SOUTH EAST EUROPE
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MONITOR II

Monitor II

new methods for linking hazard mapping and contingency planning

CSA – Continuous Situation Awareness:
the tools for linking hazard mapping and contingency planning.

MONITOR II is supported by means of the European Regional Development Fund

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NEW METHODS FOR LINKING HAZARD MAPPING AND CONTINGENCY PLANNING

CSA – Continuous Situation Awareness: the tools for linking hazard mapping and contingency planning.

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CSA – basic information

Goals

The primary goal of the MONITOR II CSA (Continuous Situation Awareness) is to improve situation awareness and knowledge about those situations, which are relevant for disaster management. This goal has to be achieved for different stakeholders in different phases of the disaster management cycle.

The main operational goal is thus to identify and assess situations, according to pre-defined types of situations and rules.

Situation awareness is "knowing what is going on around oneself."

Situation awareness depends on the integration of a (large) number of information from different sources and to evaluate these in different levels of detail. This process is usually called information fusion. Information fusion is at the heart of the CSA.

CSA vision

The CSA supports disaster management processes with information provision

- relevant for the current situation and the corresponding tasks of the user
- integrated into seamless view
- communicated in an easily understandable manner.

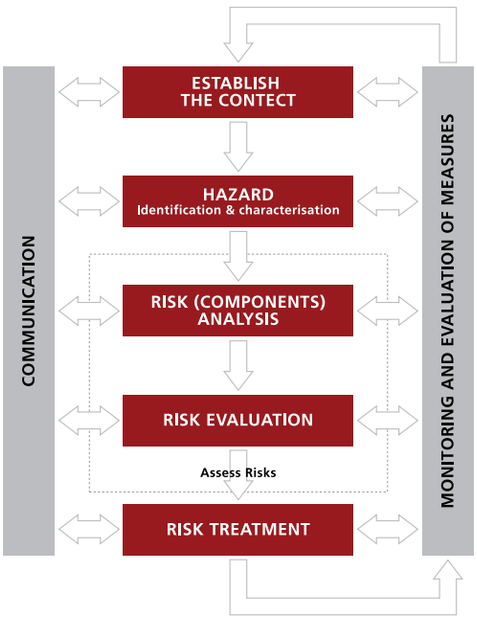

Figure 1: CSA tasks

The tasks, which can be handled by the CSA, can be structured according to the disaster management work-flow (as shown left).

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CSA usage scenario

The use of this risk management steps within the CSA can be shown with a typical initial usage scenario of a disaster management officer:

RISK MANAGEMENT STEP	USER ACTIVITY	CSA
ESTABLISH THE CONTEXT	Define temporal filter: CURRENT Define spatial filter: LOWER AUSTRIA Choose hazard type: FLOOD Choose task: OBSERVE SITUATION	Show overview maps with status on different (administrative) levels List relevant documents (regional contingency plan…)
HAZARD IDENTIFICATION	View information describing the hazard to be observed	Relevant Gauges and their history + weather information services
HAZARD ASSESSMENT	Identify hazard scenario – usually pre-defined scenarios	Situation assessment – rule engine • Current situation • Near-term forecast • Mid-term forecast
RISK ANALYSIS	Show elements at risk. Classify and evaluate elements at risk.	Maps with elements at risk, classified
RISK EVALUATION	Identify risk scenarios	Situation assessment – rule engine ALERT Situation
RISK TREATMENT	According to work-flows of contingency plan: Check measures (checklist) and choose/implement measures	Propose measures according to contingency plan: • Alert on district level • Pre-information to stakeholders • Intensify monitoring

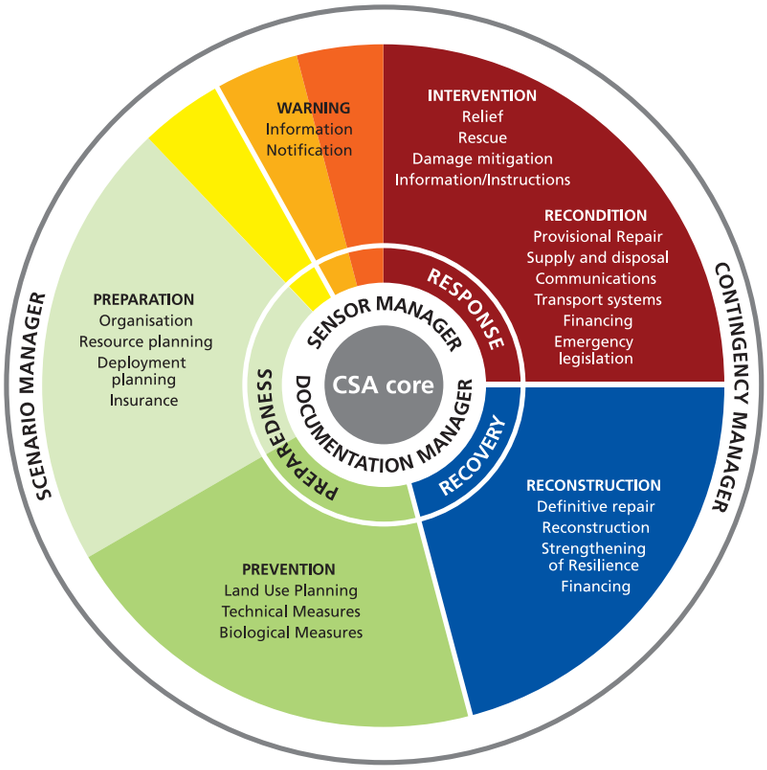

Figure 2: CSA – components and their role in disaster management

CSA technology

OPEN STANDARDS
The MONITOR II CSA is a series of software components, which allows the easy integration, presentation and use of disaster management information. The CSA supports the information needs of different phases of the Disaster Management Cycle.

The system architecture of the CSA takes into account the existence and well established use of legacy systems. This means that the components of the CSA follow some design rules:

- they are standards based, supporting OGC standard (like WMS, WFS or Sensor Web) and INSPIRE whereever feasible;
- they define open service oriented interfaces, allowing to integrate them with other components;
- their functionality is encapsulated so that they function indepently of specific other components and/or information sources;
- their modular design ist defined on thematic and interoperable units.

The CSA is designed to store event data in a special CSA database. Object data – like buildings or roads – are assumed to be stored in the local, regional or national GIS.
The CSA can use these object data directly if they conform to the thematically corresponding INSPIRE implementation rules. Otherwise a transformation of data is necessary.

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INTERACTION WITH OTHER SYSTEMS
MONITOR II project is well aware of the fact that partners and potential users have developed a number of well established systems. These systems have been built with considerable costs and many users are accustomed to using them.

The consequences from this are
- MONITOR II CSA provides solutions only as a complement to existing systems
- MONITOR II CSA builds strongly and is dependent on interactions with existing and planned systems

LEVELS OF INFORMATION INTEGRATION
The CSA defines different levels of information integration
- visual integration by overlaying information sources into one common image (map)
- functional integration by using external functions (like simulation models) and integrating only the results of this
- full integration of data and data processing within CSA.

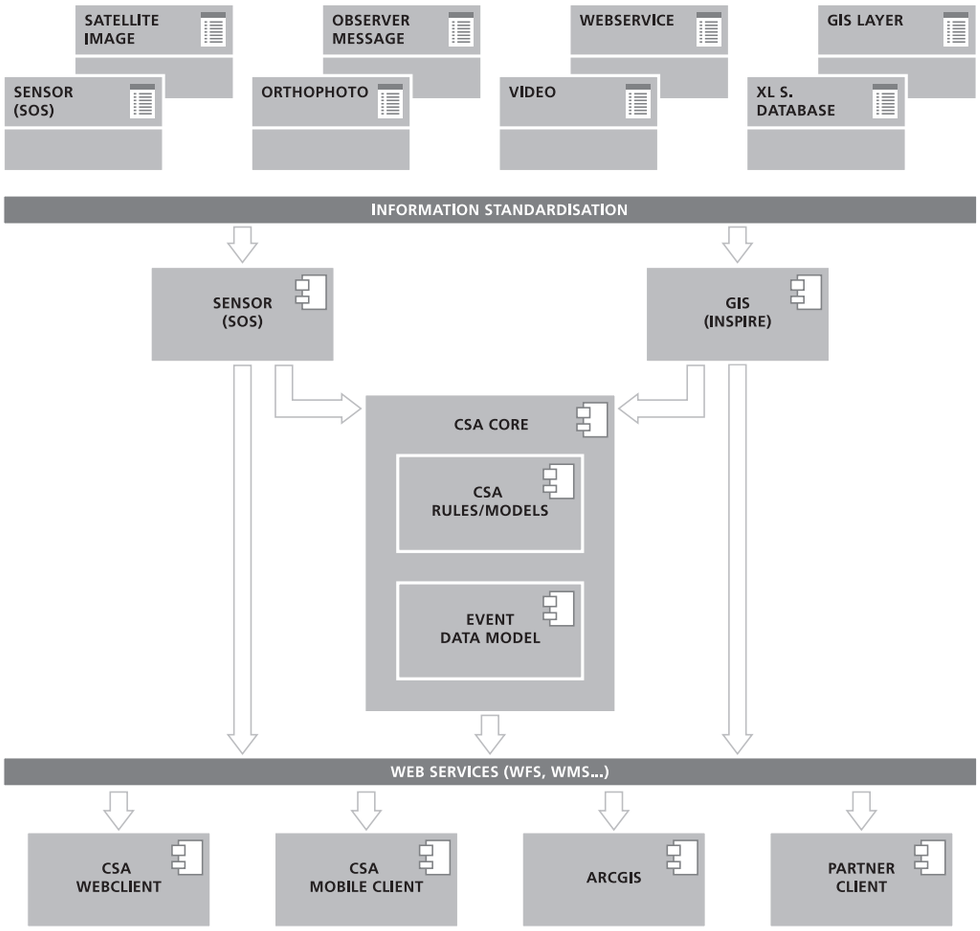

Figure 3: MONITOR II CSA – simplified system architecture

Scenarios of use

Some example scenarios can describe the use of the CSA:

- Scenario 1: Seamless integration of internal and external information sources (weather services, meteo data, gauge data)
- Scenario 2: Work-flow definition and enactment (formalising a contingency plan) – use the contingency plan for pre-alert and alert in case of floods
- Scenario 3: Situation identification (rule based) and work-flow support for alerting and alarming in case of landslide-blocking a relief relevant transportation route

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Scenario manager

The scenario manager represents work-flows and uses (at least) the following elements as "process nodes":

- natural processes
- measures (and – depending on the measures defined – the possible processes, which are influenced/changed by these measures)
- damages

Endangered objects may be linked to processes (exposition). The scenario manager is intended to describe general models of natural (disaster) processes and shows the resulting damages depending on the measures taken. It provides a means for communicating the results of hazard assessment (e.g. hazard mapping) to a broad community of non-hazard-experts.

The scenario manager has been implemented as an ESRI geodatabase, allowing to structure information in a GIS related to hazard scenarios, potential damages and measures as well. Thus hazard scenarios and the measures of contingency plans can be managed together in one database.

This structure helps to standardise scenario information and makes hazard information easily exchangeable and communicable.

Usage prototype

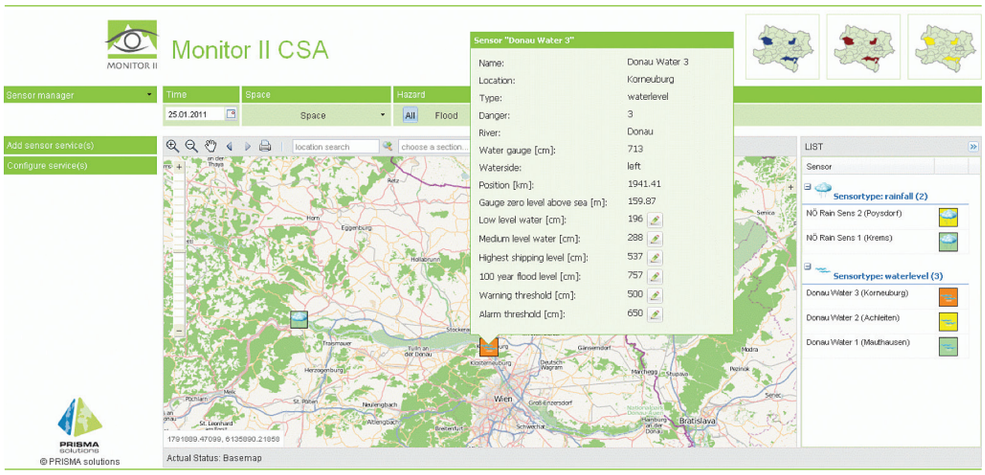

Figure 4: Visualise and query sensor information with the sensor manager

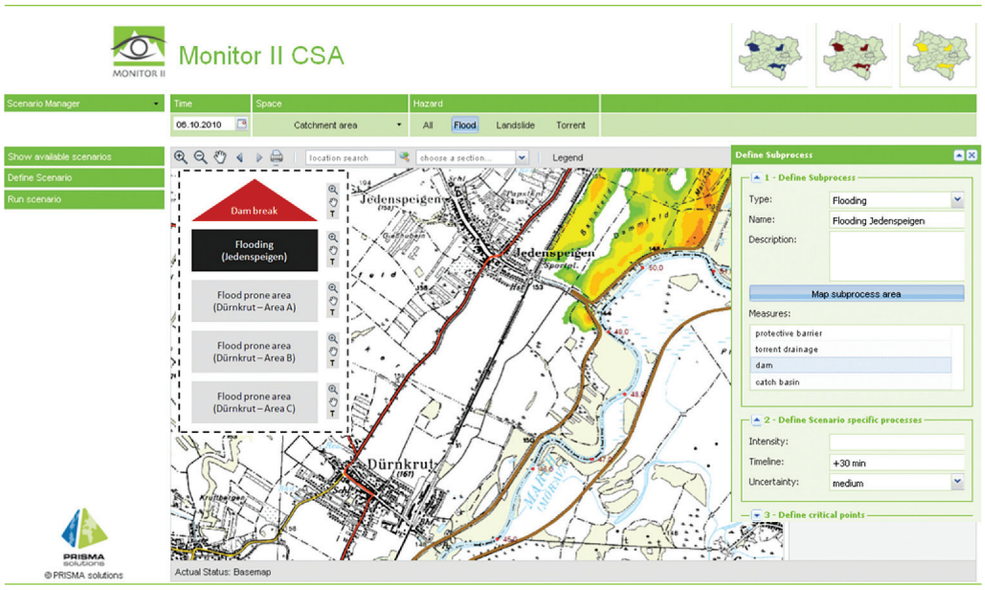

Figure 5: Define a scenario with the scenario manager

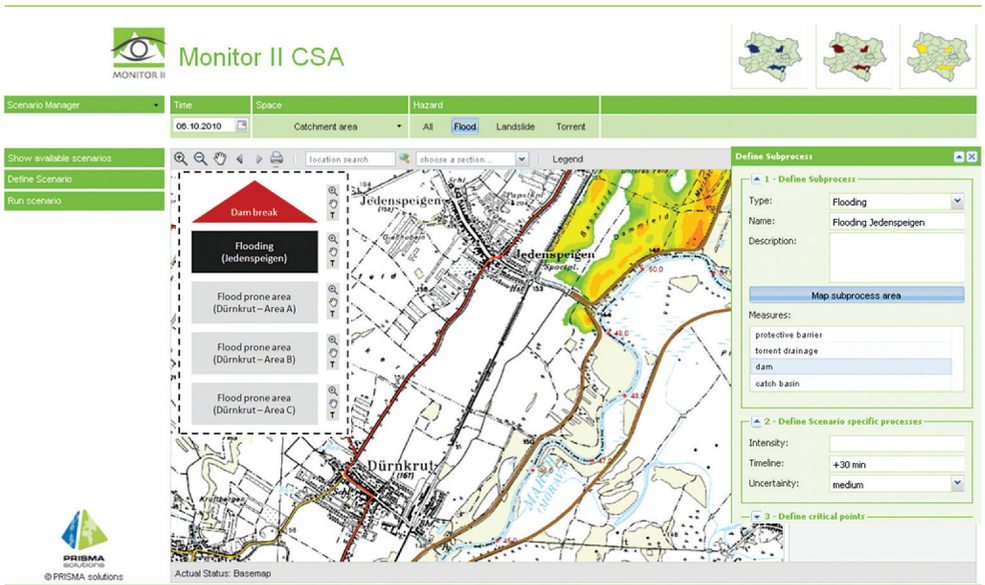

Figure 6: Document the development of an event with the documentation manager

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Example work-flow

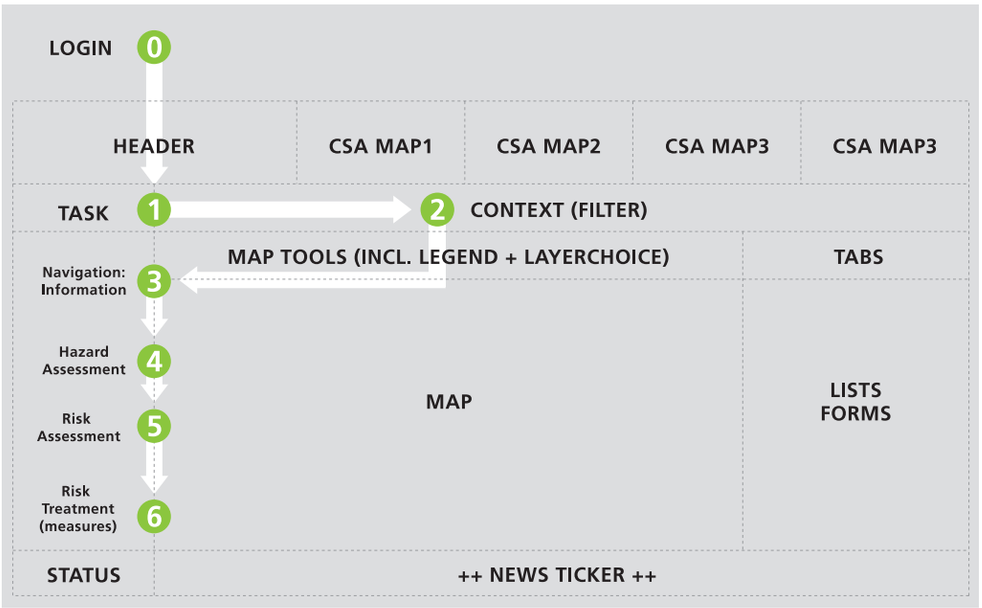

Figure 7: User interaction work-flow

STEP	DESCRIPTION
0: LOGIN	User and role → define together possible tasks, navigation structure, possible filters (area, hazards)
1: TASK	Choose your task at hand → defines navigation and possible filters
2: CONTEXT DEFINITION	Define the time, space and theme (e.g. hazard) of interest → restrict your data in map/lists…
3–6: DO IT (in the navigation)	Use the navigation to do your work → define information you view in map, lists, forms, graphs
WORKBENCH	Continously view your data in the workbench, with maps and lists
CSA MAPS 1-N	Continously view shortcuts to relevant overview data; e.g. weather forecast, weather warnings, traffic information, alarm situation in the area…
STATUS	Continuously observe the functioning of your systems (e.g. are all monitoring data sources online and working)
NEWS TICKER	Continuously monitor the most important information (messages), which you have subscribed to

Figure 8: Prototype example work-flow

MONITOR II Partners

Lead Partner

BMLFUW
Federal Ministry of Agriculture, Forestry,
Environment and Water Management,
Forest Department
Vienna, Austria
www.lebensministerium.at

Project Partners

02 OEBB
Federal Railways Railnet Austria Inc.
Railway Services
Natural Hazards Management
Vienna, Austria
www.oebb.at

03 PUH
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04 UL-FGG
University of Ljubljana
Faculty of Civil and Geodetic Engineering
Ljubljana, Slovenia
www.fgg.uni-lj.si/kmte

05 BZ-CP
Autonomous Province of Bolzano South Tyrol
Department of Fire Control and Civil Protection
Bolzano, Italy
www.provinz.bz.it/zivilschutz

06 ROMSILVA
National Forest Administration
Development Department
Bucharest, Romania
www.rosilva.ro

07 UNIMORE
University of Modena and Reggio Emilia
Department of Earth Sciences
Modena, Italy
www.terra.unimore.it

08 DAG
State Forestry Agency
Sofia, Bulgaria
www.dag.bg

11 IMIBAS
Institute of Mathematics and Informatics
at the Bulgarian academy of Sciences
Sofia, Bulgaria
www.math.bas.bg/index.html

12 REMTH
The Hellenic Republic
Region of East Macedonia – Thrace
Komotini, Greece
www.remth.gr

13 OTRG
Office of the Tyrolean Regional Government
Regional Forestry commission (public)
Innsbruck, Austria
www.tirol.gv.at/wald

10% Project Partner

UNIBG
(financed by Lead Partner)
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Faculty of Forestry
Department of Ecological Engineering in Soil
and Water resources Protection
Belgrade, Serbia
www.sfb.bg.ac.yu

MONITOR II within the South East Europe programme

The South East Europe programme (SEE) is a unique instrument which, in the framework of the Regional Policy's Territorial Cooperation Objective, aims to improve integration and competitiveness in an area which is as complex as it is diverse.

The programme is supporting projects developed within four Priority Axes: Innovation, Environment, Accessibility, and Sustainable Growth Areas - in line with the Lisbon and Gothenburg priorities, and is also contributing to the integration process of the non-EU member states.

More information about MONITOR II and SEE:

www.monitor2.org, monitorii@prisma-solutions.at

www.southeast-europe.net