




Promoting Cooperative Solutions for Space Sustainability

United Nations/Chile Workshop on Space Technology
Applications for Socio-Economic Benefits
Santiago, Chile

A circular satellite image of Earth from space, showing the Americas and surrounding oceans. The image is framed by a thin white border.

***DATA POLICIES, CAPACITY
BUILDING, AND
DISASTER RESPONSE***

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Secure World Foundation



**The Secure World Foundation (SWF)
is a private operating foundation
dedicated to the secure
and sustainable
use of space
for the benefit of Earth
and all its peoples**



What Does the Foundation do?

Engages with academics, policy makers, scientists and advocates in the space and international affairs communities to support steps that strengthen global space security.

Promotes the development of cooperative and effective uses of space for the protection of the Earth's environment and human security.

Acts as a research body, convener and facilitator to advocate for key space security and other space related topics and to examine their influence on governance and international development.



Basic Facts

- Non-profit operating foundation founded in 2004
- Funding comes from a private endowment
- Offices in Colorado, Washington DC and Brussels
- 4 focus areas: space sustainability, space policy, NEO and HES

OUTLINE



- Space Applications Systems
- International Response to Natural Disasters
- Crowdsourcing
- Community Remote Sensing
- Legal issues
- Data policy



Source: <http://abcnews.go.com>



Source: NOAA



Source: <http://www.washingtonpost.com>

Hurricane Sandy



Source: <http://www.csmonitor.com/>

DISASTER MANAGEMENT CYCLE





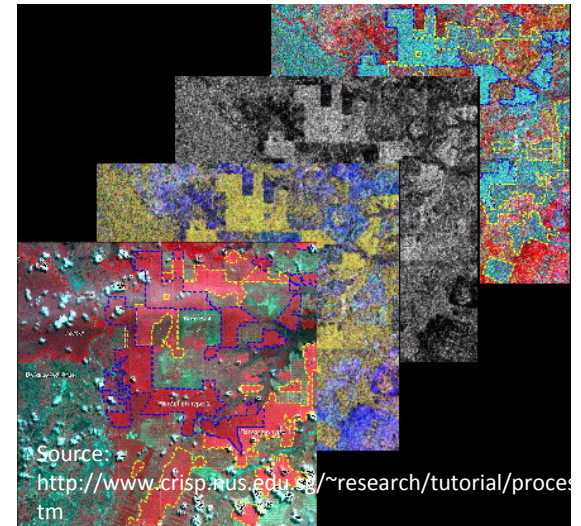
Promoting Cooperative Solutions for Space Sustainability

SPACE APPLICATIONS SYSTEMS

REMOTE SENSING SYSTEMS

(weather, land, ocean)

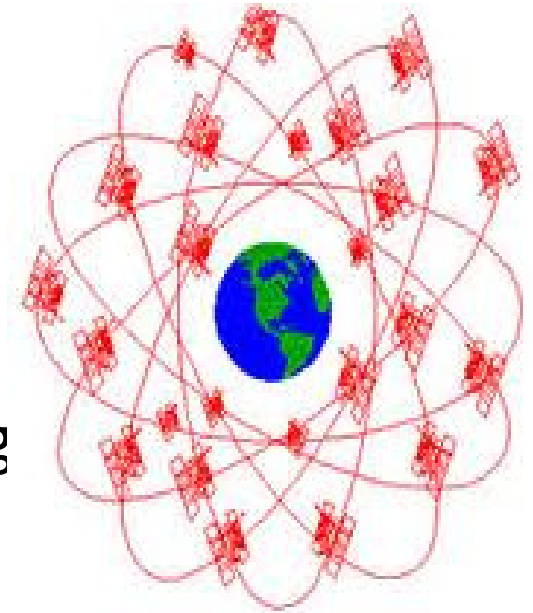
- Electro optical – multispectral images
 - Affected by cloud cover
 - Not effective at night
 - Analysis techniques broadly known
- Synthetic Aperture Radar (SAR)
 - Unaffected by cloud cover
 - Analysis tricky; requires special analytic skills



GLOBAL POSITIONING, NAVIGATION & TIMING (GNSS)

- Global Positioning System (GPS)—U.S.
- GLONASS —RUSSIA
- Galileo (in development)—EUROPE

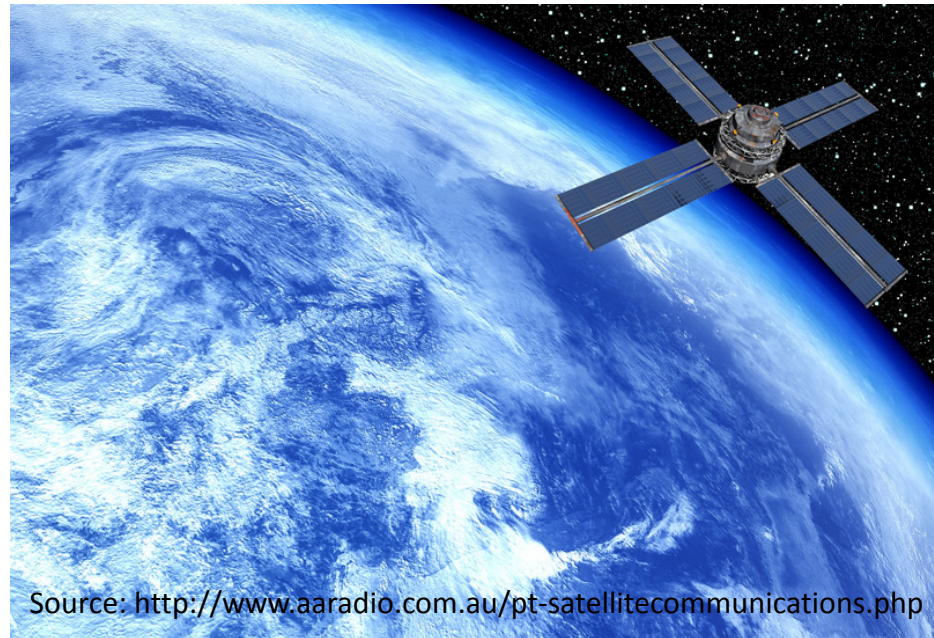
- Provide accurate positions for map making
- Accurate positions for victims, areas of major destruction, rescue personnel



Source:
<http://www.asladvancedsys.in/public-GNSS.shtml>

SATELLITE COMMUNICATIONS

- Individual satellite phones
- Base stations connectivity through satellites
- Satellite broadband





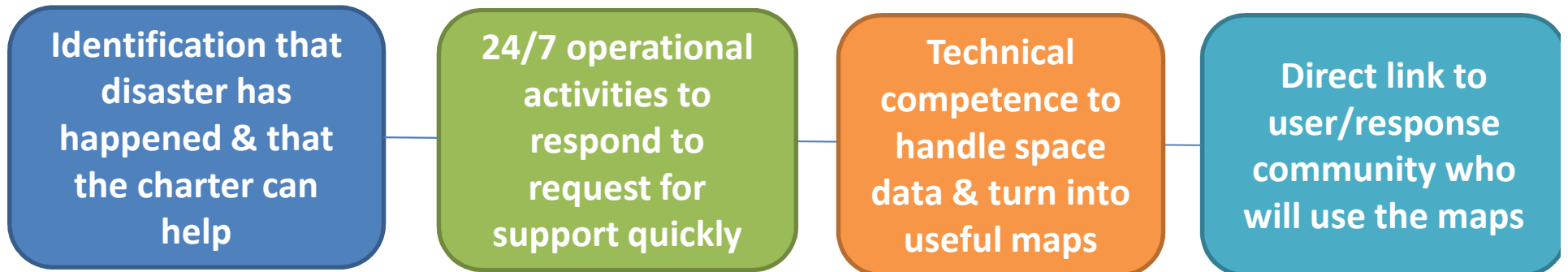
INTERNATIONAL RESPONSE TO NATURAL DISASTERS

INTERNATIONAL CHARTER: SPACE & NATURAL DISASTERS (1/2)

- Started: 2000
- Scope: To coordinate satellite data providers' response to major disasters
- 14 Members: ESA, Argentina, Britain, Canada, China, France, India, Japan, USA, Japan, Brasil, Germany, Korea, EUMETSAT
- Activation: 352 times / 2012: 33 times
- Problems: Timely delivery as is smaller disasters and limited budget



ACTIVATION OF THE CHARTER (2/2)



Home

Charter Activations

Activations Map

Media Gallery

News

About the Charter

- FAQ

- Text of the Charter

- Activating the Charter

- Charter Members

- Charter for Schools

- Charter Geographical Tool

- Disaster Statistics

- Movie of the Charter

- Presentation of the Charter

- Follow Disasters Charter on Twitter

Advanced Search

Links

Ocean Storm, State of New York and New Jersey

[Back to Charter Activations](#)



Type of Event

Ocean Storm - Hurricane

Location of Event

United States of America - States of New York and New Jersey

Date of Charter Activation

01 November 2012

Charter Requestor

USGS on behalf of Federal Emergency Management Agency (FEMA)

Project Management

Florida Division of Emergency Management

Description of the Event

Hurricane Sandy - the largest Atlantic tropical storm system on record - made landfall just south of Atlantic City, New Jersey, bringing winds up to 90 mph (150 kph), and pushing a massive storm surge onto beaches and shorelines. At least 50 deaths have been reported.

Millions across the Eastern Seaboard are now without power, and even more are struggling with rising floodwater.

Sandy continues northward, now downgraded to a post-tropical cyclone, and those affected are now assessing the damage.

Images and/or Image product Delivered under the Charter will be published here as soon as they become available



SPACE AND MAJOR DISASTERS

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[Home](#)

[Charter Activations](#)

[Activations Map](#)

[Media Gallery](#)

[News](#)

[About the Charter](#)

[FAQ](#)

[Text of the Charter](#)

[Activating the Charter](#)

[Charter Members](#)

[Charter for Schools](#)

[Charter Geographical Tool](#)

[Disaster Statistics](#)

[Movie of the Charter](#)

[Presentation of the Charter](#)

[Follow Disasters Charter on Twitter](#)

Earthquake Guatemala



[Back to Charter Activations](#)

Type of Event

Earthquake

Location of Event

Guatemala

Date of Charter Activation

08 November 2012

Charter Requestor

SIFEM on behalf of SE-CONRED

Project Management

Description of the Event

At least 52 people have been killed after a 7.4 magnitude tremor hit Guatemala, San Marcos region, on Wednesday. Several people have been injured and thousands are left without power.

Aftershocks continued into the night causing people to flee their homes and buildings. Many residents camped outside their homes, wrapped in blankets. San Marco has been the most affected where more than 30 buildings were destroyed and 40 deaths were confirmed.

Rescue operations are under way; Panama, El Salvador and Honduras have offered to help with the rescue operation. 2000 soldiers have joined the rescue operation teams offering to help find any survivors.

This is the most powerful earthquake to hit Guatemala since 1976. President Otto Perez Molina has declared three days of mourning after visiting the affected areas.

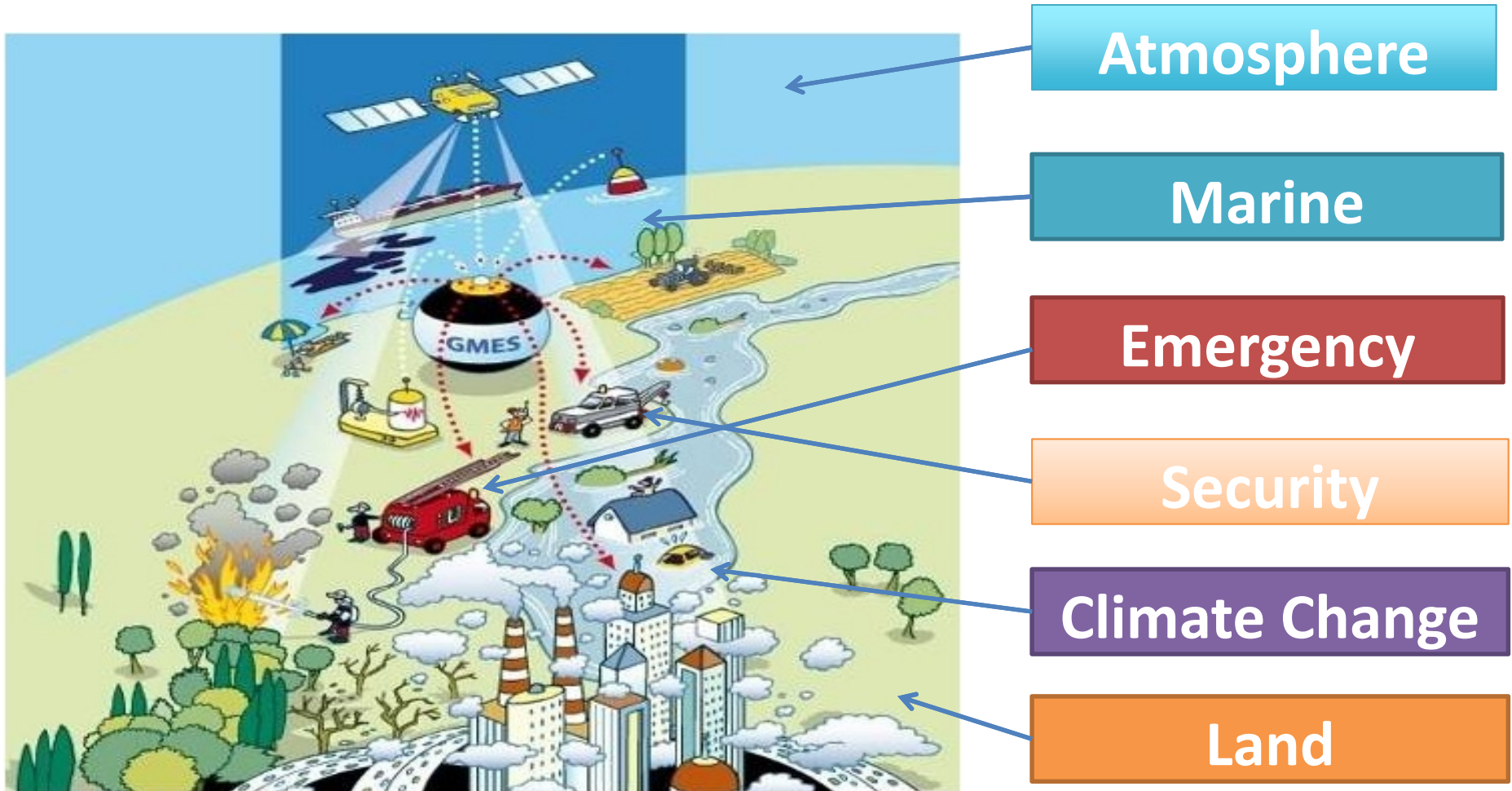


UNSPIDER

UNITED NATIONS PLATFORM FOR SPACE-BASED INFORMATION FOR
DISASTER MANAGEMENT AND EMERGENCY RESPONSE

- Established by Resolution 61/110 of the General Assembly in 2006 within the U. N. Office of Outer Space Affairs (UNOOSA)
- Provides access to all countries and all relevant international and regional organizations to all types of space-based information and services relevant to disaster management to support the full disaster management cycle, including capacity building

GMES (1/3)



GMES (2/3)

GMES EMERGENCY RESPONSE SERVICE

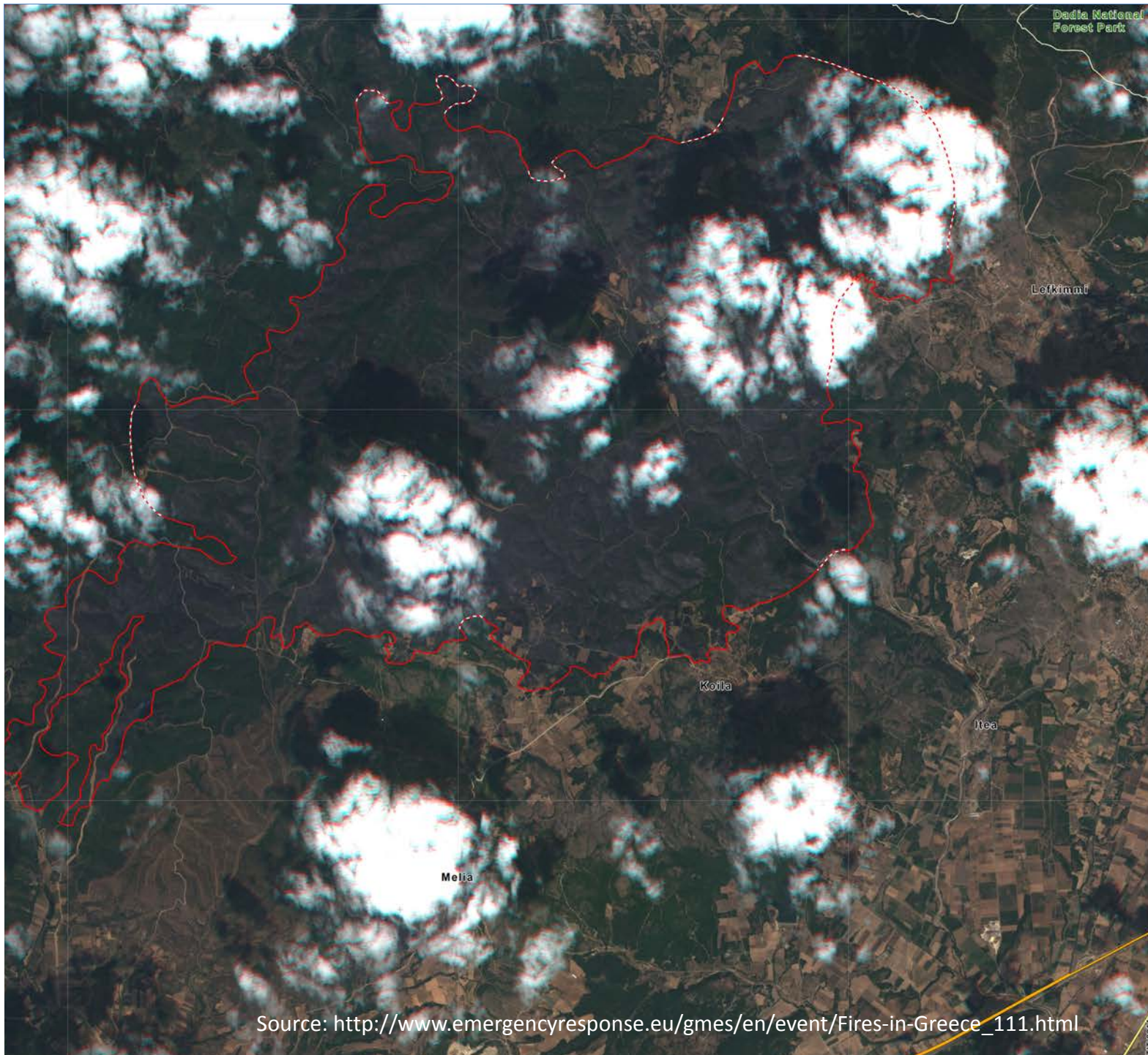


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graph TD; A[GMES EMERGENCY RESPONSE SERVICE] --> B[Emergency Response Service]; A --> C[Emergency Support Service];
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Emergency Response Service

Emergency Support Service

- Cartographic service to the end users
- GMES Emergency Response Service (2009): **100 times**
- Emergency Support service for preparedness/prevention or post-crisis purpose: **50 maps**
- Activation: registered users (European Civil Protection Agencies & Humanitarian Actors)



Source: http://www.emergencyresponse.eu/gmes/en/event/Fires-in-Greece_111.html

Greece - EVROS Burnt areas extent map Detail Situation the 27th of August 2011

Location Diagrams



Legend

	Limit of burnt areas		Burnt area
	Potential limit of burnt areas		
Landscape elements			
	Cloud		Highway
	Cloud shadow		Primary Road
	Forest area		
	Agricultural area		
	Urban area		

Interpretation

Greece declared a state of emergency Thursday Aug 25, 20 as fires became uncontrollable. High winds are fanning the wildfires and hampering operations to extinguish the blaze many fronts in the Evros region, NE Greece. Many people were evacuated as the fire swept through the forested rural area. Otherwise, a natural reserve known for its bio-diversity the Dadia National Forest Park, is at risk. This map shows the loose limits of burnt scars on the forest. Due to a large cloud coverage and associated shadows, the fire line presents uncertainly limits. In addition, a few older burnt scars occur sooner in the season can have been included inside the limit

Cartographic Information



Local projection: UTM Zone 35N, Datum: WGS 84
Geographic projection: Lat/Lon (DMS), Datum: WGS 84
Scale: 1:25 000 for A1 prints

Data Sources

Potentially fire affected areas extracted from :
RapidEye image (6.5m) acquired the 27th of August 2011
© SERTIT 2011
Background layer
Natural colors RapidEye image (6.5m) acquired the 27th of August 2011
© RapidEye AG 2011
Thematic layers and toponyms
© SERTIT 2011, ESRI, Open Street Map

Disclaimer: elaborated for this Rapid Mapping Activity & realised to the best of our ability, within a very short time frame during a crisis/exercise, optimising the material available. All geographic information has limitations due to the scale resolution, date and interpretation of the original source material. No liability concerning the content or the use thereof is assumed by the producer. The research leading to these results has received funding from European Community's Sever Framework Programme (FP7/2007-2013) under grant agreement n° 218802.

Map produced the 27 08 2011 by SERTIT
© SERTIT 2011
sertit@sertit.u-strasbg.fr
<http://sertit.u-strasbg.fr>



RESPONSE SPEED, ACCURACY, CRUCIAL

- Many hours, even days can pass before map products are available
- Problems in getting maps to end users in the impact areas
- We **MUST** be able to do near real time data acquisition, analysis, and dissemination to end users





FILLING THE GAPS

CROWDSOURCING

- Using the power of the “crowd” to achieve a task quickly and efficiently
- Examples:
 - classifying galaxies in the Galaxy Zoo project
 - “Fold it” project public input to protein folding
 - Rapid processing of satellite data (Haiti, Burma)



COMMUNITY REMOTE SENSING

- “A new field that combines remote sensing with citizen science, social networks, and crowd-sourcing to enhance the data obtained from traditional sources
- It includes the collection, calibration, analysis, communication, or application of remotely sensed information by these community means



Location
Bldg. type
floors
Construction
Build year
Photo



Google Earth forms a convenient platform for CRS inputs





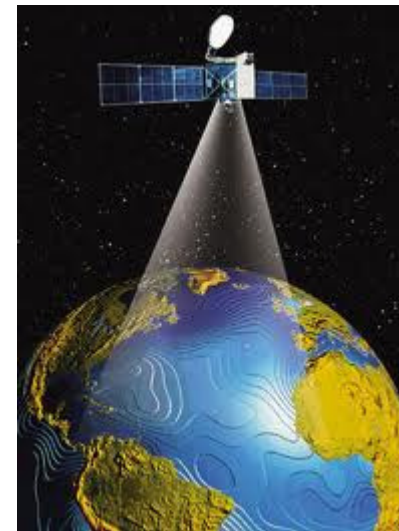
LEGAL ISSUES

THE LEGAL ISSUES BECOME MORE COMPLEX

Spatial Law is the set of legal issues associated with collection and use of spatial data and spatial technology

Issues include:

- Privacy
- Data Ownership
- National Security
- Data Quality/Liability
- Complexity impacts ability/willingness to share



CRS–POTENTIAL LEGAL ISSUES

- Intellectual Property Rights in Spatial Data
- Spatial products/services frequently include a mixture
 - Terms and restrictions are not always clear or evident
- Wide Variety of Legal Restrictions on Use
- No copyright
 - State and local governments
- Variety of laws regarding use
 - Copying, commercial use, derivative products,
 - Proprietary Sources



CONCLUSIONS

- Increased effort on training
 - Building capacity among ALL communities to carry out their own analysis of satellite data
 - Training to response teams in using space-derived maps
- Much greater international sharing of space-derived data, such as CBERS & Landsat
- Foster use of crowdsourcing and CRS methodologies
 - Develop methods & standards
 - Explore legal aspects of these methods





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