

Geosensor Networks

Relatively new to the spatial-information world and receiving increasing attention, the geosensor network is based on a large number of interlinked, simple sensors distributed over geographical space and able automatically to generate a host of useful information by combining their diverse sensing abilities. <P>

A generally accepted definition of a geosensor network does not yet exist. Some consider it a wireless sensor network (an ad hoc wireless network of self-powered, sensor-enabled miniature computers) that monitors phenomena in geographical space, while others define it more generically as 'any network of sensors that sense geographically referenced information'. The topic deals not only with spatial aspects like positioning and sensing, but also with data communication and data processing. Applications include disaster and emergency management; new geosensor systems present important opportunities for automated monitoring of disaster mitigation efforts, early warning and recovery at a level of spatial and temporal granularity impossible to achieve using other technologies. Other key applications include transportation, precision farming, security, and environmental monitoring.

Integration and Access

Key issues concern integrating data from geosensor networks with other data sources and making data accessible to scientists, decision-makers and the wider public. It is important to develop standards for interoperability so as to incorporate data from geosensor networks in all areas of public life. But interoperability faces not only technical problems; social and institutional hurdles have also to be jumped, and these tend to increase as geosensor networks mature and the data they generate increases in value. Precise positioning of geosensors is another key theme.

Wireless geosensor networks in particular present problems new to measurement science, including the toleration of low absolute accuracy and precision. Given the fine granularity of information, reliable positioning of nodes relative to one another is often adequate.

Another issue is the need to conserve limited power and communication resources by processing data within the network itself. Small groups of nodes are able partially to process data generated by them in collaboration, leading to reduced data communication needs and so improved network longevity.

Workshop

To focus the increasing interest, EuroSDR and ISPRS held a workshop in Hanover, Germany, from 20th to 22nd February 2008. The more than seventy attendees came from government, industry and academia, and most were from Germany. But there were also many participants from outside Europe, including the USA and Australia. The technical programme of 24 papers included three keynote speakers. Talks covered measurement science and geodesy, computer science and ICT, environmental applications and human user issues. Co-organiser Christian Heipke summarised the key messages in his closing address. Today's innovations would be directly relevant for near-future applications. The technology provided a motivation for new and interesting research, and to ensure good research progress it was necessary that we "talk to each other" across disciplinary boundaries. The workshop, he remarked, showed the very healthy state of potential for collaboration.