



Outline of the Self-Organising Seismic Early Warning Information Network

K. Fleming (1) and the SAFER and EDIM work groups (1,2)

(1) Section 2.1 Earthquake Risk and Early Warning, GeoForschungsZentrum Potsdam, Germany, (2) Department of Computer Science, Humboldt-Universität zu Berlin, Berlin, Germany (kevin@gfz-potsdam.de)

A Self-Organizing Seismic Early Warning Information Network (SOSEWIN) is being developed consisting of low-cost sensors that, while providing a lower accuracy than classical, more expensive seismic stations, compensate for this by forming denser arrays. Four channels of data are recorded: 3-component accelerometric or geophone data, and a fourth channel to measure an environmental parameter (temperature, noise etc.).

The network will arrange itself automatically into a number of clusters, each headed by a Leader Node (LN) that will be in direct communication with the surrounding Sensor Nodes (SN) and other LNs. The choice of which SN will be the leader depends upon first determining the most efficient communications arrangement, and secondly on seismological constraints. The network uses wireless technology (WLAN) in a self-organizing way and is therefore able to automatically adapt itself to changing circumstances arising from, for example, nodes being added or removed, loss of communication between nodes or clusters (which may be temporary), or sections of the network becoming inoperable. Specific nodes, termed Gateways, will be designated to communicate with systems outside of the network, for example seismological data centres. Data from the SOSEWIN will be used to generate alert maps, that will form an integral part of the early warning protocols, and shake maps. The shake maps resulting from the SOSEWIN will be comparable to those produced by the USGS ShakeMap program, although due to the denser network, the results will be less dependent upon the standard ShakeMap interpolation schemes.

The longer-term aim is for the sensors to evolve into units suitable for purchase by the general public, while at the same time being included in a public early warning system. This work is being undertaken as part of the SAFER (Seismic eArly warning For EuRope) and EDIM (Earthquake Disaster Information systems for the Marmara Sea region, Turkey) projects.