Recent Advances in European Research: the role of information & communication technologies for disaster risk reduction

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European Commission

- **Largest of the EU institutions**
  - Propose and implement EU policies

- **Made up of «Directorate Generals»**
  - Policy DG's and Research DG's
  - The EC supports EU R&D via its « Framework Programmes »:
    - every 4 years (now in FP6 ~ 17.5 Billion €)
    - R&D in support of EU policies & EU RTD policy (ERA)

- **DG INFSO – promoting European research in Information & Communication Technologies (ICT)**
  - ICT for risk & emergency management !

Current Issues

- Risk management is not yet a well-organized discipline -> lack of unifying concept
- Unclear organizational responsibility for information generation
  - lack of quality reporting -> lack of historical data
- Incompatible information systems -> access to relevant data is not easy
- Risks are handled in isolation
- No clear methodology to handle inter-related risks
- ……etc….

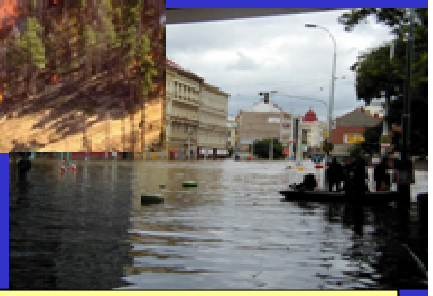
Evolving disaster reduction paradigm

RISK = Hazard * Exposure* Vulnerability

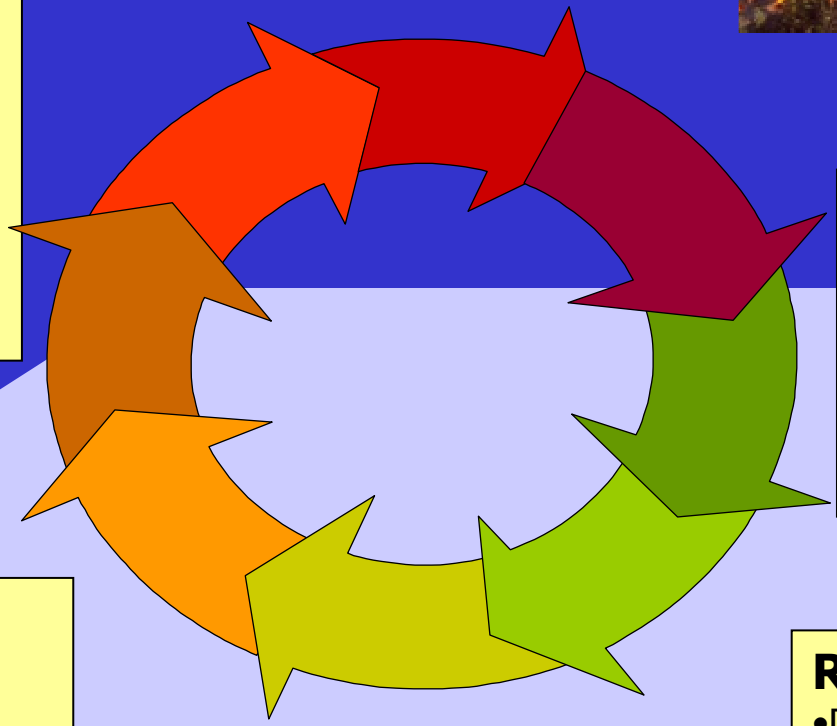
1. **Comprehensive emergency management**
   - Focus on response
2. **Disaster-resistant communities**
   - Focus on natural hazard prevention
3. **Resilient communities**
   - « Living with disasters » and focus on rapid recovery
   - Covers the whole risk management chain
4. **Sustainable disaster mitigation**
   - Focus on processes linking environment, development and disaster
   - Vulnerability of people, infrastructure, environment
   - Capacity building

Disaster Management Cycle

Preparedness
- Scenarios development
- Emergency Planning
- Training



Prevention and Mitigation
- Hazard prediction and modeling
- Risk assessment and mapping
- Spatial Planning
- Structural & non structural measures
- Public Awareness & Education..



Alert
- Real time monitoring & forecasting
- Early warning
- Secure &dependable telecom
- Scenario identification
- all media alarm

Post Disaster
- Lessons learnt
- Scenario update
- Socio-economic and environmental impact assessment
- Spatial (re)planning

Recovery
- Early damage assessment
- Re-establishing life-lines transport &communication infrastructure

Response
- Dispatching of resources
- Emergency telecom
- Situational awareness
- Command control coordination
- Information dissemination
- Emergency healthcare

Disasters in the EU policy context

- **EU SD Strategy & EU's 6th Environmental Action Programme**

  DG ENV:

  Civil Protection Community Action Program

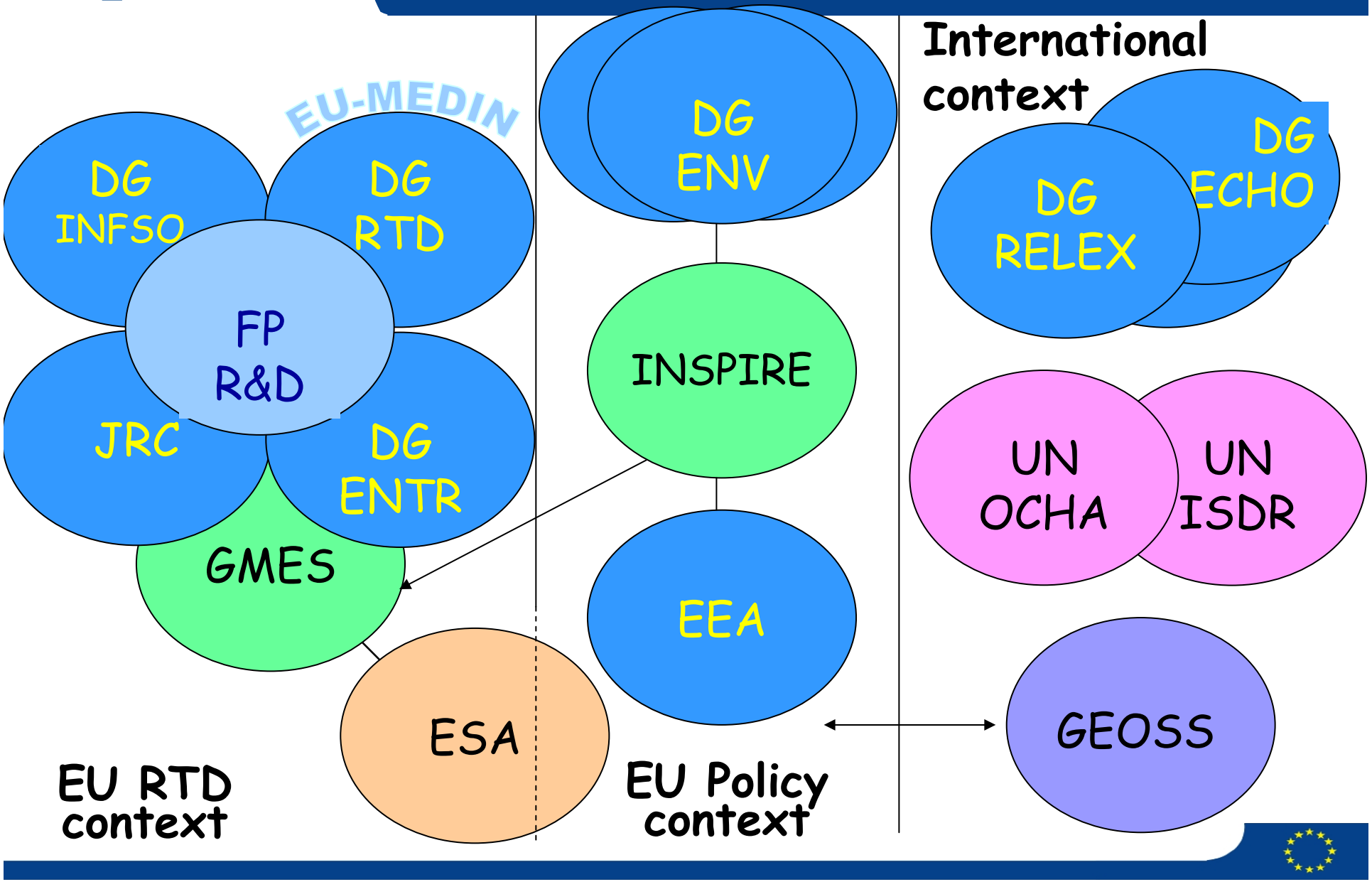
  - flood, fires, earthquakes, landslides, industrial accidents..
  - early warning & alert, emergency management & communication

  Water Framework Directive, Forest Focus, marine pollution, INSPIRE,etc

- **Development & Humanitarian aid, solidarity & cohesion funds (DG REGIO), Common Foreign and Security Policy (CFSP)**

- **Initiatives: GMES, GEOSS …**

Disaster Reduction in the EU



Disaster Research in the EU

DG Information Society & Media

- ICT for the Environment (multi-risk ICT applications for disaster reduction & emergency management

DG Research

- Global Change and Ecosystems (earthquakes, floods, forest fires, volcanoes, etc)

FP

DG Enterprise

- Aeronautics & Space – GMES (mostly in support of an satellite Earth Observation capacity)
- Preparatory Action for Security Research (PASR)

DG Joint Research Centre

- Institute for Environment & Sustainability (ie: hazard assessment, flood forecasting, fire index maps, ect.)
- Institute for Protection & Security of the Citizen (ie: GDAS, NEDIES, MAHB, ect.)

FP & DF

Disaster Reduction Research

ICT FOR RISK MANAGEMENT

Information Society Technologies

DG Information Society and Media

ICT for Risk Management

General Objectives:

- To contribute to the deployment of an eINFRASTRUCTURE for risk & emergency management in Europe

- To promote the development of cost-effective ICT services for sustainable disaster reduction and mitigation:
  - System integration – solution driven
  - Specific technological developments when needed
  - Market & user needs driven
    - Focus on generic solutions
    - Re-usable software components
    - Open source software
    - Interoperability, scalability
  - Based on state-of-the-art disaster science

ICT for Risk Management

Strategic Approach[1]:

- To cover the whole risk management cycle:
  - Risk assessment, preparedness, early warning, alert, response, recovery, lessons learnt etc.

- To cover all environmental hazards, including systemic risks / cascading risks

- To focus on system architecture rather than specific applications thereby decreasing development & maintenance costs, whilst improving reliability, scalability and interoperability

ICT for risk management

Strategic Approach[2]:

- To support large scale pilot test with end-users
- To foster pre-standardisation activities as an integral part of RTD
- To promote "open source" as a mean to improve the uptake of RTD results
- To contribute to the relevant EU policies and actions: ie: INSPIRE, GMES, GEOSS

ICT for risk management

ICT Issues[1]:

- Situational awareness: how to obtain, sustain common operating picture in a distributed decision environment under conditions of uncertainty.

- Information overload: how to filter information and still get the right information to the right people at the right time, how to minimize degradation of decision process due to information overload.

- Real time decision support: how to provide robust, and applicable models, ensure data and system availability where and when needed.

- Supporting response management operations: how to coordinate and track activities and resources in multiple organizations and operations centers during extremely large and complex operations.

ICT for risk management

ICT issues[2]:

- Communicating to community, victims, the media: how to ensure that warning systems warn, that crisis communications communicate

- Communication interoperability & security: how to provide technology and systems that are open enough to connect all necessary parties while controlling access

- Utilizing and controlling ad hoc communications: Cell phones, satellite phone, text messaging, internet

- Identifying and tracking people (victims and workers) and things. How to facilitate the process of identifying the survivors and the dead, notifying appropriate authorities, tracking victims, tracking and verifying identity of workers and things

ICT for risk management

Strategy Implementation:

- Structuring projects (IPs), Innovative projects (STREPs), Support & Coordination Actions

Topics related to past Call for proposals:

- **eINFRASTRUCTURE for risk management**
  - Interoperability of geo-spatial data
  - Service architecture

- **Improved emergency management**
  - Command control coordination
  - Full situational awareness
  - In a multi-lingual/cultural environment

ICT for risk management

On-going Call for Proposals:

- Sensor network architecture
- Public safety communications (alert)
- Take-up actions to support risk management architectures

Future Call for Proposals (tentative)

- Tsunami early warning and alert system

Call 6 – in the making!

Towards an integrated tsunami early warning & alert system

- enabling strong collaboration and interoperability across the whole disaster-reduction cycle.
- based on the integration of advanced ICT systems and services to meet the needs of local, regional and basin wide TEWS
- Alert communications making use of all media broadcasting & telecoms.
- Validation environments for testing prototype integrated systems and services
- SSAs CAs to support technology transfer and sharing best practices

Call 6 – in the making!

Towards an integrated tsunami early warning and alert system: lessons learnt:

- Many individuals, unable to get information elsewhere, turned to the Internet in search of their family and friends.
- Survivors also bypassed official channels posting their whereabouts on message boards found on various different websites.
- Virtual, unfiltered, information centers, or blogs, have been able to provide data that was previously available only to rescue workers on the ground. These websites, which are updated with a speed that cannot be matched by traditional means, have provided individuals with a means for locating survivors, donating resources, and getting in depth first hand accounts.
- The Internet is providing the ability to virtually coordinate a relief effort from the bottom-up. The technology lends itself to this, but at the current time, there appears to be no evidence that governments or aid organizations are taking advantage of this capability.

FP6 Ongoing Research Themes

- Risk information infrastructure and generic services
- Emergency management and rescue operations
- Humanitarian Demining
- In-situ monitoring and smart sensor networks
- RTD on public safety communication, alert systems and rapidly deployable emergency telecommunications systems.
- Specific support and coordination actions to achieve full interoperability

Approx. 90 million Euro

- Develop, validate and demonstrate a distributed tsunami early warning and alert system, relevant to Europe & Indian Ocean.

Show Case

EU Projects related to Disaster Reduction

ROBOVOLC

A Robot For Volcano Exploration

- FP5 project: 6 partners, coord. Univ of Catania - completed
- Robot integrated in volcanic surveillance system, for use when access to active vents becomes too dangerous for human life, but information is vital for a correct forecast of dangerous eruptions

  Final version of the platform manufactured and tested in laboratory and in volcanic environment, includes:
  - SCARA manipulator and gripper
  - Gas sampling system
  - Localisation system
  - Sensor turret
  - Navigation system
- http://www.robovolc.dees.unict.it

DISMAR

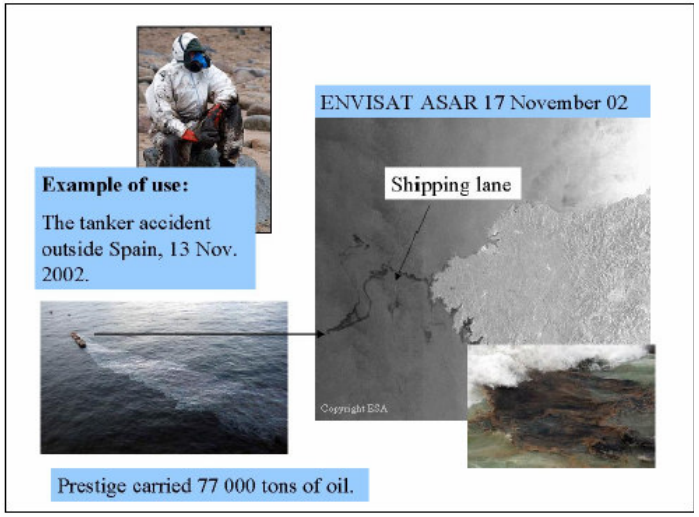
Data Integration System for Marine Pollution and Water Quality

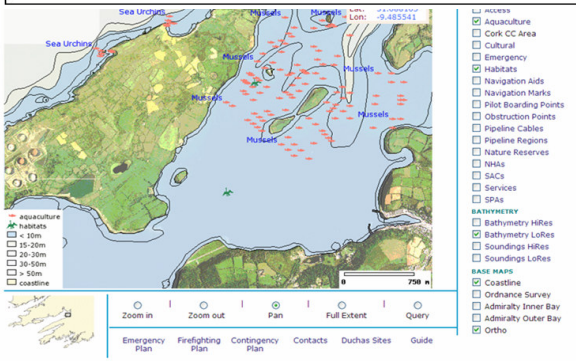
FP5 project: 15 partners, coord. Nansen Environmental and Remote Sensing Center (NO) - completed

Objective: to developed a distributed system – DISPRO - for monitoring and forecasting of the marine environment, which provides a single entry point, via a web-based GIS portal, to services delivering a variety of remote sensing, in situ and model data to support decision-making in crisis situations.

Systems was demonstrated in 6 coastal zone and ocean areas in Europe: (1) North Sea / Skagerrak area, (2) German coast, (3) coast of Italy, (4) coast of France, (5) Western English Channel, and (6) South-West Ireland.

url: http://www.nersc.no/Projects/dismar





WIN

Wide Area Network

FP6 project: 15 partners, coord. Alcatel Space (FR) – ongoing until Aug. 2007

Objective:

To integrate existing reference results and initiatives to contribute to the design, development, & validation of a European risk management information infrastructure.

'info-structure' will be a major element of the future European Spatial Data Infrastructure (ESDI) & represents an important step in operational risk management in Europe

url: http://www.win-eu.org

Information exchange: Current situation and WIN expected results

ORCHESTRA

Open Architecture & Spatial Data Infrastructure for Risk Management

FP6 project: 14 partners, coord. ATOS (ES) – ongoing until Aug. 2007

Objective: to design & implement an open service oriented software architecture to improve the interoperability among actors involved in Multi-Risk Management, by:

- Designing an open service-oriented architecture
- Developing software infrastructure for enabling risk management services
- Developing useful services for different thematic applications (forest fires, floods, etc.);
- Setting software standards for risk management applications.

url: www.eu-orchestra.org

OASIS

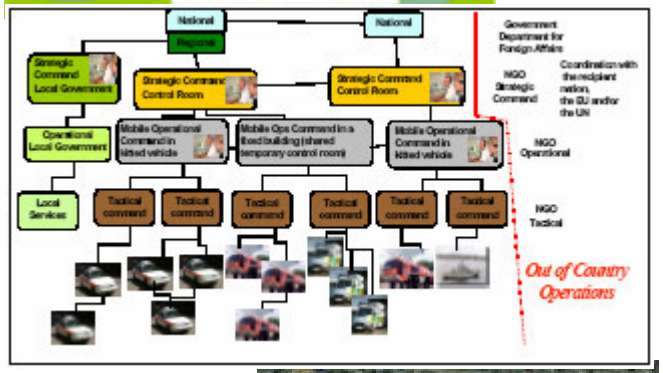
Open Advanced System for Crisis Management

FP6 project: 13 partners, coord. EADS (FR) – ongoing until Aug 2008

Objective: to define & develop an IT framework based on an open and flexible architecture to serve as the basis of a EU Disaster & Emergency Management system to:

- facilitate cooperation between info systems used by civil protection organisations, in a local, regional, national or international environment.
- support the response operations in the case of large scale as well as local emergencies.

url: http://www.oasis-fp6.org



OSIRIS

Operational Solutions For The Management Of Inundation Risks In The Information Society

FP5 project: 12 partners, coord. SOGREAH – completed

Developed a suite of applications taking into account of all the stages of flood risk management:

- preventive measures,
- preparing action plans,
- monitoring a river and forecasting overflows
- warning, information to the citizens
- measures to mitigate the effects of floods
- managing the crisis situation,
- monitoring its consequences and
- bringing the situation back to normal.

EGERIS

European Generic Emergency Response Information System

FP5 project: 16 partners, coord. EADS - completed

Objective: to provide Civil Protection organisations & national or regional authorities the most recent information and communication technology developments to support them in their Emergency Management operations during the response & preparedness phases.

Method: integration of technologies providing a full range of emergency Communication, Information and Decision Making functions. *EGERIS* has also a firm commitment to implement open systems approaches to achieve standardisation, interoperability and portability.

http://www.egeris.org

MITRA

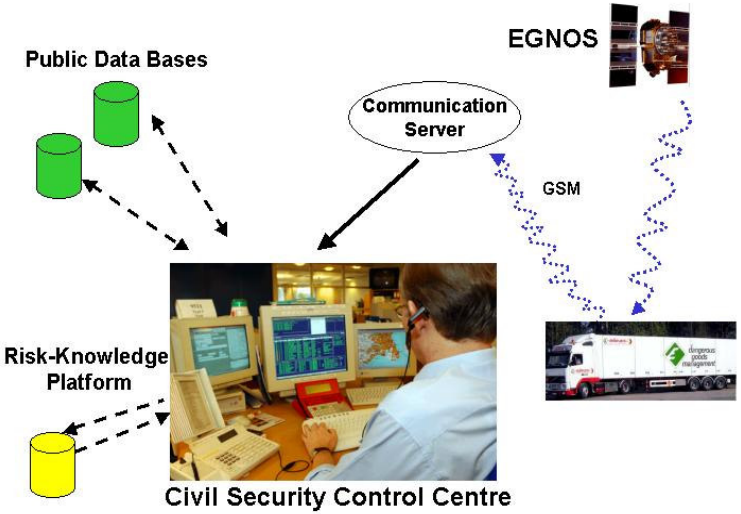
Monitoring & Intervention for Transportation of Dangerous Goods

FP6 project: 14 partners, coord. "M3 Systems » - ongoing until Aug. 2008

Objective: Specify and prototype an innovative operational platform:

- Interoperability between Civil Security centres
- Electronic identification of dangerous goods
- Risk-knowledge platform
- Real-time information on the situation, to help intervention & rescue teams to:
  - Evaluate the situation, before or after accid
  - Assess the risks and effects of the accident
  - Determine adequate intervention measures

url: http://www.mitraproject.info



EU-MEDIN

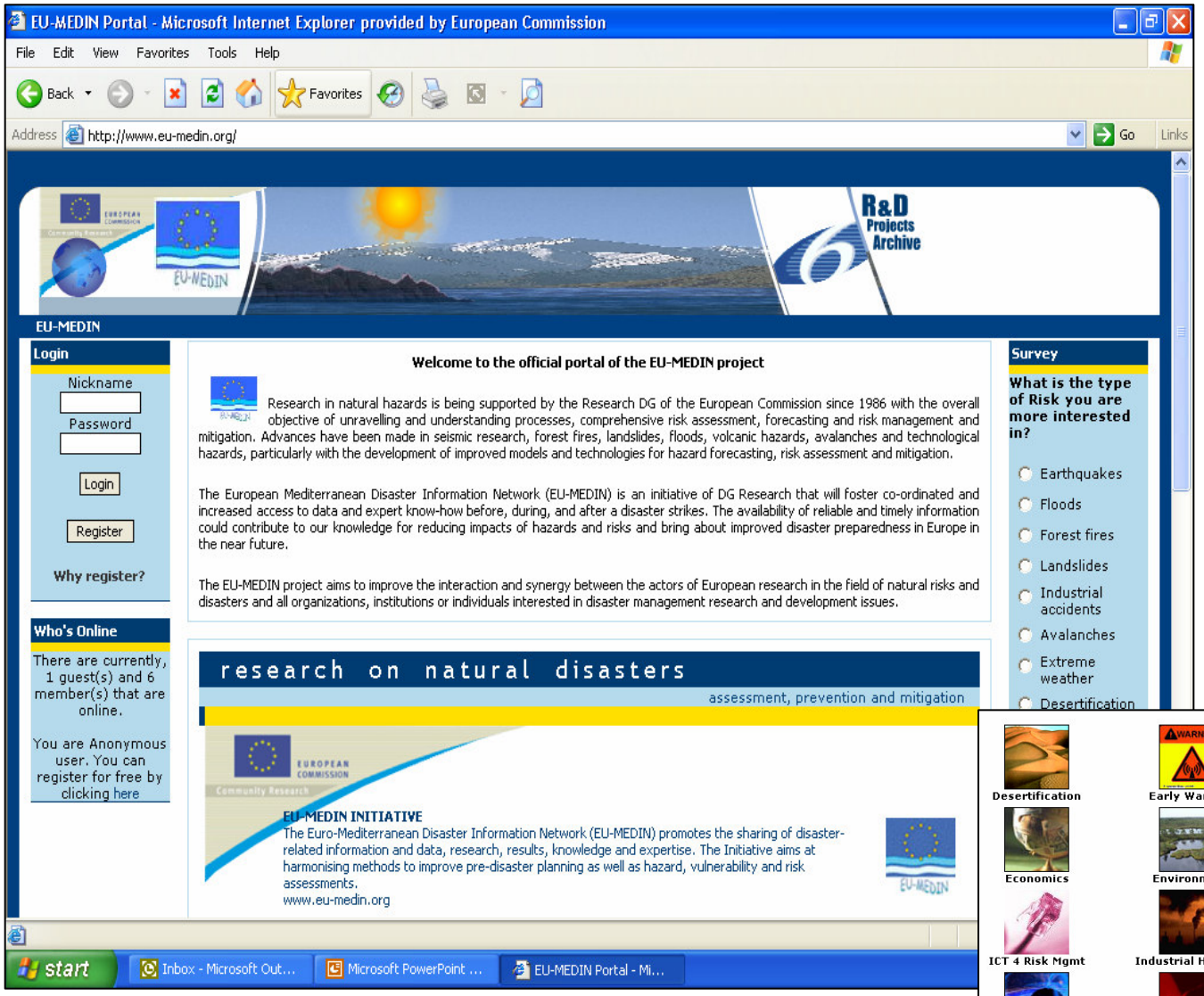
Euro-Mediterranean Disaster Information Network

- Initiative of EC to promotes the sharing of disaster-related information and data, research, results, knowledge and expertise.

- The initiative aims at harmonising methods to improve pre-disaster planning as well as hazard, vulnerability and risk assessments.

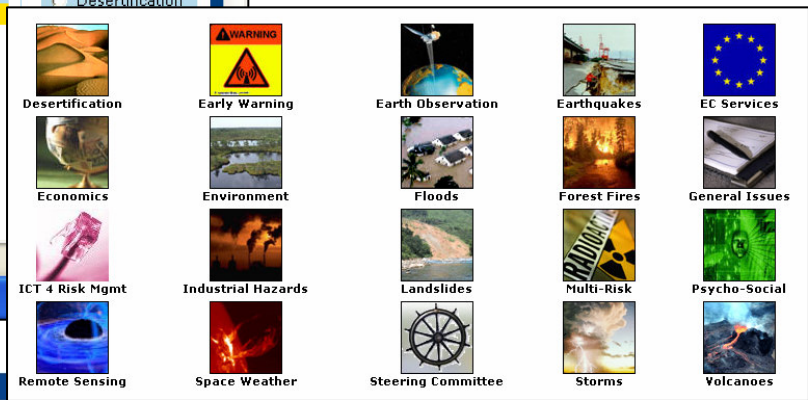
- Disaster themes: forest fires, storms, floods, earth-quakes, volcanoes, landslides, avalanches & technological hazards, ICT for DM, etc.

www.eu-medin.org



EU projects, metadata on project results, events, who's is who in the EU disaster science community

Have a look!



For more Info

IST website:
http://europa.eu.int/information_society
http://www.cordis.lu/ist/
Mailbox: INFSO - G5@cec.eu.int

GMES: http://www.gmes.info/

INSPIRE: http://www.ec-gis.org/inspire/

EU-MEDIN: http://www.eu-medin.org

GEO: http://earthobservations.org/

Experts welcome to help us evaluate project proposals:
http://www.cordis.lu/experts/fp6_candidature.htm


The End …
Thank You!