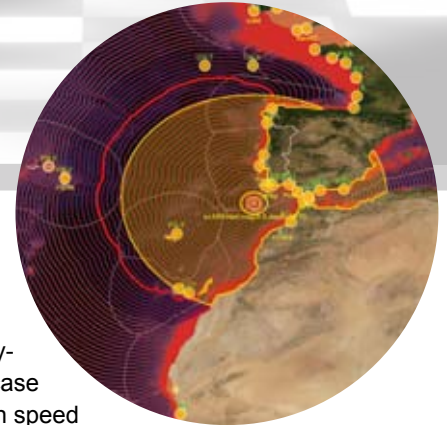


TSUNAMI EARLY WARNING SYSTEM

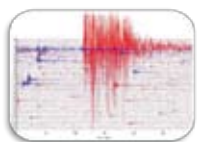


MANAGING TSUNAMI HAZARD WITH THE TRIDE³DEC SYSTEM

TRIDE³DEC is the European response to impending tsunami events which have threatened the nations around the Mediterranean Sea for many centuries. Tsunami early warning systems relying on seismic and oceanographic sensor platforms are the key to saving lives and property in case of stronger earthquakes in the marine realm close to shore regions. Through TRIDE³DEC, very high speed decision making becomes possible in complex and critical geological hazard scenarios. Based on the design and implementation of a unique collaboration infrastructure addressing interoperable services, TRIDE³DEC supports intelligent management of information and data increasing both in terms of size and dimensionality in a highly efficient manner. The latest progress in early warning system design is achieved by means of a core of software technologies for intelligent geo-information management, collaborative computing techniques and the enhancement of the interoperability of system components. A collaborative decision support environment enables decision makers in different regions and locations to generate or relay alerts and alarms, appropriate and custom designed to fit their national or regional requirements. Created by a European consortium in the scope of the 7th EU Framework Programme, the TRIDE³DEC tsunami warning software is freely available for governmental agencies, related monitoring institutions, and warning authorities.



The TRIDE³DEC software system supports the overall monitoring and warning process of tsunami. The system is designed for the 24/7 surveillance in 4 layers:



1. Monitoring:

Digital sensor data and information is delivered by broadband seismic networks, strong motion accelerometers, ocean bottom seismometers and pressure measuring devices, GPS-buoys, tide gauges, in various formats and different channels through national and international sources.



3. Detect and Define affected Areas:

TRIDE³DEC defines the shore areas to be affected by the tsunami, calculates the probable run up heights in the various shore regions, and provides the different arrival time ranges as well as necessary alert levels for the predicted geographical units based on the best fitting forecast.



2. Forecasting:

The fast influx of new data enables the operators to analyse the most critical parameters immediately. Most crucial information is provided by the analysis of the earthquake focal mechanism: Did the earthquake generate a tsunami? Where and when did it happen? The incoming data merged with known geo-information and simulations allow for a first stage estimate of the event.



4. Warning Dissemination:

TRIDE³DEC offers various case specific routines for the generation and controlled dissemination of alerts and warnings, through a wide variety of channels, e.g., sirens and PA systems, SMS, e-mail, fax, radio and broadcasting services focused on the different user groups like police and fire departments, civil protection, governmental agencies or schools, hospitals and other specific stakeholders. Messages essentially follow the Common Alerting Protocol (CAP).

The TRIDEC Perspectives – Key to event detection, monitoring and warning processes



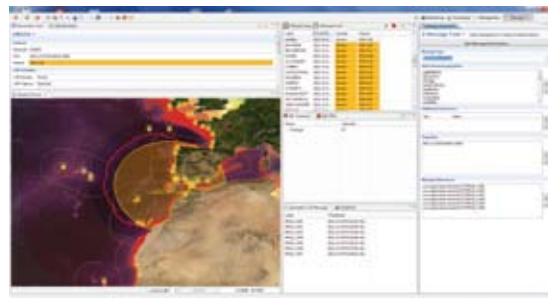
Monitoring Perspective: Continuous observation of in situ-sensor systems (seismic, oceanographic, GPS etc.)



Forecasting Perspective: Incoming data match with simulation



Detect and Define affected Areas: Calculation of the estimated arrival time, wave height and alert level



Warning Dissemination Perspective: Generation of messages and dissemination over different channels like e-mail, sms, fax, ftp, ...

System Requirements

Server:

- 3 virtual server, each with
 - minimum 2 cores
 - minimum 2GB RAM
 - 20GB hard disk storage
 - Linux 64Bit (Ubuntu or Debian)

Client:

- Linux Ubuntu or Windows 7 64 bit
- minimum 4 GB RAM
- minimum 2 cores
- Display: 2 WUXGA (1920 x 1200)

Configuration of the TRIDEC System

The configuration includes the connection to various available sensor platforms, e.g. seismic systems, tide gauges, GPS stations, bouys, ocean bottom instrumentation. The Command and Control User Interface (CCUI) is configured to integrate spatial data infrastructure, WMS, WFS, administrative boundaries, and costal forecast zones. Additionally, different user groups/recipients in national and international domains are connected.

Installation and Support

Installation on site is performed by the TRIDEC consortium. The package includes editing and creation of tailor-made messages (contents / languages), the set up of warning dissemination channels, e.g. e-mail, fax, sms, sirens, broadcasting, and finally the integration of the national system into international warning networks.

On Site Instruction and Training

On site instruction for the warning centre personnel on the system use and maintenance will be provided by the TRIDEC consortium. Additionally, several schemes of training courses ranging from earthquake hazard assessment up to system usage and adaptation or software enhancement are available and can be booked with the TRIDEC consortium partners.



TRIDEC is based on the development of the Distant Early Warning System (DEWS) and the German Indonesian Tsunami Early Warning System (GITEWS) providing a service platform for both sensor integration and warning dissemination. In TRIDEC new developments in Information and Communication Technology (ICT) are used to extend the existing platform by introducing a component-based technology framework for building distributed tsunami warning systems for deployment, e.g. in the North-Eastern Atlantic, the Mediterranean and connected Seas (NEAM) region.

web: www.tridec-online.eu
 e-mail: tridec-contact@gfz-potsdam.de

