



# Operationalizing Agility<sup>17th</sup>CCRTS

## The Role of Social Media in Crisis

Best Paper Award  
Presentation 2012



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International  
Command & Control  
Research & Technology  
Symposium  
The Mason Inn  
Fairfax, VA, USA  
June 19–21, 2012

# Agenda

- Contributors List
- Definitions
- Lessons From Past Crisis
- The Role of ICT in Crisis
- The iSAR+ Way: an Approach for Social Media in Crisis
  - The THEO Methodological Approach
  - iSAR+ Platform and Services
- Conclusions

# Contributors List

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# Definitions

- **Crisis:** In this paper, crisis is defined in the security context as resulting of human activities, technological hazard events or natural phenomena, and understood as the situation in which the priority values, interests, preconditions or critical functions of large social systems are seriously threatened, challenged, impaired or overloaded.
- **Social Media:** Social media refers to “online technologies and practices to share content, opinions and information, promote discussion and build relationships”. Social media services and tools involve a combination of web-based technology, telecommunications and social interaction.
- **Online and Mobile Communications:** Online communications refer to ‘social media’. Mobile communications are based upon the use of mobile devices, such as mobile phones, smartphones, tablets, portable computers and personal digital assistants (PDAs).

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# Lessons From Past Crisis

- September 11<sup>th</sup> 2001 – Terrorist Attacks on the USA
- 2003 China SARS Epidemic
- March 11<sup>th</sup> 2004 – Madrid Train Bombings
- December 24<sup>th</sup> 2004 – The Indian Ocean Tsunami
- July 7<sup>th</sup> 2005 – London Tube Bombings
- August 29<sup>th</sup> 2005 – Hurricane Katrina
- 2007 Southern California Wildfires
- January 12<sup>th</sup> 2010 – The Haiti Earthquake
- January 27<sup>th</sup> 2010 – The Chilean Earthquake
- 2011 Victorian Floods
- March 11<sup>th</sup> 2011 – The Great Japanese Earthquake
- 2011 Middle East Upheavals
- 2011 England Riots
- July 22<sup>nd</sup> 2011 – Norwegian Terrorist Attacks

# Lessons From Past Crisis

## December 24<sup>th</sup> 2004 – The Indian Ocean Tsunami

- A 9.3 magnitude earthquake was felt in the Indian Ocean and within minutes a giant tsunami decimated Banda Aceh, on the island of Sumatra, and massively struck twelve countries bordering the Indian Ocean, killing over 280,931 people.
- No advance warning was given. Information on the destruction of Sri Lanka's coast reached (by telephone) the media, and then the general public, prior to the news of Banda Aceh's fate.
- The existence of available information was severely hindered by the low connectivity and scarce telecommunications access in developing Asia.
- The **UN Humanitarian Information Centre** in Banda Aceh became the local information hub, BUT the first reports of this disaster came from **tourists** (photos and videos from mobile phones uploaded to WEB).
- More than fifty worldwide contributors built **The South-East Asia Earthquake and Tsunami Blog**, which aggregated news and set up a tracker for missing persons' reports and humanitarian efforts.

# Lessons From Past Crisis

## July 7<sup>th</sup> 2005 – London Tube Bombings

- Three bombs detonated on three London Underground trains and a fourth bomb on a double-decker bus. The attacks were the deadliest in London since World War II, killing 52 people and injuring more than 700 others.
- Initial information was scarce causing confusion in passengers.
- FRs with problems with radio communications. Not all radio systems operated in underground and there was **interoperability problems** between the different systems.
- **Legal issues:** the United Kingdom's Data Protection Act prohibits sharing personal data without the consent of those concerned.
- Most mobile operators reported capacity problems (excessive usage)
- Victims trapped underground were able to take photos and video of their surroundings but could only be later forwarded to police and broadcasted through the media around the world.
- (**media**) Local and national radio either suspended regular programming, or provided regular updates, whereas continuous, uninterrupted TV news coverage of the attacks was broadcast throughout the day, **empowered by the use of mobile phone footage sent in by members of the public and live pictures from traffic CCTV cameras.** This day marked how day-to-day technology undertook a major role in **citizen's journalism.**



# Lessons From Past Crisis

## August 29<sup>th</sup>, 2005 – Hurricane Katrina

- Hurricane Katrina devastated New Orleans and flooded 80% of the region for weeks, forcing 1.2 million residents to evacuate and killing 1,836 people.
- **The emergency 911 service was severely damaged and surviving stations were soon overwhelmed by the awesome volume of calls as desperate people tried to get help.**
- The New Orleans Police Department's communications system was inoperative for three days. **80% of the city's emergency networks were incompatible.**
- Satellite phones worked once the immediate storm passed. Satellite radio, such as XM and Sirius, continued to function.
- The **Amateur Radio Emergency Service** provided communications in areas where the communications infrastructure had been damaged or totally destroyed, and the SATERN network of amateur radio operators helped to locate more than 25,000 survivors.
- The **Federal Emergency Management Agency's (FEMA) Mobile Emergency Response Support (MERS)** teams provided assistance with emergency communications, with limited impact in the first days.

# Lessons From Past Crisis

## August 29<sup>th</sup>, 2005 – Hurricane Katrina (2)

- The absence of authoritative and believable information from public officials created a **climate of rumour, misinformation and speculation**, and added to the loss of citizens' confidence and the government's inability to maintain public order.
- **Field reporters** became conduits for information between victims and authorities, often using internet sites such as **blogs, wikis, fora and community journalism**.
- The **authorities monitored local and network news broadcasts, as well as internet sites**, to assist in the rescue efforts coordination.
- **NOLA.com** (blog) the web affiliate of New Orleans' Times-Picayune accepted and posted thousands of individual pleas for rescue. Much of **NOLA's information came indirectly from trapped victims via SMS messaging of their cell phones**.
- **Shelters emerged as information hubs** for seeking and providing information and the large Red Cross-run shelters had to establish well-organized call centres and processes for recording and transmitting messages.
- A few shelters had computers to access the internet but many users **needed computer training**. **Volunteers assisted with this task** and helped them to share information, find missing people and follow-up relief efforts.

# Lessons From Past Crisis

## 2007 Southern California Wildfires (end-October and November)

- Multiple wildfires in Southern California destroyed 1500 homes and burned over 500,000 acres of land, killing 9 people, injuring 85 and provoking the evacuation of more than half a million people. In the process, six counties were declared disaster areas: Los Angeles, Riverside, Orange, San Bernardino, San Diego and Ventura.
- **Prompt evacuation and road blockades** were fundamental to reduce public exposure and maximise firefighters' access to threatened locations.
- **The Reverse 911 system worked extremely well** notifying residents of danger, in spite of provoking increased congestion on exit routes.
- Several local fire authorities ordered a large number of Public Information Officers (PIO) **providing volunteers the official information and disaster relief contacts as well as for connecting to the media and the public the vast amount of information they required.**
- Unable to learn critical information from the media (too general and often incorrect), people in the affected region used mobile and social media to be informed: **mobile phones to contact relatives and friends, information portals and websites to know about road closures and fire-line status.**
- During the course of the fires, **citizen journalists used Twitter and Flickr to provide real-time updates** about evacuations, meeting points and places to gather supplies or bring animals. These updates could be combined with **reports from broadcast television news, local radio, streaming video, instant messages, text messages, online scanner radio feed and e-mails from friends in the area.**
- San Diego's local National Public Radio affiliate turned to **Google Maps and Twitter to report the news online** when excessive web traffic brought down its website. Likewise, some **people acted as information brokers**, distributing information, giving advices and providing console.

# Lessons From Past Crisis

## January 12<sup>th</sup>, 2010 – The Haiti Earthquake

- A 7.0 magnitude earthquake struck Haiti, killing 316,000 people, injuring as many as 300,000, destroying 300,000 houses and leaving 1,600,000 people homeless.
- Amidst the collapse of all critical infrastructure, communications withstood a considerable high damage. Still, within hours of the earthquake, most of Haiti's cell phone towers were still operational and **text messages were getting through.**
- Being Text messaging (SMS) the primary means of remote communication in Haiti, a **free aid service 4636** (via DigiCel) was implemented: hundreds of messages in **Kreyol-language** were received (about 1000 per day), translated, categorized and geolocated by hundreds of volunteers worldwide.
- The **Ushahidi Haiti platform** was linked directly to the “4636” live feed and, from this time, the **US Marines starting taking the feed of messages and established a dedicated force to monitor and respond to them.**

# Lessons From Past Crisis

Banner indicating important numbers to send SMS (integration with Mission4636)

Incidents over a map (and timeline)

Incident Statistics over a timeline

Newsfeeds over the net (twitter, sparked, citizens journalism, etc.)

The screenshot shows the Ushahidi Haiti website interface. At the top, there is a banner with the text 'Haiti The 2010 Earthquake in Haiti'. Below the banner, there are navigation tabs for HOME, REPORTS, SUBMIT AN INCIDENT, GET ALERTS, CONTACT US, and HOW TO HELP. A prominent yellow button labeled 'SUBMIT AN INCIDENT' is visible. The main content area features a map of Haiti with numerous red circular markers representing incident locations. Below the map is a line graph showing incident statistics over a timeline from January 12, 2010, to January 19, 2010. To the right of the map, there is a 'CATEGORY FILTER' section with several icons and labels: 1. EMERGENCIES / EMERGENCIES, 2. SERVICES / SERVICES, 3. EMERGENCIES / LOGS / SERVICES / OTHER, 4. SERVICES / RESPONSE, 5. ACTION / ACTION, and 6. NEWSFEEDS OF PERSONS / PERSONAL NEWS. Below the filter is a 'How to Report' section with a list of instructions. At the bottom of the page, there are three social media feeds: 'On Twitter' showing tweets about the Haiti-Caribbean Application, 'Help Tag Photos' showing a 'sparked' photo gallery, and 'Person Finder' showing a notice that the service is no longer managing accounts from the Haiti earthquake of 2010.

Search functions / Overall Statistics / RSS

Submit an incident

Subscribe to Alerts (based on geographical area, category, etc)

Filter by Category

3rd Party Apps (Google PFIF)

# Project 4636

How a simple SMS, sent from a Haitian in need, can be transformed into a powerful resource that fuels the crisis response and recovery effort.

- 1 A Haitian with a need sends an SMS to the 4636 shortcode.
- 2 The SMS is then forwarded onto the crowdfunder.com website.
- 3 A Haitian volunteer or staff member logs onto the website and translates the SMS, adding meta and geospatial information.
- 4 After translation, the SMS is turned into a Report that goes out to multiple organizations involved in the crisis response and recovery effort.

A product of  **Ushahidi Labs**



## NOTE:

- Local language is Kreyol
- Hundreds of volunteers translated about 1000 messages per day

Source:

<http://blog.ushahidi.com/index.php/2010/02/08/project-4636-an-info-graphic/>

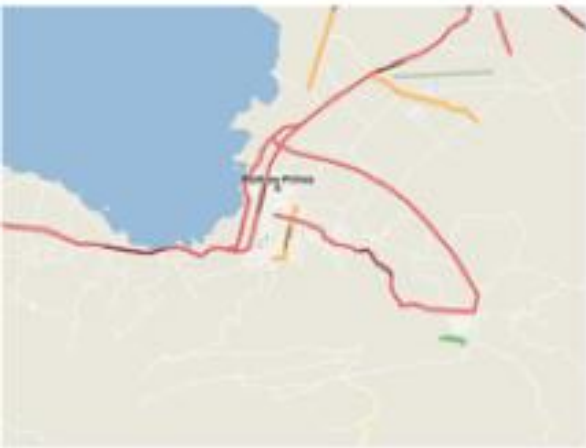
# Lessons From Past Crisis

## January 12<sup>th</sup>, 2010 – The Haiti Earthquake (2)

- An increasing number of organisations were using the maps to plan and coordinate relief efforts: Red Cross, Plan International, Charity Water, US State Department, International Medical Corps, AIDG, USAID, FEMA, US Coast Guard Task Force, World Food Program, SOUTHCOM, OFDA and UNDP.
- **(media)** Radio is the most common medium used by Haitians: thus Radio Lumière resumed broadcasting across most of its network within a week.
- The International Charter on Space and Major Disasters was activated, allowing satellite imagery of affected regions to be shared with rescue organizations.
- Members of social networking sites, such as **Twitter and Facebook**, spread messages and pleas for help.
- The **OpenStreetMap community** responded to the disaster by improving the level of mapping available for the area (using post-earthquake satellite photography provided by GeoEye) and tracking website Ushahidi messages to assist Haitians still trapped and keep survivors' families informed.

# Lessons From Past Crisis

Example: January 12<sup>th</sup>, 2010 Haiti Earthquake



Left image: Before the Earthquake

Center image: Two days after the Earthquake

Right image: on October 14<sup>th</sup> 2011





# Lessons From Past Crisis

## March 11<sup>th</sup> 2011 – The Great Japan Earthquake

- A powerful 9.0 magnitude earthquake (the seventh most powerful earthquake in recorded History) struck the coast of Japan, causing widespread power outages, fires and a severe tsunami reported to be 40.5 meters high and traveling 10 km inland. At least 15,647 people were killed, 4,643 missing, 5,924 injured, 130,927 displaced and more than 332,395 buildings, 2,126 roads, 56 bridges and 26 railways destroyed or damaged.
- Electricity, gas and water supplies, telecommunications and railway service were disrupted and several reactors severely damaged at Fukushima's nuclear power plant.
- One minute before the earthquake was felt in Tokyo, the **Earthquake Early Warning system sent out warnings** of impending strong shaking to millions. It is believed by the Japan Meteorological Agency to have saved many lives.

Cellular and landline phone service suffered major disruptions in the affected area but **internet services were largely unaffected**. In an hour, with the Japanese fixed telephone network destroyed, **Twitter became the emergency service**, with almost 1200 tweets per minute coming from Tokyo, accordingly to Tweet-o-Meter.

20 Tweets per second

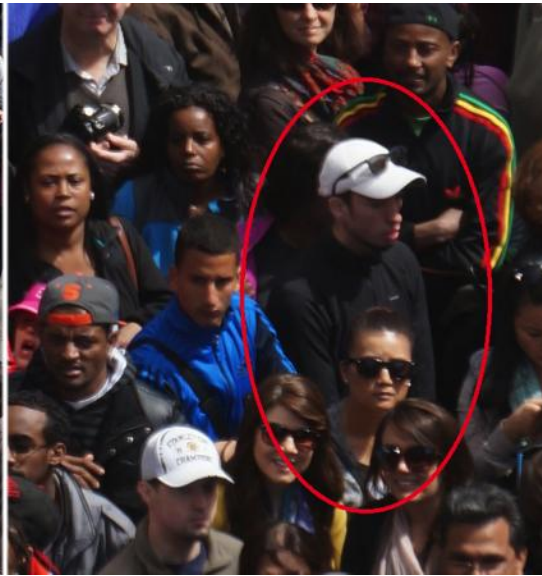
# Lessons From Past Crisis

## March 11<sup>th</sup> 2011 – The Great Japan Earthquake (2)

- Several Wi-Fi hotspot providers reacted by providing free access to their networks and companies provided free VoIP calls.
- There was **no clear decision-making structure** that would allow the disparate stakeholders on disaster recovery to work together (local response only). The traditional problem of Japanese decision-making, mixed with the stove-piped *tatewarigousei* and protective *nawabari* cultures, makes the **protection of own information the priority**, prompting a agency-centric response management instead of a coordinated and integrated capability.
- **Cabinet Secretary Yukio Edano, used social media tools** to calm public fears and remedy media speculation. As expected, the crisis at the Fukushima power plant was catapulted online almost instantly and within a few days generated 64% of blog links and 32% of Twitter news links.
- Public criticism in the Japanese society both against the government and against Tepco, the operator of the plant, started to rise. **Cabinet Secretary Edano's live press conferences were praised on Twitter**, for he was clear, articulate and unafraid of difficult questions, presenting leadership qualities.

# Since 2012...

- Boston Marathon bombing (April 15, 2013) highlighted growing citizens' participation in the response effort, with the authorities enlisting the public's assistance to provide information and identify the suspects, resorting to images and videos collected from online and mobile technologies.



# Since 2013

- London UK (23<sup>rd</sup> May 2013): a terrorist incident took place in broad daylight and involved two suspects killing a serving soldier. As the victim lies in the road behind him one suspect turns and gives passers by his justification for the attack encouraging them to use take pictures and social media to record his words.



# Since 2013

- Turkey: Ignored in traditional media, Turkish protesters go online



*On Facebook and YouTube, users have published videos depicting police officers firing tear gas into unarmed crowds, assaulting women, and, in a particularly disturbing video, surrounding a prostrate protester and taking turns kicking him and clubbing him in the head. This video of police firing tear gas bombs into the crowd has gathered more than 130,000 shares on Facebook.*

<http://www.dailydot.com/society/turkey-taksim-square-riot-facebook-twitter/>



# Since 20

Rumour  
Management

- **Hurricane Sandy: Rumour Control**
- *There is a lot of misinformation circulating on social networks regarding the response and recovery effort for Hurricane Sandy. Rumors spread fast: please tell a friend, share this page and help us provide accurate information about the types of assistance available.*
- <http://m.fema.gov/sandy-rumor-control>



# Lessons From Past Crisis

## Common Aspects in Studied Crisis:

- Critical infrastructures, namely communications, withstand extreme damage or destruction.
- Internet and cellular connectivity exhibit a resilient performance, especially the capacity to send / receive SMS and text messages.
- 112 or 911 emergency services rapidly becoming overwhelmed by the high volume of incoming calls.
- Traditional unidirectional communication means are too generic (broadcast media). Local channels are very useful.
- ICT tools deployed by independent organizations (or individuals) are adopted by citizens and other organisations.
- Social networks were the first providers of news in a number of cases.
- Citizens were the first sensors *in situ*.

# Lessons From Past Crisis

## Common Aspects in Studied Crisis (2):

- Public Safety organisations have no bi-directional communication mechanisms implemented with citizens
  - The implementation of ICT tools for this purpose is mainly driven by individuals or independent organisations.
  - These ICT tools do not conform with Europe's data privacy legislation of Europe (and US).
- Law restricts most public safety organisations on information sharing concerning the public.
- Public Safety organisations face severe law restrictions even during crisis in what concerns sharing information about victims.
- Citizens have been filling the present gap using social networks (not originally designed for this purpose) and other available tools.



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# The Role of ICT in Crisis

A plethora of new tools and platforms has been developed and used in crisis



**Mission 4636**



Google latitude

Google Crisis Response  
a google.org project

Google earth

twitter

PermiLoc

You Tube

Blogger

flickr

Panoramio

Picasa

# The Role of ICT in Crisis

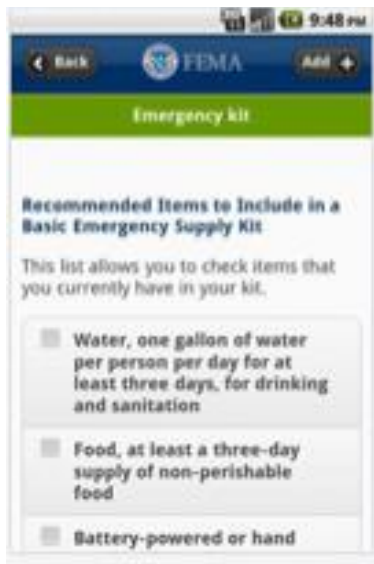
## Mobile



Gaia GPS Application (for Haitian Disaster Relief)

# The Role of ICT in Crisis

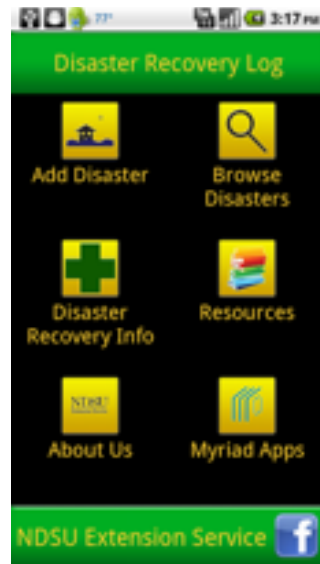
## Mobile



US FEMA



Wildfire App  
Red Cross



North Dakota  
State University



Ushahidi



Disaster Alert  
(Pacific Disaster  
Center's World  
Disaster Alerts)

# The Role of ICT in Crisis

## Police goes mobile



### North Yorkshire Police Authority Mobile Application

The image on the right refers to a photo of a suspect that was shared by the police to citizens. The image was anonymized in this presentation.

# The Role of ICT in Crisis

## Social Networks / User Uploaded content

Social Networking Mobile App	Citizen Main Use
Facebook	Share messages, images and video with friends or anyone. Most used social media worldwide. EU alternatives are Hyves.nl (in the Netherlands) and Nasza-klasa.pl (in Poland)
Twitter	Connect with and follow people based on a similar topic. Short text messaging in real-time. Supports geotagging messages.
YouTube	Share videos. Easy to post a video recorded by a smartphone.
Flickr	Share images. Supports geotagging images. Alternatives are Picasa, Panoramio (photos of the world).

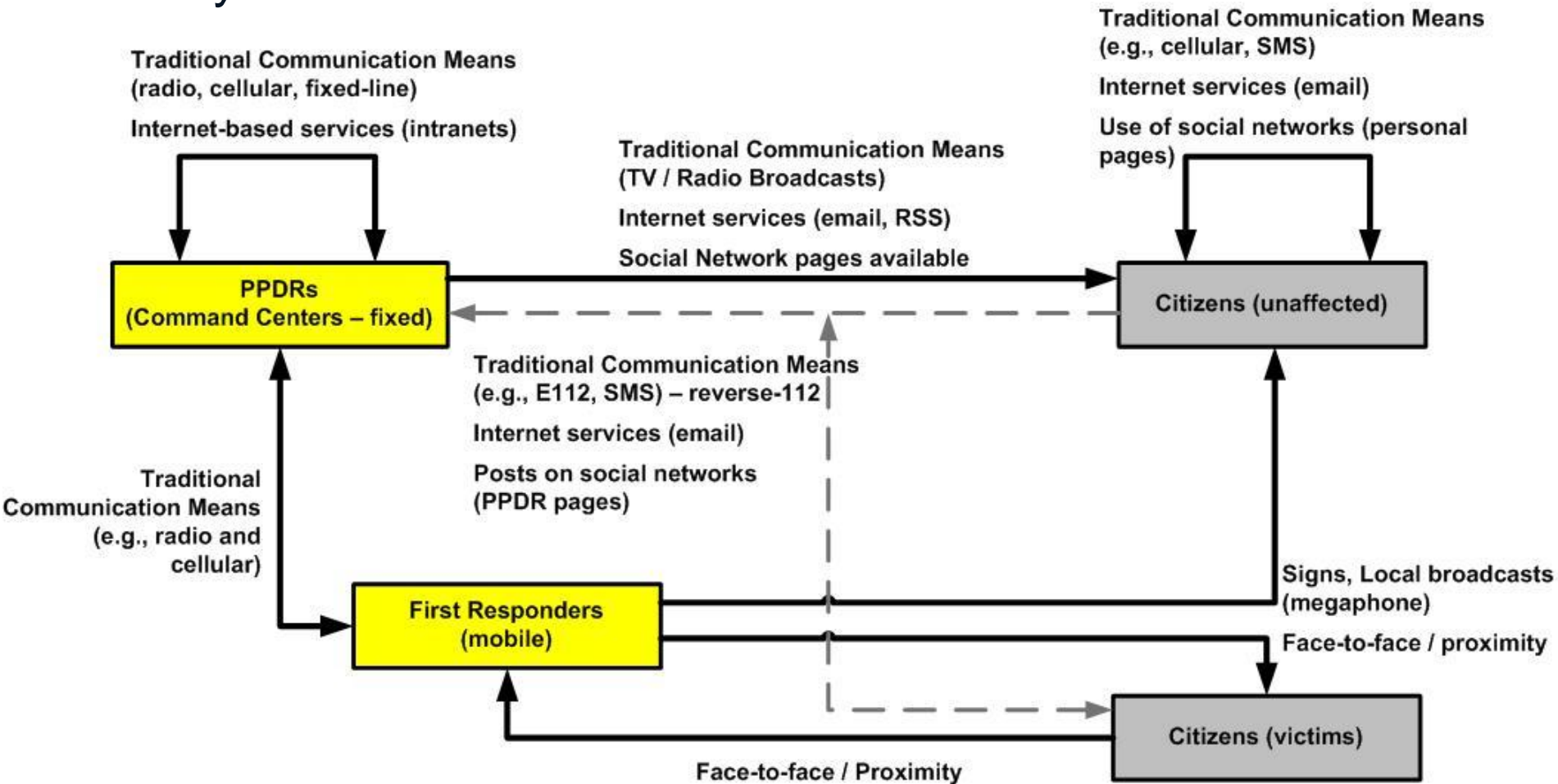
In flickr, “Haiti” and “Hope for Haiti 2010” have more than 10.000 photos posted.

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# The iSAR+ Way

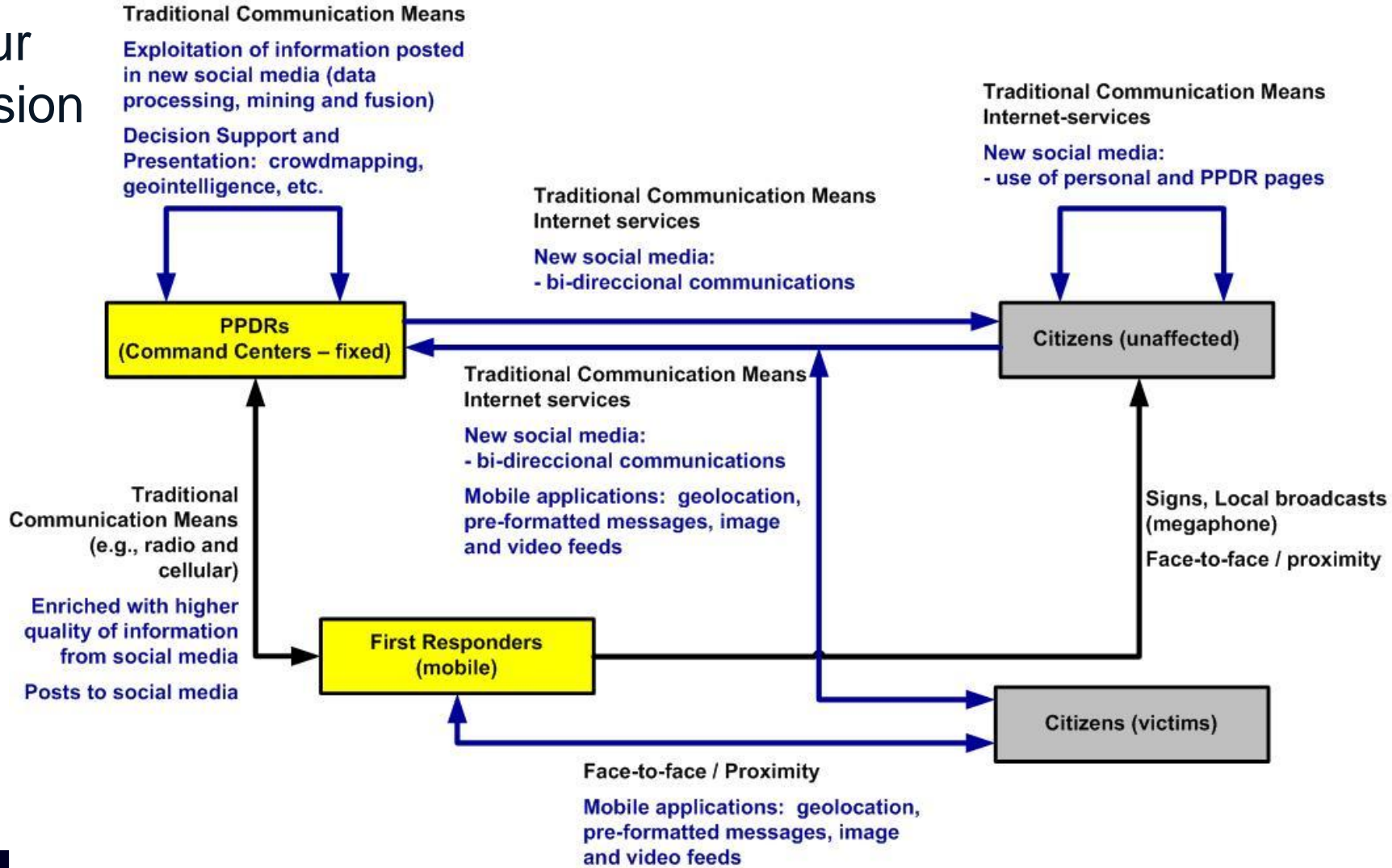
- Today





# The iSAR+ Way

- Our Vision



# The iSAR+ Way

## MAIN CHALLENGE

To enable PPDRs and citizens to (rapidly) generate high levels of situational awareness upon the occurrence of a large emergency or crisis event.

## MAIN OPPORTUNITY

To exploit the citizens' (i) high-level of adoption and use of mobile technology and (ii) their pro-active behaviour of online information production and consumption.

# The iSAR+ Way

BARRIER (PPDRs)

PPDRs distrust online social media as a credible information source and a viable communication tool with citizens in crises.

BARRIER (PPDRs)

Popular online social media platforms cannot be used as a formal PPDR tool for they do not uphold EU ethical principles and legal framework.

BARRIER (PPDRs)

Introducing change to PPDRs entails new risks and it is a process to be carefully structured, managed and tested, before implementation.

BARRIER (Citizens)

Citizens use the online platforms they are accustomed to. Forcing a change of habits and the adoption of an unfamiliar platform will likely result in failure.

# The iSAR+ Way

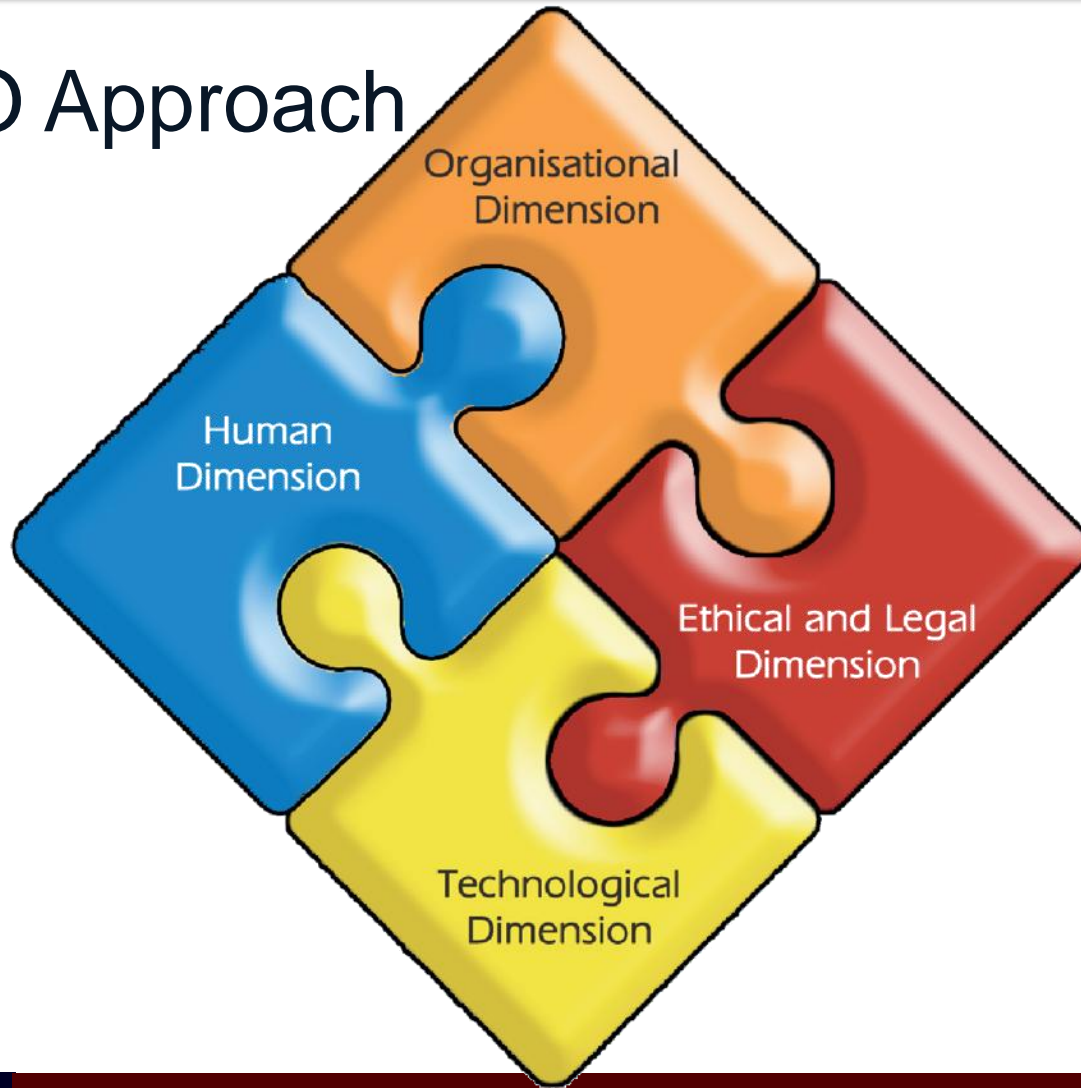
To enable the engagement of citizens and PPDRs in crisis response efforts, by encouraging the use of the new communication media, requires more than yet another PPDR technological system: it requires a **profound change in PPDR communication principles**

PPDR Communication Principles	Today	With New Communication Media
On information exchange policies	Strictly defined; top-bottom approach Unidirectional (from PPDRs to citizens)	Undefined; bottom-up approach Bi-directional (between PPDRs and citizens)
On control of information	Fully controlled by PPDRs	Control-free and community-driven
On information trust and quality	Official sources with adequate verification and validation	Anonymous or unofficial sources and self-correcting
On citizens inclusion	Seen as auxiliary source and reactive	Seen as primary source and proactive
On communication target	General public	Tailored according to user profile
On approach	Need-to-know. Command & Control.	Need-to-share. Connect & Collaborate.

**PPDR Communication Principles: Today and With the New Communication Media**

# The iSAR+ Way

## The THEO Approach



# The iSAR+ Way

## Technological Dimension

- Entails the integration of current ICT tools for crisis, equipment, communications, information processing technologies and current standards into a platform.
- Explores the real potential of ICT and mobile technologies in what concerns crisis response and search and rescue actions.

# The iSAR+ Way

## Human Dimension

- Focuses on the citizens' perspective on the acceptance and adequate employment of state-of-the-art mobile and social media communication technologies in crisis situations.
- Addresses human factor analyses, message delivery channels and message content.

# The iSAR+ Way

## Ethical and Legal Dimension

- Deals with the ICT/Tools requirements to abide to the ethical principles and legal framework applicable when developing an ethics-by-design project approach.
- Addresses the ethical and legal framework concerns and waivers emerging from the debate on the boundaries of privacy rights and public security, with respect to the integration of new online and mobile technology in crisis response efforts.



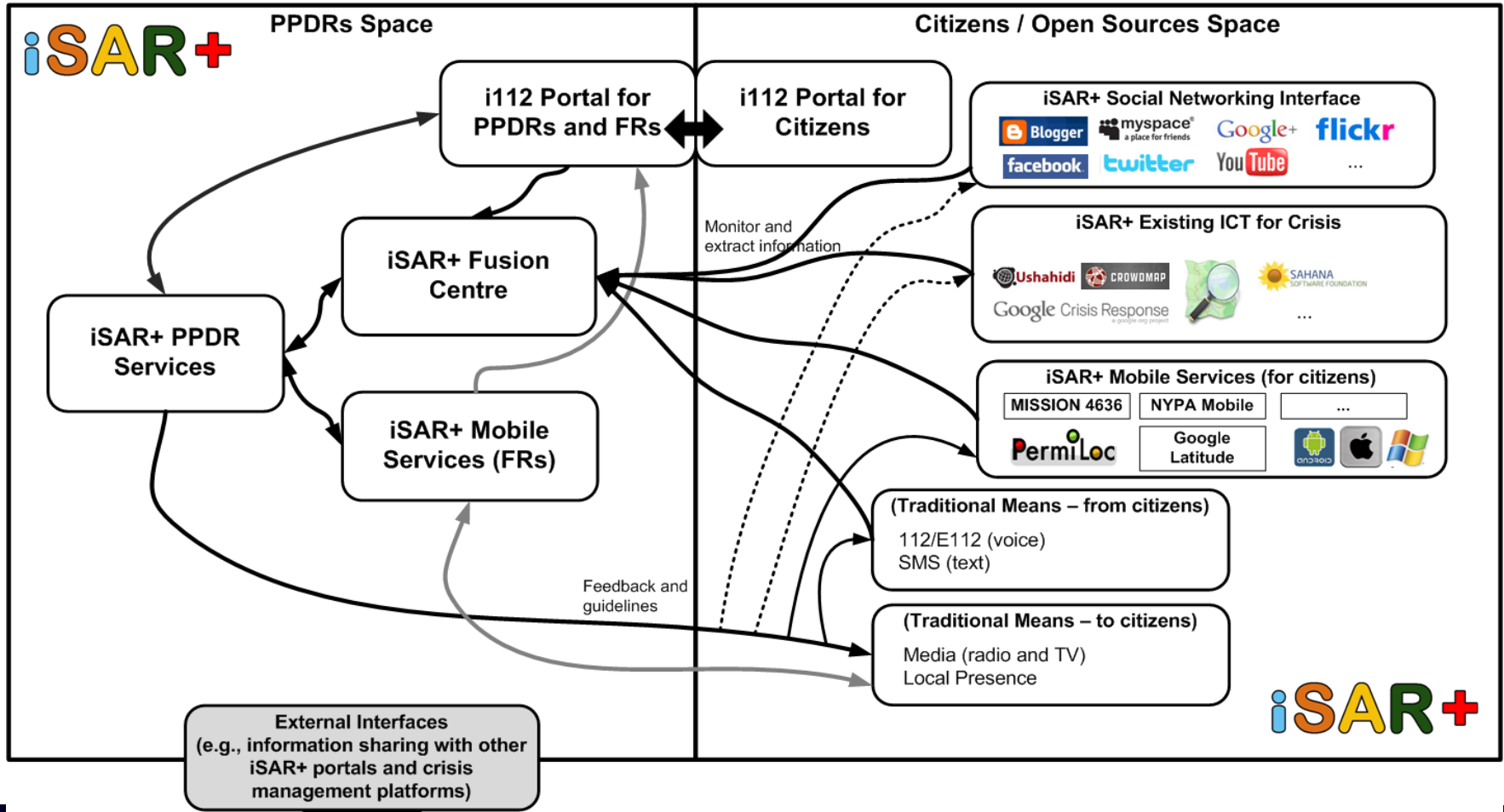
# The iSAR+ Way

## Organisational Dimension

- Focuses on PPDR organisations and their culture, roles, processes, competences, training and technologies.
- How to adapt these organisations to work with social media platforms, building their trust in online networking platforms?
- How to introduce these new technologies into the organisations' operational processes?

# The iSAR+ Way

## The iSAR+ Platform and Services



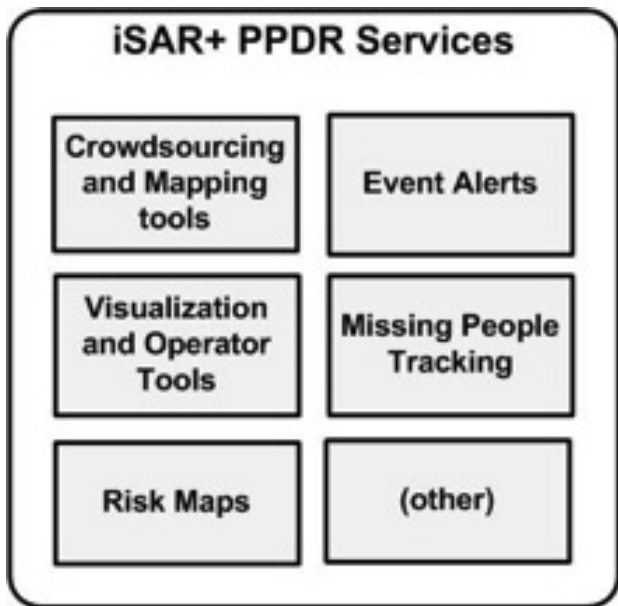
# The iSAR+ Way

## The iSAR+ Platform and Services

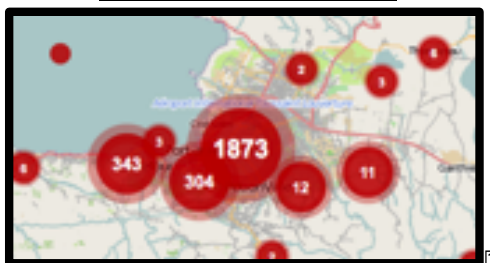
- The i112 Portal (for Citizens and for PPDRs)
- Interoperability with Existing Social Media and ICT Tools for Crisis
- The iSAR+ Fusion Centre
- iSAR+ PPDR Services
- iSAR+ Mobile Services
- Advanced Services [study]

# The iSAR+ Way

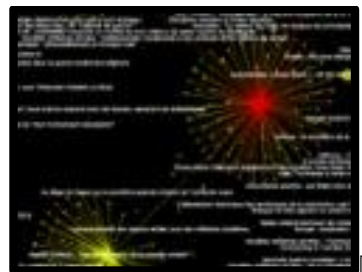
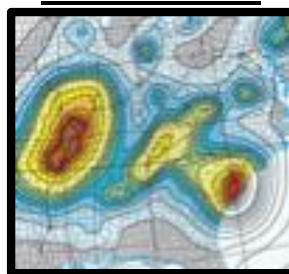
## iSAR PPDR Services (examples)



Ushahidi Crowdmapping<sup>2</sup>



Risk/danger map<sup>2</sup>



THALES Visualisation and Decision Support tools<sup>2</sup>



Missing People Tracking<sup>1</sup>

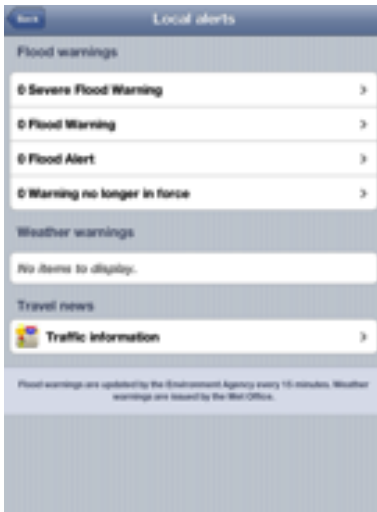


BRIDGE129 Advanced Alerting Tools<sup>2</sup>



# The iSAR+ Way

## iSAR Mobile Apps (examples)



Ushahidi Report Form and Mapped Information

NYPAs Mobile Application (warning screen)

DW's PermiLoc Public Warning Extension (to be developed)

# The iSAR+ Way

## SMS / MMS

French Civil Protection Message

HOSPITAL NEAR YOUR LOCATION:

Hôpital Saint-Antoine

184 Rue Fbg St Antoine, 75012  
Paris, France

CALL 112 FOR HELP



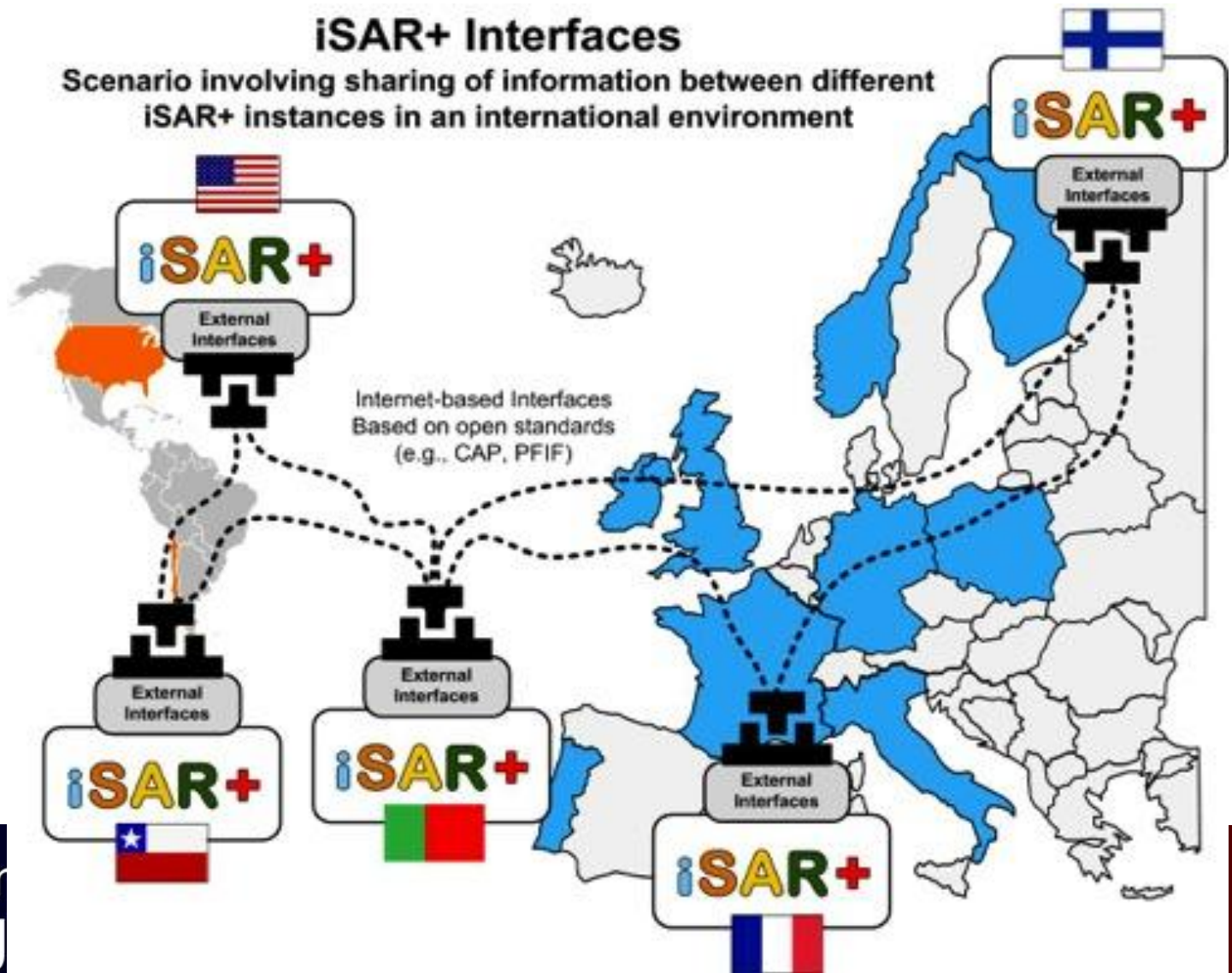
# The iSAR+ Way

## Advanced Services



# The iSAR+ Way

## iSAR+ Interfaces: international cooperation





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# Conclusions

Social Media offers a crucial communication mechanism for disaster response organisations, First Responders and citizens:

- Faster PPDR response reaction times for the citizens' benefit
- Improved links amongst prevention, detection, reporting and rescue
- Improved performance of first responders, medical personnel, police and law enforcement agencies

# Conclusions

The iSAR+ Way: Today

# iSAR+

Online and Mobile Communications  
for Crisis Response and Search and Rescue



# Conclusions

The iSAR+ Future: Link with SOTERIA  
(Social Media for Emergencies)

# SOTERIA

# Conclusions

For more information, visit us at:



*isar.i112.eu*



*iSAREUProject*



*@iSAR\_EU*



Online and Mobile Communications  
for Crisis Response and Search and Rescue



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# Operationalizing Agility <sup>17<sup>th</sup> ICRTS</sup>

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Thank You for Your Attention !



International  
Command & Control  
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Symposium  
The Mason Inn  
Fairfax, VA, USA  
June 19-21, 2012