



Promoting Cooperative Solutions for Space Sustainability

UN International Expert Meeting on Crowdsourcing Mapping for Disaster Risk Management & Emergency Response Vienna, Austria

DATA POLICIES, CAPACITY BUILDING & 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.

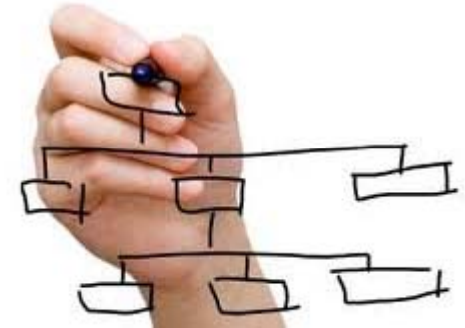
Acts as a research body, convener and facilitator to advocate for key space security and other space related topics and to examine their influence on governance and international development.



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





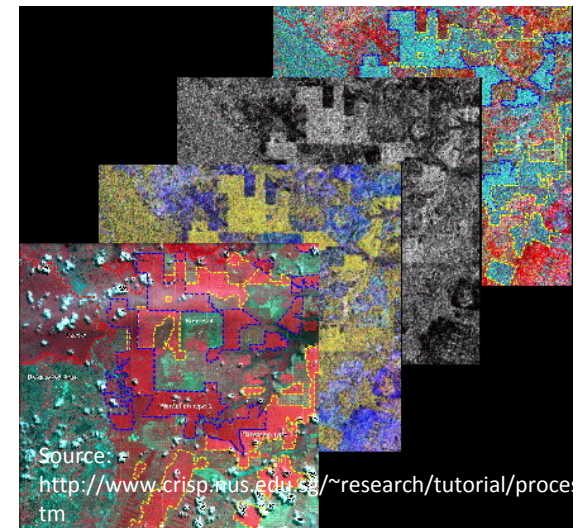
Promoting Cooperative Solutions for Space Sustainability

SPACE APPLICATIONS SYSTEMS

REMOTE SENSING SYSTEMS

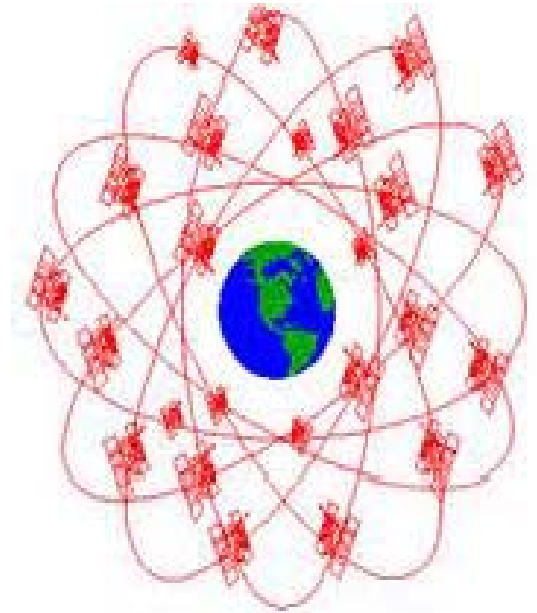
(weather, land, ocean)

- 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 POSITION, NAVIGATION & TIMING (GNSS)

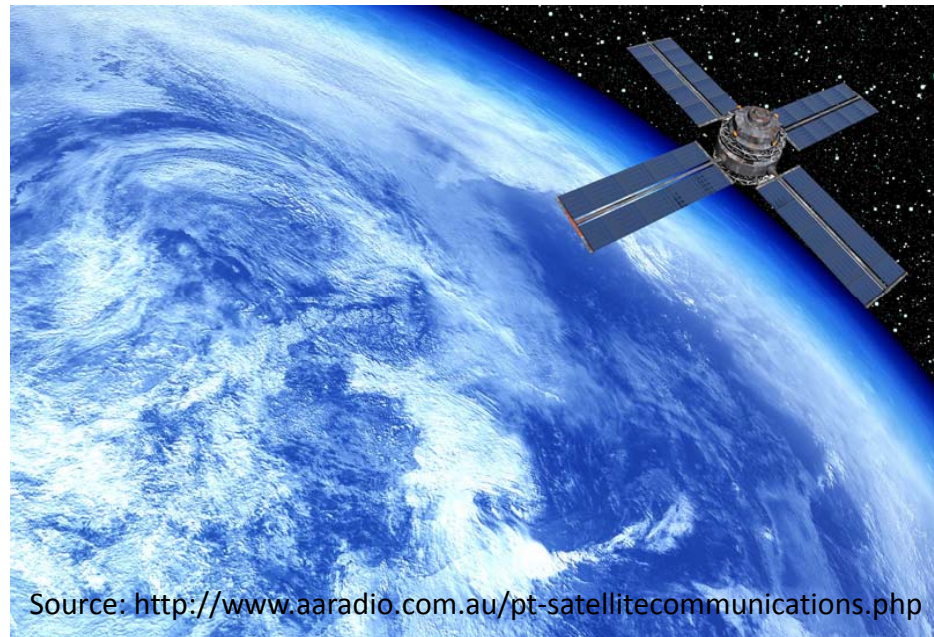
- Global Positioning System (GPS)—U.S.
- GLONASS —RUSSIA
- COMPASS - CHINA
- Galileo (in development)—EUROPE
- Provide accurate positions for map making
- Accurate positions of victims, areas of major destruction, rescue personnel



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

SATELLITE COMMUNICATIONS

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



Source: <http://www.aaradio.com.au/pt-satellitecommunications.php>



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INTERNATIONAL RESPONSE TO NATURAL DISASTERS

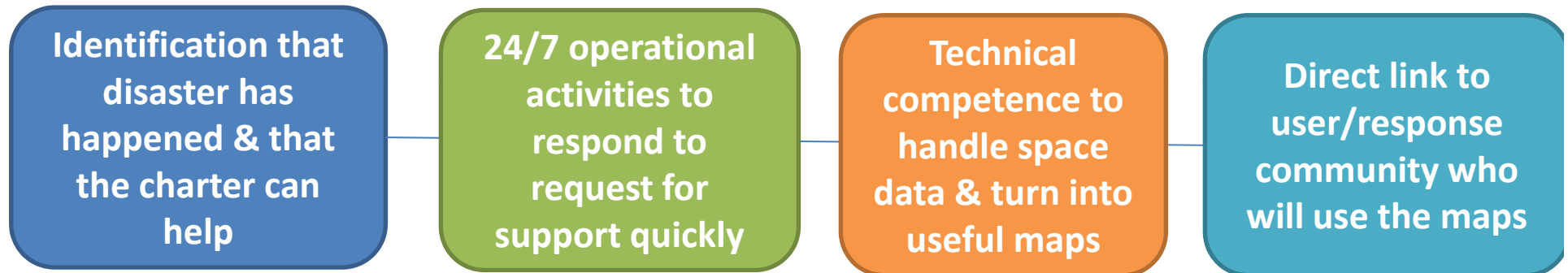


INTERNATIONAL CHARTER: SPACE & NATURAL DISASTERS (1/2)

- Started: 2000
- Scope: To coordinate satellite data providers' response to major disasters
- 14 Members: ESA, Argentina, Britain, Canada, China, France, India, Japan, USA, Japan, Brazil, Germany, Korea, EUMETSAT
- Activation: 353 times / 2012: 34 times
- Problems: Timely delivery in smaller disasters and limited budget



ACTIVATION OF THE CHARTER (2/2)



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on Twitter

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Links

Ocean Storm, State of New York and New Jersey



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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



INTERNATIONAL CHARTER SPACE AND MAJOR DISASTERS

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Flood in England



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Type of Event	Flood
Location of Event	England, United Kingdom
Date of Charter Activation	27 November 2012
Charter Requestor	Environment Agency (of England and Wales)
Project Management	Environment Agency (of England and Wales)

Description of the Event

There has been widespread flooding across a number of regions within England during the last 5 days and the event is still ongoing.

Environment Agency - BBC News

Over 900 properties have been flooded and two deaths have been reported. In addition to the flooded properties there has been widespread inundation of agricultural land on floodplains.

Among the affected areas are: Somerset levels, Oxford, Tewkesbury, Darlington to York, Nene Washlands, and Nottingham.

As of **29 November 2012**, there have been 1650 flooded properties in total and one further fatality (3 deaths in total).



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)

USERS

Policy makers & Public & Private, commercial

What is their need?



Farming

Ice monitoring

Air quality

Flood

Surveillance Climate Change

Examples provided



Land



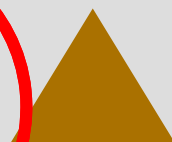
Marine



Atmosphere



Emergency



Security



Climate

Information services



Sustainable information

12/7/2012

OBSERVATION

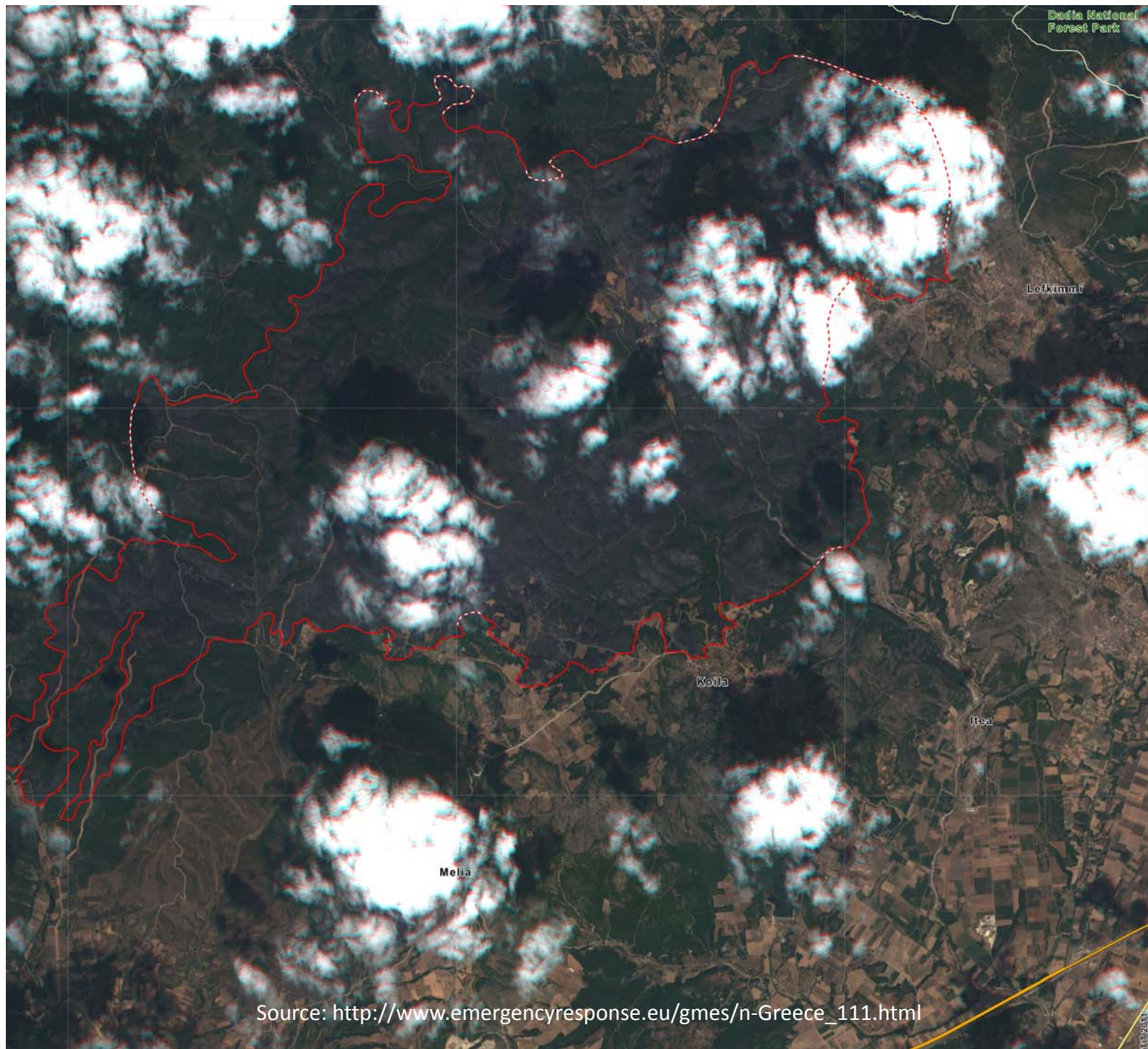
Source: EC, DG ENTR, GMES unit



GMES (2/3)

GMES Service: Emergency Management Service (EMS)

- The first operational service of the European GMES programme
- Successor to SAFER and linkER activities
- kick-off per 1 April 2012, for 3 years
- Covers: Floods, Earthquakes, Landslides, Severe Storms, Fires, Technological disasters, Volcanic eruptions, Humanitarian crises, Tsunamis
- Activation: Authorised Users may activate the service by completing the relevant Service Request Form (National Focal Points in EU MS, EC Services (DGs))



Source: http://www.emergencyresponse.eu/gmes/n-Greece_111.html

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

Location Diagrams



Legend

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

Interpretation

Greece declared a state of emergency Thursday Aug 25, 20 as fires became uncontrollable. High winds are fanning 1 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 ru area. Otherwise, a natural reserve known for its bio-divers the Dadia National Forest Park, is at risk. This map shows 1 loose limits of burn scars on the forest. Due to a large clo coverage and associated shadows, the fire line prese uncertainly limits. In addition, a few older burn scars occur sooner in the season can have been included inside the limit

Cartographic Information

0 1 2 km
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 Aug 2011
© RapidEye AG 2011

Thematic layers and toponyms
© SERTIT 2011, ESRI, Open Street Map

Disclaimer: elaborated for this Rapid Mapping Activity 4 realised to the best of our ability, within a very short time fram during a crisis/exercise, optimising the material available. All geographic information has limitations due to the sca resolution, date and interpretation of the original source materi No liability concerning the content or the use thereof is assum by the producer. The research leading to these results h received funding from European Community's Sever Framework Programme (FP7/2007-2013) under grant agreem 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





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FILLING THE GAPS

CROWDSOURCING

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

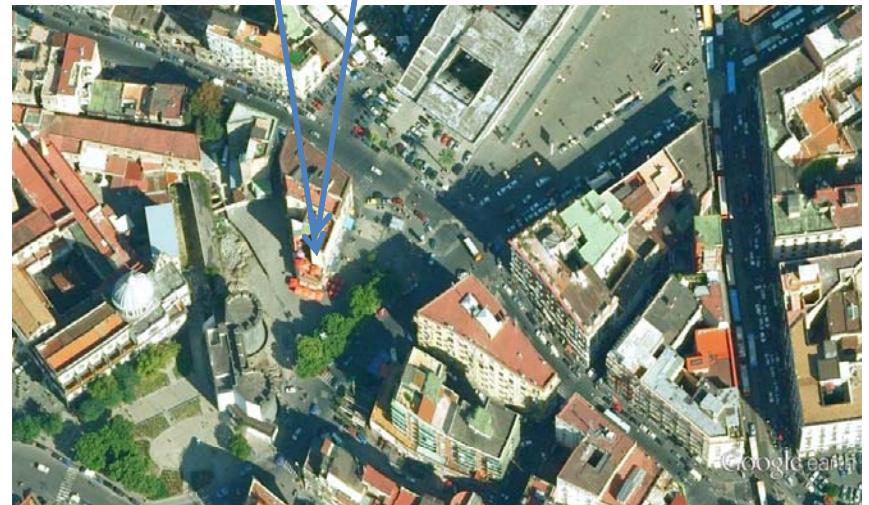


COMMUNITY REMOTE SENSING

- “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



12/7/2012

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2009 Europa Technologies
© 2009 Tele Atlas
US Dept of State Geographer

©2008 Google



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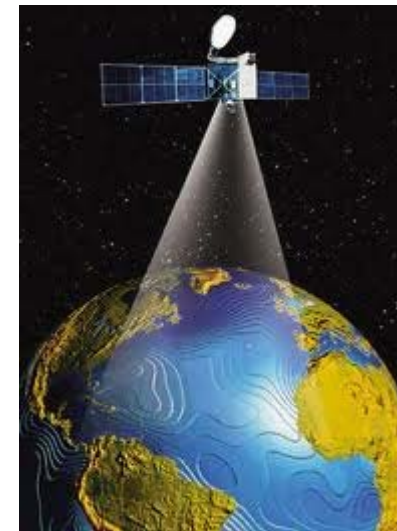
LEGAL ISSUES

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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