



Fourth United Nations International UN-SPIDER Bonn Workshop on Disaster Management and Space Technology:

“The 4C - Challenge:
Communication - **C**oordination - **C**ooperation -
Capacity Development”





ITHACA



ITHACA (Information Technology for Humanitarian Assistance, Cooperation and Action) is a **non-profit association**, founded in November 2006 by the Italian technical university Politecnico di Torino and SiTI





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Istituto Superiore sui
Sistemi Territoriali per l'Innovazione

On the basis of a formal agreement with **UN WFP**, the Association proposes itself as a center of applied research for the distribution of products and services **in support of emergency management activities.**





ITHACA expertise





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- ❑ **Applied research** in the field of **Geomatics**
(*Remote sensing, Photogrammetry, GIS, ...*);





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- ❑ **Geospatial data** acquisition, management and processing;
- ❑ Academic and industrial know-how (team: **PhD students, Post-Doc, Researchers**).





Main activities

Emergency preparedness and response:

Early Warning ed **Early Impact** (*main data source: satellite remote sensing*)

Spatial data infrastructure (SDI):
design, implementation and management (WFP SDI)

WebGIS applications: *design, implementation and management*



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- “Other international humanitarian actors at country level broadly **accept and appreciate the leadership** role exercised by UN agencies and, where applicable, their co-leads. While many **NGOs** were initially skeptical about the cluster approach, they now widely **support dedicated leadership roles** at country level and have toned down their criticism at global level.”



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- “The evaluation team found evidence that global clusters provide **more support than is acknowledged on the ground.**”
 - ✓ No proactive dissemination of support tools;
 - ✓ Staff turn-overs problems;
 - ✓ Global support not relevant (behind local experiences, not relevant in country-specific situations).

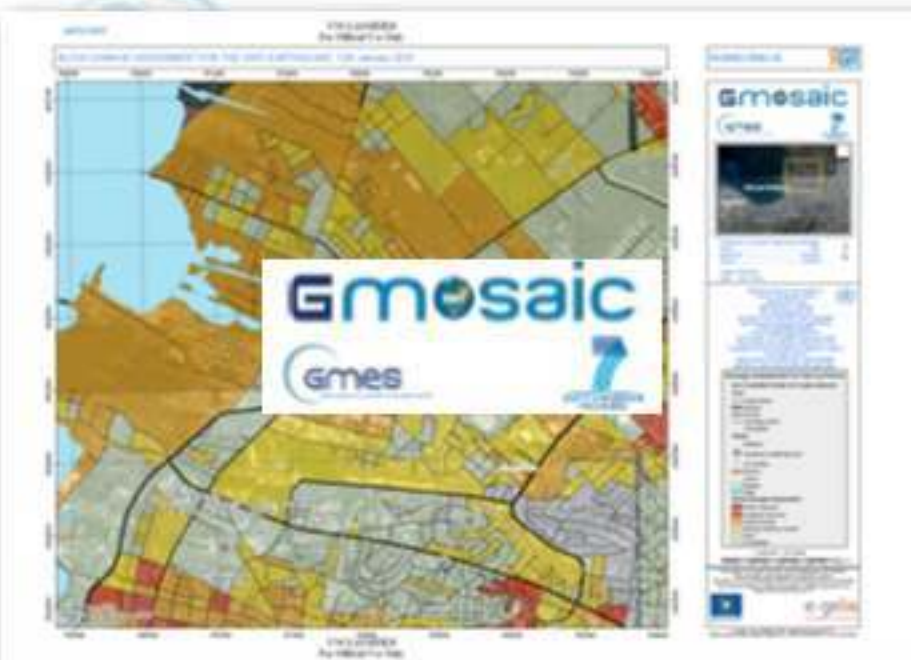


Some examples...



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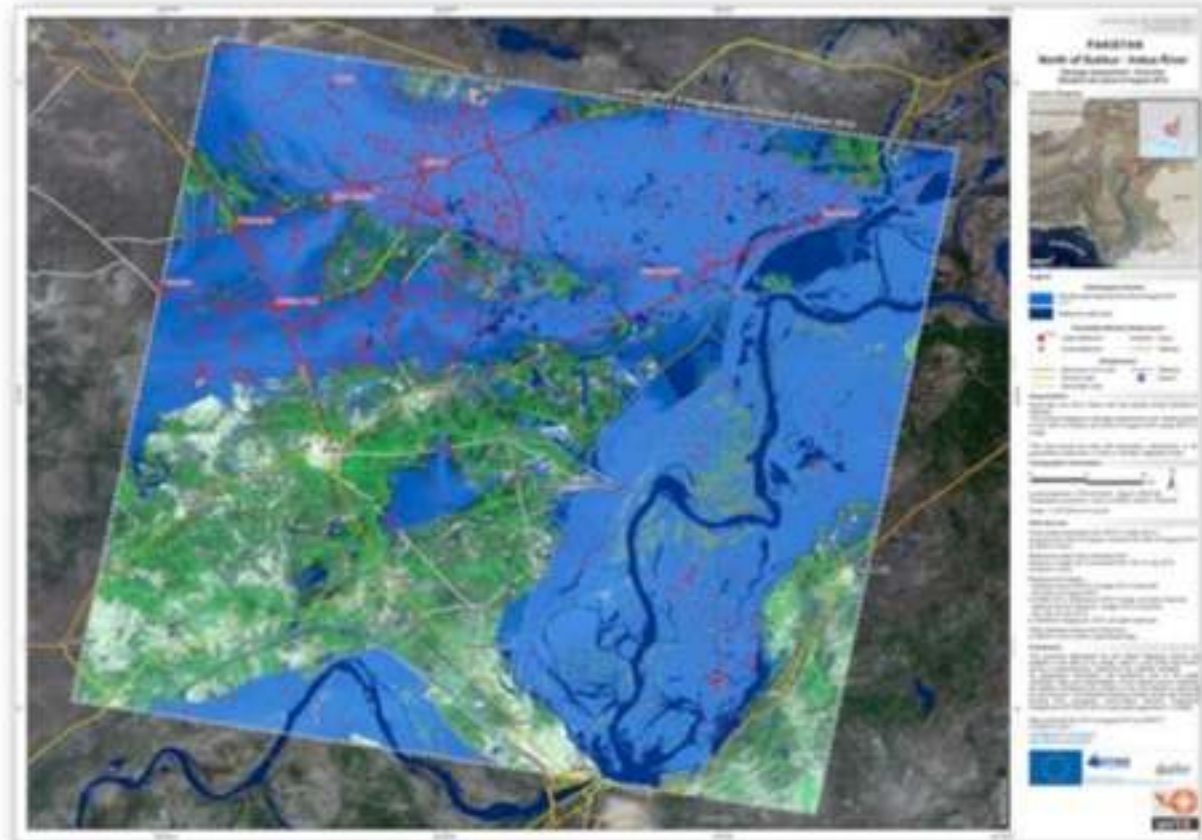
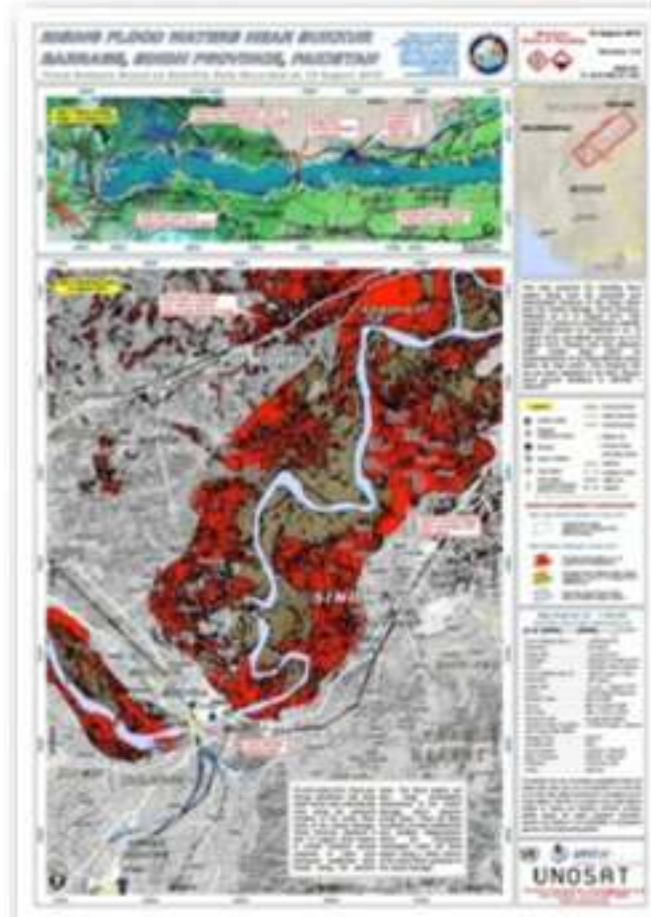
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- Results are not 100% comparable.

- More recent map doesn't take into account previous analysis;
- Reference datasets are not homogeneous.





A better cooperation is possible?



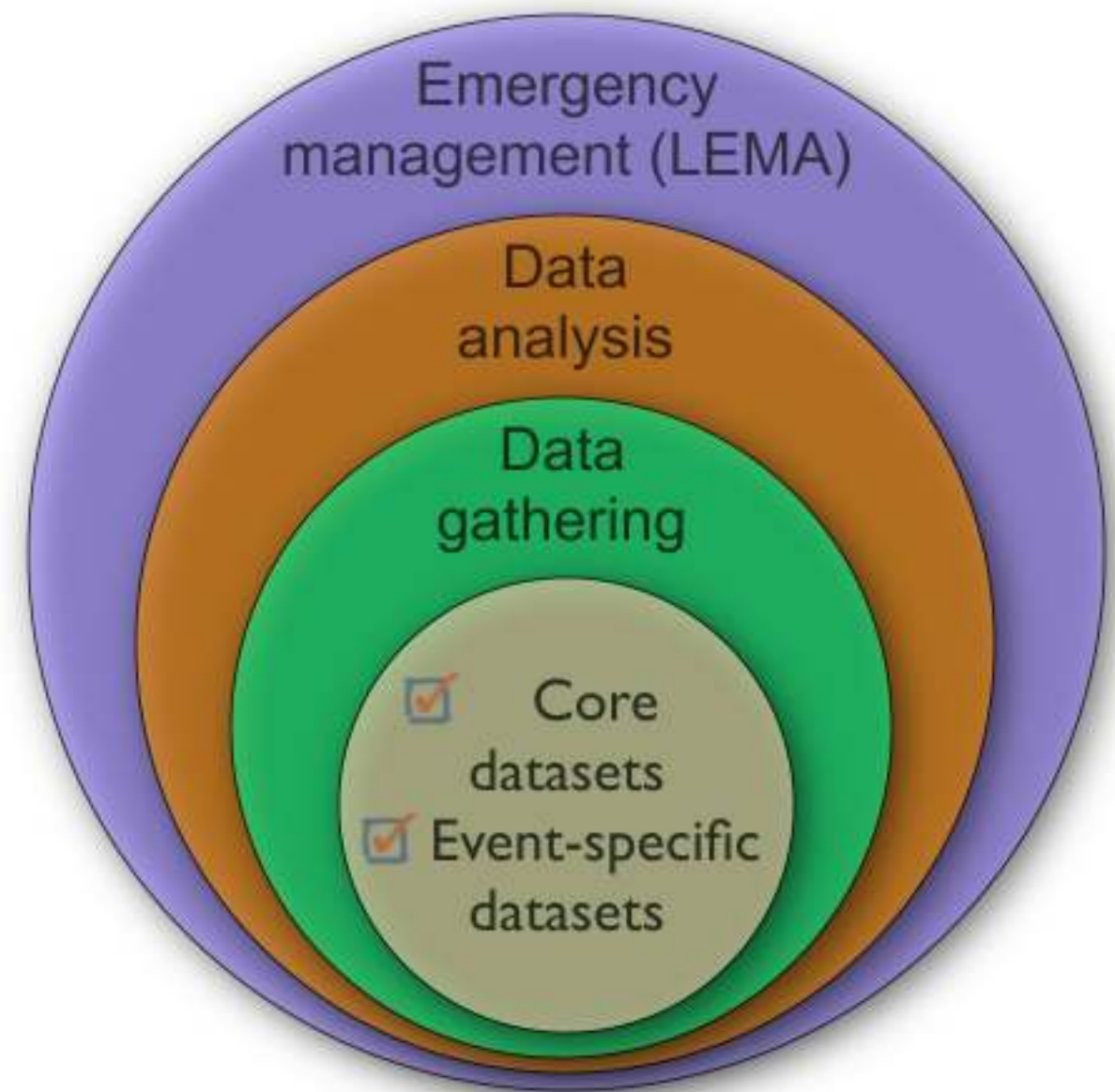
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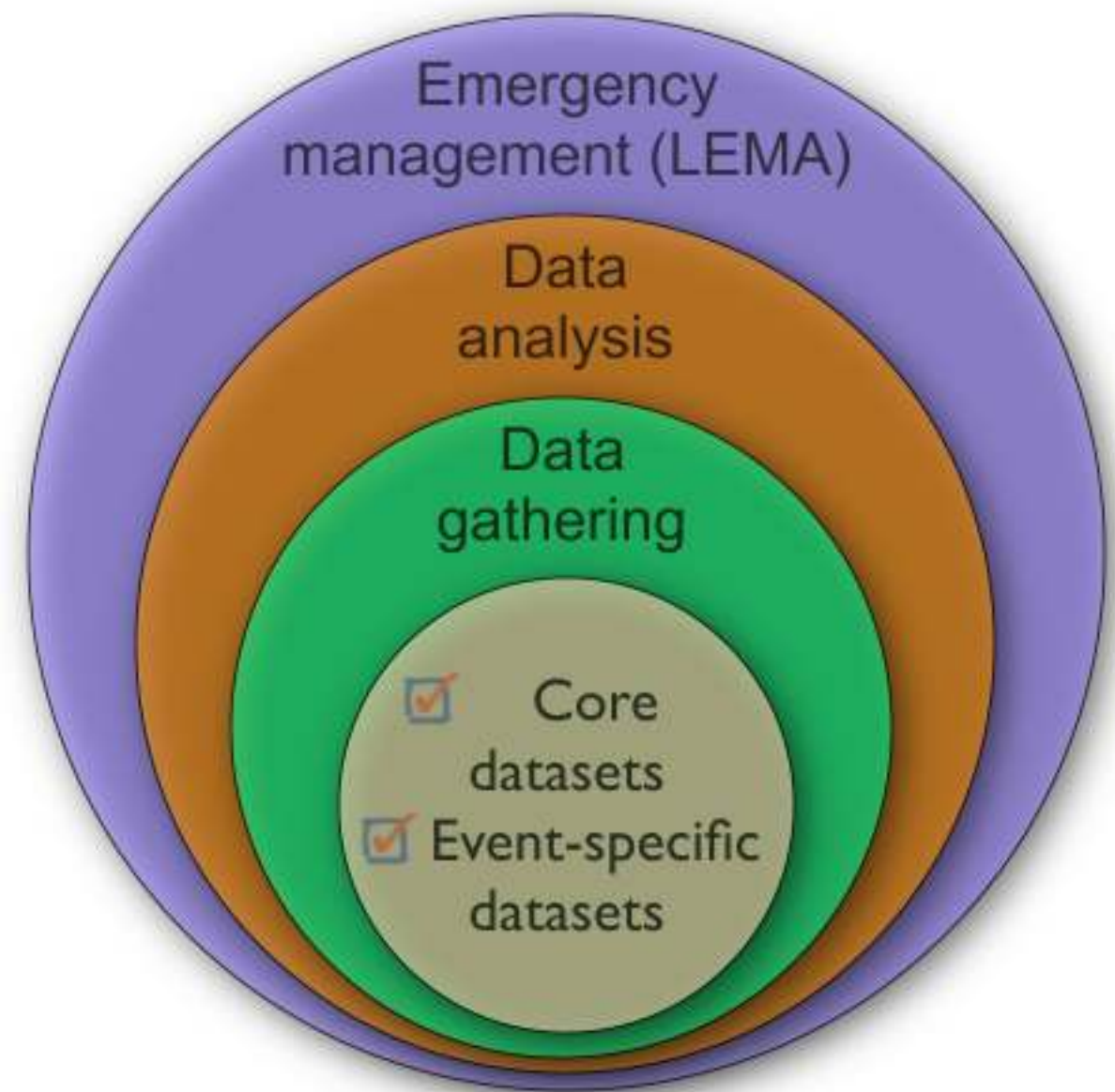
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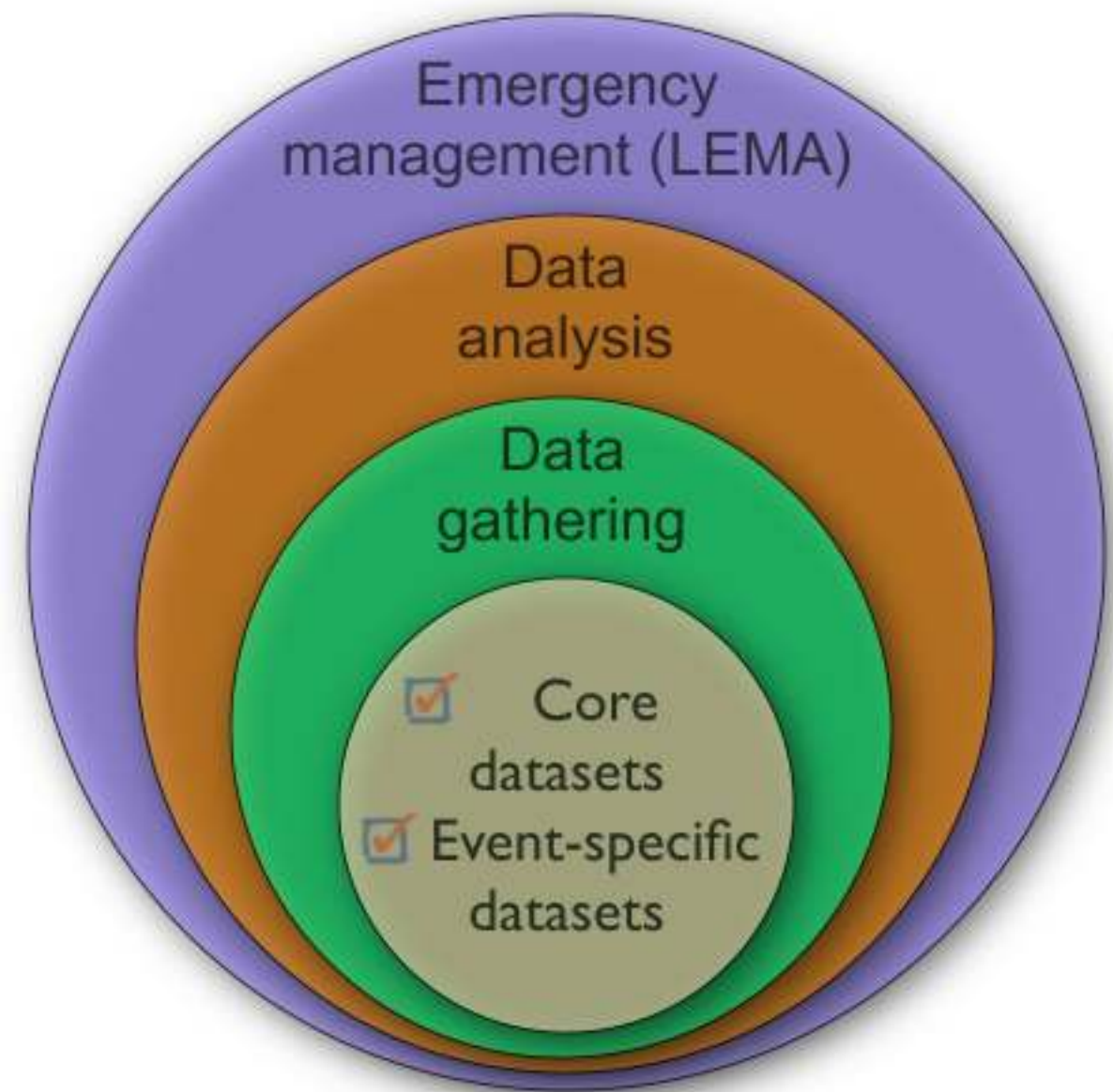
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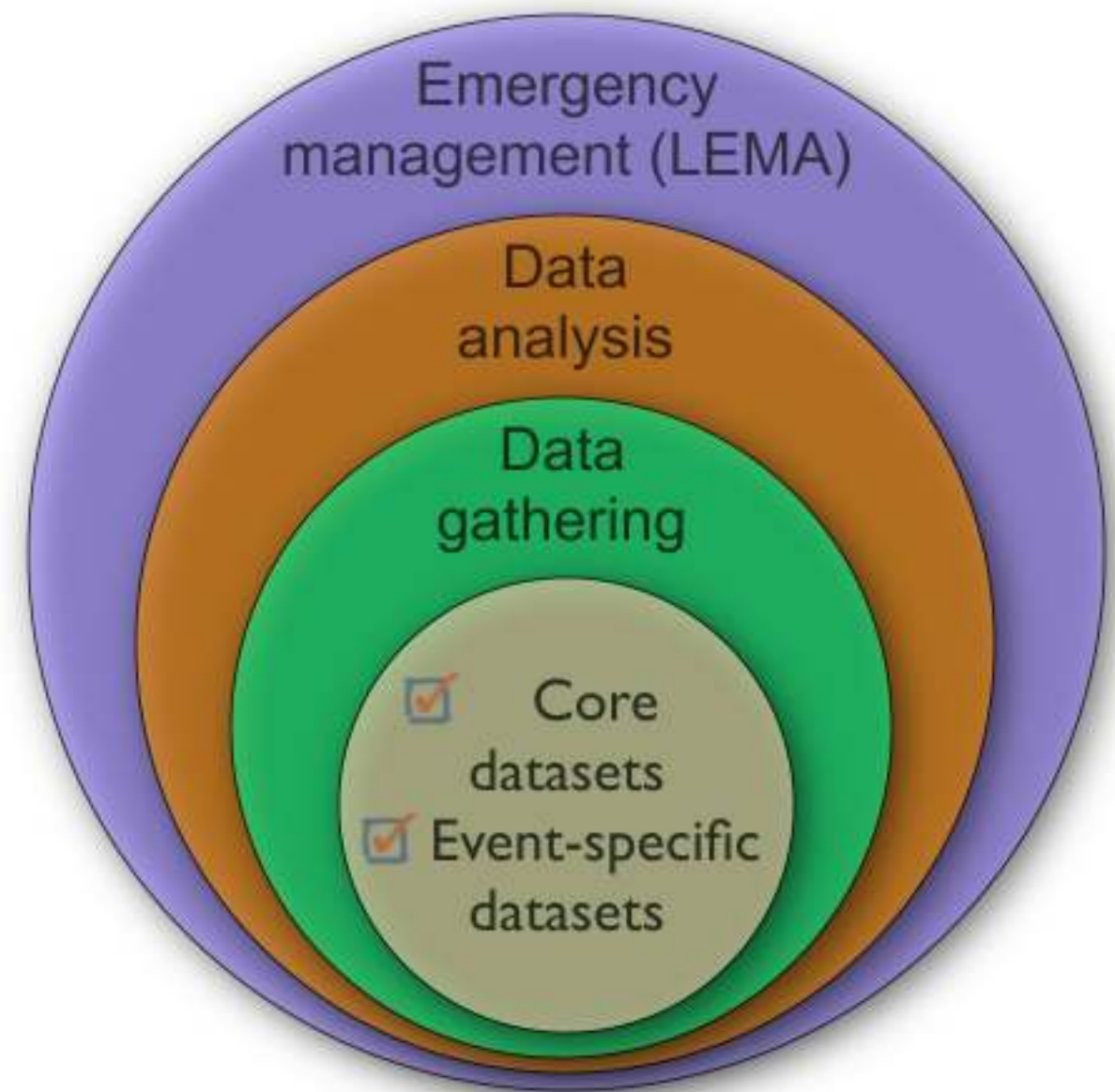
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- Coordination and cooperation is required at **different levels**;
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 - * to **authoritative, independent entities**, responsible for procedures development, for controlling their application and for capacity building and training;
 - * de facto, to **organizations providing tools, instruments, procedures** (volunteered based communities).





Volunteered Effort for Haiti



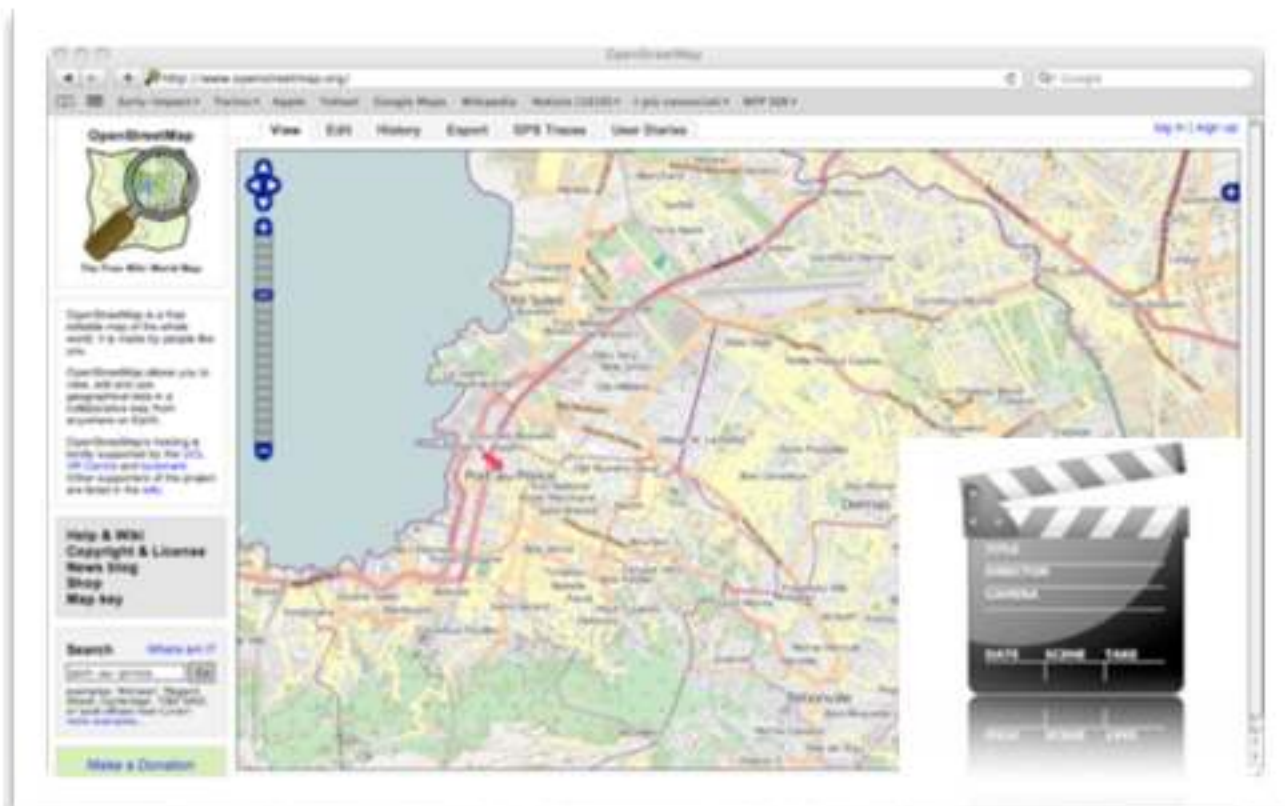
Volunteered Effort for Haiti

- ✓ **Thousands of volunteers** took an important part of the operational response, even if not being physically in Haiti, thanks to the open collaborative networks created and the free, open source mapping technologies used;



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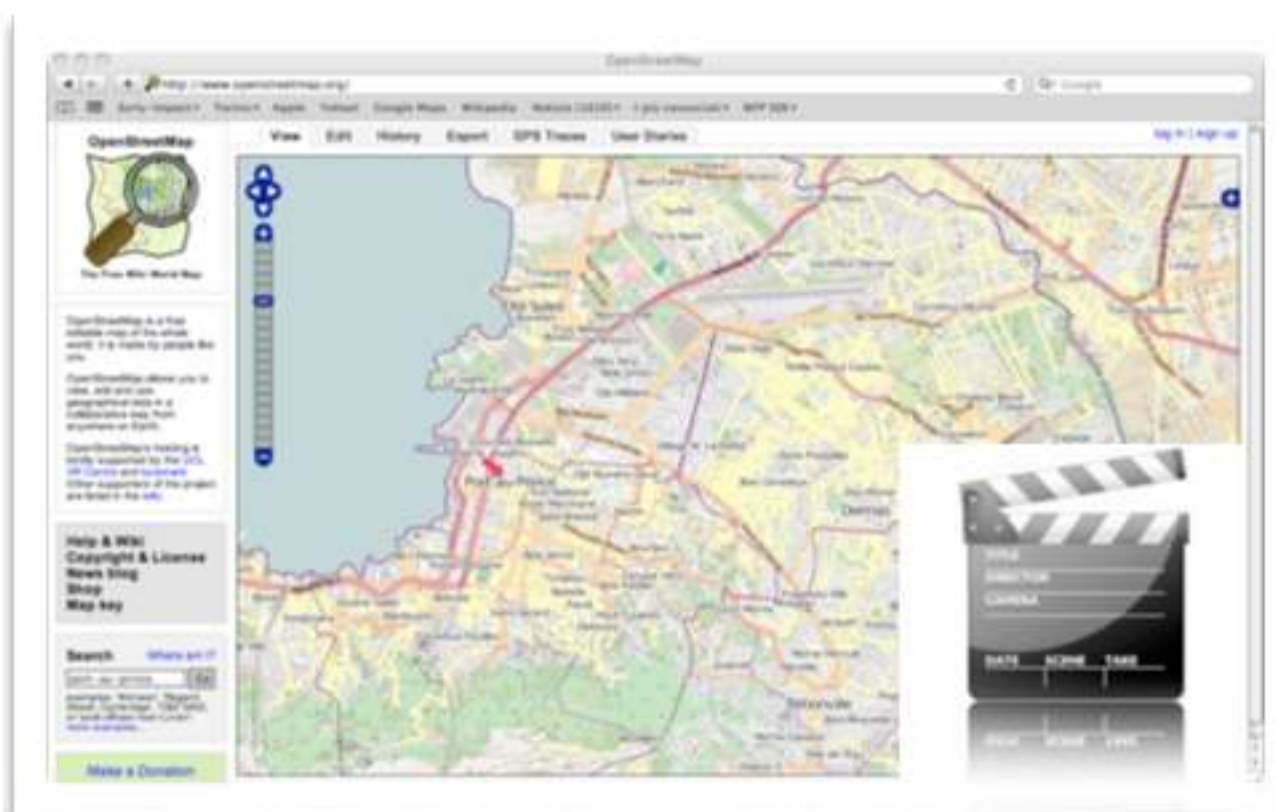
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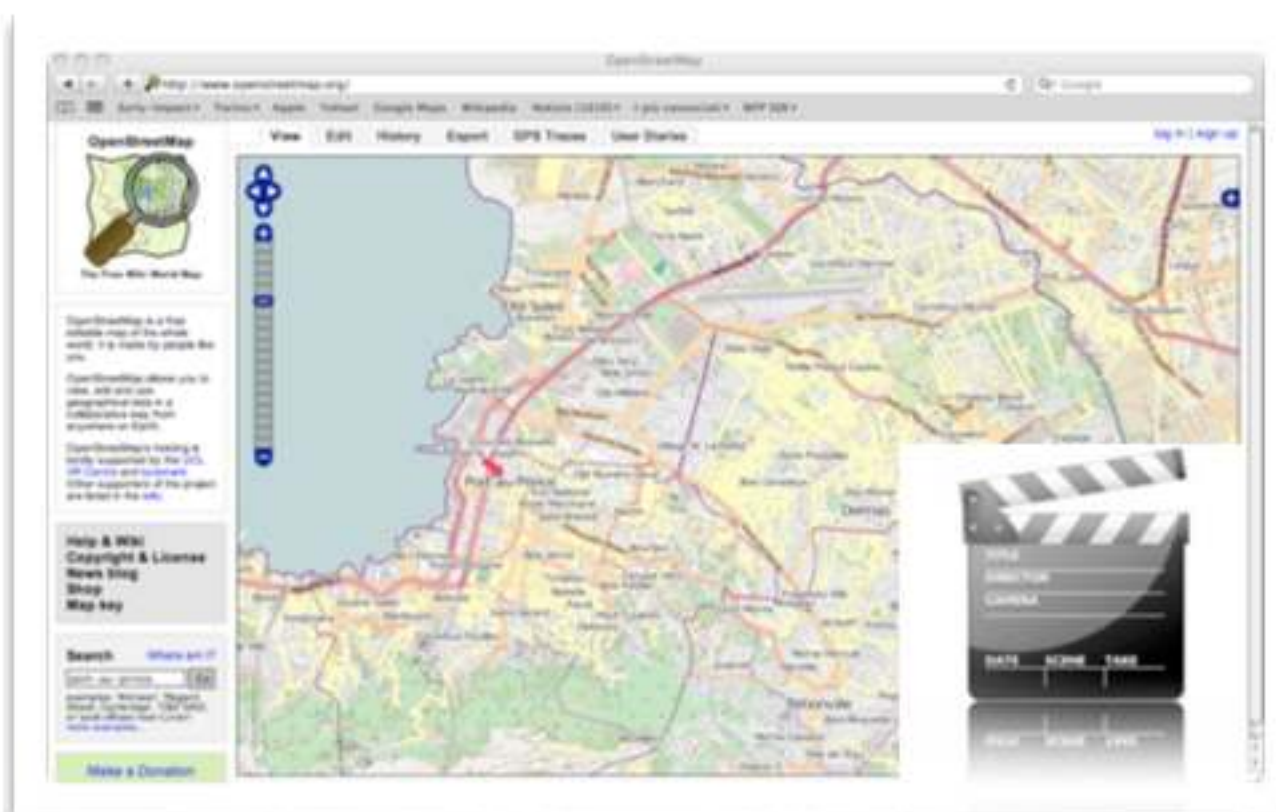


But also Twitter, Facebook, radio broadcasting...



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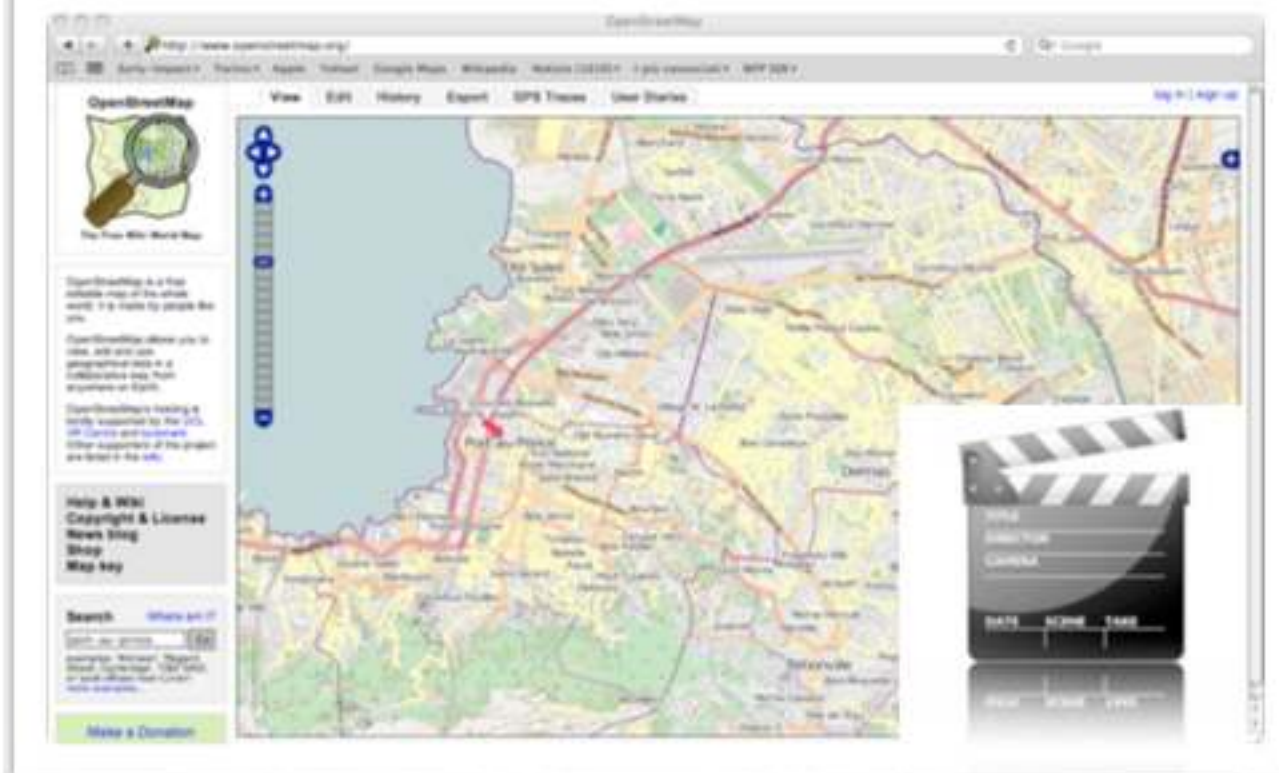


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- ☐ These volunteer networks are **looking** to the humanitarian community **for mentorship and guidance**;
- ☐ How do we take these informal, distributed and ad hoc networks and allow them to **interface effectively** and in a timely way with structured humanitarian organizations?



But also Twitter, Facebook, radio broadcasting...



Looking for a solution...



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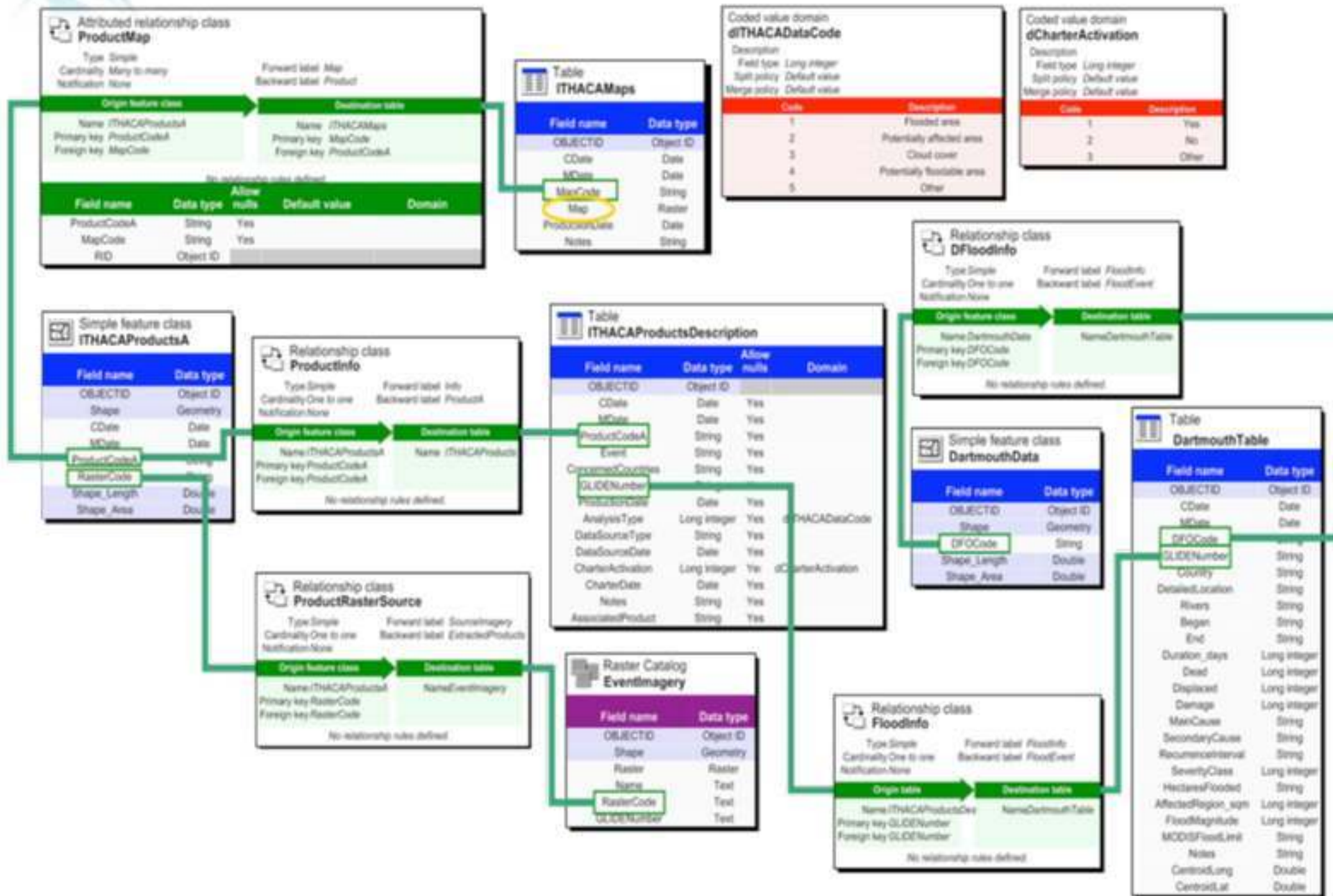


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- For additional info: <http://irevolution.wordpress.com/2010/09/26/crisis-mappers-task-force/>

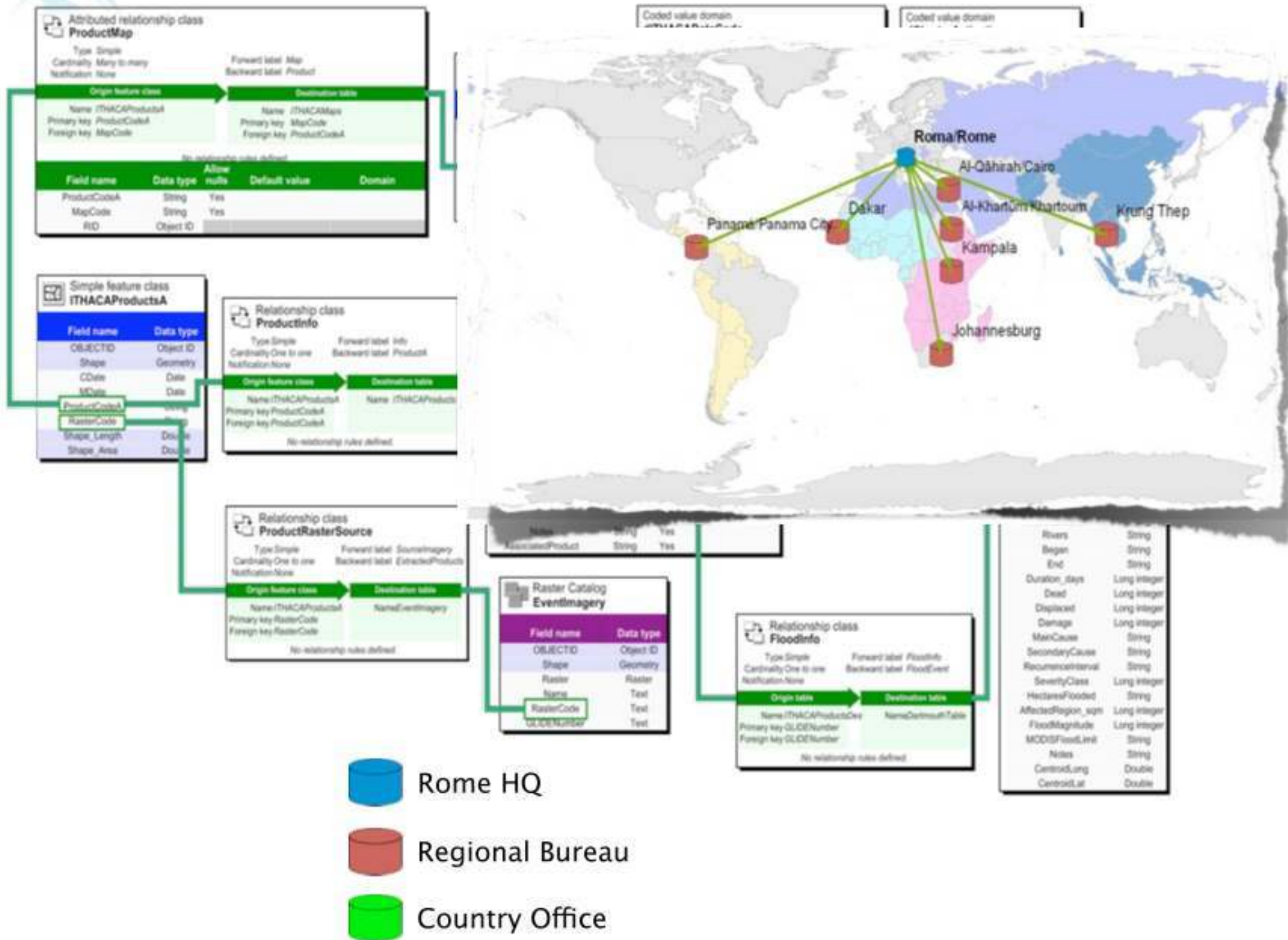


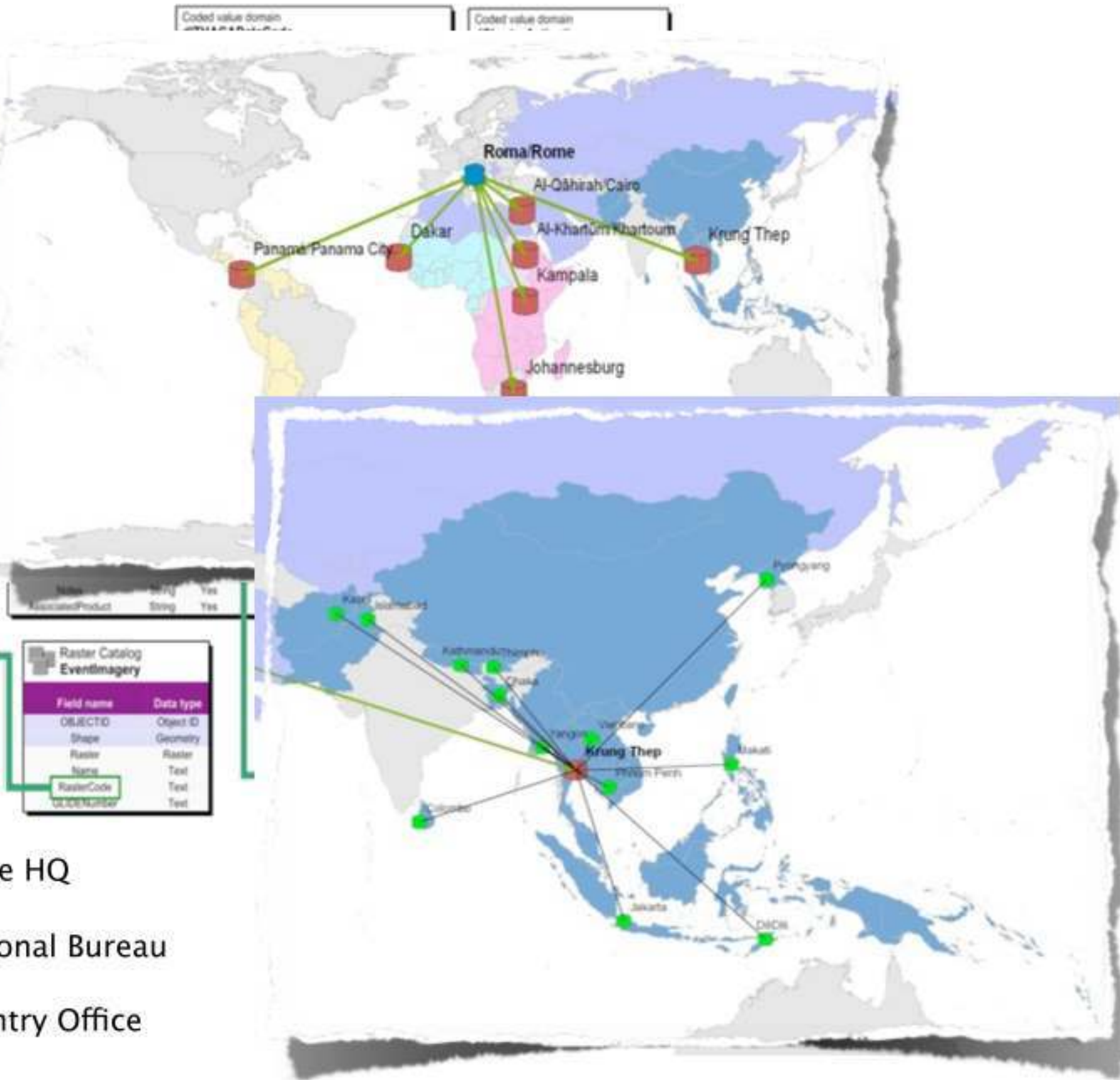
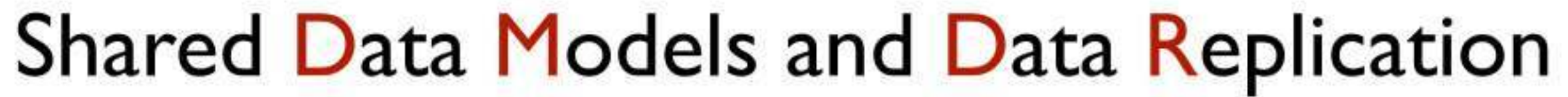
Shared Data Models and Data Replication





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- Rome HQ
- Regional Bureau
- Country Office



Low Cost Mobile Mapping System





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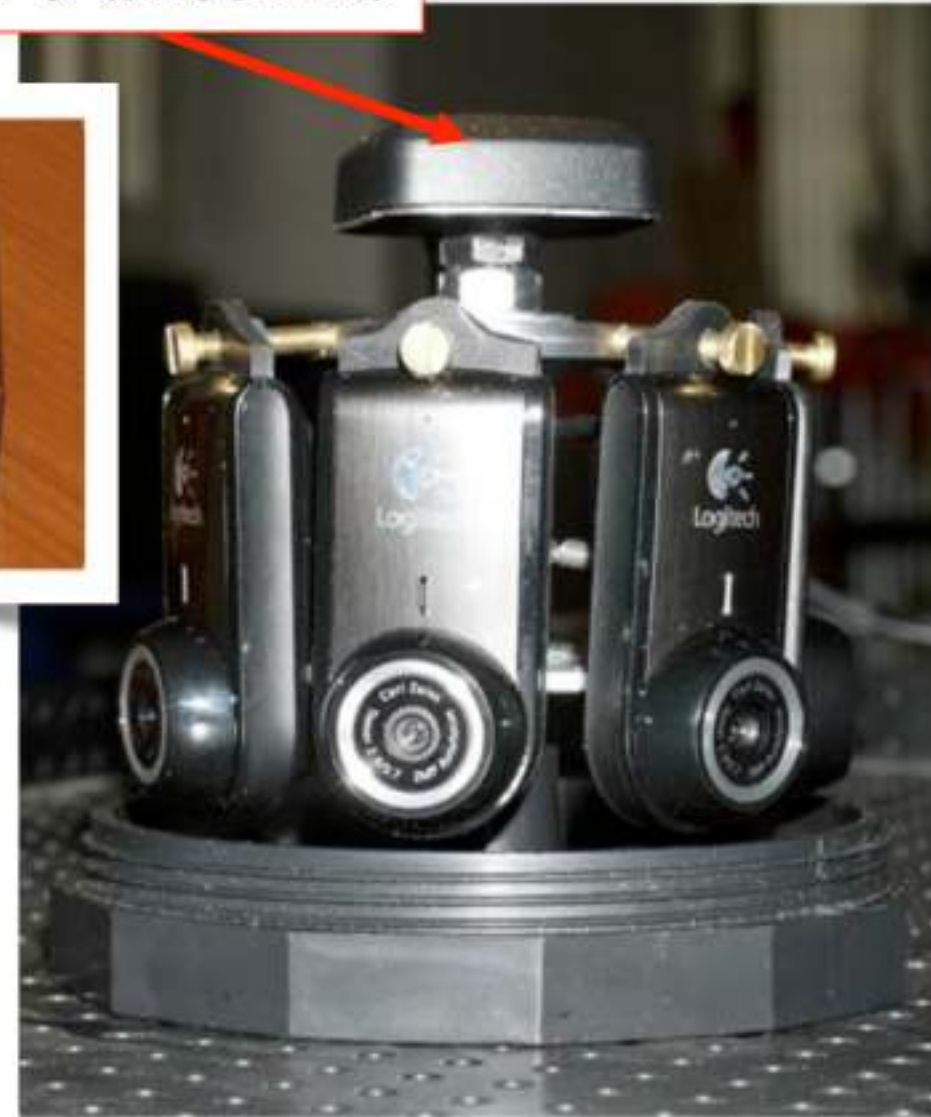




Low Cost Mobile Mapping System



GPS antenna

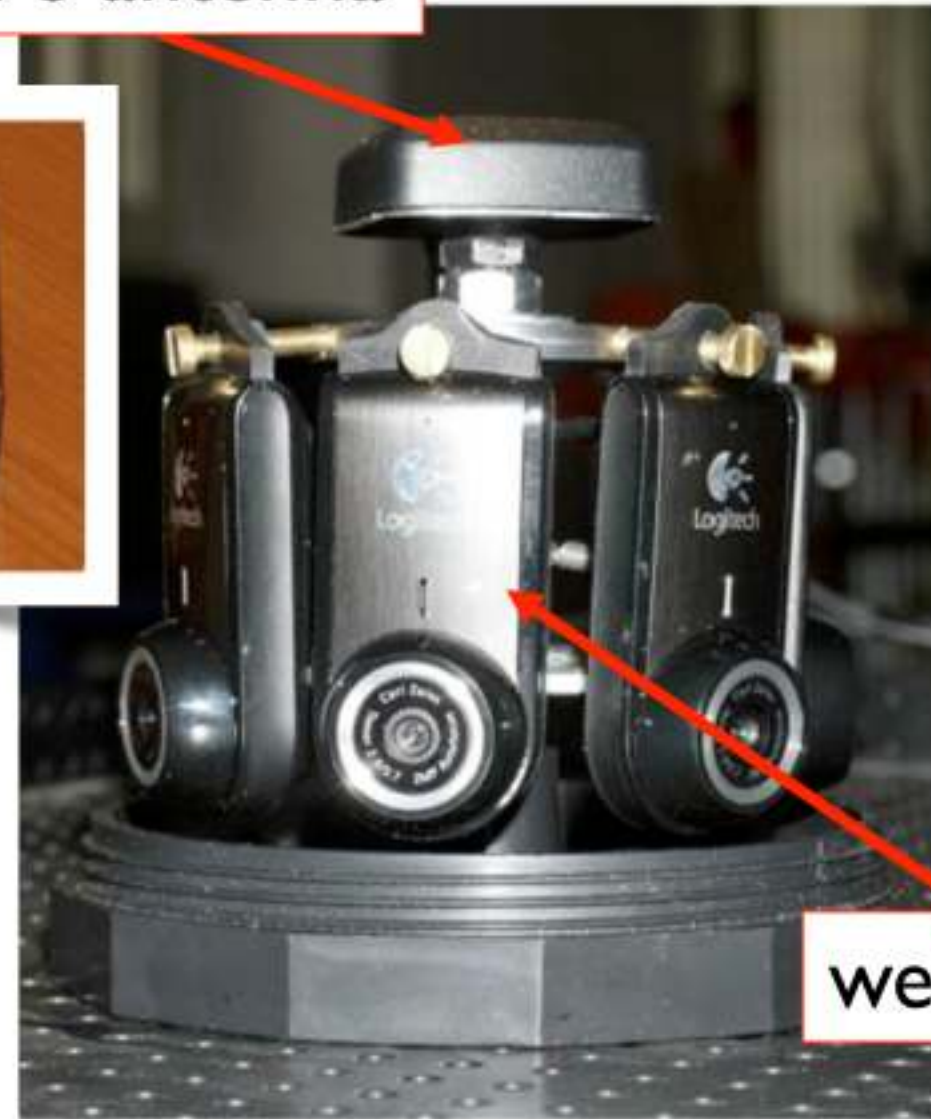




Low Cost Mobile Mapping System



GPS antenna



webcams



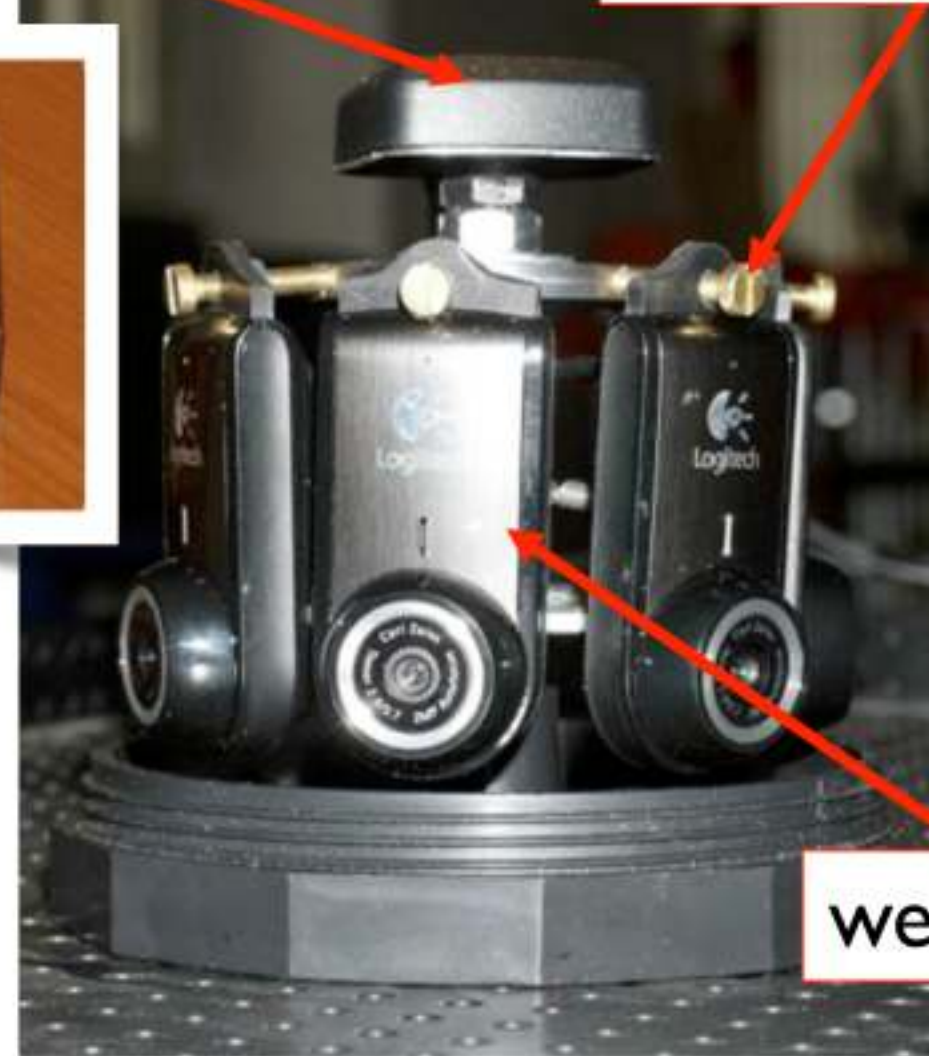
Low Cost Mobile Mapping System



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adjustment screw



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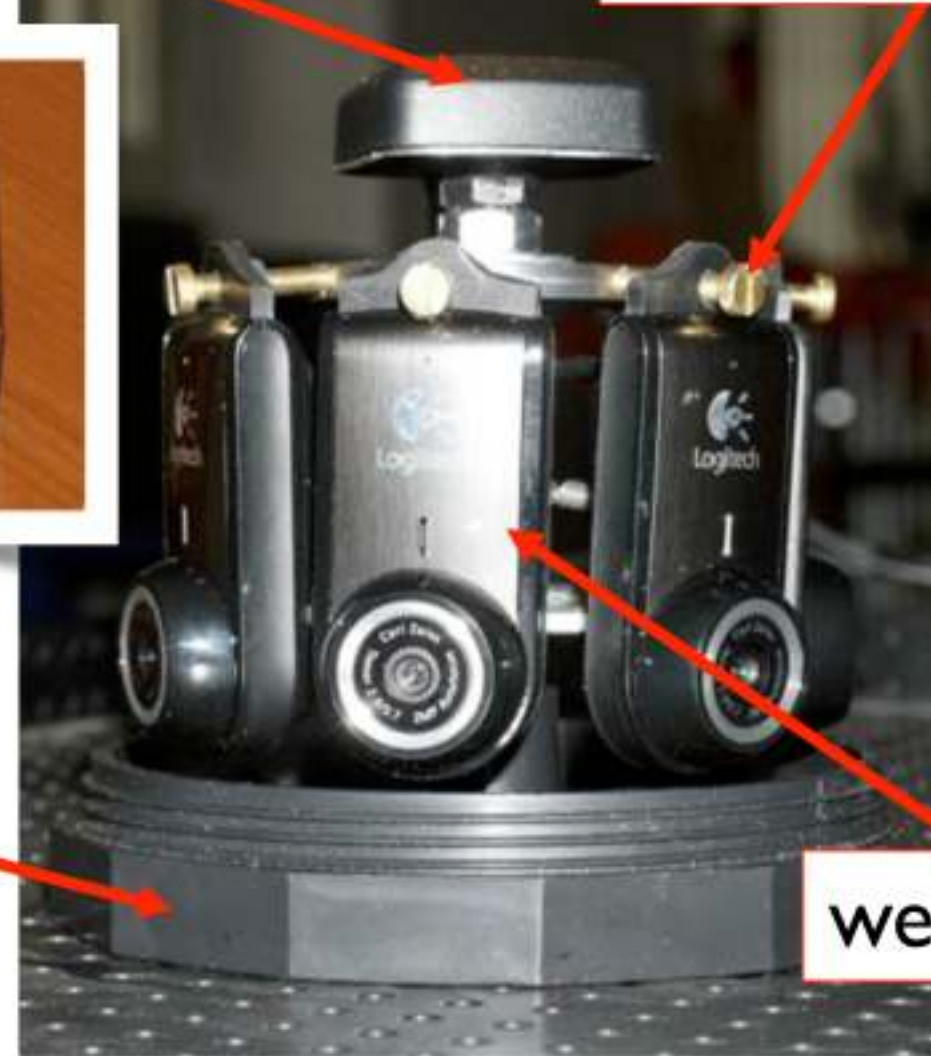
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Magnetic support

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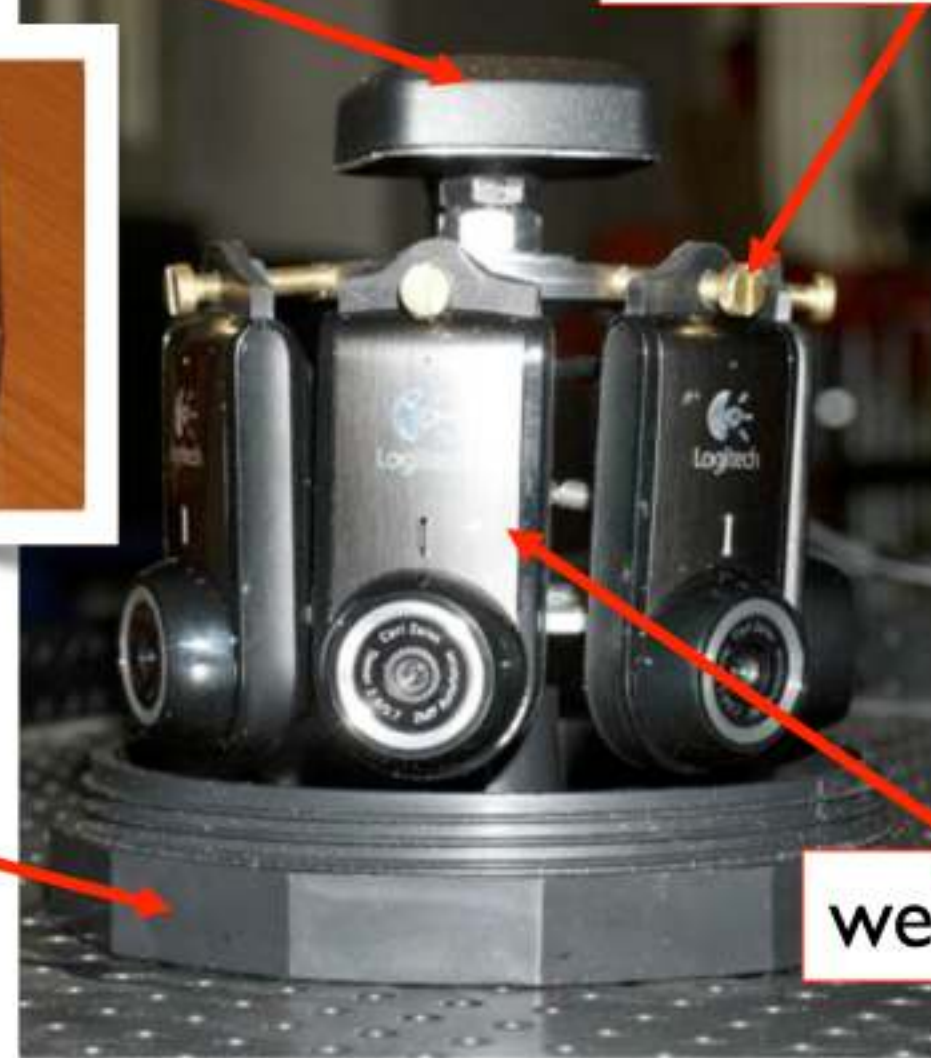
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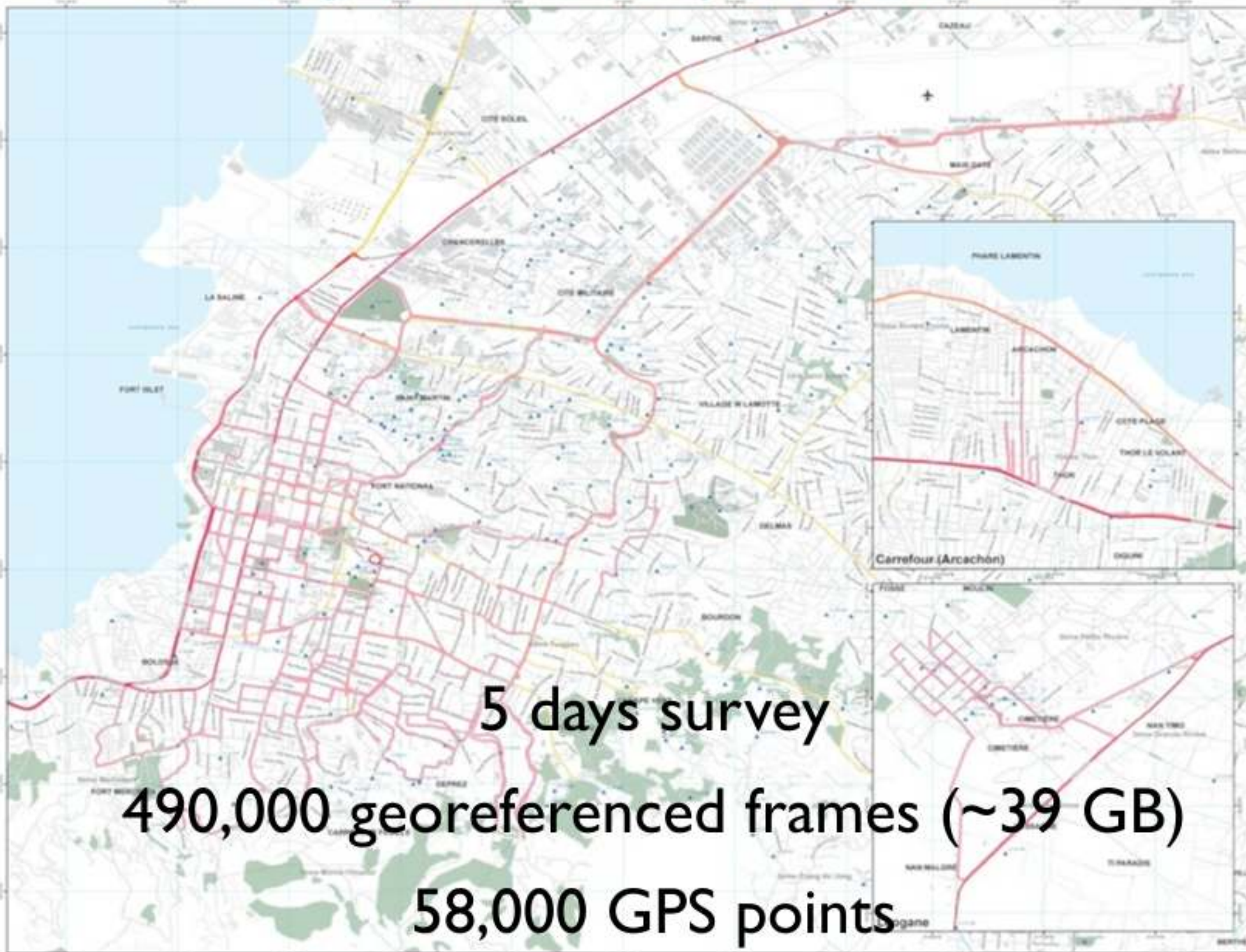
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webcams



Low Cost Mobile Mapping System

Haiti - Port-au-Prince, Leogane, Carrefour - Ground survey tracks as of 02/03/2010



Legend

- Ground survey track
- Populated places
 - National capital
 - 1st order capital
 - 2nd order capital
 - 3rd order capital
 - Town
- Airdrome
 - Airport
 - ILZ
- Adm. boundaries
 - International
 - 1st order
 - 2nd order
 - 3rd order
 - 4th order
 - Coastline
 - River
 - Stream
 - Canal
- Road
 - Primary
 - Secondary
 - Local/Urban
 - Track
- Buildings
- Natural areas
 - Forest
 - Park
 - Riverbank
 - Inland Water

Source: Survey is based on a Low Cost Mobile Mapping System (LCMMS) developed by ITHACA and WFP. The system includes a 1:15,000 scale map and a 1:15,000 scale map.

1:15,000 on A1 paper format
0 0.2 0.4 0.6 0.8 1 km
Geographic Coordinates - WGS84

Source for road data, buildings, waterways and natural areas is OpenStreetMap project. Source for vector map data is (2008) datasets was the United States National Imagery and Mapping Agency (NIMA) datasets are available to the LCMMS system through ITHACA. The map data is not more accurate or up-to-date than the data contained herein. This map is for planning purposes only. © United Nations World Food Programme 2010. All rights reserved.

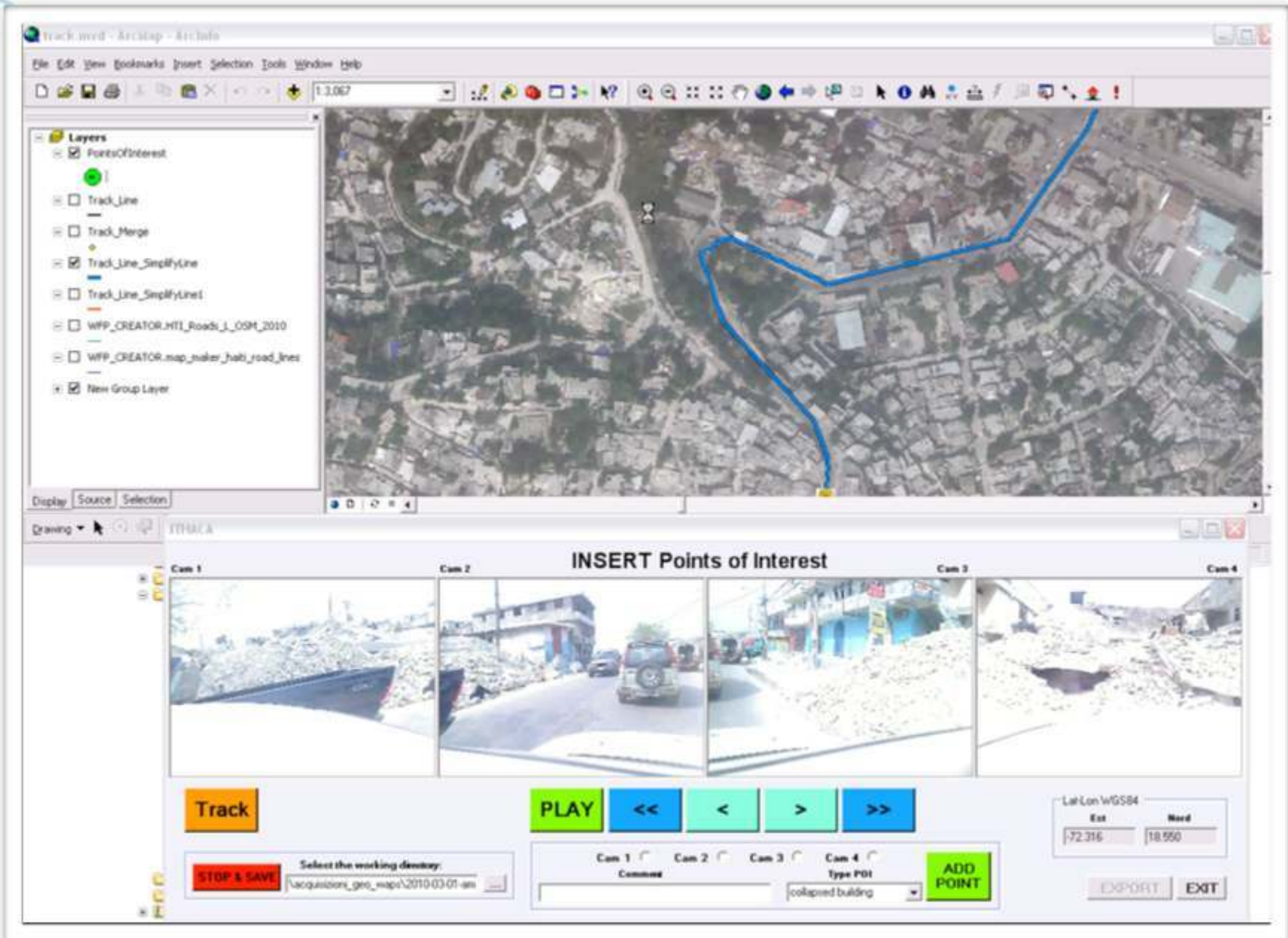
Produced by ITHACA
in cooperation with WFP



5 days survey
490,000 georeferenced frames (~39 GB)
58,000 GPS points



Low Cost Mobile Mapping System





Rue St. Martin

Rue Dr. Aubry

Rue Tiremasse

Buildings - Main Damage Site Class

Aerial Data Survey

-  Destroyed (BD)
-  Moderate Damage (BMD)
-  No Visible Damage (NVD)
-  Severe Damage (BSD)



Buildings - Main Damage Site Class

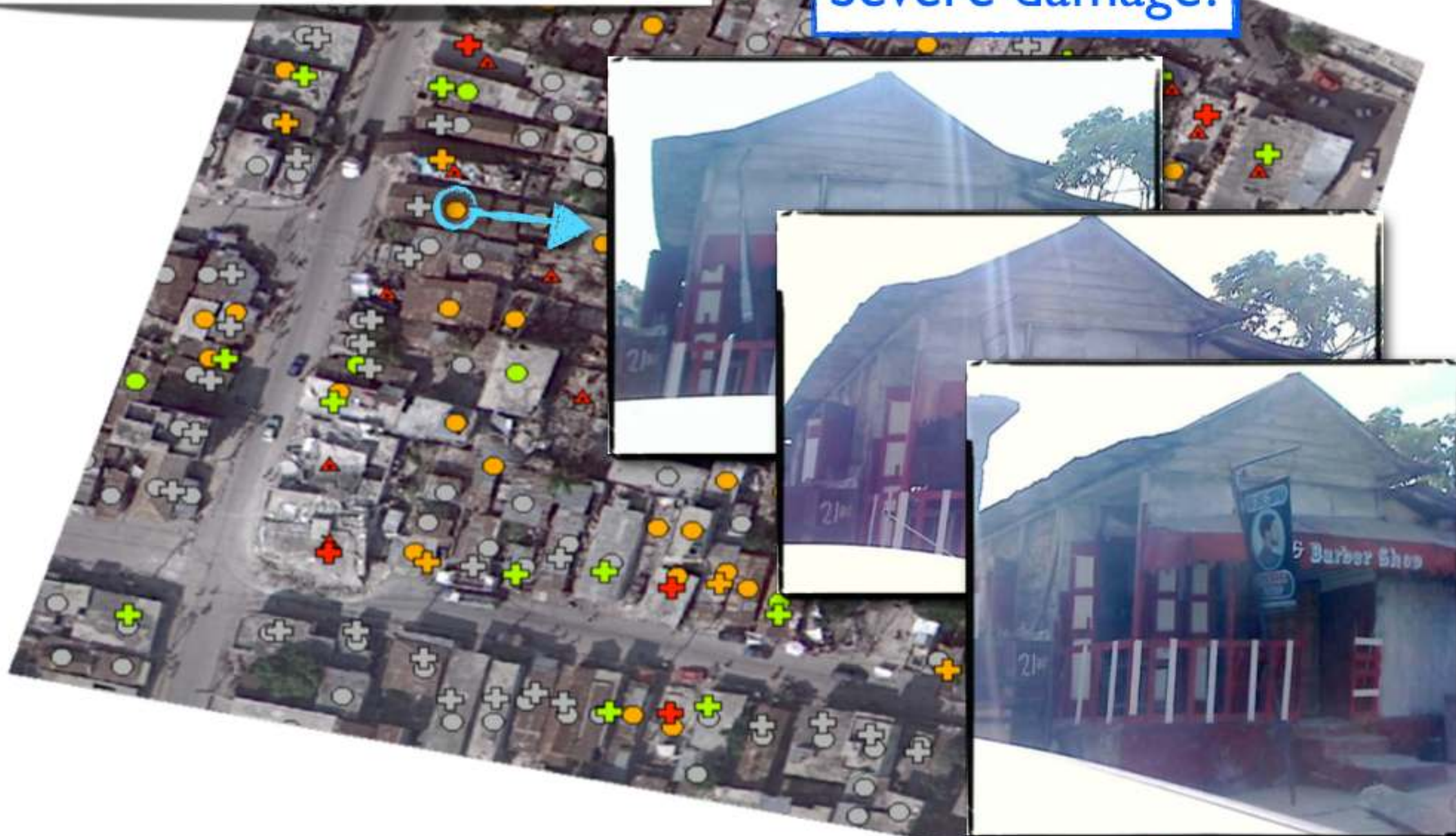
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Destroyed building?



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Global accuracy ~ 65%





Mobile Mapping Facility

Project for an **equipped container** (hw/sw) dedicated to geographic information management and acquisition **on the field**, during emergency response phases



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Equipment:

- ☒ Container provided by UNHRD;
- ☒ A0 plotter;
- ☒ PC for managing printing processes;
- ☒ PC for geographic information management;
- ☒ Notebook;
- ☒ GPS permanent station;
- ☒ Satellite communication station;
- ☒ Mobile instruments for surveys (GPS receivers, digital cameras with GPS7compass, LCMMS).





Near real-time Flood Monitoring System

Goal:

timely availability of geographic information on water bodies extension for early-warning and damage assessment phases



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Means:

historical analysis, obtaining **dynamic reference data**, related to different climatic periods/seasons by the **automation of the classification of water bodies** from remote sensing images at regional scale

Development of a **near real-time monitoring system** for flood events



Near real-time Flood Monitoring System



Near real-time Flood Monitoring System





Some open issues...



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... especially referring to **coordination and cooperation**:



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○ Haiti 2010 earthquake has **several peculiarities**:

- ☑ complexities of Haitian history and society;
- ☑ near-complete loss of governance structures;
- ☑ non-english speaking country;
- ☑ enormous influx of international NGOs;
- ☑ logistics has been a major impediment.



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What next? It's dangerous to consider it as the only and reference model;



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○ Haiti 2010 response was a **turning point** or an **exception**?
What next? It's dangerous to consider it as the only and reference model;

○ Haiti experience **raised** the **expectations/awareness** of the humanitarian workers community. Need for increased capacities of systematic data acquisition and monitoring through local deployment of tools/instruments/people.



Some open issues...



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- **Gaps** between humanitarian workers and volunteers/crowd-sourcing communities **must be filled**:
 - establishing long-term relationships;
 - volunteers must understand the process;
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 - establishing long-term relationships;
 - volunteers must understand the process;
 - CRO want to tap innovation.
- Volunteers/crowd-sourcing communities should be **“professionalized”**;
- Further strengthen the role of clusters in defining, adapting, using and promoting **relevant standards**.