SEVENTH FRAMEWORK PROGRAMME (FP7)
SPECIFIC PROGRAMME 'COOPERATION' - ICT
THEME: INTELLIGENT INFORMATION MANAGEMENT (ICT-2009.4.3)
GRANT AGREEMENT NO: 258723

TRIDEC

COLLABORATIVE, COMPLEX AND CRITICAL DECISION-SUPPORT IN EVOLVING CRISES

Annual Public Report 2010

TRIDEC focuses on new technologies for real-time intelligent information management in collaborative, complex critical decision processes in earth management. Key challenge is the construction of a communication infrastructure of interoperable services through which intelligent management of dynamically increasing volumes and dimensionality of information as well as data is efficiently supported; where groups of decision makers collaborate and respond quickly in a decision-support environment. The research and development objectives include the design and implementation of a robust and scalable service infrastructure supporting the integration and utilisation of existing resources with accelerated generation of large volumes of data. These include sensor systems, geo-information repositories, simulation- and data-fusion-tools. TRIDEC involves 10 partners and will be concluded in August, 2013.

1 Summary of Activities

In the initial phase of the work, the TRIDEC consortium has essentially concentrated its efforts on three major topics:

1. Establishing the necessary structures and procedures for project management and project execution including the kick-off meeting and regular conference calls,
2. Strengthening collaboration and communication within the project by releasing the first version of the TRIDEC Project Portal. The portal will serve as central information hub for both public information and project information management. Functions include a central document store, wiki, message board and issue tracker.
3. Starting the elicitation and compilation of user and system requirements. Requirements provide the essential input for the design of the system and the development of the first application prototype scheduled for August 2011. Two project meetings dedicated to these topics have already been organised.

The achievements constitute the solid ground for the further elaboration of requirements thus providing the profound basis for a proper design and effective development of the first TRIDEC Demonstrator.

2 Important Working Areas

TRIDEC puts the focus on three core working areas: requirements engineering, design and system architecture, and the 1st TRIDEC Demonstrator.

2.1 Requirements Engineering

User and system requirements provide the essential input for system development activities, i.e. the design, specification, development, and deployment of the TRIDEC system. Additionally, requirements are the key reference for the validation of the software developed.

Requirements engineering in TRIDEC is considered a moderated communication process between, on the one hand, experts and stakeholders active in the respective application fields natural crisis management and subsurface exploitation, and IT experts responsible for the system design and development on the other hand. TRIDEC uses a defined process to support the elicitation and documentation of requirements. The process is based on a stepwise mapping of real world processes to concrete requirements and includes scenarios, user stories, and use cases.

Scenarios define relevant physical phenomena as well as their respective technological and organisational environment. A scenario includes one or more stories providing a description of the sequence and evolution of events. A story provides a small-scale understandable presentation of information and should help to understand what the system should accomplish. Individual stories can use different levels to describe the sequence and evolution of events, e.g. physical, sensor, system, and human interaction levels.

Sequences and evolution of events documented in scenarios and user stories have to be mapped and transformed to a description of the behaviour of future information systems. For this purpose, use cases are applied. A use case describes a process and its steps in detail

and represents a formal description of a system's behaviour as it responds to a request that originates from outside of that system. This technique is used to capture and document the system's behaviour.

2.2 Design and System Architecture

Design and system architecture specification form a key process within the TRIDEC project. Requirements of the application domains have to be mapped to system functionalities, technologies, and components creating the overall system architecture and interface specifications.

In a first step existing technological approaches will be analysed and evaluated. The consortium partners have started to compile their domain specific knowledge for the software design specification. This includes frameworks, technologies and paradigms in the field of service oriented architecture, complex event processing, knowledge bases, data mining, and service orchestration. Both application areas natural crisis and drilling are highly involved in this integration process and contribute models, simulation components for physical phenomena as well as data formats and specifications of existing systems.

In a second step this knowledge is applied to the development of a reference architecture including both an underlying sensor integration platform and an application framework. While the platform development is focussed on the seamless integration of complex heterogeneous sensor constellation into an event driven middleware, the application framework will provide service endpoints and notification systems for all kind of client technologies, such as rich clients or mobile applications.

2.3 First TRIDEC Demonstrator

The TRIDEC system and its novel features for the intelligent management of large volumes of information are demonstrated in two application fields for collaborative, complex and critical decision-support systems, the natural crisis management and subsurface exploration. A multiple demonstration of TRIDEC in different stages of the system development process is envisaged in order to guide the development process and to safeguard that the results meet the requirements of stakeholders and potential users.

The organisation of the system development process therefore is incremental and essentially follows a spiral type development model. Prototypes used for demonstration activities show an increasing complexity and functionality. This allows multiple validations of functions and system performance against the requirements. The demonstrations provide a framework for the discussions of results and the adequate refinement of requirements.

The first TRIDEC Demonstrator is scheduled for August 2011 and will focus on natural crisis management in case of tsunami. The demonstration activities have to be carefully planned and prepared. One task is the preparation of data about the structure and components of sensor networks to be integrated. Another important activity is the pre-calculation of virtual events including e.g. seismic and tide gauge data. These simulated events are necessary to trigger system activities relevant for the demonstration of its decision support capabilities similar to natural, historic event series. Additionally, what-if calculations based on simulated tsunami propagation models will play an important role for the demonstration of decision

support functionality. These virtual, pre-calculated data sets will become an important component of the TRIDEC knowledge base.

3 User Involvement, Promotion and Awareness

User involvement is important for the design, development, and validation of the TRIDEC system. The consortium has already started to create a network of authorities and industry partners as well as research institutions. In order to initiate a communication and exchange process with other projects funded in the 7th Framework Program TRIDEC participated in the Networking Session "Web of Events - Challenges and Opportunities for the Event-driven World" at ICT 2010 on 27th September 2010 in Bruxelles. Overall promotion and awareness efforts as well as dissemination activities will be intensified as soon as project results become available.

4 Future Work

In the first year the main focus of TRIDEC is on the collection of proper requirements and the development of a TRIDEC prototype that is already capable of demonstrating basic features of TRIDEC. The review of user and system requirements and the draft system design mean an important internal milestone. Both, requirements and design, will be presented to the TRIDEC Advisory Board consisting of information technology experts and representatives from the respective application fields natural crisis management and subsurface exploitation and discussed extensively. After passing this milestone, TRIDEC will focus on the development of system components and the preparation of the first demonstrator.

5 Further Information

Further information and up to date status reports may be obtained by consulting the TRIDEC website at http://www.tridec-online.eu or contacting us at tridec-contact@gfz-potsdam.de.

5.1 Consortium

The TRIDEC Consortium includes following ten partners:

Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, CeGIT Centre for GeoInformation Technology (Germany) http://www.gfz-potsdam.de/

University of Southampton, IT Innovation Centre (United Kingdom) http://www.it-innovation.soton.ac.uk/

Queen Mary and Westfield College, University of London - Department of Electronic Engineering (United Kingdom) http://www.elec.qmul.ac.uk/

Joanneum Research Forschungsgesellschaft GmbH – Institute of Information Systems & Information Management (Austria) http://www.joanneum.at/en/digital.html

Fraunhofer - IOSB - Fraunhofer-Institute of Optronics, System Technologies and Image Exploitation (Germany) http://www.iosb.fraunhofer.de/servlet/is/6974/

TDE Thonhauser Data Engineering GmbH (Austria) http://www.tde.at/

Q-Sphere Limited (United Kingdom) http://www.q-sphere.com/

Instituto de Meteorologia, I.P. - Departamento de Sismologia e Geofísica (Portugal) http://www.meteo.pt

Alma Mater Studiorum - Universita di Bologna – Department of Physics (Italy) http://www.df.unibo.it/

Bogazici Universitesi - Kandilli Observatory and Earthquake Research Institute (Turkey) http://www.koeri.boun.edu.tr/eng/topeng.htm

5.2 Coordinator

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