EMERGENCY MANAGEMENT AND WARNING AREA

Extracts from the Draft Report of the EMERGENCY MANAGEMENT AND WARNING AREA in TELEMATICS for the ENVIRONMENT

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1. OBJECTIVES OF THE AREA

The main objective of projects related to the **Emergency Management & Warning Area** is the integration of information in risk and crisis management for environmental emergencies. There are a number of issues, which the projects are undertaking dealing with a number of emergencies, as they have been identified within the Emergency Management Area of the Concertation meetings and mechanisms in the Telematics for environment sector. These areas under coverage belong to the following list:

A: *forest fires, chemical fires, structural fires*

B: *industrial accidents, oil and chemical spills, explosions, nuclear accidents, radiation*

C: *storms, tornadoes, floods, dam ruptures, marine algal blooms*

D: *avalanches, landslides, earthquakes, seismic waves, volcanic eruptions*

The projects under the Telematics Sector for the Environment are providing a number of users and experts in the above referenced fields, by getting actors from differing organisational and responsibility structures, such as:

I. *Regional Governments and Responsible organisations in EEMS, within regional centers the three primary actors, are*
  - *A. fire brigades*
  - *B. paramedics*
  - *C. police*

II. *Civil protection units*
III. *Emergency services (where applicable)*
IV. *Special Groups (where applicable)*
V. *Communities and active civil groups*
VI. *Coast guards (primarily for marine pollution)*
VII. *Search and Rescue Organisations (SAR)*
VIII. *National Governments and Administrations*
IX. *Local Governments (pending on country or region structure)*
X. *Various Ministerial Bodies and / or Divisions*
XI. *others to be defined*

2. PRESENTATION OF PROJECTS

2.1. ARTEMIS

ARTEMIS (*Application Research & Testing for Emergency Management Intelligent Systems*) is a feasibility project (6 months) of a generic emergency system, based on users requirements analysis and building a mock-up demonstrator including 2 accident scenarios on chemical accident (Thriassion Plain near Athens) and flood (Jucar River near Valencia, ES).

2.1.1. Project Summary

The management of emergencies, whether resulting from natural or man-made causes, faces major difficulties as a result of:

- poor and inefficient planning
- lack of inter-agency co-ordination
- insufficient information
- shortage of experience and training of responders
- weak technical support (databases, experts, decision support tools, etc.)
- lack of real-time monitoring of changing conditions etc.

Recent developments in the fields of telematics and knowledge-based systems offer prospects of an important contribution being made to emergency management. These developments make it possible to combine reliable and efficient data acquisition networks, which feed in data in real time, with on-line intelligent software, which can give the right answers and explanations to operators. Good decisions can be supported through dialogue between the system and its operators.

The objective of the present project is to provide the groundwork for a system which achieves that. It aims to establish user requirements and functional specifications. Initially two classes of emergency situations will be covered: industrial accidents and floods. Eventually it is intended that the specifications be applied to a wide range of emergency situations. When fully implemented the resulting system will enable emergency management and planning authorities to:

- integrate monitoring and planning functions
- establish a coherent framework for inter-agency co-ordination of plans
- draft plans to be implemented in response to different types of emergency
- train decision-makers in crisis management
- dynamically manage an emergency situation when it arises from a major incident
- aid decision makers in the longer-term management of an incident as it evolves
- aid longer-term land use and infrastructure planning.

The present project will arrive at a full specification for such a system covering

- user requirements
- functional specifications

evaluation framework

specification of model adaptation and development requirements

the building of a 'mock-up' of the final system.

2.1.2. Major Validation Sites

Prefecture of West Attica, Athens, GR
Spanish Ministry of Public Works, Valencia, ES

2.1.3. Users

Users will be involved in various stages throughout the project. Included will be major actors in emergency management in Greece and Spain, e.g. the Fire Corps of Greece, the Civil Protection Authority of Spain, the Prefecture of West Attica, and the General Directorate for Hydraulic Works in Spain.

2.1.4. Approach

User requirements will be established through a series of structured group discussions. System architecture and modelling requirements will be specified for full development. A 'mock-up' of the system will be constructed to aid interaction with users and to demonstrate basic system functionalities.

2.1.5. Expected Benefits

improved performance of emergency management authorities, resulting in less material damage and loss of life, whether from man-made or natural disasters

ability of political and civil authorities to perform their tasks more effectively and efficiently

in the case of industrial accidents, less damage and lower insurance payments due to better response from emergency units

for supplier companies, value added to telematics infrastructures, which will provide added incentive for wider adoption and installation.

2.1.6. Contribution to EU Policies

The system is expected to result in improved practices in emergency management, leading to a common platform for the development of site-specific management systems. It will speed up the full implementation of the SEVESO Directive.

2.2. DEDICS

DEDICS (*Distributed Environmental Disaster Information and Control System*) is a demonstrator project, mainly applying on forest fire management (on various validation sites), with one demonstration on floods, including detection, monitoring, decision support and communication. The understanding of and capitalising knowledge on disasters has been pointed out as a major issued of the project, that could be an area common issue.

2.2.1. Project Summary

DEDICS is a telematics tool designed to facilitate the management of environmental disasters by providing users with a set of functions to support monitoring, control and decision-making. The system is composed of elements designed to provide key information to the users: early detection for fast response, simulation for preparing types of intervention, data server for sharing experience, and building up an information asset for post-analysis of disasters. These services use an interactive communication kernel, which links all types of users in headquarters, offices and the in field of operations.

As most environmental disasters are on a regional scale, DEDICS is a regional system. It is designed to be adapted to a wide range of such situations. Its application will be tested on forest fires, which constitute one of the most frequent and difficult kinds of environmental disasters in Europe.

DEDICS concerns three categories of users who share common interests and needs:

- fire managers, involved in prevention and fighting of forest fires
- local authorities, responsible for land management, resource allocation and information to the public
- researchers involved in the study of forest fire prevention and simulation models.

The objective of the project is to increase efficiency in prevention, fighting and understanding of forest fires. It will promote better cooperation in the field of environmental disasters through the assessment of common needs, the evaluation of different solutions and the organisation of demonstrations by users from six European countries.

2.2.2. Major Validation Sites

OANAK, Eastern Crete Development Organisation, Heraklion, GR
Junta de Andalucia, Jaen, ES
DDSIS, Direction Départmentale des Services d'Incendie et de Secours, Villeneuve-Loubet, FR
Fire Brigade, Kassel, DE

2.2.3. Users

The users of the system will be fire managers involved in prevention and fighting of forest fires; local authorities involved in land management, resource allocation and information to the public; and researchers involved in the study of forest fire prevention and simulation models.

2.2.4. Approach

DEDICS will apply the technologies of distributed computing and information processing, satellite, radio and mobile phone communications, decision support systems, and GIS.

2.2.5. Expected Benefits

- reduced damage - due to improved prevention and management of forest fires
- better protection of the population - due to models for predicting fires at the urban-rural interface boundary
- better protection of the environment
- easier decision-making - due to readier availability of data
- improved communications between users

ability to use simulation models

improvements in the validation of existing systems and easier introduction of new components adapted to requirements

specification and promotion of standards for information on natural hazard management.

2.2.6. Contribution to EU Policies

Protection of forests against fires has a particular and urgent importance in the EU (EC regulation 2158/92).
Improved alert criteria guarantee better organisation for fire-fighting and adapt actions to the real situation (4th PRCD, Environment and Climate).

2.3. E.M.M.A.

E.M.M.A. (Integrated Environmental Monitoring, Forecasting and Warning systems in Metropolitan Areas)

2.3.1. Project Summary

The project aims at meeting users' needs in the field of air quality monitoring, forecasting and warning by the introduction of innovative telematics and integrated multimedia systems.
The work will be carried out in the following cities: Genoa, Leicester, Madrid and Stockholm.
The final objective is to develop new approaches to the use of air quality and meteorological data for the improvement of life in metropolitan areas. This will involve the integration of existing technologies to enable responses to be made at the most appropriate time and at the most appropriate level. Particular emphasis is placed on forecasting over 24 and 48 hours and providing information to general public.

The EMMA project is characterised by:

Integration of existing networks covering a range of air quality and meteorological parameters. This range of air quality and meteorological networks is representative of many European urban areas.

Improved data collection, assessment and forecasting, using common system architectures for monitoring, forecasting and warning networks and models, quality control procedures, expert software systems for the front-end data validation from networks. Introduction of software and system improvements will minimise the time-lag between network measurements and dissemination to the public and media.

Strong orientation to administrations in local environment, transport and health: regions, provinces, municipalities, public hospitals and, most importantly, citizens of metropolitan areas. A User Reference Group will be established with responsibility for establishing objectives and monitoring progress towards their implementation.

Research into economic benefit for administrations and therefore to citizens: integrated architectures and models, and other characteristics of the project, make it possible to minimise the number of sensors and instruments to be purchased. By building common understanding, this will increase the information available to citizens, administrators and research institutes.

High attention to Air Quality Indicators; in this field this project will have a direct impact on future harmonisation between national and European approaches, consistently with the Commission Proposal of Directive (94/0106) on Ambient Air Quality Assessment.

2.3.2. Major Validation Sites

Stockholm S L B (Air Quality Dept.), SE
Ayuntamiento de Madrid, ES
Provincia di Genova, IT
Leicestershire County Council, UK

2.3.3. Users

The users of the proposed system are of three types

Environment Administrations: Provincia di Genova, Stockholm Air Quality Dept, Ayuntamiento de Madrid, Agencia del Medio Ambiente de Madrid, Leicestershire County Council, European Environment Agency

Urban Traffic Administrations: Swedish Road Dept, Leicestershire Transport Dept, Town Hall of Zaragoza

Health & Research Organisations: World Health Organisation, Regional Hospital of Madrid.

2.3.4. Approach

The technologies to be applied are primarily Geographic Information Systems, multimedia archiving systems, advanced local area networks, RDS/TMC (synthesised voice) and World Wide Web / Internet.

2.3.5. Expected Benefits

easy access to local environmental information

greater availability of meteorological information

accurate forecasts (24 and 48 hours) of environmental situations

optimised investments and the use of air quality and meteorological sensors and instruments

availability of more accurate environmental data

quality control on real-time environmental data

quicker standardisation of air quality measurements and forecasting

improved performance of air quality monitoring and forecasting systems

creation of a first-line software product.

2.3.6. Contribution to EU Policies

EU Directives 80/779, 89/427, 82/884 and 92/72

5th Action programme of the European Union, relating to the "need to find a balance between the use of different tools: product standards, emission limits and environmental quality objectives".

2.4. EFFECT

EFFECT (Environmental Forecasting for the Effective Control of Traffic) is a demonstrator project, applying to air quality monitoring vs. traffic conditions in 4 European cities. The warning component concerns traffic control and management in relation with real-time air

quality measurements. The problem of how warning is spatially distributed from spatially distributed assessment of air quality has been addressed as a potential common issue.

2.4.1. Project Summary

The objective of the project is to predict poor local air quality in real time and then to initiate effective traffic demand management measures to reduce pollution levels in particular problem areas. This will be achieved through establishing Local Environmental Management Boards, and integrating air quality models with real-time information on traffic flows, pollutant concentrations and meteorological conditions, and thereby identifying pollution "hotspots". The traffic demand management strategies will be designed to reduce the pollution levels at the hotspot. The demand management tools include Variable Message Signs and traffic messages broadcast on FM radio digitally using RDS-TMC. The demonstration sites, each with a different emphasis, will be in Gothenburg(SE), Leicester(UK), Maidstone(UK) and Volos(GR).

2.4.2. Major Validation Sites

Swedish National Roads Administration, Gothenburg, SE
Leicestershire County Council, UK
Kent County Council, UK
Volos Municipal Enterprise for Urban Studies and Construction, GR

2.4.3. Users

The users comprise traffic and environmental authorities, environmental consultative groups, and the public. Within the project they are:

in the UK: Kent County Council, Maidstone Borough Council Environmental Health, the Department of the Environment, Leicestershire County Council, and the general public

in Greece: Municipality of VOLOS, Car Free Cities Club

in Sweden: Swedish National Road Administration, Environmental Health Department, and the general public

other cities which will be associated with the work.

2.4.4. Approach

The components of the project concern monitoring of traffic conditions, roadside air quality and weather, air quality modelling and prediction based on real-time and historic data, analysis and demonstration of traffic demand management.

2.4.5. Expected Benefits

better information and knowledge of local air quality,

near real-time improvement of air quality in "hotspot" locations

improved capabilities to manage traffic demand and control traffic

more strategy options available for controlling transport demand

improved software for air quality monitoring and management

demonstration of sensors for roadside air quality monitoring.

2.4.6. Contribution to EU Policies

Monitoring of traffic pollution improved development of tools to reduce traffic pollution at hotspot locations.

2.5. ENVISYS

ENVISYS (Environmental Monitoring Warning & Emergency System) is a demonstrator project, mainly applying to rapid detection and monitoring of oil spills using radar satellite data, and secondarily to forest fires and floods. Considering existing and future satellite imagery, this project addresses the difficulties related to data availability and reception delay in emergency situations.

2.5.1. Project Summary

ENVISYS' primary objective is to create a complete system for the early detection of oil-spills, the monitoring of sea pollution due to oil spills, and the provision of support to the responsible public authorities during clean-up operations. Other objectives include investigating the feasibility and cost-effectiveness of applying the ENVISYS system in the detection of other emergencies (e.g. forest fires and floods), and an overall evaluation of the proposed techniques. A demonstrator will be built integrating and developing existing remote sensing techniques, communication tools, GIS, databases and multimedia tools; its applicability will be tested and verified.

The main results of the project include demonstrations of the system at three different sites and an overall evaluation and assessment in the user-oriented context. This will be followed by dissemination of related information, in the first instance to the Envisys User Reference Group, and more widely to an international community directly or indirectly associated with this type of work.

ENVISYS will provide a management, monitoring and control system for various Public Authorities in Europe concerned with identification and alerts on oil spills. It will indicate the applicability of such a system to a harmonised emergency system for other natural disasters such as forest fires and floods.

2.5.2. Major Validation Sites

Cyclades Regional Development Company, Notio Aigaio, GR
Sistemas de Seguimento Informatico S.L., Valencia, ES
Sociedad Estatal de Sasemar Salvamento y Seguridad Maritimo, Galicia-Andalucia, ES
Norsk Regnensentralen, NO

2.5.3. Users

The users involved are, AN.ET.KY - Affiliate of the Prefecture of Cyclades in Greece, INDI - marine environment information provider in Spain, and SASEMAR, the Spanish Maritime Salvage and Safety Company.

2.5.4. Approach

The technologies to be applied are primarily remote sensing based on synthetic-aperture radar imagery, integration of data, Geographical Information Systems, telecommunications, databases, and multimedia HMI presentation.

2.5.5. Expected Benefits

protection of the marine environment

improvement of the quality of life

increase in awareness of protection of the marine environment

aids in the management, monitoring and montrol of oil spills

automatic detection of spills and automatic warning systems

support for clean-up actions in the case of an incident or accident

indirect benefits from these technologies for tourism, fishing and transport

particular benefit for expanding telecommunications and electronic sectors.

2.5.6. Contribution to EU Policies

The project supports EU measures on emergency management of human inflicted or natural disasters, and overall policies on the environment and the quality of life.

2.6. RADATT

RADATT (Rapid Damage Assessment Telematic Tool) is feasability study (9 months) aiming at analysing user requirements and defining functional specification of an emergency management system applied to rapid estimate of damage after earthquakes. It is based on the use of real-time satellite imagery integrated in a GIS, and it will be applied in Portugal, Italy and Crete.

2.6.1. Project Summary

An overall methodology for rapid estimation of damage from natural disasters, and support for decisions on response and recovery when they occur, involves integrating several components within a single user interface. They comprise remote sensing and earth-science database information, GIS technology, analytical modelling and image processing techniques.
Integration of near real-time satellite imaging data with existing databases and natural hazard models will provide rapid and reliable estimates of damage. The results can be made immediately available via a network such as the Internet.
After an earthquake, a great amount of money is always spent for the mitigation-rehabilitation process. Consequently, any improvement to the planning of mitigation-rehabilitation has a direct impact in terms of economic-technical benefits for EU.
The proposed effort will concentrate on analysing user requirements and defining the functional specification for a software system architecture to achieve the above possibilities. Other tasks such as system implementation, validation and development of an exploitation plan will be addressed in a separate project after completion of the proposed programme.

2.6.2. Major Validation Sites

GNDT, Italian Group of Earthquake Disaster Prevention, Rome, IT
Municipality of Lisbon, PT
Region of Crete, GR

2.6.3. Users

The users are operative units of the Italian Group of Earthquake Disaster Prevention, the Portuguese National Civil Protection and Municipality of Lisbon, and the Region of Crete.

2.6.4. Approach

The technologies to be examined include Geographic Information Systems, multi-source information access methods, data integration and image processing techniques. An expert in loss estimation will take an important role in the project.

2.6.5. Expected Benefits

rapid identification of the damage sources

optimal response to emergency

reduced reaction time - from days to a matter of hours after a disaster

more efficient organisation of assistance and rehabilitation

increased reliability of damage and loss estimates

information from diverse data sources in common formats standardised across the EU

system directly available for use in seismic hazard applications in Greece, Portugal and Italy

subsequently exportable to other European countries

also adaptable to other types of natural disaster: potential to be investigated for the utilisation in various regions of North Africa, Middle East and India.

2.6.6. Contribution to EU Policies

This is an opportunity to create a European system involving European experts, catering for the different geophysical characteristics in Europe, and accommodating large amounts of historical data whose availability is a feature of the European scene.

2.7. REMSSBOT

REMSSBOT (Regional Environmental Management Support System Based on Telematics) is a demonstrator project, and aims at providing a quick access to Catalogues of Data Sources in environmental management situations. It includes a warning component.

2.7.1. Project Summary

REMSSBOT aims to demonstrate environmental information services at the regional level. Participating in the project are public administrations from the regions Piedmont(IT), Attica(GR) and Zeeland(NL).
Many local and regional environmental management administrations, like those in the REMSSBOT regions, are faced with a transition from management by environmental topic and local area to integrated environmental management, or even cross-border management. Most public administrations already have some environmental management systems or subsystems in place. These are usually designed along the paradigms valid during the original conception of these systems, and this has resulted in the coexistence of incompatible systems and in many cases also of incompatible information. An obvious way to make this less of a patchwork of systems and information would be to redesign and re-implement a new IT system from scratch, taking all user requirements into account. However, apart from the complexity and costs involved in such an effort, this would imply writing off investments in data and existing systems, and it would inhibit the further use of current environmental management systems.
The REMSSBOT project aims at overcoming these problems by offering integral management using an innovative telematics solution. The approach is based on a catalogue which conforms to the guidelines of the Catalogue of Data Sources (CDS) of the European Environment Agency (EEA). This describes what information is available at what location and provides IT systems with the automated procedures to access the actual information. The supporting tools and building blocks allow users to navigate through the catalogue and explore information sources regardless of the environmental topic and location.
Based on such a design approach, within the project three demonstrators will be made in the participating regions:

in Zeeland, water managers and policy makers, acting in the frame of the International Scheldt Commission, will be informed about the situation in the whole catchment area of river Scheldt

in Piedmont, public officers of several administrations involved in the management of the administrative and technical procedures of industrial plants with relevant risk of accident (EEC Directive n. 82/501) will co-operate during the assessment proceedings

in Attica, several measurement points in the regional area will be integrated into a single system to show conditions on air quality, solid waste disposal and bathing waters.

These demonstrators would prove the feasibility of using a catalogue-driven approach to implement real applications at relative low cost and with low effort.

2.7.2. Major Validation Sites

Regione Piemonte, Torino, IT
Provincia di Torino, Torino, IT
Provincia di Alessandria, Alessandria, IT
Lab. Sanità Pubblica, Grugliasco (TO), IT
International Scheldt Committee, Brussels, BE
Rijkswaterstaat Directie Zeeland, Middelburg, NL
Rijks Instituut voor Kust en Zee, Middelburg, NL
Rijks Instituut voor Integraal Zoetwaterbeckeer, Lelystad, NL
Rijkswaterstaat Rjks Instituut voor Kust en Zee, Den Haag, NL

ITLD, Information and Training in Local Development, Athens, GR
Ministry of the Environment offices., Athens, GR

2.7.3. Users

In the three Regions, historically, public administrations have targeted their efforts towards monitoring individual environmental topics. Today they themselves are focusing on achieving an integrated understanding of the environment and the multiple factors affecting environmental quality. In Zeeland the Rijkswaterstaat, the powerful Dutch Ministry for the Waters is involved in this process, along with its three associated directorates. In Piedmont the demonstrator will be used by the most important local Administrations (Regione Piemonte and Provincia di Torino). In Attica 23 municipal enterprises, within ITLD, and the Greek Ministry of the Environment will provide their efforts.

2.7.4. Approach

Each data provider describes both the format and qualitative aspects of the data made available but leaves the data itself in its native format. The telematics technology provides the necessary tools to locate and access the information regardless of location or format. The catalogue plays a central role as it not only describes what information is available on the network but also describes the information characteristics and the way to access that information. It will be based on an object-oriented architecture.

2.7.5. Expected Benefits

closer cooperation among public administrations

possibility of convincing other administrations to join a cooperative approach in dealing with environmental information and to save money using resources that already exist, instead of expending further effort

easier way for end-users to access to the environmental information and enforce quality of information services

multiple environmental topics addressed simultaneously

reusability of the applications: any application can run anywhere in the network, using any information available in the network

facility for local and regional authorities to enhance their own databases without affecting catalogue-based applications

uniform access by applications and models to information on any topic irrespective of it's location

verification of integrated services in "pilot sites" in three regions.

2.7.6. Contribution to EU Policies

The project supports a number of the horizontal actions called for within the Fifth Action Programme, specifically improving the data provided (basic information, trends and indicators) and offering a platform for information, education and training of all economic actors including policy-makers, planners, managers, workers, consumers.

Additionally, as a result of its regional, modular approach, the project retains the principles of subsidiarity and the concept of shared responsibility which permeates the Fifth Action Programme.

3. LINKS WITH HORIZONTAL ACTIVITIES

3.1. DG XI - Civil Protection Unit

This unit develops a European activity in terms of operational mechanisms (preparedness of public and authorities, response to expertise and assistance requests) and public information in the area of Civil Protection. It can provide a list of experts and references to projects of the Area.

3.2. DG XII - Natural Hazards Unit

The Natural Hazards domain of the Environment and Climate Programme has been presented at the Concertation Meetings of Telematics for the Environment, as well an overview of projects selected for the 1st call for proposals of 1995, in the areas of hydrologic and hydrogeologic, seismic, volcanic and forest fire risks. There is a strong willing of DG XII and DG XIII to transfer research results of DG XII - funded projects to telematics applications.

3.3. ESA - SATEMA Project

The SATEMA project has been presented at the Concertation Meetings of Telematics for the Environment as an horizontal activity of ESA to assess the use and requirements of satellite data in Telematics and Research. STAR (Satellites in Telematics And Research) meetings will be organised to animate this activity.

4. COMMON ISSUES RELATED TO PROJECTS LIFE-CYCLE

These issues are based through synthetic tables according to the four following topics :

- forest fires,
- oil spills,
- floods, earthquakes and industrial disasters,
- air quality.

The distinction between this four topics, and the grouping of floods, earthquakes and industrial disasters, is based on the differences and commonalties between these topics :

- Oil spills concern a very specific environment (sea), as well as air quality (urban areas), and are rather dealing with warning than with emergency ;
- Forest fires and floods / earthquakes / industrial disasters both concern emergency management, but forest fires usually have slower propagation and also concern a specific environment (forest and surrounding areas).

4.1. User Requirements

Forest fires DEDICS	Oil spills ENVISYS	Floods /Earthquakes / Industrial disasters ARTEMIS, RADATT	Air quality EFFECT, EMMA
Users = emergency management authorities + research	Users = emergency management authorities + research	Users = emergency management authorities	Users = emergency management authorities + public + health services
Wide user groups for transfer, validation and dissemination	Wide user groups for transfer, validation and dissemination	Restricted user groups due to short-time studies	Wide user groups, including public
Main users already convinced	Users not convinced by the use of SAR images (frequency, cost)		

4.2. Functional Specifications

Forest fires DEDICS	Oil spills ENVISYS	Floods /Earthquakes / Industrial disasters ARTEMIS, RADATT	Air quality EFFECT, EMMA
4 functions : Perception Communication Decision Support Broadcasting	4 functions : Perception Communication Decision Support Broadcasting	3 functions : Alarm Reaction and decision support Communication	
Capitalisation on disasters	Image acquisition & processing in GIS context IT operation support	Understanding events and action of emergency units Image acquisition and processing	
Real-time	No real-time	Real-time	Real-time

4.3. System Architecture

Forest fires DEDICS	Oil spills ENVISYS	Floods /Earthquakes / Industrial disasters ARTEMIS, RADATT	Air quality EFFECT, EMMA
Non-hierarchical and decentralised cooperation backbone serving a modular architecture	Centralised integration platform Built using the *Converge* model from Transport Telematics	Centralised architecture	
Configuration flexibility	Configuration flexibility Hardware and Software openness to allow interactivity with various actors	Open model to allow learning	