, 630m, 640m, 650m, 660m, 670m, 680m, 690m, 700m, 710m, 720m, 730m, 740m, 750m, 760m, 770m, 780m, 790m, 800m, 810m, 820m, 830m, 840m, 850m, 860m, 870m, 880m, 890m, 900m, 910m, 920m, 930m, 940m, 950m, 960m, 970m, 980m, 990m, 1000m  
 Buildings: 1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61m, 62m, 63m, 64m, 65m, 66m, 67m, 68m, 69m, 70m, 71m, 72m, 73m, 74m, 75m, 76m, 77m, 78m, 79m, 80m, 81m, 82m, 83m, 84m, 85m, 86m, 87m, 88m, 89m, 90m, 91m, 92m, 93m, 94m, 95m, 96m, 97m, 98m, 99m, 100m  
 Roads: 1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61m, 62m, 63m, 64m, 65m, 66m, 67m, 68m, 69m, 70m, 71m, 72m, 73m, 74m, 75m, 76m, 77m, 78m, 79m, 80m, 81m, 82m, 83m, 84m, 85m, 86m, 87m, 88m, 89m, 90m, 91m, 92m, 93m, 94m, 95m, 96m, 97m, 98m, 99m, 100m  
 Vegetation: 1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61m, 62m, 63m, 64m, 65m, 66m, 67m, 68m, 69m, 70m, 71m, 72m, 73m, 74m, 75m, 76m, 77m, 78m, 79m, 80m, 81m, 82m, 83m, 84m, 85m, 86m, 87m, 88m, 89m, 90m, 91m, 92m, 93m, 94m, 95m, 96m, 97m, 98m, 99m, 100m  
 Water: 1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61m, 62m, 63m, 64m, 65m, 66m, 67m, 68m, 69m, 70m, 71m, 72m, 73m, 74m, 75m, 76m, 77m, 78m, 79m, 80m, 81m, 82m, 83m, 84m, 85m, 86m, 87m, 88m, 89m, 90m, 91m, 92m, 93m, 94m, 95m, 96m, 97m, 98m, 99m, 100m  
 Other: 1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61m, 62m, 63m, 64m, 65m, 66m, 67m, 68m, 69m, 70m, 71m, 72m, 73m, 74m, 75m, 76m, 77m, 78m, 79m, 80m, 81m, 82m, 83m, 84m, 85m, 86m, 87m, 88m, 89m, 90m, 91m, 92m, 93m, 94m, 95m, 96m, 97m, 98m, 99m, 100m

Map information  
 UTM Zone 52S, 2007 coordinate system  
 TMS file: Model: gray, system: UTM, units: meters  
 Data: VICT 1982 UTM Zone 52S, 2007 coordinate system  
 TMS file: Model: gray, system: UTM, units: meters

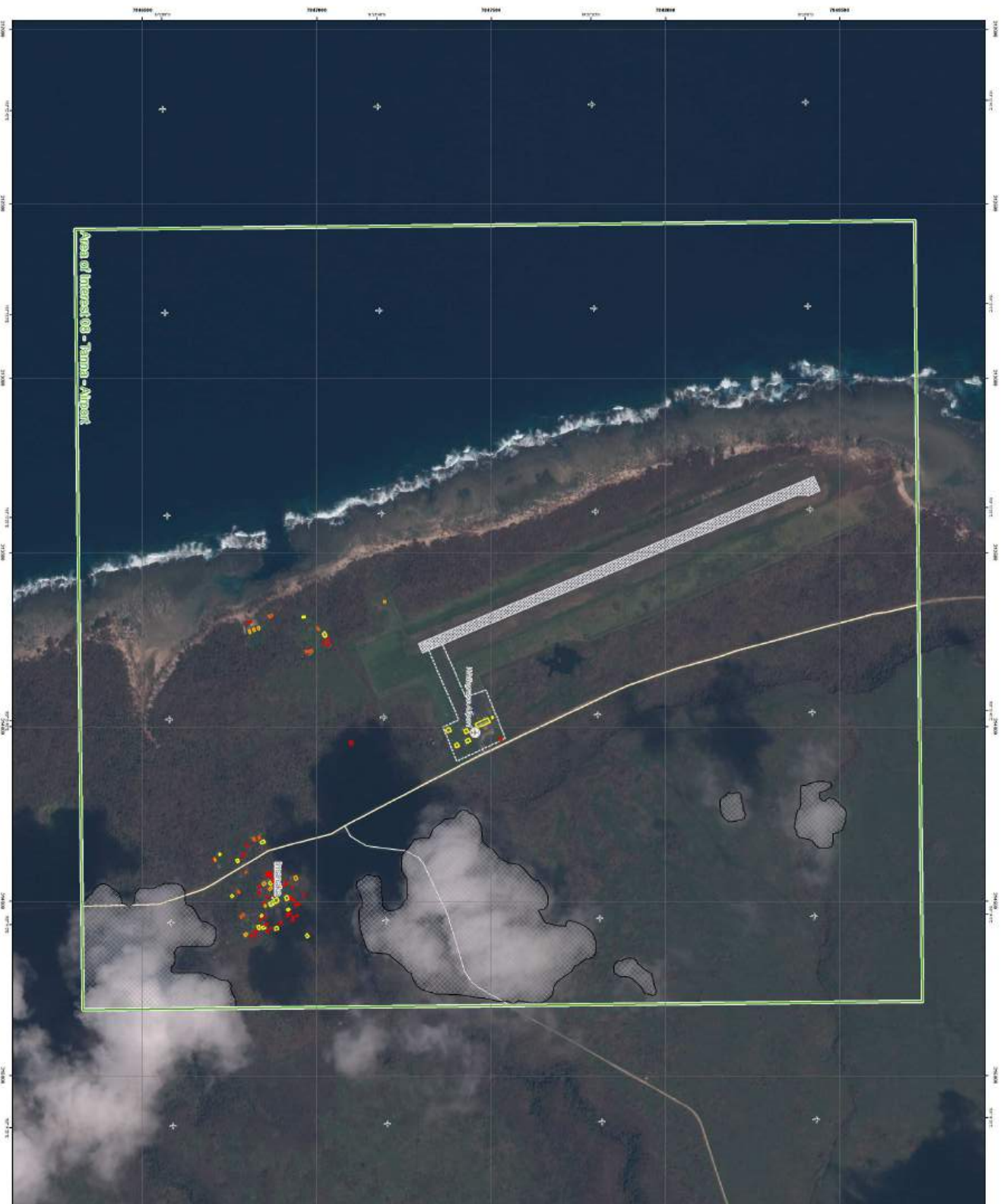
Category	Count	Area (m²)	Percentage (%)
Destroyed	18	1800	1.5
Highly affected	61	6100	5.2
Moderately affected	244	24400	2.1
Possibly affected	78	7800	0.7
<b>Total affected</b>	<b>401</b>	<b>40100</b>	<b>3.4</b>
<b>Total in AOI</b>	<b>11737</b>	<b>1173700</b>	<b>100</b>

0.5 m

16/03/2015

opermicus

# Airport conditions assessment in Tanna island



04.062 INHERIT 16.2016 000026.AVI\*  
 Tanna - Airport - VANUATU  
 Wind storm - 14/03/2015  
 Grading Map



**Cartographic Information**  
 1:8000  
 Full date: 16/03/2015 (Projection: UTM 50Q)  
 Date: 14/03/2015  
 Title: Wind storm - 14/03/2015  
 UTM zone: 50Q  
 UTM datum: WGS 84  
 UTM projection: UTM  
 UTM units: Meter

- Legend**
- Crisis Information**
    - Red: Affected
    - Yellow: Possible affected
    - Green: Not affected
  - General Information**
    - Blue: Airport
    - Grey: Runway
    - Green: Taxiway
    - Black: Check
  - Transportation**
    - Red: Road
    - Grey: Secondary Road
    - Blue: River
    - Green: Stream
    - Black: Dam
  - Settlement**
    - Red: Urban
    - Yellow: Suburban
    - Green: Rural
  - Water**
    - Blue: Lake
    - Green: Pond
    - Black: Swamp

**Map Information**

Map Name	Map Scale	Map Date	Map Author	Map User
Tanna - Airport - VANUATU	1:8000	16/03/2015	Opemnicus	Opemnicus
Tanna - Airport - VANUATU	1:8000	16/03/2015	Opemnicus	Opemnicus
Tanna - Airport - VANUATU	1:8000	16/03/2015	Opemnicus	Opemnicus
Tanna - Airport - VANUATU	1:8000	16/03/2015	Opemnicus	Opemnicus
Tanna - Airport - VANUATU	1:8000	16/03/2015	Opemnicus	Opemnicus

**Data Sources**

DEM: SRTM30 PLUS  
 Vector Data: OpenStreetMap  
 Imagery: WorldView-2  
 Projection: UTM  
 Datum: WGS 84  
 Units: Meter

**Disclaimer**

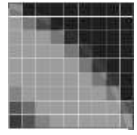
This map is provided as a service of Opemnicus. Opemnicus is not responsible for any errors or omissions in this map. Opemnicus is not liable for any damage or loss resulting from the use of this map. Opemnicus is not responsible for any changes to the map data after the date of publication.

**Map Production**

This map was produced by Opemnicus on 16/03/2015. The map data was sourced from WorldView-2 satellite imagery and OpenStreetMap vector data. The map was produced using the Opemnicus software.

**Contact**

Opemnicus  
 Email: info@opemnicus.com  
 Website: www.opemnicus.com

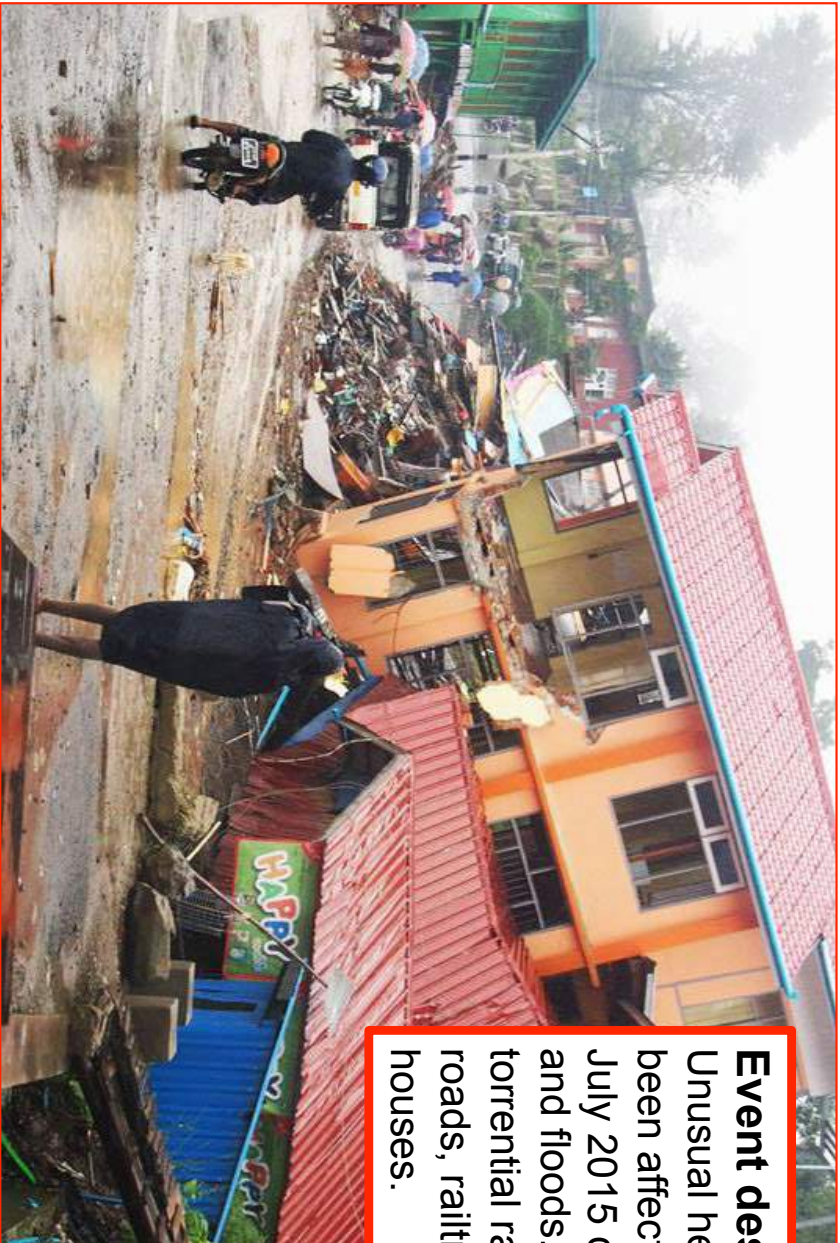


16/03/2015





# Activation – Floods in Myanmar



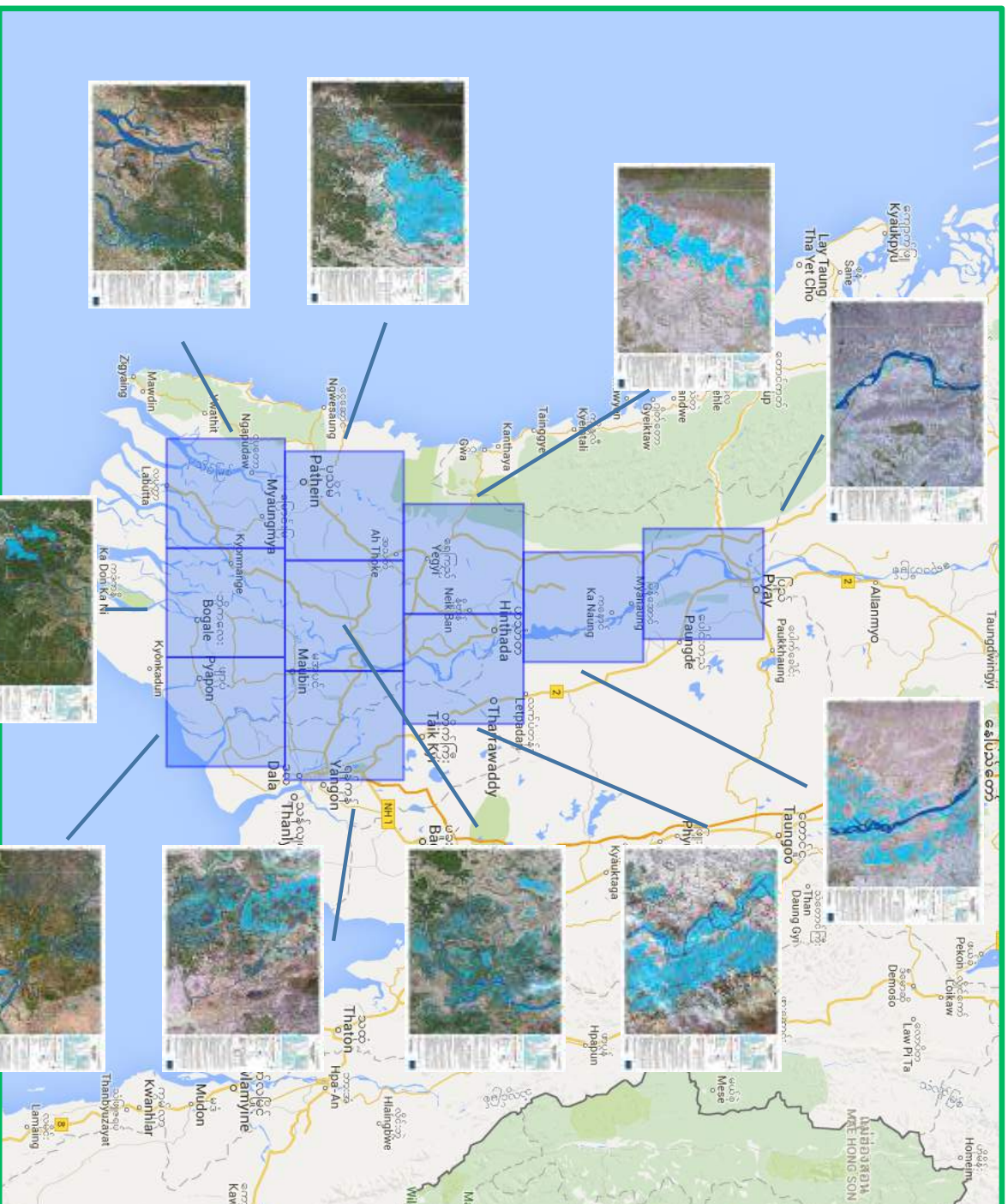
## **Event description:**

Unusual heavy monsoon rains have been affecting Myanmar since 16 July 2015 causing river overflows and floods. In the past few days, torrential rains damaged farmland, roads, railtracks, bridges and houses.

## **Triggering entity: EU Emergency Response Coordination Center**

- Copernicus Emergency Management Service in Rapid Mapping mode was activated by the EU Emergency Response Coordination Center (ERCC) on August 7th, 2015 requesting flood delineation maps over a large area of the country affected by the event.

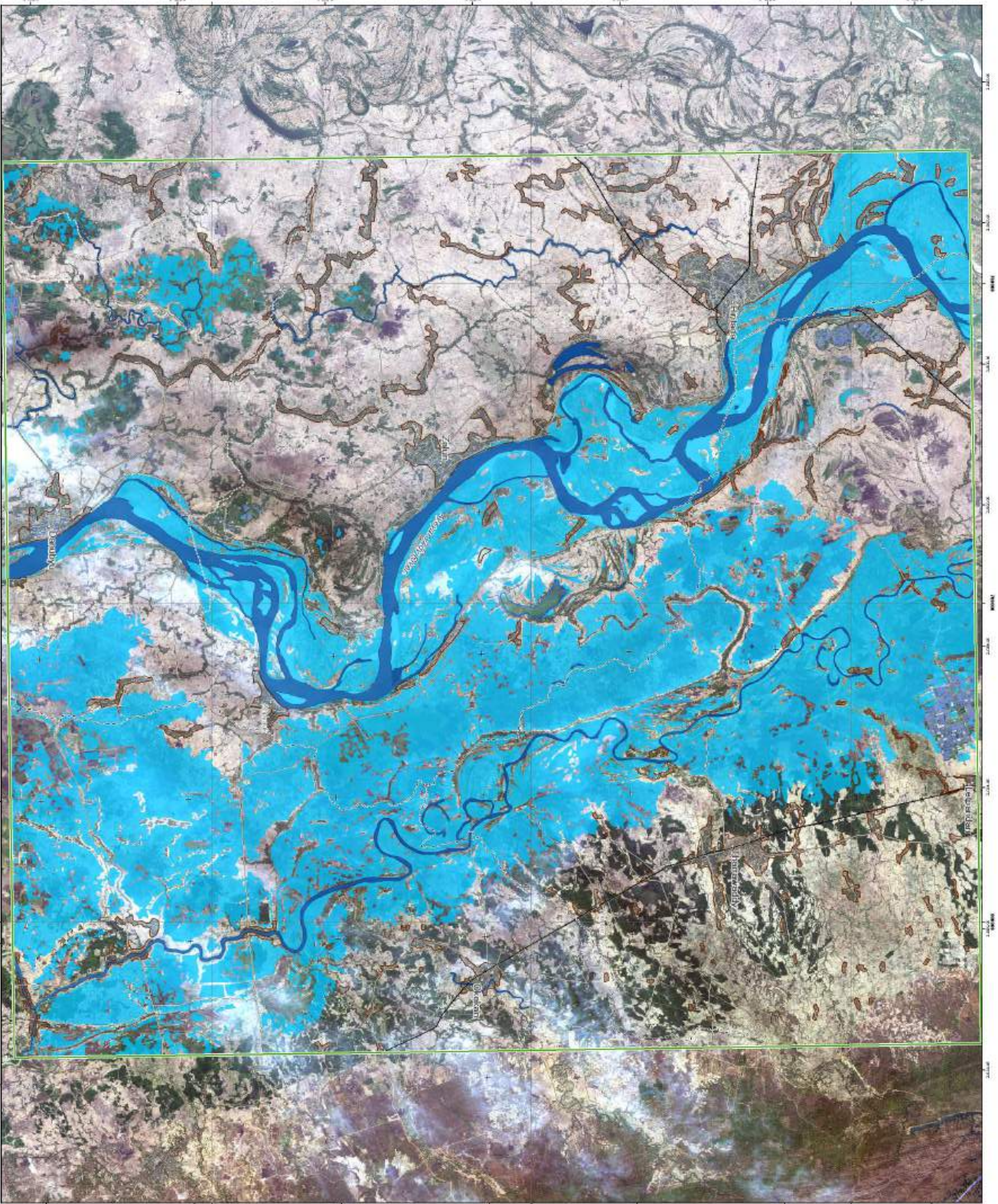
# Large area covered for rapid flood assessment



## Areas of Interest:

- Yegyi
- Pyay
- Monyo
- Labutta
- Pathein
- Bogale
- Kaiklat
- Hinthada
- Yangon West
- Pathwe

# Flood extent in Hintatada (Myanmar, 09/08/2015)



SLD/EuroVet/Map

POU/INTL/EN/2015/08/15/1818

## Hintatada - Myanmar Flood - 01/08/2015 Delineation Map



### Catographic information

Scale: 1:110000  
 Full map: 100% of the scale (100% dpi)  
 0 2.5 5 10  
 Kilometers  
 0 1 2 3 4 5 6 7 8 9 10  
 Miles  
 The content of the map is for informational purposes only.  
 The content of the map is for informational purposes only.

### Legend

- Legend**
- Color**
- Symbol**
- Line**
- Area**
- Text**
- Image**
- Sound**
- Animation**
- Print**
- Export**
- Layers**
- Scale**
- Projection**
- Coordinate**
- Metadata**
- Help**
- Home**
- Layers**
- Scale**
- Projection**
- Coordinate**
- Metadata**
- Help**
- Home**

Comparison with the data of the Ministry of Natural Resources and Environmental Conservation

Indicator	Ministry of Natural Resources and Environmental Conservation	SLD/EuroVet/Map
Area (km <sup>2</sup> )	1000	1000
Perimeter (km)	100	100
Population	10000	10000
Number of people	10000	10000
Number of animals	10000	10000
Number of plants	10000	10000
Number of birds	10000	10000
Number of insects	10000	10000
Number of fish	10000	10000
Number of amphibians	10000	10000
Number of reptiles	10000	10000
Number of mammals	10000	10000
Number of birds	10000	10000
Number of insects	10000	10000
Number of fish	10000	10000
Number of amphibians	10000	10000
Number of reptiles	10000	10000
Number of mammals	10000	10000

### Map information

This map was created using the data of the Ministry of Natural Resources and Environmental Conservation of Myanmar. The data is for informational purposes only. The content of the map is for informational purposes only.

### Data sources

The data used in this map was obtained from the Ministry of Natural Resources and Environmental Conservation of Myanmar. The data is for informational purposes only. The content of the map is for informational purposes only.

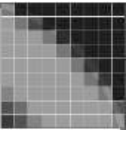
### Disclaimer

This map is for informational purposes only. The content of the map is for informational purposes only. The content of the map is for informational purposes only.

### Map production

The map was produced by SLD/EuroVet/Map. The content of the map is for informational purposes only. The content of the map is for informational purposes only.

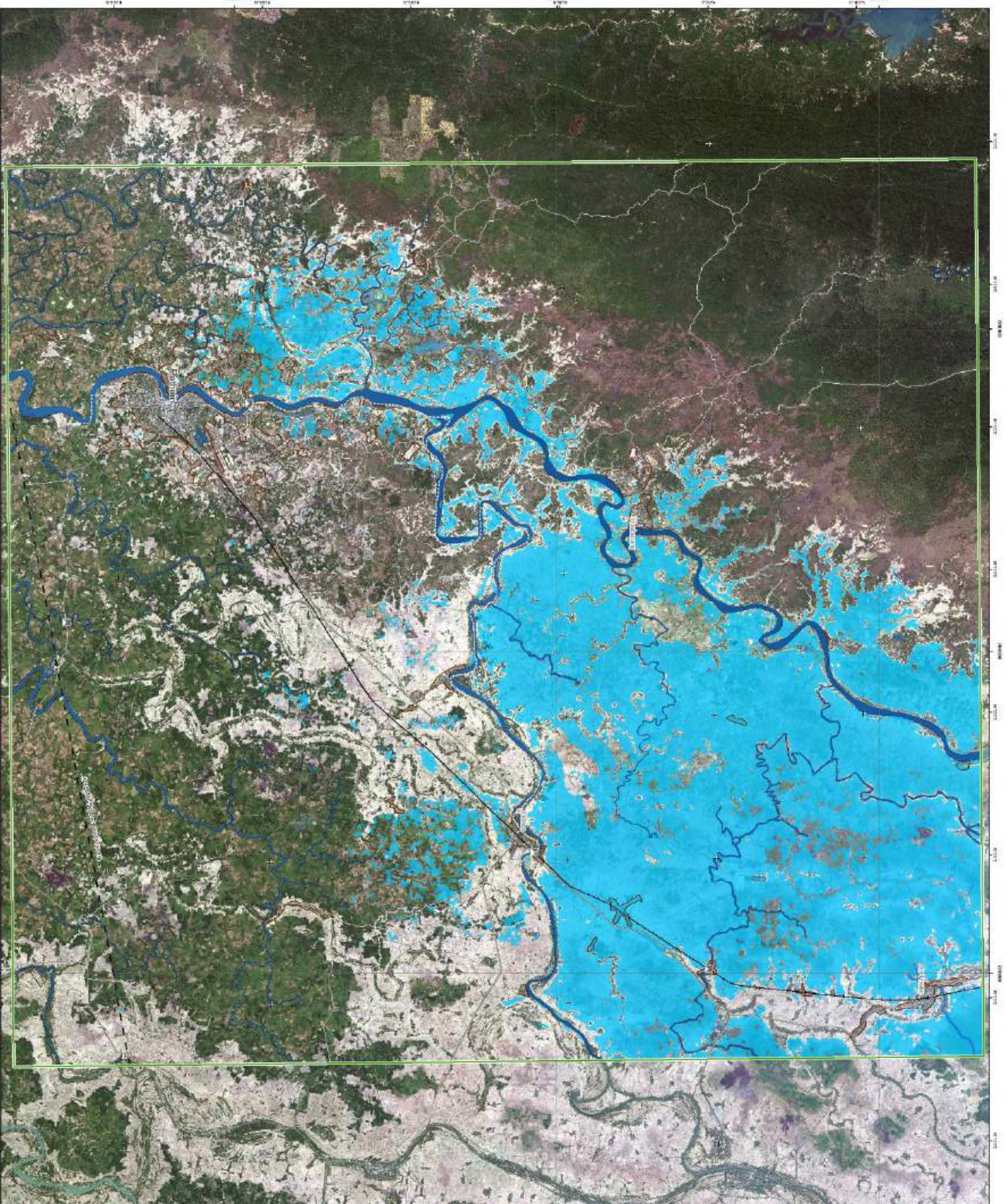
Contact: SLD/EuroVet/Map. The content of the map is for informational purposes only. The content of the map is for informational purposes only.



09/08/2015



# Flood extent in Patheingyi (Myanmar, 09/08/2015)



Scale: 1:10,000  
North Arrow

### Patheingyi - Myanmar Flood - 09/08/2015 Delineation Map



**Legend**

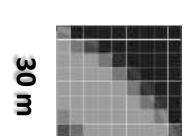
- Water
- Urban
- Open water
- Forest
- Barren land
- Water bodies
- Barren land
- Water bodies
- Barren land
- Water bodies

Statistics	Value
Area (km <sup>2</sup> )	100.00
Water (km <sup>2</sup> )	10.00
Urban (km <sup>2</sup> )	5.00
Open water (km <sup>2</sup> )	2.00
Forest (km <sup>2</sup> )	1.00
Barren land (km <sup>2</sup> )	77.00

**Map Information**

This map was generated using the COSMO-SkyMed satellite imagery. The map shows the flood extent in Patheingyi, Myanmar, on 09/08/2015. The map is a delineation map showing the flood extent in blue. The map is a delineation map showing the flood extent in blue. The map is a delineation map showing the flood extent in blue.

COSMO-SkyMed  
Myanmar



09/08/2015

