Capacity Building and the Role of INCO Partners

The philosophy and approach of the DEWS project is based on a technical and methodical two-way transfer of knowledge and know-how between partners. The results and experiences will be swiftly transferred to tsunami prone areas in Europe. A long term implementation of a professional education scheme for early warning systems engineering contributes a corner stone in DEWS.

The goal is a joint international tertiary education curriculum for early warning system engineers and managers. Conceptual papers and curricular materials are prepared in a modular form and provided in a knowledge platform. Materials will be published in English, Bahasa, Thai, Tamil, and Singhalese. Moreover, leading universities of Indonesia, Thailand and Sri Lanka are prominently involved in the DEWS project to guarantee the development of persistent and sustainable structures.

Beyond the scientific, technical and structural developments, main issues tackled in the scope of the project are:

- Open service oriented architectures for early warning systems
- Integration concepts for heterogeneous sensor systems
- Standardisation of warning message generation in a multi-lingual environment
- Warning message dissemination and information exchange in a regional environment via multiple telecommunication channels
- Vocational Training and Tertiary Education for the purpose of long term maintenance and further system development
- Financing of regional and worldwide warning systems and tsunami insurance


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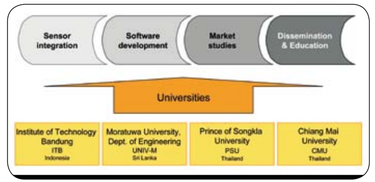

The Role of INCO Partner Universities


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DEWS Partners

Atos Origin S.A., Spain	Seismological Bureau, Thailand
Deutsches Geo-Forschungs-Zentrum - GFZ, Germany	Citizen Alert Services BV, Netherlands
Engineering Ingegneria Informatica S.p.A., Italy	National Research Centre for Earth Science and Disaster Prevention, Japan
ELSAG DATAMAT S.p.A., Italy	Swedish Rescue Services Agency, Sweden
Institute of Geological and Nuclear Sciences, New Zealand	Alma Mater Studiorum-Universita di Bologna, Italy
Geological Survey and Mines Bureau, Sri Lanka	National Disaster Warning Centre, Thailand
Teknillinen korkeakoulu Helsinki University of Technology, Finland	Badan Meteorologi dan Geofisika, Indonesia

Disaster Management Centre, Sri Lanka	Bandung Institute of Technology, Indonesia
University of Moratuwa, Sri Lanka	Prince of Songkla University, Thailand
Chiang Mai University, Thailand	Department of Disaster Prevention and Mitigation, Thailand

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Distant Early Warning System for Tsunami


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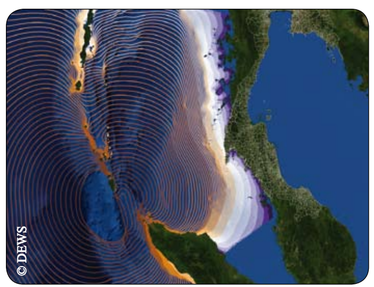
SIXTH FRAMEWORK PROGAMME

www.dews-online.org
www.dews-conference.org

Specific Targeted Research Project
Proposal No: 045453

Banda Aceh after the tsunami



Simulation of the tsunami event

One of the great scientific, technical and social challenges resulting from the Indian Ocean Tsunami event of 2004 is the development of a cross border regional tsunami warning system in order to enable the nations around the Indian Ocean to improve the disaster resilience of their societies. The DEWS project, partly funded under the 6th Framework Programme of the European Union, has the objective to create a new generation of interoperable tsunami early warning systems based on an open sensor platform. This platform integrates sensor systems for the rapid detection of earthquakes, for the monitoring of sea level, ocean floor events, and ground displacements. Presently seismic networks, tide gauges, buoys, and GPS land stations are available.

DEWS is stimulated by the concepts and results of the German-Indonesian Tsunami Early Warning System GITEWS which went into service in November 2008. The sensor integration platform will support the adaptation of additional or completely new sensor systems. Based on this high quality upstream information flow DEWS will focus on the improvement of downstream capacities of warning centres especially by improving information logistics for effective and targeted warning message aggregation for a multilingual environment. Multiple telecommunication channels will be used for the dissemination of warning messages. DEWS will be based on standards and best practices e.g., OGC specifications and the ORCHESTRA Reference Architecture. An Enterprise Service Bus will be used for the integration of system components and for accessing event and monitoring data of sensor systems as well as simulation data.

The DEWS Concept

DEWS embraces a large consortium of public organisations, private companies, and the International Cooperation Partner Countries (INCO/ICPC), working together in order to develop an innovative, interoperable tsunami early warning system tailor-made for the entire Indian Ocean region. Since 2004, much progress has been made to minimise the threats to human life caused by such ravaging events, mainly by means of single state activities, supported by institutions of the UN system. Especially for Indonesia, the GITEWS project (German Indonesian Tsunami Early Warning System), that started development in 2005 and went into service late in 2008, has been very successful so far.

A broad range of competence and application experience will build up a system with focus on the advance warning time and on a functioning information logistics for warnings, both at national and at international level. Additionally, competent support comes from Japan and New Zealand in the field of geoscientific experience and long-term disaster prevention. The DEWS architecture is based on the Reference Model - ORCHESTRA Architecture (RMOA) developed by the European project ORCHESTRA. A modular toolbox with upstream, downstream and warning centre services meeting the demands of modern Information logistics is building the core of the DEWS concept. Software developments provided by the GITEWS project have to be adapted to the DEWS-specification in order to complete the warning system. Moreover, capacity building for early warning is also an important objective in DEWS particularly in view of long term system stability and availability. After the accomplishment of DEWS in the Indian Ocean a transfer of the system to tsunami prone areas in Europe is envisaged, i.e. for the Mediterranean Sea and the North East Atlantic coast.

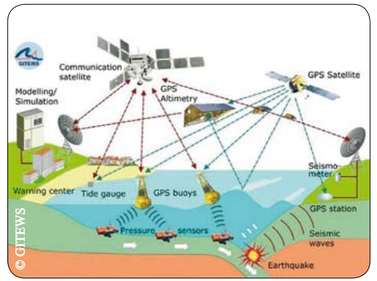
DEWS Architecture

Constituting the next generation of interoperable tsunami early warning systems, DEWS will be based on an open sensor platform, integrating sensor systems for

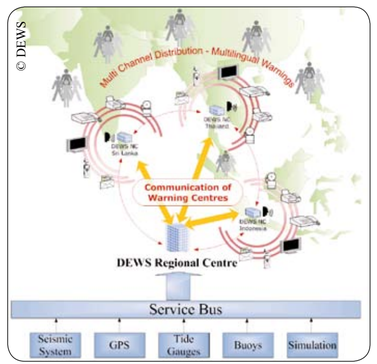
- earthquake - seismic
- sea level - tide gauge, buoys
- ocean floor - pressure sensors
- ground displacement - GPS land stations

monitoring.

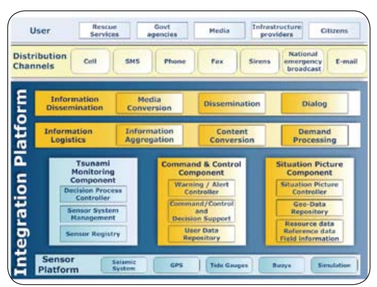
Based on improved upstream (sensor) information flow the downstream capacities will be enhanced by sophisticated information logistics and multi-channel warning dissemination. Alongside excellent state-of-the-art sensor instrumentation it is equally important to establish an IT-platform supporting the integration of additional or completely new sensor systems. Standardised interfaces are used to access event and monitoring data of these sensor systems. GITEWS and DEWS are based on the Service Oriented Architecture (SOA), an architectural principle which supports the flexible setup of new process chains by orchestrating IT services, e.g. sensor systems. This in turn opens up the possibility for a new generation of future early warning systems able to protect the population against different types of natural hazards, such as volcano eruptions, floods or land slides.



Instrumentation in the GITEWS project



DEWS Regional Centre



Architecture of DEWS

Training course in Jakarta

Data analysis with SeisComP

From Earthquake Detection to Rapid Alerts

The new Seismological Communication Processor SeisComP3 developed by the GFZ has reduced lead times for earthquake detection and source process analysis dramatically. It serves for seismological data acquisition and real-time data exchange over the Internet, speeding up the detection of tsunami-producing earthquakes. The system was installed in May 2007 at the Meteorological and Geophysical Agency of Indonesia (BMG) in Jakarta, as well as other locations, and has already been tested with great success.

Dissemination of Tsunami Warnings

Within DEWS three prototype implementations, a Principal Demonstrator, a National and a Regional Warning Centre, are planned. While the Principal Demonstrator shows the overall feasibility of the method, the National Centre will focus on public warning. It will disseminate warning messages to the different groups of a population adjusted to the specific need of target organisations, e.g. national and local governments, mayors' offices, police and fire brigades, military, search and rescue organisations, broadcasting media and others. The Regional Centre acts as a fallback/standby system in case a National Centre is hindered in the execution of its tasks. Communication paths exist between Regional and National Centres constituting a multilingual environment.