TRICDEC³

Collaborative, Complex and Critical
Decision-Support in Evolving Crisis

Facts

- ICT Call 5: Intelligent Information Management
- Acronym: TRIDEC
- Reference: 258723
- Start Date: 01.09.2010
- End Date: 31.08.2013
- Duration: 36 months
- Contract Type: Collaborative Project - IP
- Costs: 8.9 million €
- Funding: 6.79 million €
- 10 Partners
- Coordinated by GFZ German Research Centre for Geosciences Potsdam

The Challenge

- TRIDEC focuses on new technologies for real-time intelligent information management in collaborative, complex critical decision processes in earth management.

Objective ICT-2009.4.3: Intelligent Information Management

Collaboration and decision support: *efficient and dependable problem solving and* <u>*decision support systems for critical, information-bound domains*</u> *in which our ability to share and exploit information is outstripped by the rate of its growth in size and complexity. Intended beneficiaries include organisations with* <u>*complex business processes*</u> *and access control policies; scientific communities collaborating on challenging projects and building* <u>*very large datasets*</u>*; teams of professional creators working on complex designs or multimedia materials; and web communities with sophisticated cooperation needs. The effectiveness of such solutions will be* <u>*tested against the requirements of the respective groups or communities*</u>*.*

TRIDEC Project History

http://www.tridec-online.eu/
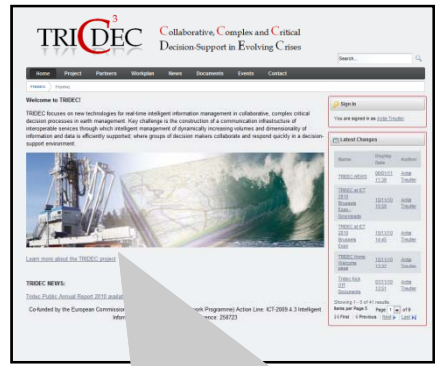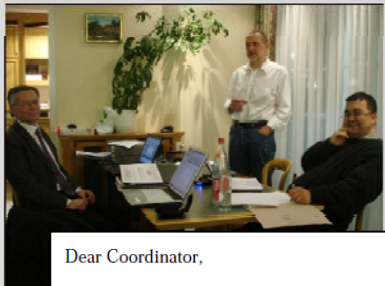
Dear coordinator,

We are inviting you to connect to NEF for the project TRIDEC - Collaborative, Complex and Critical Decision-Support in Evolving Crises.

Dear Coordinator,

Subject: Invitation to attend an evaluation hearing relating to your proposal submitted to call FP7-ICT-2009.4.3

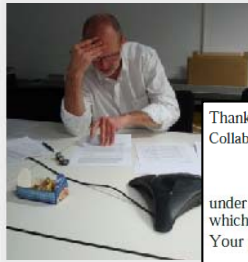Proposal: 258723 TRIDEC

01.09.2010 Start of TRIDEC

Negotiation Phase

19.02.2010:
- Negotiation Mandate
- Invitation to NEF

19.03.2010:
Negotiation meeting Luxembourg

04.05.2010 NEF session successfully closed

24.08.2010
TRIDEC Grant Agreement signed by the EC

Hearing
13.01.2010
Luxembourg

FP7-ICT-2009-5
Challenge 4: Digital Libraries and Content
ICT 2009.4.3 Intelligent information management (CP, NoE, CSA)

Proposal deadline
26.10.2009 +1

ICT Call 5 (call identifier FP7-ICT-2009-5): Following technical difficulties which lead to a brief loss of the EPSS service earlier today, the **deadline for ICT call 5 has been extended** by 24 hours, to 17h00 Brussels time on Tuesday 27th October.

ICT Call 5 published 30.06.2009

Thank you for submitting your proposal   TRIDEC
Collaborative, Complex and Critical Decision-Support in Evolving Crises

under the call FP7-ICT-2009-5
which has been recorded as having arrived on   27/10/2009 16:43:01
Your proposal has been given the following reference number:

Proposal reference number: FP7- 258723

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TRIDEC Partners

- Helmholtz Centre Potsdam GFZ - German Research Centre for Geosciences *(Germany)* Centre for GeoInformation Technology
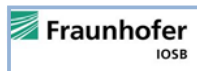
- University of Southampton, IT Innovation Centre *(United Kingdom)*

- Queen Mary and Westfield College, University of London - Department of Electronic Engineering *(United Kingdom)*

- JOANNEUM RESEARCH Forschungsgesellschaft mbH - DIGITAL - Institute of Information and Communication Technologies *(Austria)*

- IOSB - Fraunhofer-Institute of Optronics, System Technologies and Image Exploitation *(Germany)*

- TDE Thonhauser Data Engineering GmbH *(Austria)*
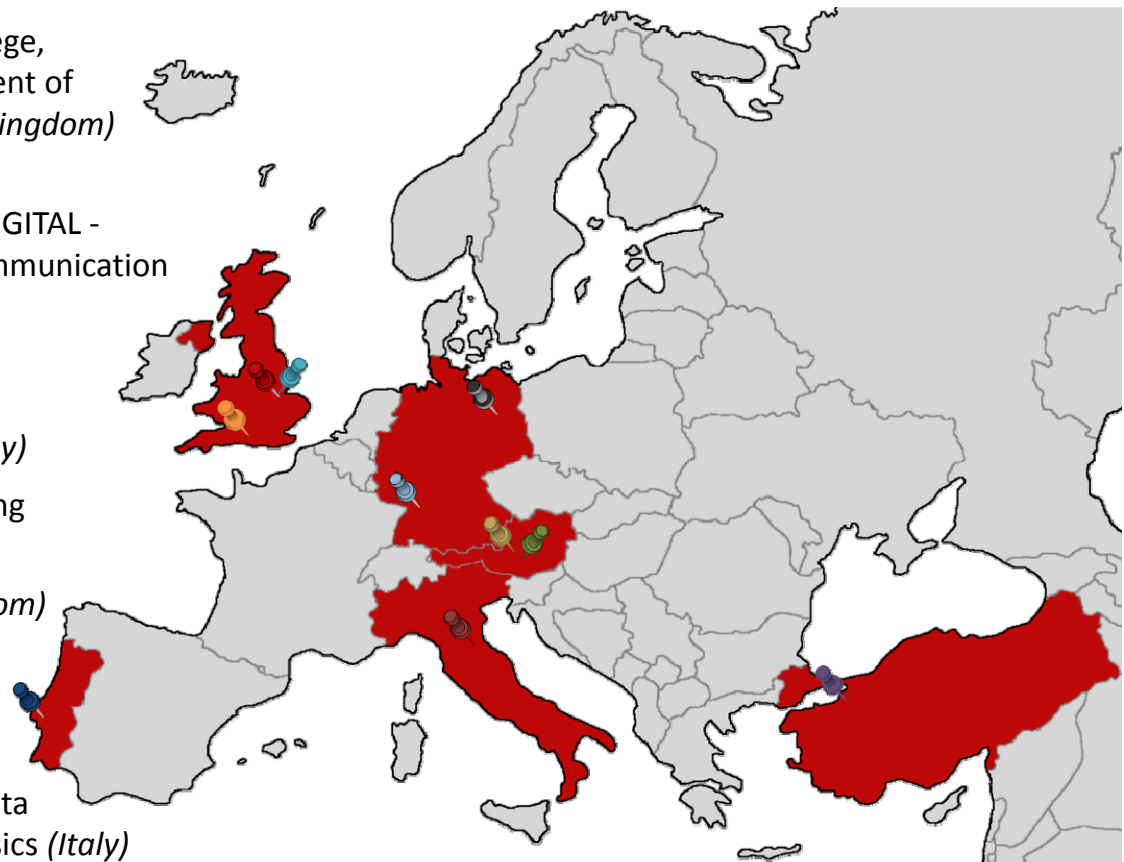
- Q-Sphere Limited *(United Kingdom)*

- Instituto de Meteorologia, I.P. - Departamento de Sismologia e Geofísica *(Portugal)*

- Alma Mater Studiorum- Universita di Bologna - Department of Physics *(Italy)*

- Bogazici Universitesi - Kandilli Observatory and Earthquake Research Institute *(Turkey)*

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Key Software Development Tasks

- A communication infrastructure of interoperable services for the intelligent management of dynamically increasing volumes and dimensionality of information.

- A robust and scalable service platform supporting the integration and utilisation of existing and- growing resources such as sensor systems, geo-information repositories, simulation-, and data-fusion-tools.

- A knowledge-based service framework for context information and intelligent information management with flexible orchestration of system resources.

- An adaptive framework for collaborative decision making with the support of complex business processes and workflows.

Demonstration in Two Real-World Scenarios

- Tsunami Early Warning System (Natural Crisis Management)

- Drilling Operations (Industrial Subsurface Development)

Damages by tsunami: City of Conception, Chile imaged on January 10th 2010 (left) and on February 27th 2010 (right) by the RapidEye satellite constellation. The right image was taken eight hours after an earthquake of magnitude 8.8 had occured and the resulting tsunami had affected the shoreline.
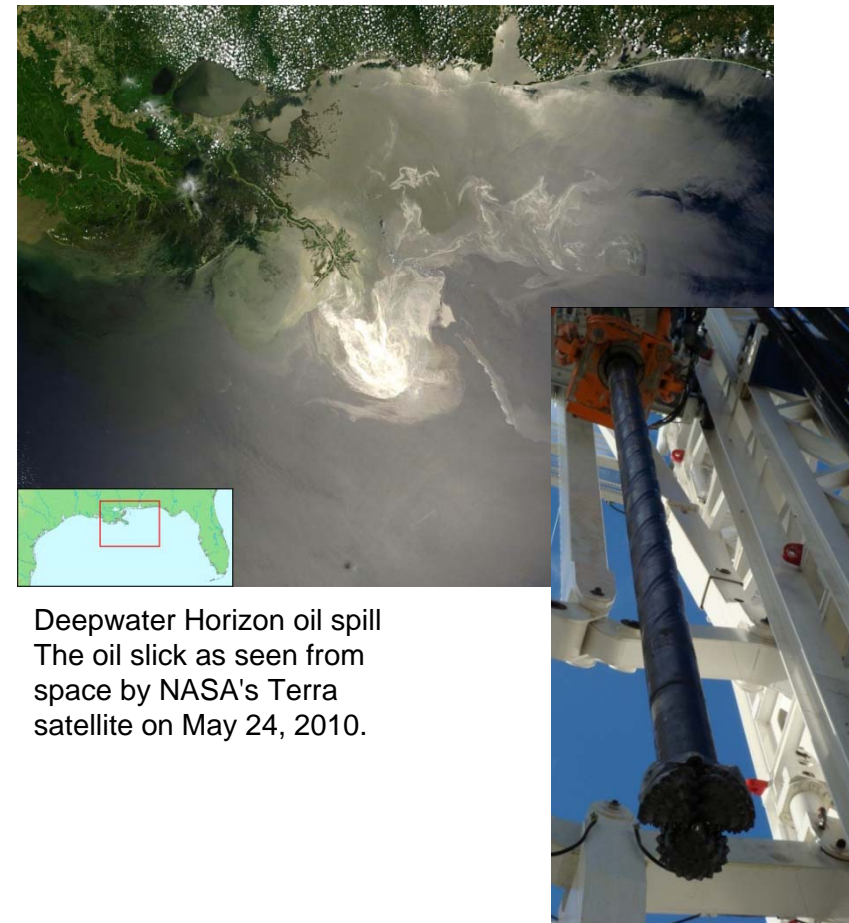
Deepwater Horizon oil spill The oil slick as seen from space by NASA's Terra satellite on May 24, 2010.

Challenges in Software Architecture

- Collaborative decision making with the support of complex business processes and workflows
- Collaboration in very loosely coupled, distributed systems
- Synchronisation of complex business processes
- Complex event processing
  - Data quality and reliability
  - Filtering and aggregation of events
  - Knowledge base with context information e.g. sensor data, geo-information repositories, historic events
  - What-if calculations supported by simulation components

Tsunami Scenario

Drilling Scenario

TRIDEC components

Access for Operators on Duty
Command and Control User Interface (CCUI)

Decision Support

Data Enrichment
"Data to knowledge"

Filtering and Aggregation
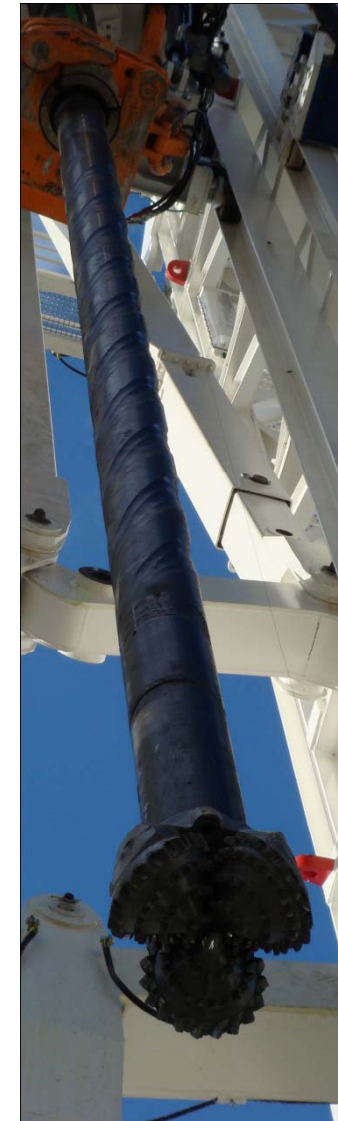Data Mining and Data Fusion

Transformation: Data Standardisation
Features and SWE connectivity,
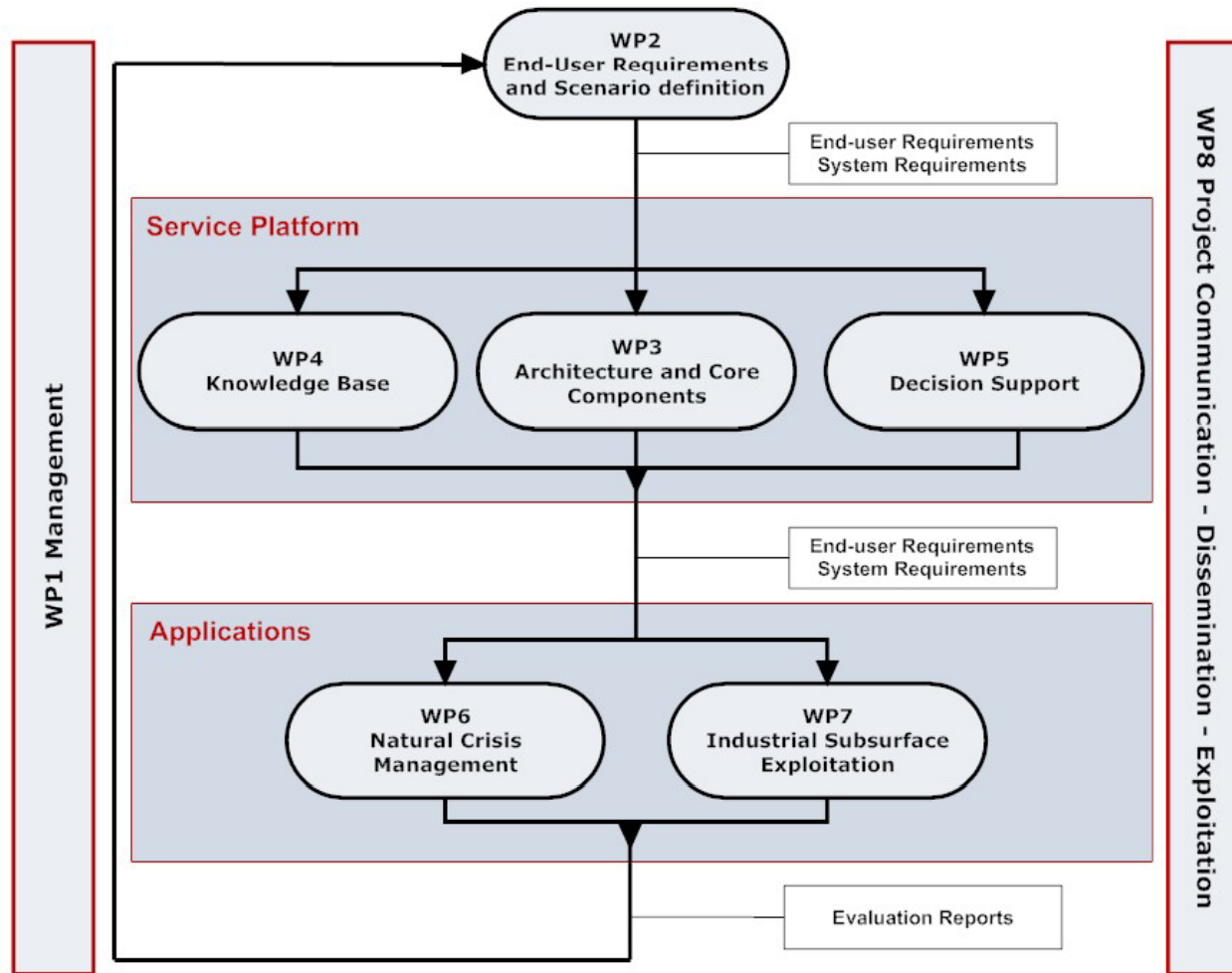OGC Services: WNS, SOS, SAS, SPS

Resources/Sensors
Virtual Sensor Network, Unconventional Sensors,
Partner Sensor Networks, Observations

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TRIDEC Workpackage Structure

WP1 – Management & Coordination

This work package encompasses the management, co-ordination and quality assurance activities of the project.

Additionally, it will include the advice and influx of knowledge from external sources, like the needs of the markets and the involved countries, as well as the involved supranational bodies (IOC, UNESCO) through the inclusion and management of scientific and technical advisory boards.
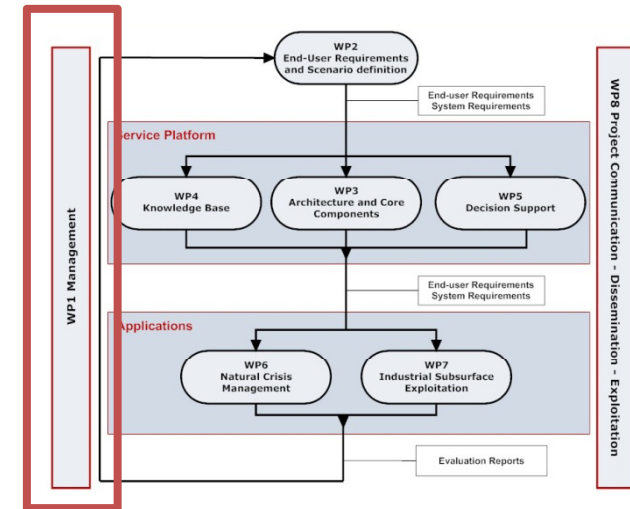
WP2 – End-User Requirements and Scenario Definition

WP2 provides the basis for the target-oriented design and development of core components, knowledge base, and decision support services (WP3, WP4, WP5) as well as application systems (WP6, WP7).

In a first step the legal, administrative, and economic will be identified for the two scenarios and scenarios the relevant stakeholders will be identified.

Business processes and interactions will be explored as well as the legal framework based on public legislation.
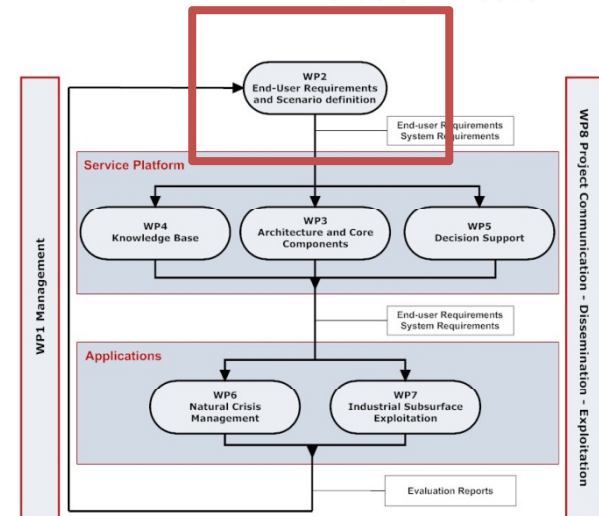
WP3 – Architecture and Core Components

WP3 is focused on the conception, design, and specification of the scalable, robust and resilient TRIDEC collaboration platform.

This core infrastructure for the TRIDEC system uses hybrid design principles of Service Oriented Architecture (SOA), elements of an Event-Driven Architecture (EDA) and a Multi-Media-Streaming Architecture (MMSA).

The development work requires close interaction with TRIDEC technology implementation WP's (WP4: Knowledge-base, and WP5: Service Orchestrations and Decision-Support) as well WP2 on User Requirements.
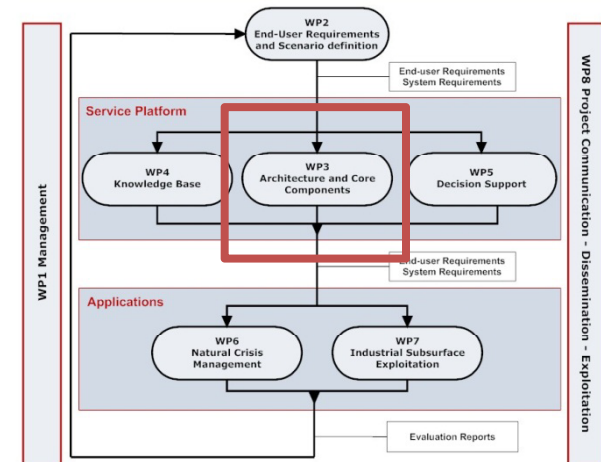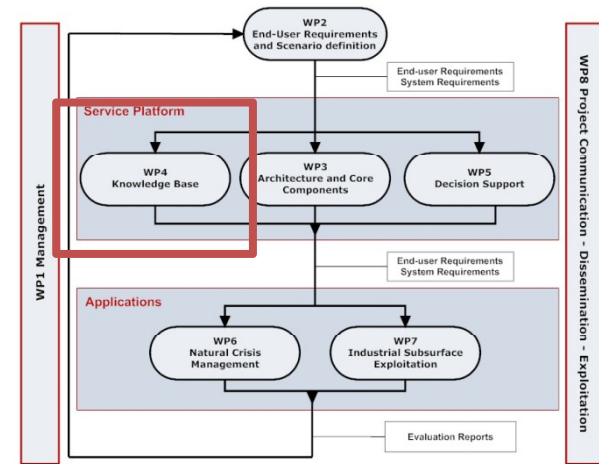
WP4 – Knowledge Base

WP4 develops a knowledge-based service framework for TRIDEC. It provides intelligent processing capabilities that will add value to multiple distributed information feeds in an efficient, scalable and robust way.

TRIDEC knowledge-base services will be able to subscribe to continuous real-time information feeds, adopting flexible processing strategies (incremental, caching, batch processing etc.) according to the requirements of each actor and at each stage of the evolving events for decision-making.

WP5 – Services Orchestration and Decision Support Workflows

WP5 orchestrates the knowledge-based service framework. The tasks address the challenges in Decision-support:

- Scenario Decision-support (D-s) Requirements Analysis
- Specification of Thematic Models and Services for D-s Workflows
- Rapid Prototyping of D-s Services and Workflow Engine
- Development of the D-s and Workflow Management Infrastructure
- Adaptation/Enhancement of D-s Services for the Thematic Scenarios
- Use of existing sensor, video and semantic web standards for maximum services and data inter-operability.
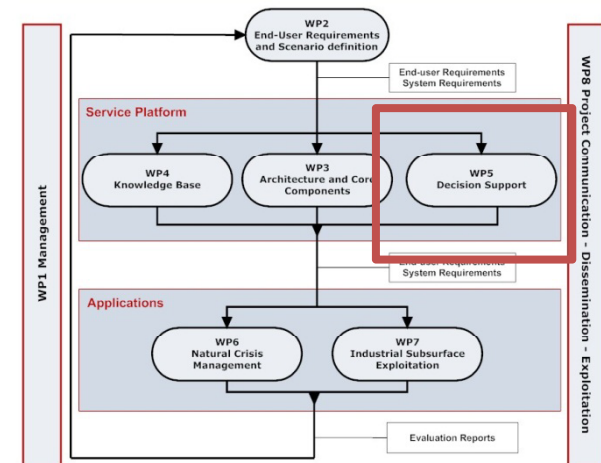
WP6 – Natural Crisis Management

WP6 develops the TRIDEC tsunami warning system. A decision support system will enable human experts to formulate and produce warning messages for different target/user groups. The system will also include the message logistics necessary to guarantee fast and secure delivery of the warnings.

The warning system will integrate the available real time sensor data, including seismometer networks, tide gauges, GPS stations, GPS buoys, ocean bottom units including pressure gauges. Additionally, bathymetric and topographic data sets, as well as precalculated or real-time simulations of coastal wave run-up will be used.
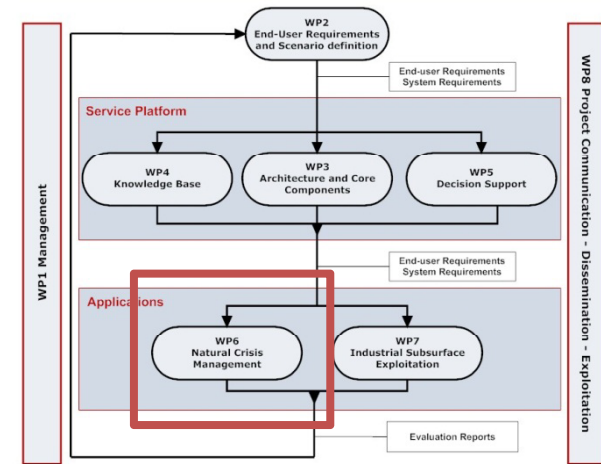
WP7 – Industrial Subsurface Development (Drilling)

WP7 provides the TRIDEC planning and drilling operation scenario. It includes a collaborative decision process by integrating the planning decision-support of geologic sites and real-time decision-support for drilling operations.
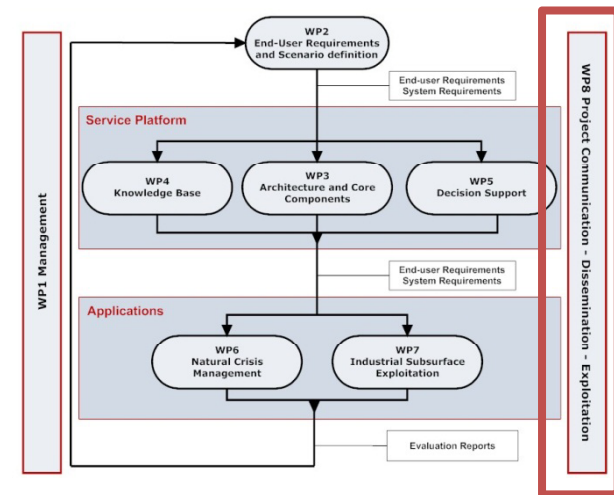
The system has to allow for evolutionary changes. It has to be adaptive as new plans of drilling sites are added, drilling rigs are moved to different locations, rigs are added, and the sensor setup is changed.
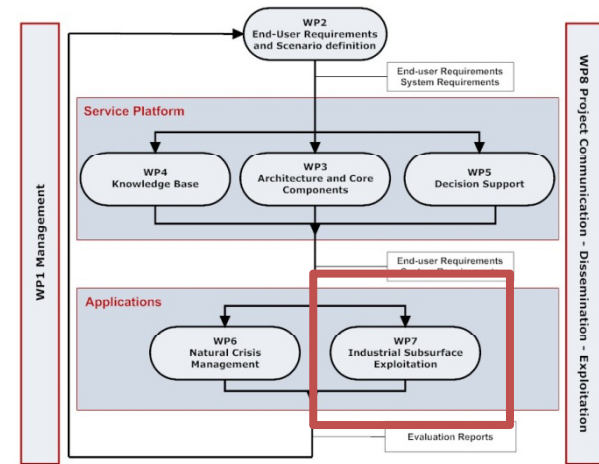
WP8 – Project Communication - Dissemination - Exploitation

This work package covers the tasks of

- **Project Communication,**

- **Dissemination, and**

- **Exploitation**

The following subtasks stand out:

- Transportation of the project achievements to the scientific and technical communities, policy makers and the general public

- Provision of project results for tertiary education to maximize long term impact for society.

- Development of a business strategy for commercial exploitation for both application fields