# Location Based Social applications and crowd sourced efforts future role in disaster management scenarios

## Presentation for the
### United Nations/Abdus Salam International Centre for Theoretical Physics Workshop on the Use of Global Navigation Satellite Systems for Scientific Applications

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# Location based Social Network (LSBN)

*... A social structure made up of individuals connected by the interdependency derived from their locations in the physical world ... a given timestamp and the location history ... [and their]* **common interests, behavior, and activities**

Tal Dekel

December 1, 2014

http://research.microsoft.com/en-us/projects/lbsn/

# Mobile Crowdsensing Apps

"Mobile crowdsensing applications …collect and share information about the user or the environment, either interactively or autonomously, towards a common goal."

Source: IBM




Nasa.gov


talentgenius.co.uk


December 1, 2014
geek.com/

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# Current Research

- Social Networks Applications (SNA) changes the way people communicate

- GNSS based SNA applications are used for various daily applications: social navigation, mapping;rideshare parking discovery e-commerce etc.

- the common denominator being a resource limited world and a smart ability to share geotagged information

- Search and rescue efforts recently show increase use in SNA+GNSS.

- How could SNA be utilized in crisis management to better respond in future crises?

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# Timeline of Major Technology – focus on the last 2 years

**Social Networks**

**facebook**
600M -> 1B Users
Jan 2012-> Oct 2012)

**OpenStreetMap**
25K+ active contributors/month
Q1 2012

**waze** way to go
40M users
65K active contributors
Q4 2012

**Google**
**waze** way to go
Google M&A
Waze for 1.2B$

**facebook**
Safety check announced

**Internet**

**twitter**
200M Tweets/day

**foursquare**
20M users
2B check ins Q1 2012
30M users Q4 2012

20% of internet surfing
Sourced from mobile

27% of Companies implement LBM

**twitter**
Twitter 230 M users
143,199 TPS ( Ave. 5700)
1%-3% Geo-tagged

**2012** **2013** **2014**

**GNSS**

GLONASS accuracy<2.8m 2012

Baidu IOC over AP Dec 2012

**MEDIATEK**
5 in 1 GNSS chip 2013

**snapdragon** by Qualcomm
QLQM SNPDRGN 615
GPS GLNSS Baudu
February , 2014 (Q3)
HTC 820

**Mobile & Smartphone**

Dual GNSS iPhone 4S

**4G lte**
Octa Core Galaxi S4

ZTE Blade 3.5 w/ A-GPS for $140

iPhone 5S M7 Android –fused location/actvtrec

1.75M Smartphone users by H1
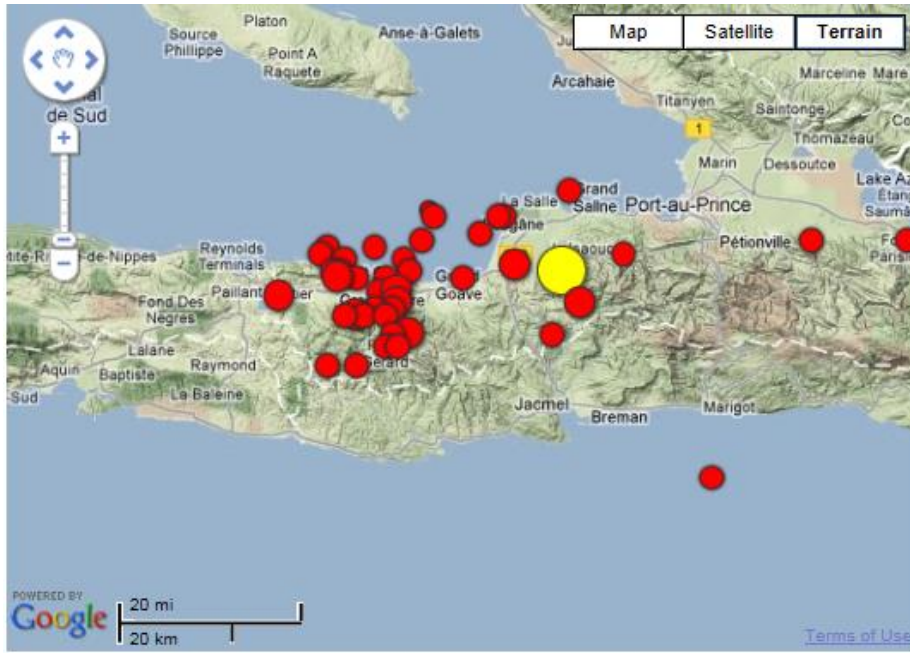
User based mesh networks IOC

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# Case Study -1
## The January 10 , 2010 Haiti earthquake



UN Mission Building Port Au Prance
Source: http://news.bbc.co.uk/2/hi/americas/8458690.stm

# Introduction



Magnitude 7 earthquake aftershock map





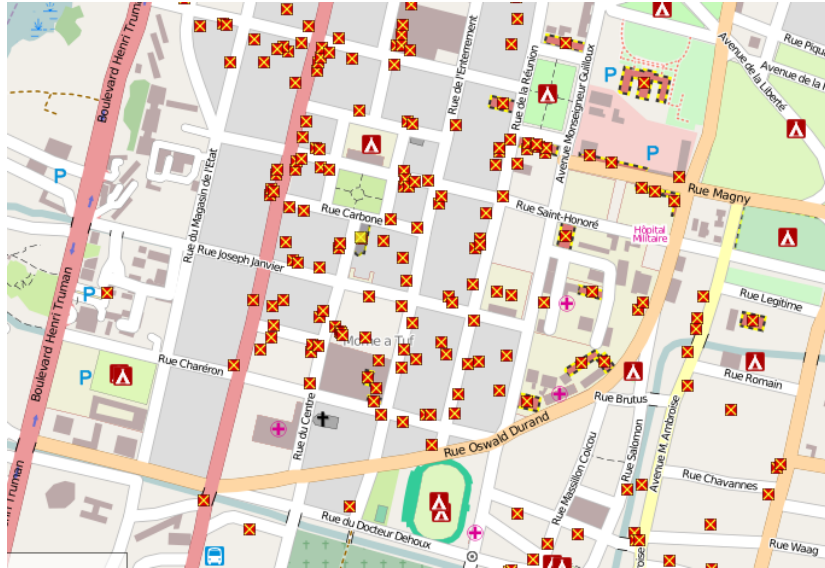Tent City in Port-au-Prince area

Source: http://www.heartlandalliance.org/international/updates.html

# Communication infrastructure



Haiti Earthquake damage map
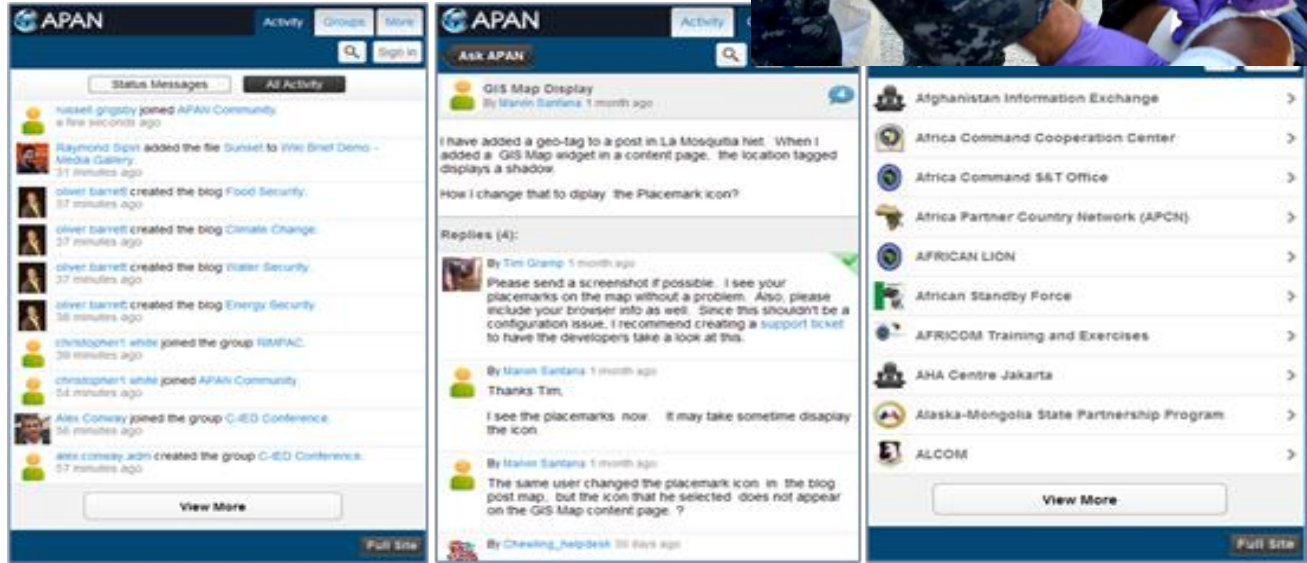Source: OpenStreetMap





Damaged communication infrastructures

Source: http://www.itu.int/ITU-D/emergencytelecoms/response/haiti2010.html

# All Partners Access Network (APAN)



Deployed 24 hours after the earthquake

Source: APAN.org



APAN mobile app announced of February 2011

Source: APAN.org

# Mission 4636
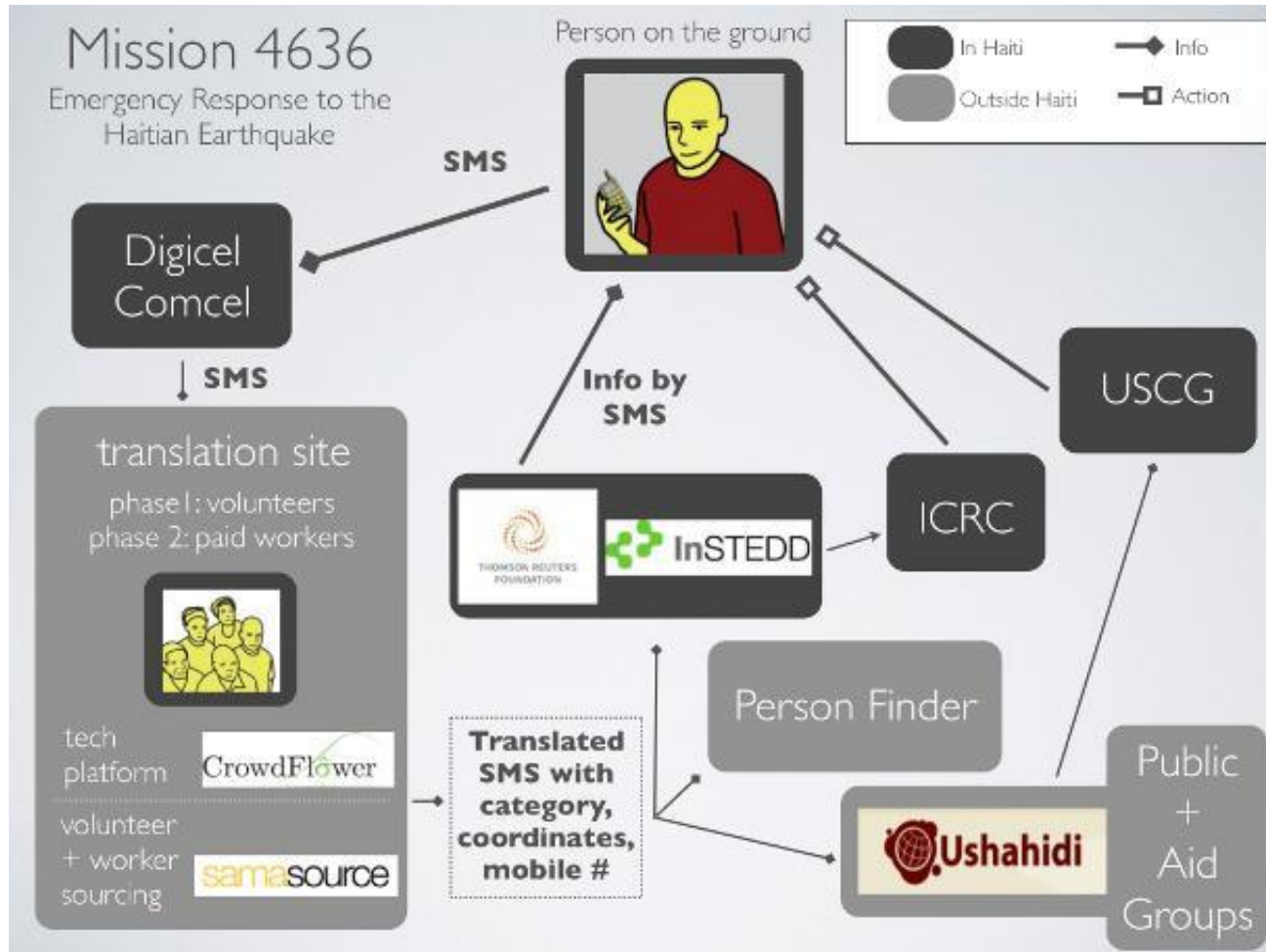


Mission 4636: 45,467 massages, 1,200 translators

Source: http://www.search-internetmarketing.com/tag/mobile-services/

# Disaster management systems
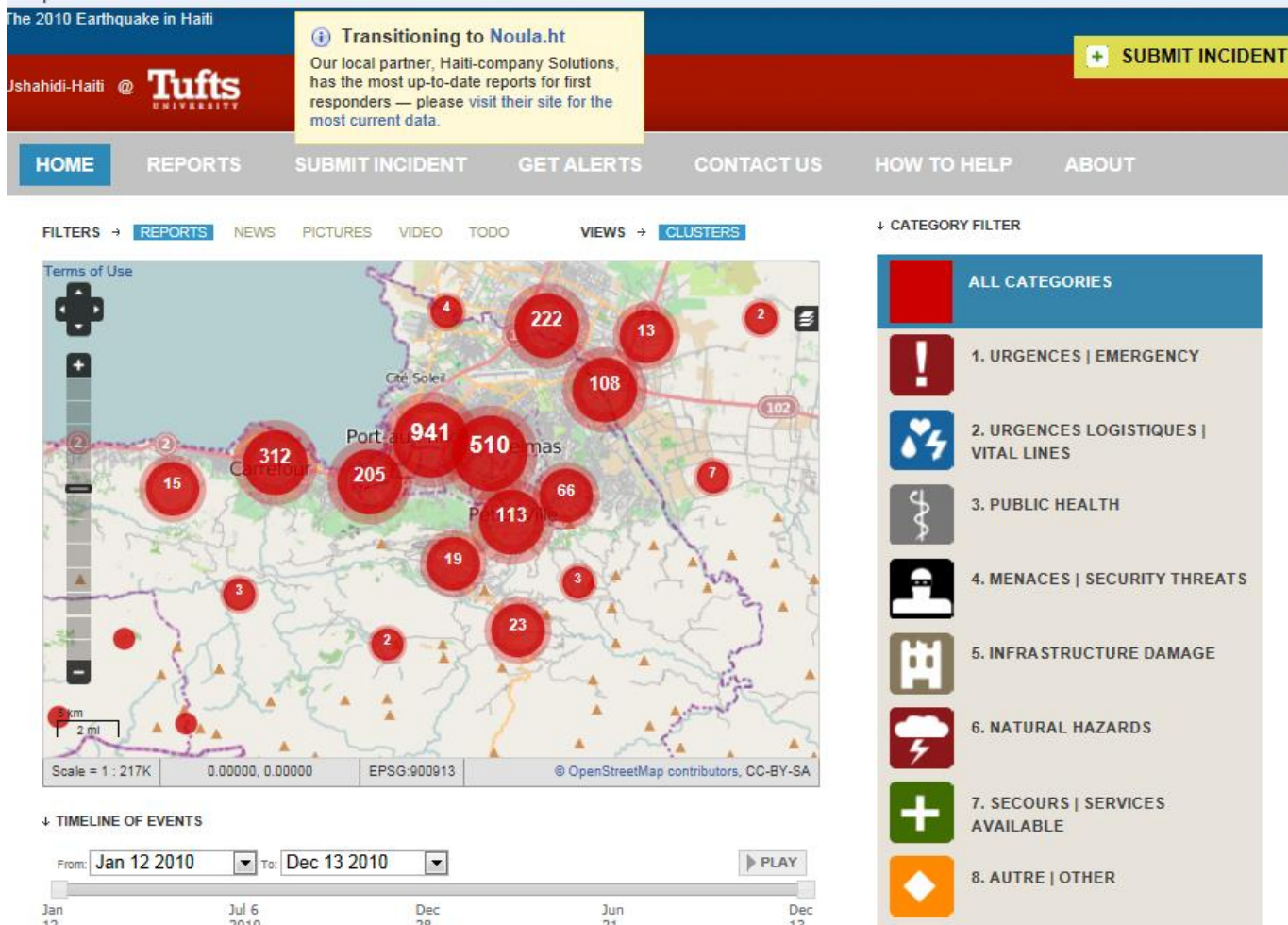


Ushaidi Report Map: 3584 reports Geotagged

Source: http://haiti.ushahidi.com/

# Google Crisis Response Team



72h IOC 55,000 Records

**Person Finder: Haiti Earthquake**
English | Français | Kreyòl

What is your situation?

I'm looking for someone | I have information about someone

Currently tracking about 34800 records.

PLEASE NOTE: All data entered will be available to the public and viewable and usable by anyone. Google does not review or verify the accuracy of this data.

Embed this tool on your site · Developers · Terms of Service
powered by
Google

Terms

Google earth images before and after the earthquake
Source: http://www.pcworld.com/article/186897/google_earth_reveals_the_devastation_in_haiti.html

# OpenStreetMap Response team
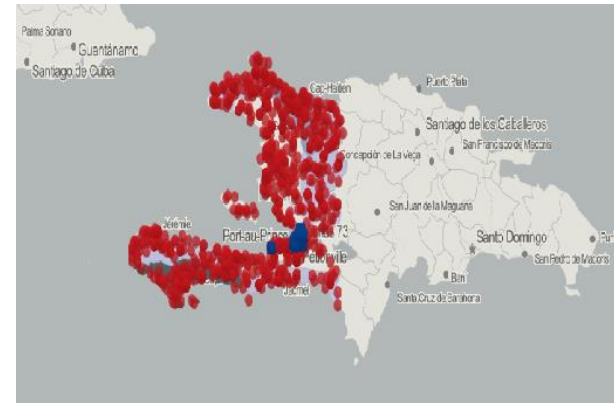
"Haiti earthquake response mapping project".

# Success stories





102 (105) Health facilities location within 35h

A hospital located outside Port au Prince
Source : http://www.tampabay.com



Israeli search and rescue team in action
Source : http://www.vosizneias.com

# Case Study -2
## March 11, 2011 Japan earthquake and tsunami



People wait to be rescued in Kesennuma, Miyagi Prefecture March 12
Source: http://www.boston.com/bigpicture/2011/03/japan_earthquake_aftermath.html

# Introduction



A magnitude 9 earthquake triggering a devastating tsunami



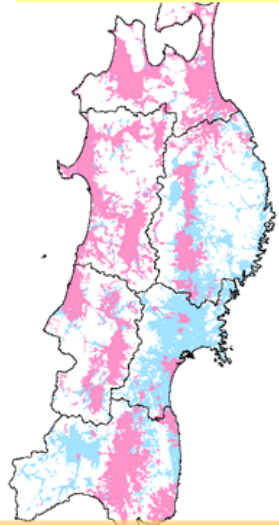The U.S. Indian Ocean Tsunami Warning System (IOTWS)
Source: http://www.boston.com/

Source: http://www.boston.com/bigpicture/2011/03/japan_earthquake_aftermath.html

# Communication infrastructure
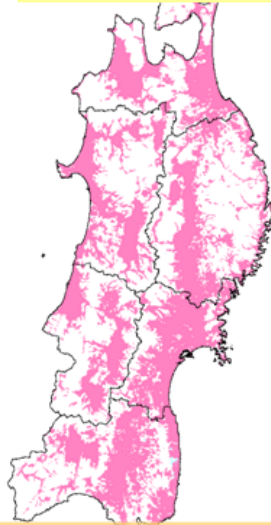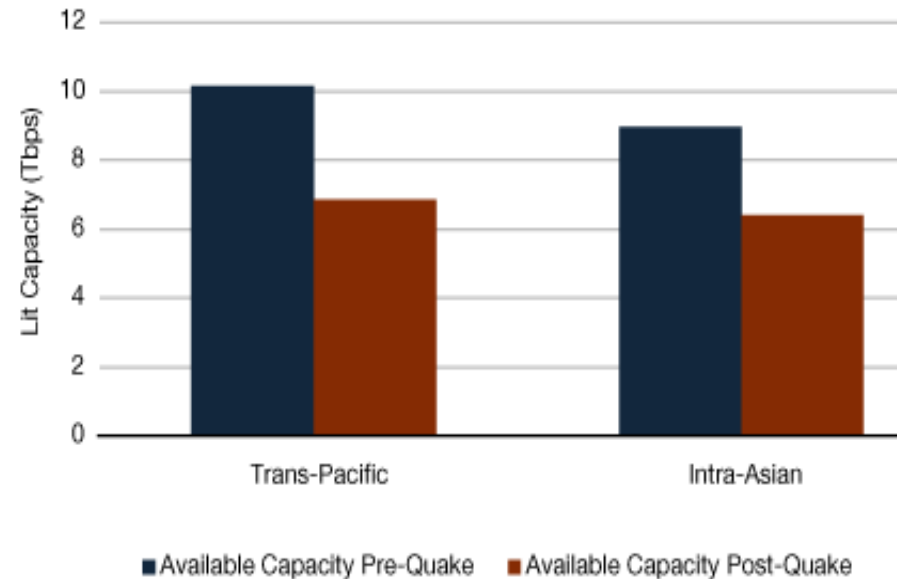


NTTDoCoMo disaster recovery scheme
source: http://www.nttdocomo.com/disaster/index.html

Earthquake's Impact on Japanese International Bandwidth

Source:http://www.telegeography.com/press/press-releases/2011/04/11/earthquakes-and-red-tape-challenge-carriers/index.html
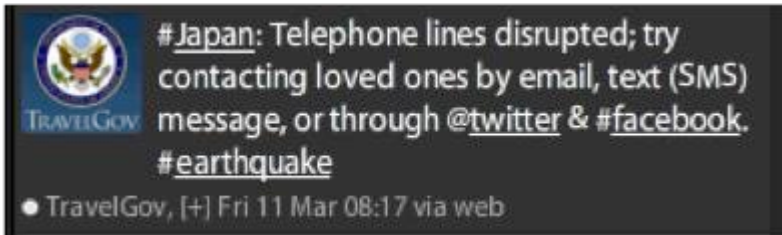
# Introduction

"While there are so many technologies at this time that isolate us ...social networking tools have shown their ability once again to unify us as human beings"
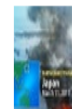


Fumiya Imagawa

I'm in Japan, near Tokyo. Our transportation is train, but some rails got broken. My father is in a business trip. I wish he returns ASAP.

Like · Comment · March 12 at 12:28am via mobile · 



#Japan: Telephone lines disrupted; try contacting loved ones by email, text (SMS) message, or through @twitter & #facebook. #earthquake

● TravelGov, [+] Fri 11 Mar 08:17 via web

Tweet from US state department
source: http://idisaster.wordpress.com/



Japan Earthquake
Widespread Tsunami waning but no threat to Australia says BOM.
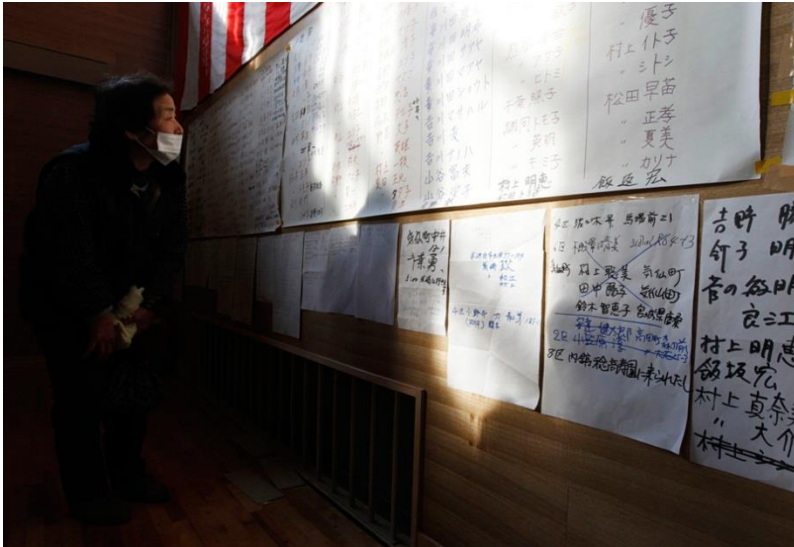
Tsunami warning for pacific region after 8.8 magnitude quake strikes Japan | News.com.au
www.news.com.au

THE Pacific Tsunami Warning Centre in Hawaii says a tsunami warning is in effect for a large swathe of the Pacific after a magnitude 8.8 earthquake hit Japan.

Like · Comment · Share · March 11 at 9:45am ·

# Online search and rescue efforts





Survivor looking for relative survivors
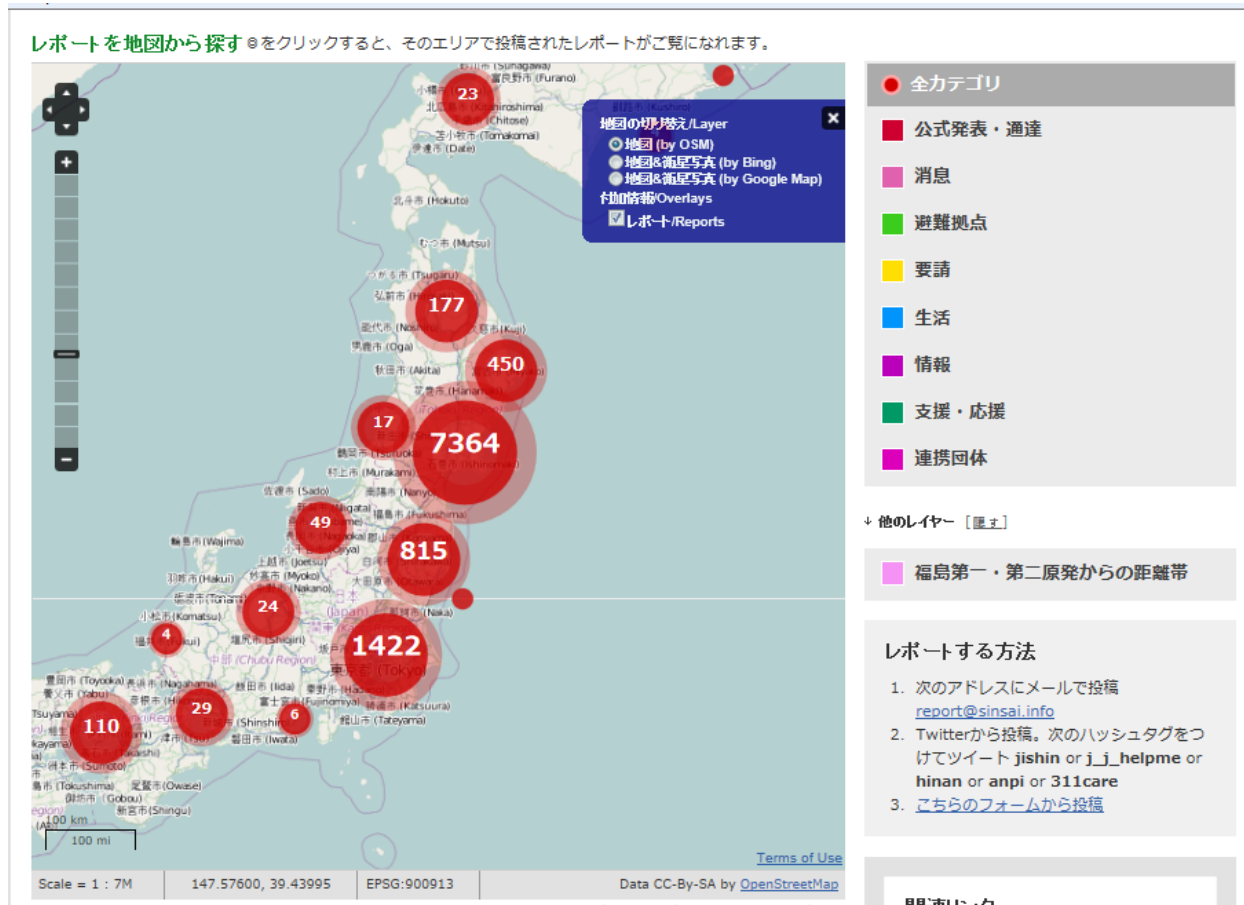
Source:
http://www.boston.com/bigpicture/2011/03/japan_earthquake_aftermath.html

Google person finder IOC within 4 hours received 7000 request in the first few hours
With overall 600,000 records
Source: http://www.kochiservnet.com/

# Disaster management systems
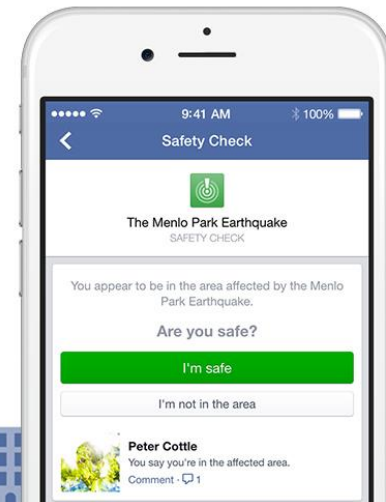


Ushaidi Report Map: 12,317 reports Geotagged

# Facebook Safety check

- On 14 October 2014 FB announced "Facebook Safety Check IOC.

- App recognize your location based on "Nearby friends" - a geo location based service

- Let friends and family know you're safe

- Check on others in the
   affected area

- Mark your friends as safe

- Privacy features

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# The use of Geo-tagged tweets for disaster management –hurricane Sandy (October 22 2012 )
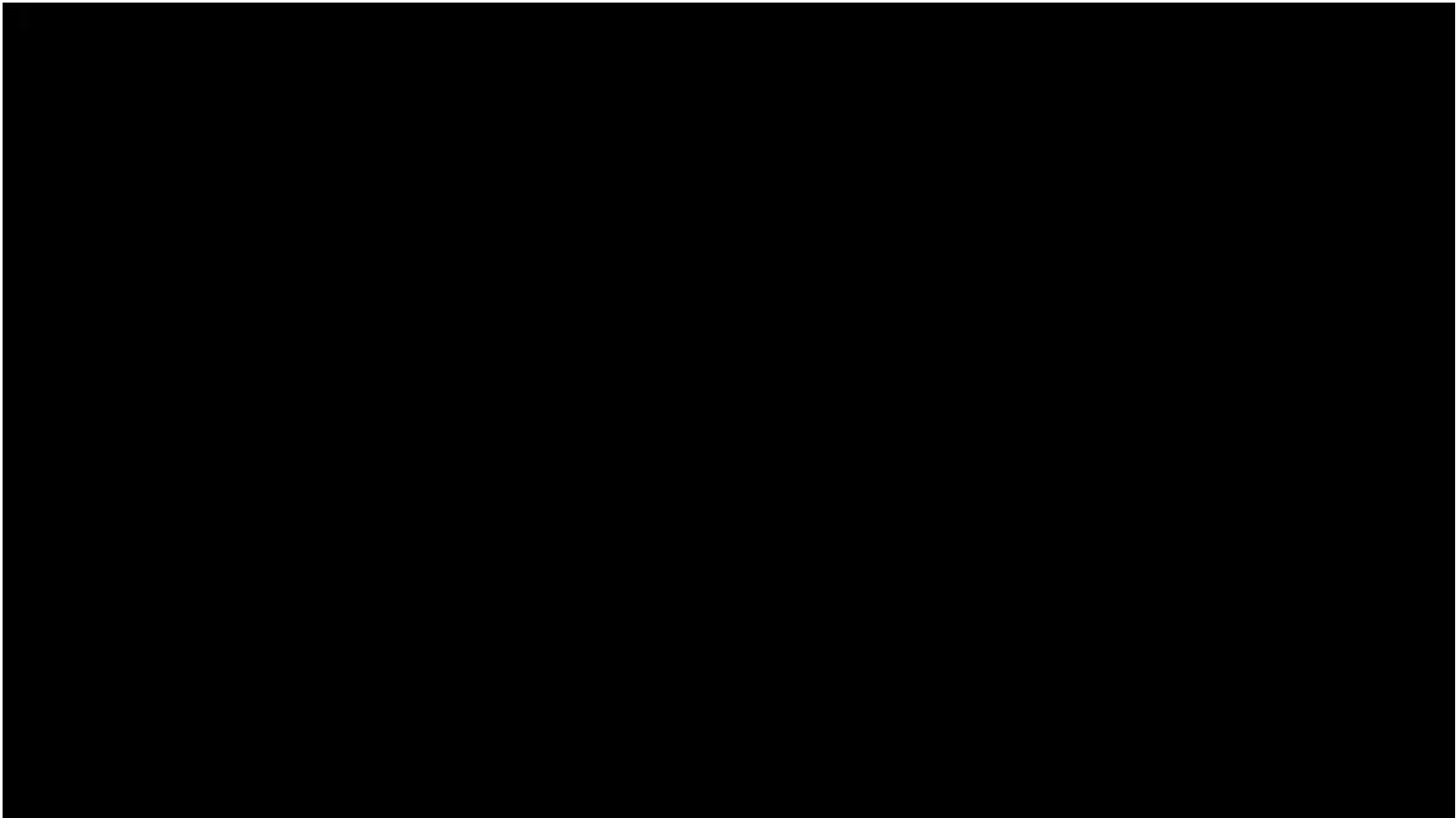


**Source:** ESRI

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## Collaborative efforts to find MA 370 Boing 777-200

- Plane was announced missing : March 8 2014

- Digital globe imagery were taken on March 9 2014
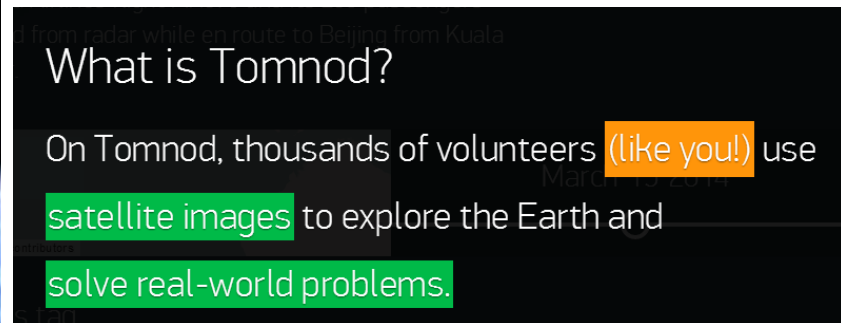
- Imagery were made available to public using Tomnod a project owned by DigitalGlobe that uses crowdsourcing to identify objects and places in satellite images

- Relevant networks: Tomnod; Redit; Tweeter;CNN iReport



**Missing Airplane: Malaysia Airlines MH370**

Malaysia Airlines flight MH370 and its 239 passengers vanished from radar while en route to Beijing from Kuala Lumpur.

Help search satellite images for...

Oil Slick    Wreckage    Raft    Other

JOIN NOW

What is Tomnod?

On Tomnod, thousands of volunteers (like you!) use satellite images to explore the Earth and solve real-world problems.

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# Results

- More than 115,000 volunteers joined the efforts (100K/min)
- 100 million page views posted in the first 34h
- 2 million satellite pages/ 10 minutes.
- Site went down after few hours
- Mike Seberger, CNN iReport was the 8th  most popular of all-time.
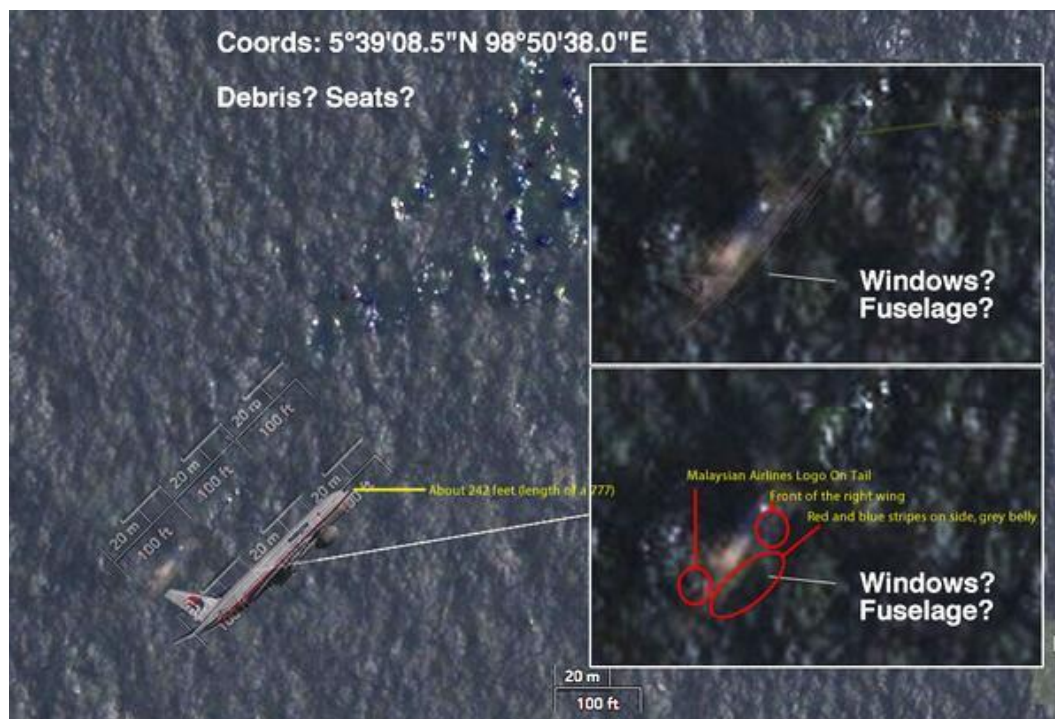
# Fire chat – Network less chat

- On the 2014 September protest in Hong Kong, protestors used the Israeli App FireChat to avoid the in availability of the network.

- They were asking for supply and help from each other

- FireChat was proven as the best communication at that given scenario

# What and where using Firechat



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# YEVVO (Yes in Zulu language)

- An in FB like social network that allow free live video streaming for followers on the network

- User Generated video outlet

- Live video through a tweeter feed

- Flashback mode for late update

- When used with geotagged tweets allow users to send geotagged videos

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# "Meet the Zero characters communication tool"

- 8 hours of prototype development

- 110K Downloads per day (raised 1M$)

- Context based Language-less communication

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# A new form of Geo location communication is forming

- New Terms to be used :
  - Post Disaster User Experience
  - Adaptive BW services
  - Self deployed networks
- Strong geo location capabilities both in frontend and in backend to identify potential activity/anomaly
- C2C/ B2C services based on location based social/crowd sourced efforts are growing rapidly
- G2C services becomes a big question mark as technology speeds up

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# The 10-14 December 2013 Alexa storm

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# The Burma Way – Waze version

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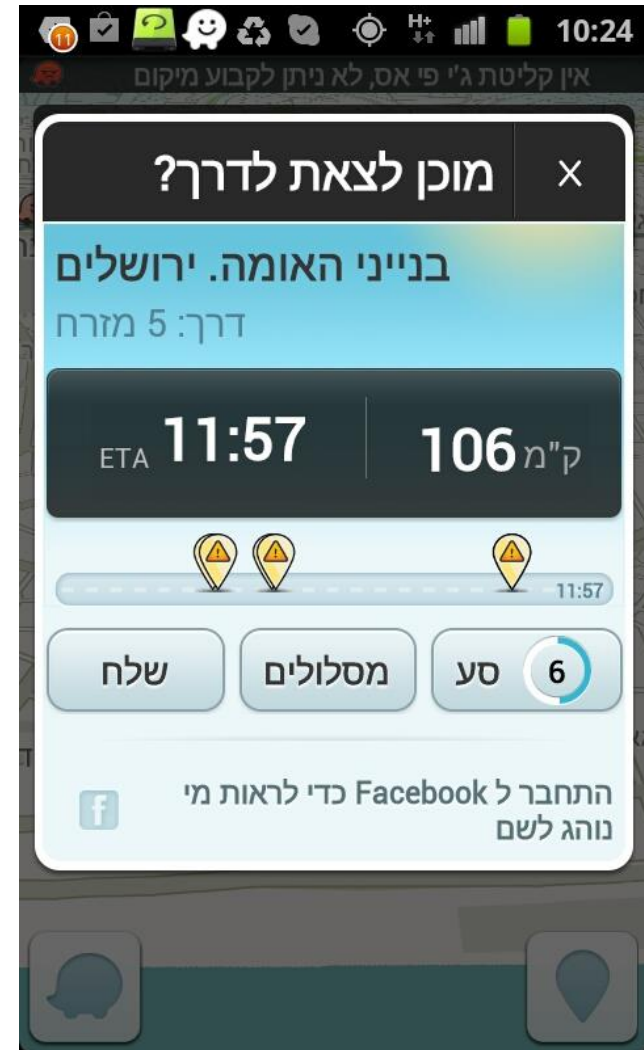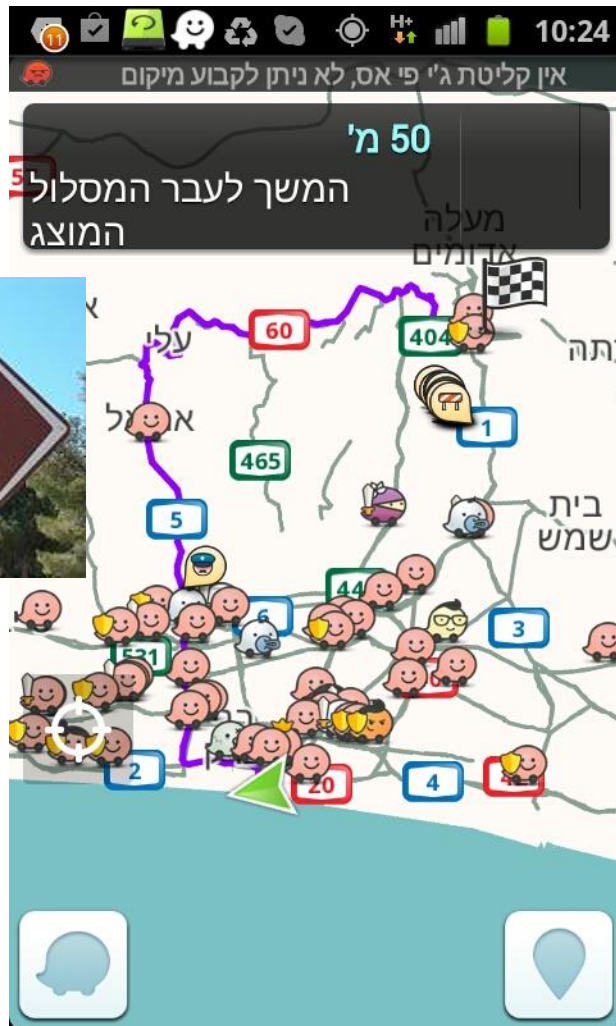
# Summary

- Location based social media increases the community resilience in resource constrained situations
- Services that are used in every day life will become a life saving  tool and a port off call for users  in disaster events
- Utilization of location based social media will become a necessity
- GNSS, mobile networks are  still critical enablers
- Users become more accessible and thus new terminology is to be addressed
- Governments need to integrate in a changing communication environment

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**Location Based Social applications and crowd sourced efforts future role in disaster management scenarios**

# Thank You!

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