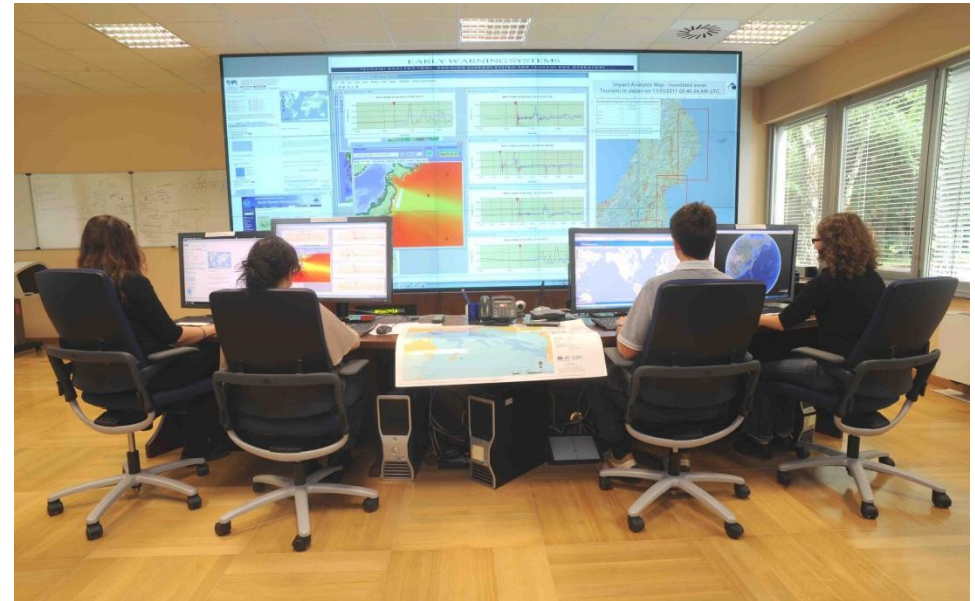


Joint Research Centre

# The JRC European Laboratory for Crises Management

*Alessandro Annunziato*



**INTERNATIONAL WORKSHOP ON  
EMERGENCY MANAGEMENT FOR CRITICAL INFRASTRUCTURES CRISES  
Rome, ENEA Headquarters, 4 Oct 2012**

# Content of the presentation



- **What is the JRC**
- **What is the ECML**
- **Activites and Programs for the ECML**
- **Conclusions**

# JRC in the European Commission



## European Commission

RELEX

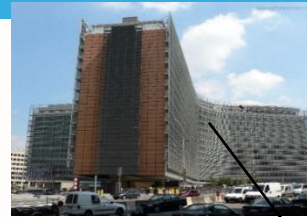
ECHO

ENV

...

JRC

## 7 Institutes



**IRMM – Geel, Belgium**  
- Institute for Reference Materials and Measurements



**IE – Petten, The Netherlands**  
- Institute for Energy



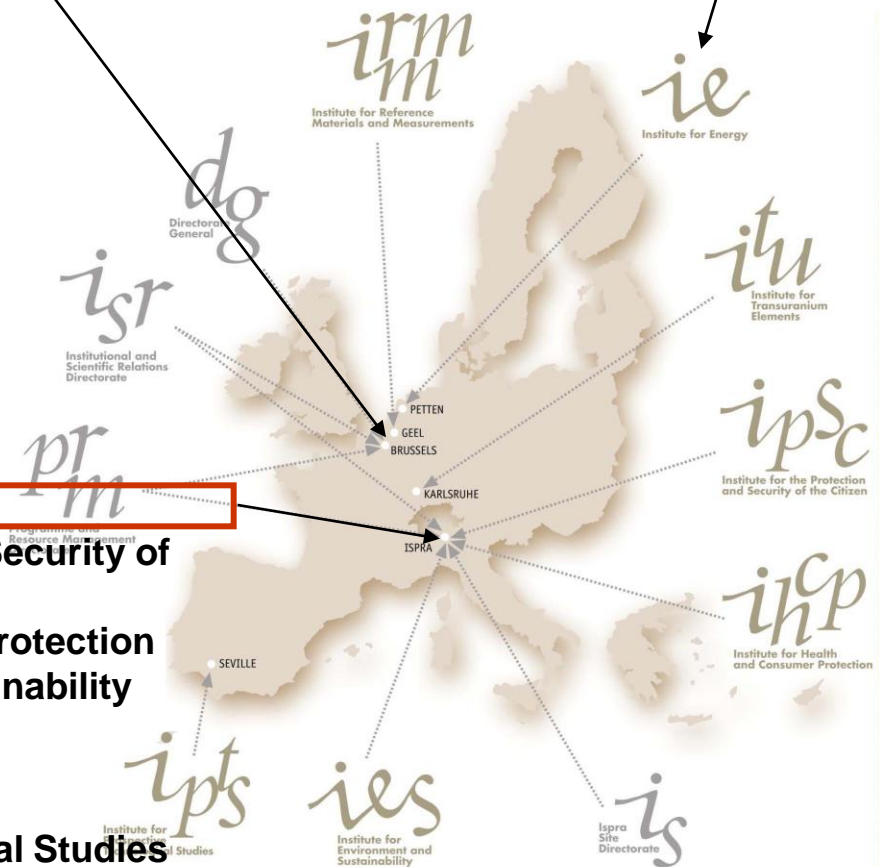
**ITU – Karlsruhe, Germany**  
- Institute for Transuranium elements



**IPSC - IHCP - IES – Ispra, Italy**  
- Institute for the Protection and the Security of the Citizen  
- Institute for Health and Consumer Protection  
- Institute for Environment and Sustainability



**IPTS – Seville, Spain**  
- Institute for Prospective Technological Studies



- **Carry out ICT focused Scientific Research and Technological Innovation:**
  - *Techniques for **automatic** information **mining** and **analysis** from relevant sources e.g. Web, Remotely sensed (e.g. satellite sensors) and Trade/Customs data*
  - ***integrated systems/tools** to support **capabilities** for: risk analysis, threat analysis, situational awareness, early warning, collaborative decision-making*
  - **European Crisis Management Laboratory**

# Inauguration 16 Mar 2012 – Visit of Pres. M. Barroso



- **Analysis of ongoing disaster events**
  - Earthquakes, Tropical Cyclones, Tsunamis, Floods, Volcanoes
  - Creation of reports for Decision Makers in European Commission (MIC)
- **Research on ICT Technologies to support Crisis Room functionalities**
  - Benchmarking software Tools (technological workshops)
  - Testing in-house software
  - Situation Awareness, Early Warning, Command and Control
- **Training and Capacity Building Activities**
  - Specific trainings: best use of Crisis Room Technologies
  - GIS Systems and Crisis Rooms
  - Tsunami Decision Support Systems for Early Warning Centers
- **Backup for EC Crisis Rooms**
  - ECHO MIC
  - DG-HOME
- **Crisis Room Design**
  - JRC Crisis Room
  - Haiti Civil Protection
  - DG-ECHO Emergency Response Service (MIC)

# Analysis of ongoing disasters events

# Analysis of ongoing events



## Analysis of Tohoku Earthquake and Tsunami March 2011



## Analysis of ISAAC Tropical Cyclone, September 2012



**11 March 2011 5:46 UTC**

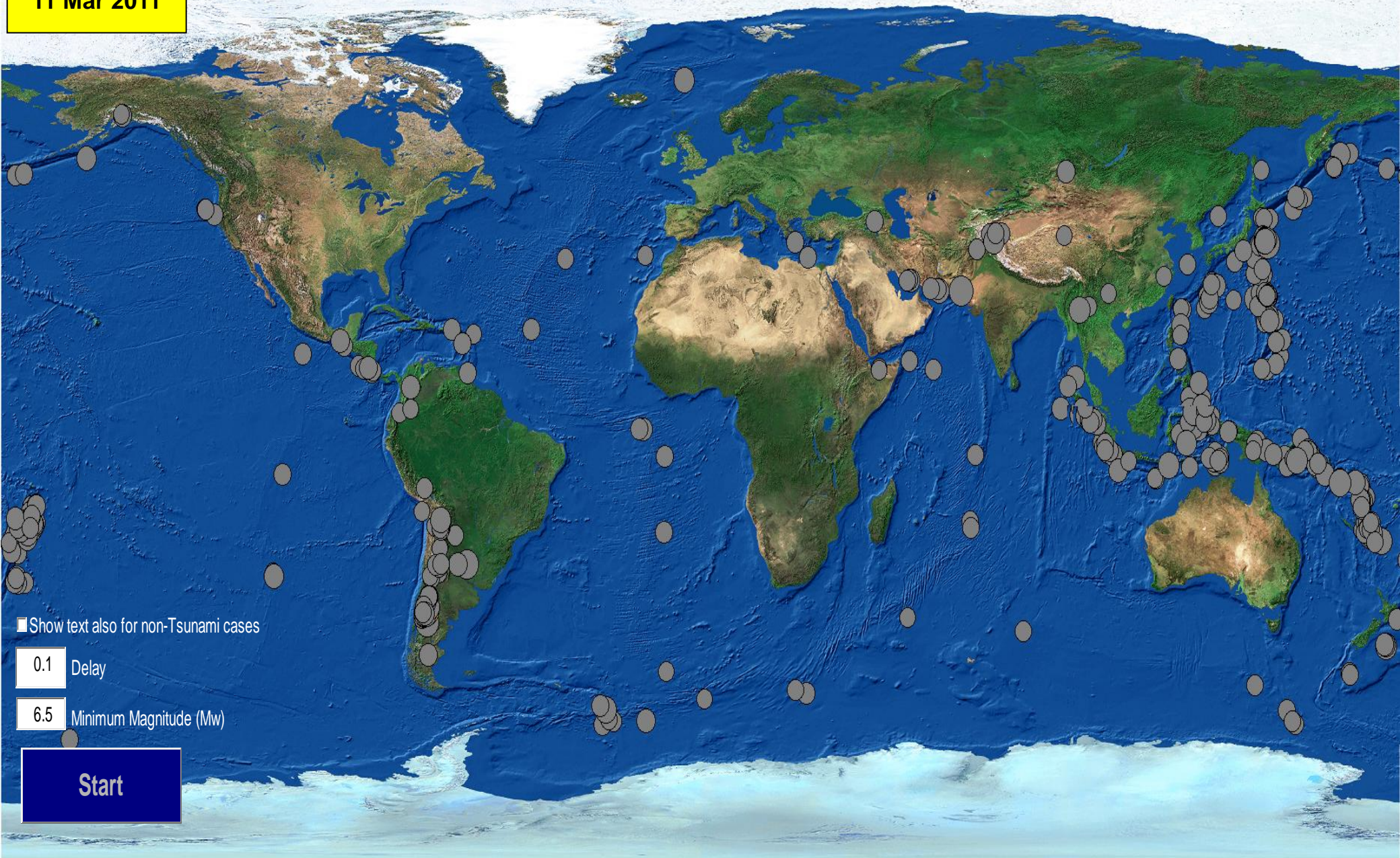
**Offshore Japan Coast**

**A demonstration of JRC Early Warning  
and Analysis Systems**

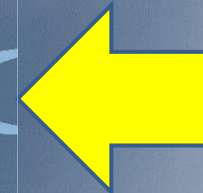
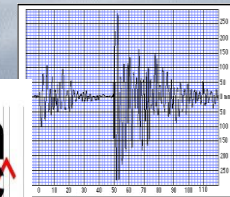
# GLOBAL DISASTERS ALERTS AND COORDINATION SYSTEM

4 OCT 2012 – Workshop on Emergency Management, Rome ENEA

11 Mar 2011



9 min



...Earthquake offshore Japan, Mag.. 7.9

10 min

Will the earthquake lead to a tsunami?

Is it a disaster??

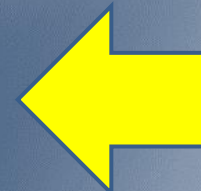
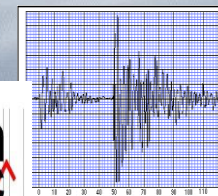
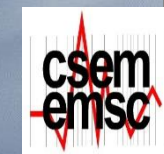
Will the tsunami be a disaster?

Which location will be affected? And when?

What is the likely damage??



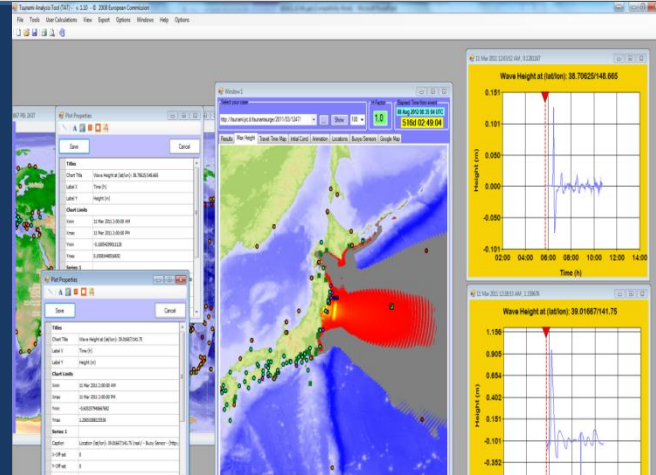
time



...Earthquake offshore Japan, Mag.. 7.9



10 min



Manual Decision Support Tool (TAT)



Will the earthquake lead to a tsunami?

Is it a disaster??

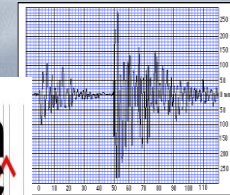
Will the tsunami be a disaster?

Is this estimate correct?

Which location will be affected? And when?

What is the likely damage??

time



...Earthquake offshore Japan, Mag.. 7.9

GDACS Automatic estimations



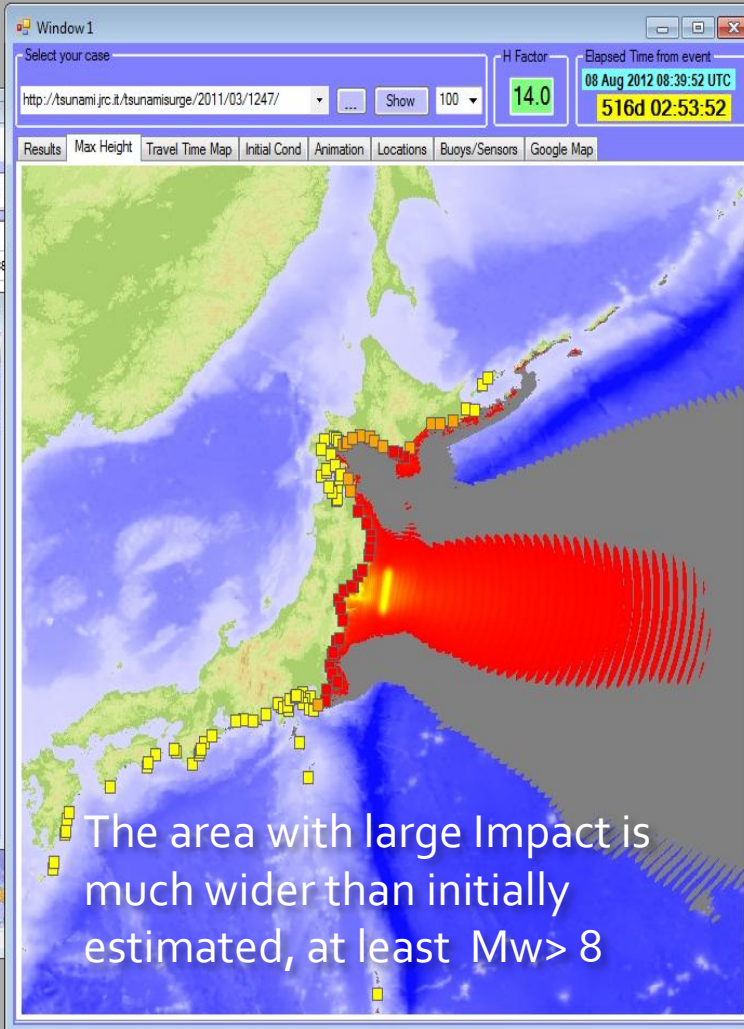
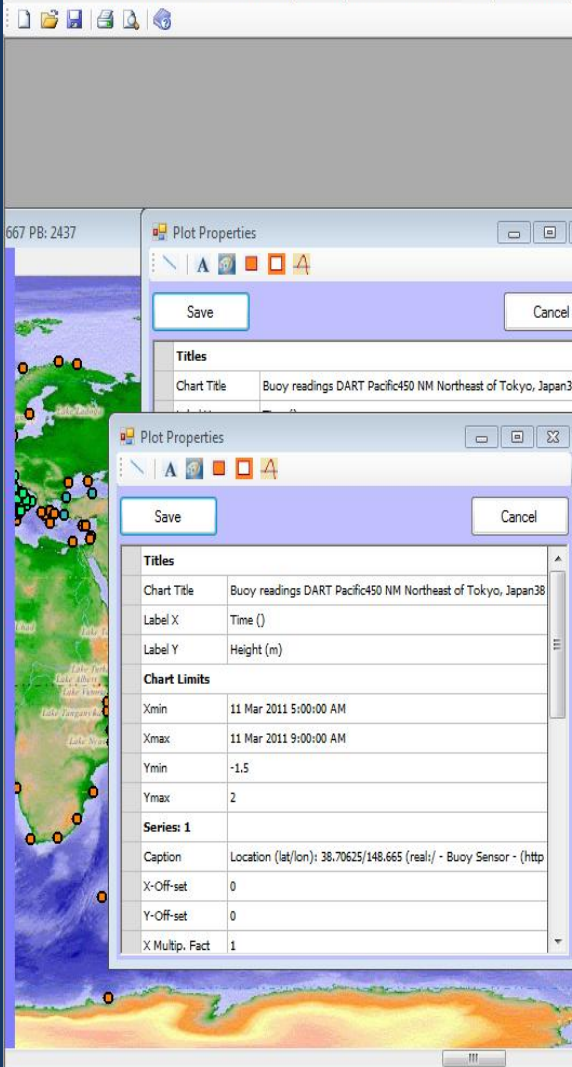
# GLOBAL DISASTERS ALERTS AND COORDINATION SYSTEM

4 OCT 2012 - WORKSHOP ON EMERGENCY MANAGEMENT, ROME ENEA

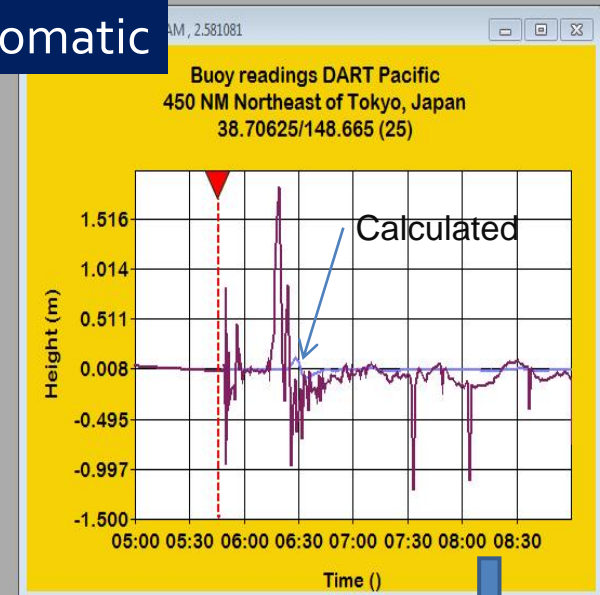
35 min

Tsunami Analysis Tool (TAT) - v. 1.10 - © 2008 European Commission

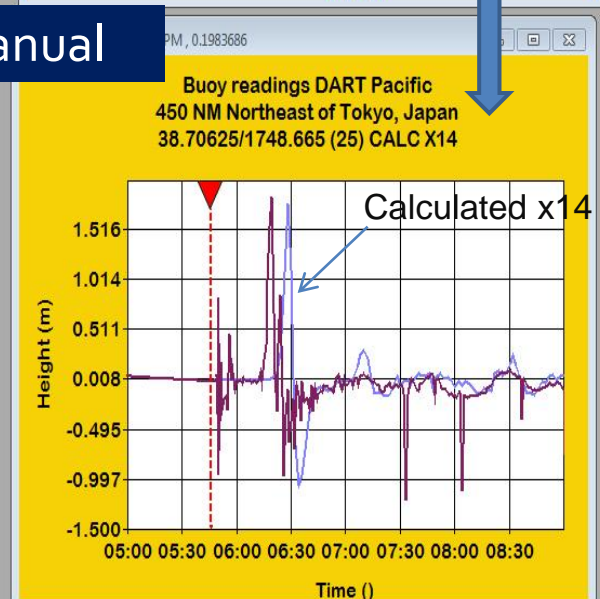
File Tools User Calculations View Export Options Windows Help Event Options Travel Time Set this as event calculation



Automatic



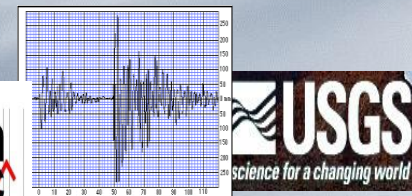
Manual



# Magnitude updated to 8.4

Extent of inundation ?  
Potential Impact ?  
Other affected countries in the Pacific Ocean ?

41 min



...Earthquake offshore Japan, Mag 7.9  
8.4

How the estimated sea level changes ?

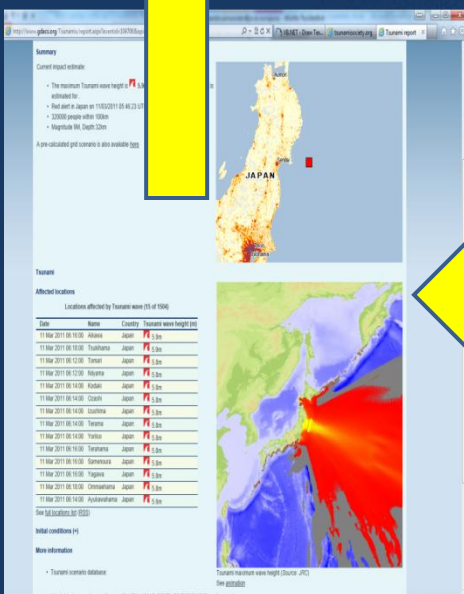
Is it a disaster ?

Which areas can be inundated ?

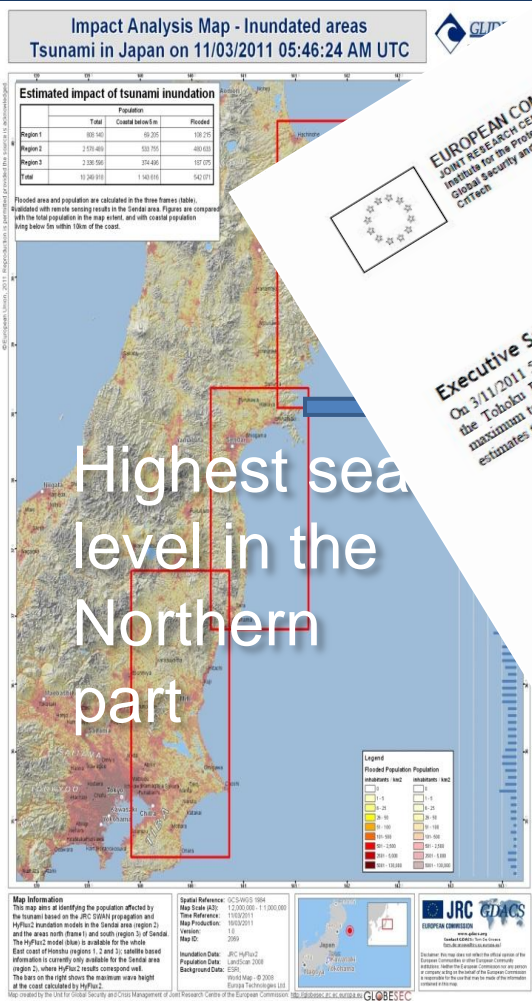
What is the likely damage ?

Other locations affected ? And when ?

time



3 h

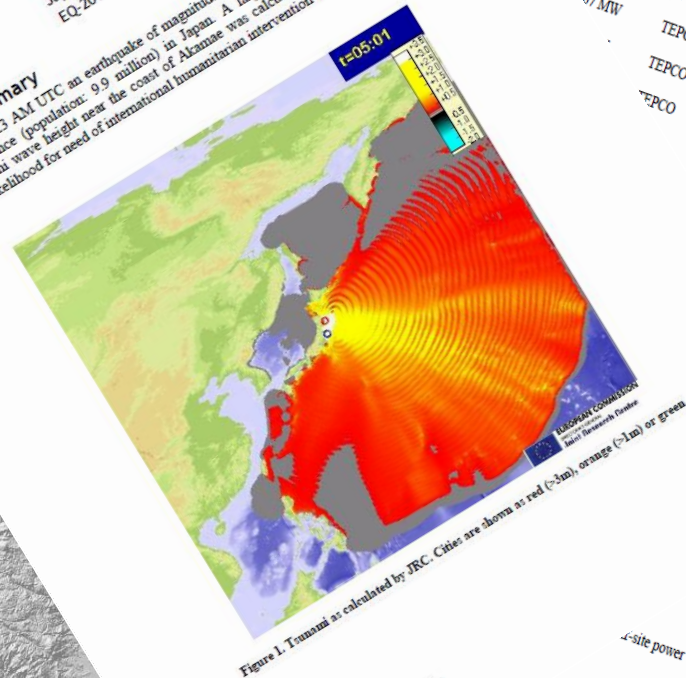


**EUROPEAN COMMISSION**  
 JOINT RESEARCH CENTRE  
 Institute for the Protection and Security of the Citizen  
 Global Security and Crisis Management Unit

**Tsunami Alert**  
 Japan, 11 March 2011  
 EQ-2011-000028-JPN

**Executive Summary**  
 On 3/11/2011 5:46:23 AM UTC an earthquake of magnitude 8.9 and depth 24.4km occurred near the Tohoku Province (population: 9.9 million) in Japan. A large tsunami was generated. The maximum tsunami wave height near the coast of Akamai was calculated to be 11.57m. GDACS estimates the likelihood for need of international humanitarian intervention to be high (Red alert).

Friday, 11 March 2011



**Nuclear plants**  
 The following Units have been shut down automatically (source: JAIF, Japan Atomic Industrial Forum):

Name	Type of Reactor	Power	Utility
Onagawa 1	BWR	498 MW	Tohoku EPCO
Onagawa 2	BWR	796 MW	Tohoku EPCO
Onagawa 3	BWR	796 MW	Tohoku EPCO
Kashiwa	BWR	439 MW	TEPCO
	BWR	760 MW	TEPCO
	BWR	760 MW	TEPCO
	BWR	767 MW	TEPCO
	BWR	TEPCO	
	BWR	TEPCO	
	BWR	TEPCO	

Units 5 and 6 were shut down for maintenance at the time of the earthquake.



Not large problems to other Pacific countries

Maps and Reports for ECHO-MIC and the GDACS Users Community

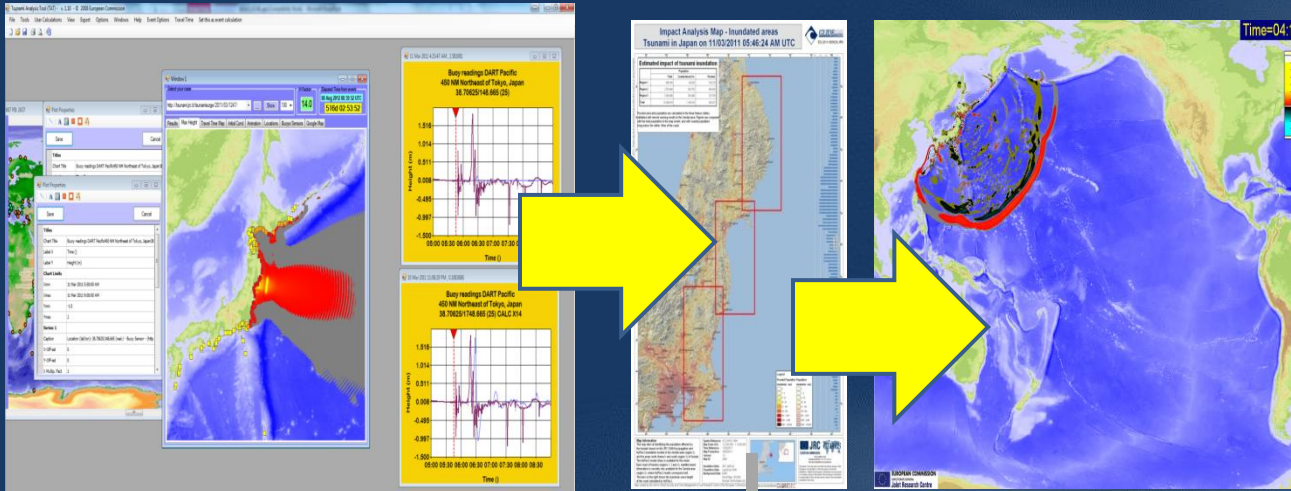


# GLOBAL DISASTERS ALERTS AND COORDINATION SYSTEM

4 OCT 2012 – WORKSHOP ON EMERGENCY MANAGEMENT, ROME ENEA

4 h

Further increase of the magnitude, estimate 12 m → 14 m



Will the earthquake lead to a tsunami?

Is it a disaster?

Will the tsunami be a disaster?

Which location will be affected? And when?

What is the likely damage?

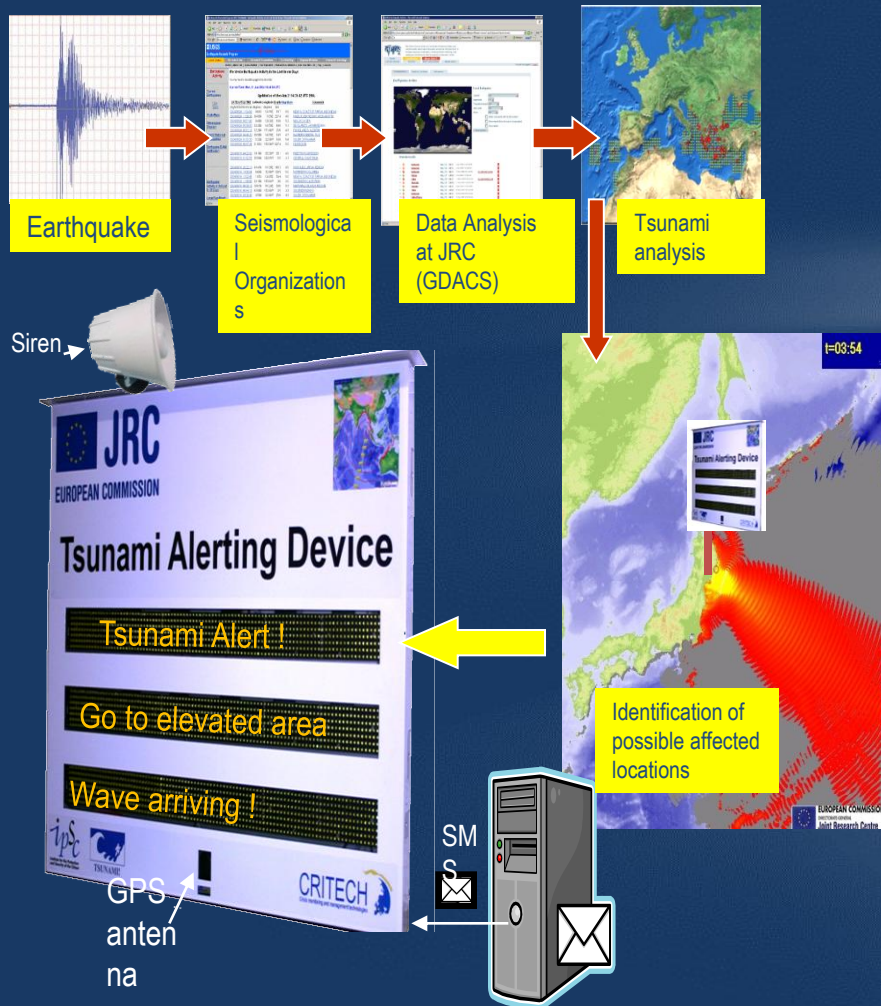
time

Date	Name	Country	Tsunami wave height (m)
11 Mar 2011 05:15:00	Akita	Japan	1.25m
11 Mar 2011 05:15:00	Aomori	Japan	1.25m
11 Mar 2011 05:15:00	Iwate	Japan	1.25m
11 Mar 2011 05:15:00	Miyagi	Japan	1.25m
11 Mar 2011 05:15:00	Nagasaki	Japan	1.25m
11 Mar 2011 05:15:00	Osaka	Japan	1.25m
11 Mar 2011 05:15:00	Sendai	Japan	1.25m
11 Mar 2011 05:15:00	Shizuoka	Japan	1.25m
11 Mar 2011 05:15:00	Tokyo	Japan	1.25m
11 Mar 2011 05:15:00	Yamaguchi	Japan	1.25m
11 Mar 2011 05:15:00	Yokohama	Japan	1.25m
11 Mar 2011 05:15:00	Choshiroshima	Japan	1.25m
11 Mar 2011 05:15:00	Choshiroshima	Japan	1.25m

...Earthquake offsho Japan, Mag. ~~7.9~~ ~~8~~ ~~8.4~~

8.8 → 9.0

# The Last Mile approach



This block shows a satellite map of the Setúbal region. A **Tsunami Alerting Device (TAD)** is shown on land, with a callout box stating: "Activity is ongoing in collaboration with the Setubal Port Authority, to connect the TAD with a sea level measurement". The TAD is located near São Lourenço. A **buoy** is shown in the water, with a callout box stating: "Connection with the buoy foreseen before the end of". A graph in the bottom right shows **Height (m)** and **Height difference (m)** over **Time**, with a red line indicating the tsunami wave and a blue line indicating the sea level measurement. The graph shows a sharp increase in height difference starting around 11:00. The map includes coordinates for Setúbal (38° 51' 45.8" N, -8° 9' 09.41" W) and the buoy location (38° 28' 23.08" N, 8° 57' 13" W).

How to alert the communities at risk of Tsunami?

# Research on ICT Technologies to support Crisis Room functionalities

# Workshops 2012 - 2014



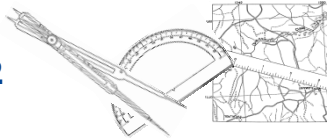
12.-13.  
**03.2012**

1<sup>st</sup> JRC ECML Workshop:  
**Mobile Interoperability I 2012**



11.-12.  
**10.2012**

2<sup>nd</sup> JRC ECML Workshop:  
**Map Interaction 2012**



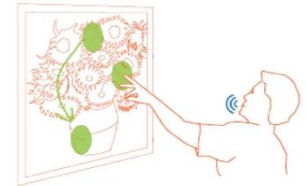
06.-07.  
**12.2012**

3<sup>rd</sup> JRC ECML Workshop:  
**Situational Awareness Systems I 2012**



07.-08.  
**03.2013**

4<sup>th</sup> JRC ECML Workshop:  
**Human Computer Interaction with Big Wall Displays 2013**



05.-07.  
**06.2013**

5<sup>th</sup> JRC ECML Workshop:  
**Unmanned Aerial Vehicles (UAVs) 2013**



09.-11.  
**10.2013**

6<sup>th</sup> JRC ECML Workshop:  
**Situational Awareness Systems II 2013**

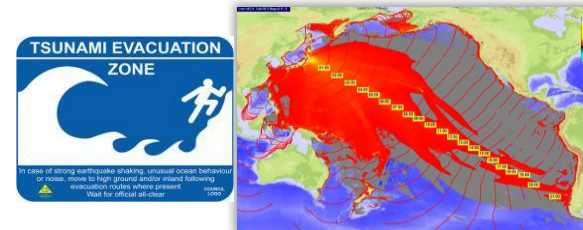


12.-14.  
**03.2014**

7<sup>th</sup> JRC ECML Workshop:  
**Mobile Interoperability II 2014**

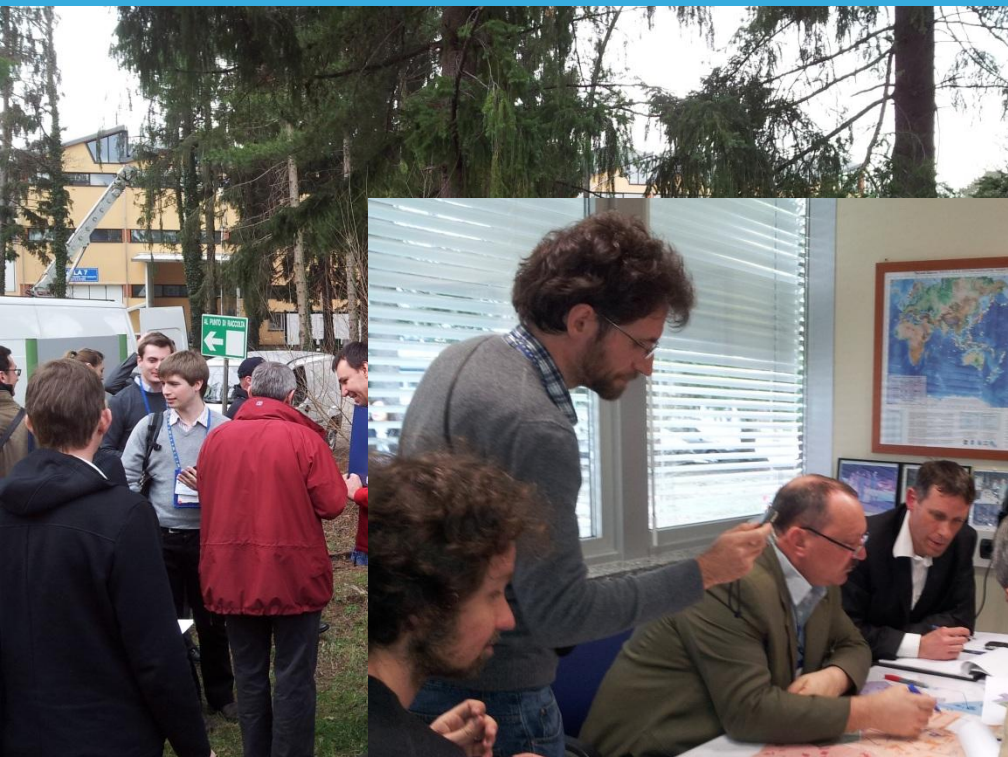
05.-06.  
**06.2014**

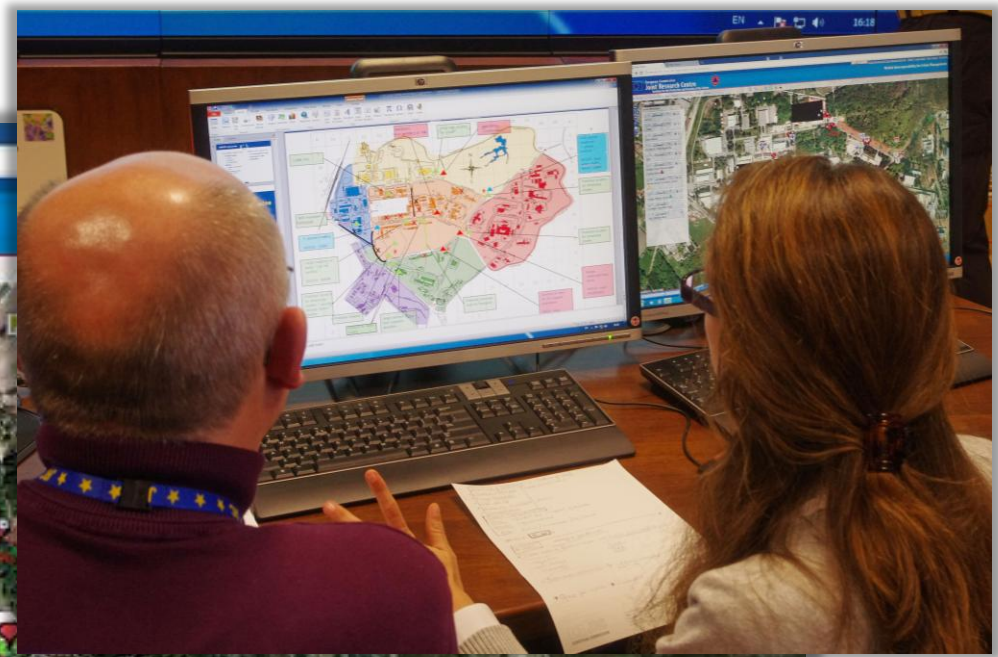
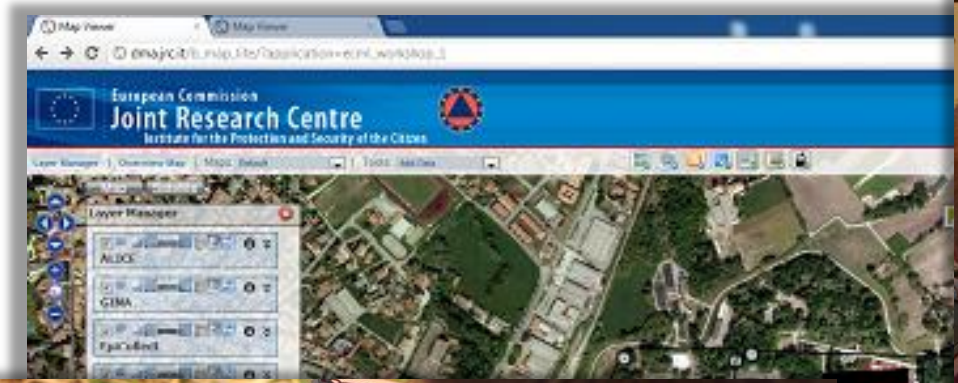
8<sup>th</sup> JRC ECML Workshop:  
**Tsunami Monitoring Systems 2014**



## 12 to 13 March 2012

- **37 participants** from: 11 EU countries, Norway, Brazil and US, 3 UN agencies, and 2 NGOs
- measure the added value of **mobile assessment technology** for rapid situation assessment in international emergency operations
- 7 mobile assessment systems provided interoperable real-time data to a single **electronic** On-Site Operations Coordination Centre (**eOSOCC**)
- Systems performance benchmarked against a traditional **paper-based** assessment that was conducted simultaneously (**pOSOCC**)





# 2nd JRC ECML Workshop: Map Interaction

## 11 – 12 October 2012, Ispra Italy

### Opening talks

*Tayfur Coskun, TU Munich, Germany:* **Map interaction in mass casualty incidents**

*Laura Bononcini, Google Italy:* **google.org map applications for crisis management**

Presentation, demonstration, and exploration of map interaction devices:

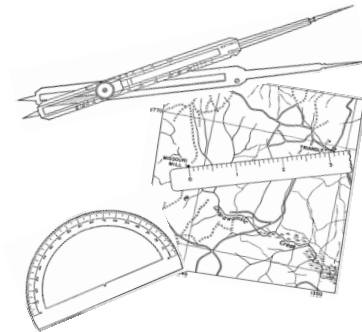
- **SMART interactive whiteboard**
- **Microsoft Kinect gesture camera** (courtesy of Software Lab)
- **Microsoft Surface 2.0 multi-touch table** (courtesy of Software Lab)
- **3DConnexion SpaceNavigator**
- **Eye-tracker** (courtesy of SR Labs)

**Benchmarking:** in ECML via predefined basic tasks

e.g., find, explore, relate, present, ...

**Methodology:** Experiment & collaborative evaluation discussion

**Key variables:** User satisfaction, error rates, time to completion



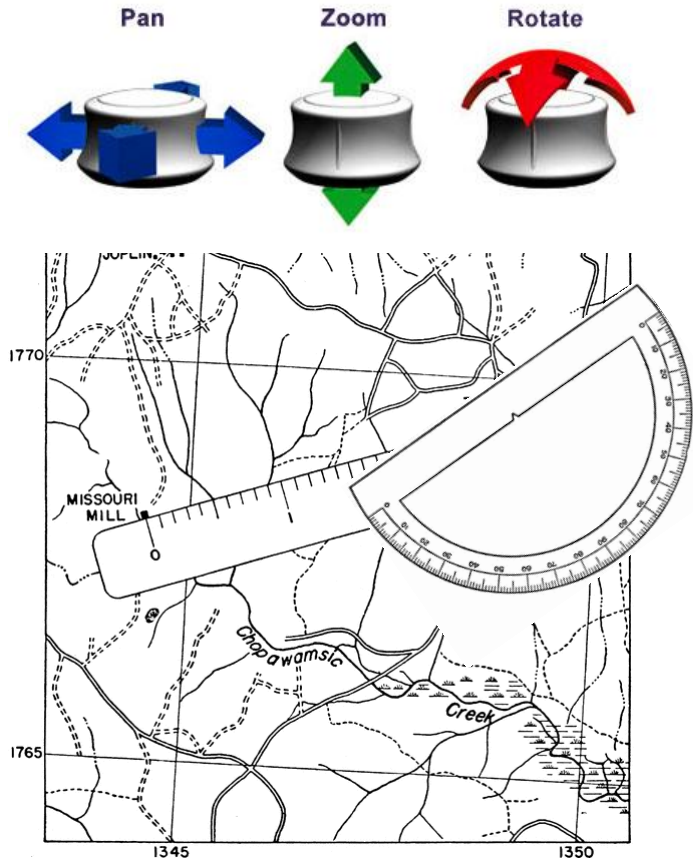


# 2<sup>nd</sup> JRC ECML Crisis Technology Workshop: Map Interaction 2012



**11-12 October 2012**

- Few key users + 1-2 companies (tbc), and JRC staff.
- Presentations of map interaction techniques (e.g., Kinect, touch screen, 3DConnexion, Mouse + Keyboard)
- Benchmarking of available solutions in ECML via predefined basic tasks e.g., **find, explore, relate**
- Key variables: **time to completion, error rates, user satisfaction, collaborative evaluation discussion**



# Crisis Room Design

# 12 Jan 2010 – Mw 7.6 Earthquake in Haiti



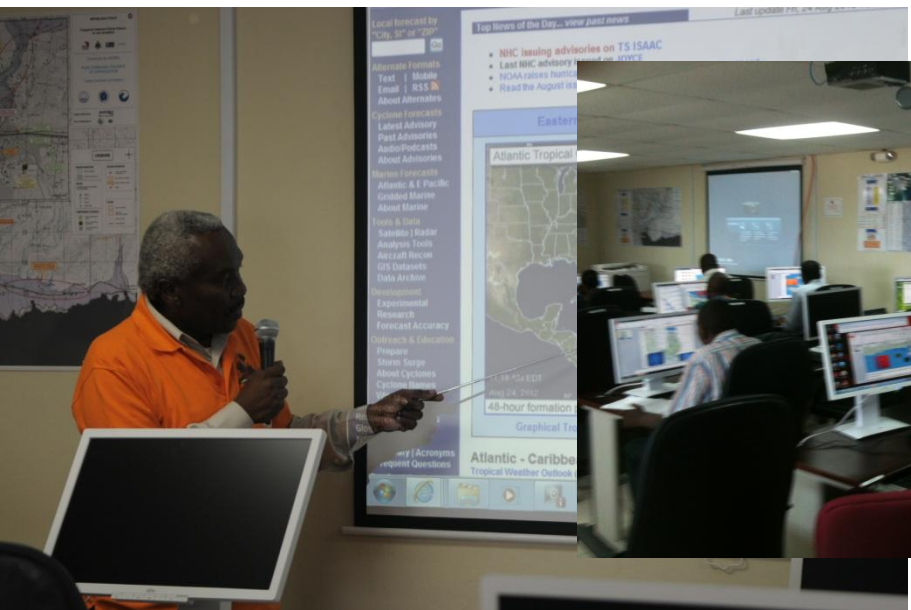
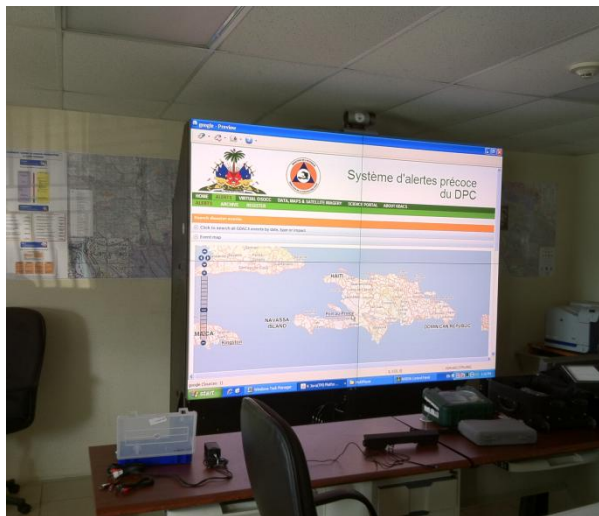
# Haiti Crisis Room Design



## European Commission support to the Haitian Civil Protection

- Design of the Crisis Room
- Purchase of all the material
- Installation
- Training





# Haiti Crisis Room - Timeline



Jan 2010

Earthquake

Jun-Sep 2010

Design of the Crisis Room

Nov 2010-May 2011

Definition of the location

May 2011-Feb 2012

Tenders and procurement

Feb-Jun 2012

Shipment & customs

Jul-Oct 2012

Trainings on

- **CM Portals development**
- **Open Source Monitoring**
- **GIS**
- **Field Data collection**

# Conclusions



- The European Crisis Management Laboratory is getting more and more activities
- The creation of dedicated applications for the large Video Wall is essential in order to exploit all the features of the large visualization
- Next step is the creation of a network of laboratories in order to exchange experience and tools and largely improve the effectiveness to manage ongoing crisis events
- Participation to future ECML workshop can be considered in the future as an opportunity for technology improvement and networking