

# Sensor Web Enablement and Sensor Network Models in risk management applications

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**Abstract:** The increasing frequency, severity and consequences of floods, storms, forest fires, and other natural hazards sensitive to climate change in Europe has clearly shown the shortcomings in environmental monitoring and information systems. Observed inefficiency is primarily a consequence of historical and organizational factors. An exorbitant amount of work on data and service standardization would be required to build more efficient information systems using state of the art technology. Emerging technologies in risk monitoring and management have a potential to speed up the necessary organizational and structural changes. But still, critical factors as having sensor network models available for setting up appropriate info-structure, rapid deployment of monitoring systems (sensors) and quality assured high speed collection of data will challenge our future development and form key measurable success factors in this domain.

Model development and its realization are needed along the whole information processing chain, e.g. from the first automated data loggers to state of the art networks, including ad-hoc wireless sensor networks and collective intelligence of SensorWeb; including the plug-and-measure paradigm.

Sensors Anywhere (SANY) is a very ambitious FP6 IST Integrated Project dealing with sensor networks for environmental and risk management applications. SANY aims to contribute to joint efforts of the European Commission (EC) and the European Space Agency (ESA) on "Global Monitoring for Environment and Security" (GMES) by improving the interoperability of in-situ sensors and sensor networks and taking up the challenges mentioned above. This means specifically: The SANY architecture and its applied Sensor Network Models shall allow quick and cost-efficient reuse of data and services from currently incompatible sources in future environmental risk management applications across organizational, administrative or regional borders.

In order to overcome these problems we follow the approach to develop and use as many as possible standard based applications. One of the most promising standardization efforts is currently happening within the ongoing Open Geospatial Consortium Sensor Web Enablement initiative (OGC-SWE).

The goal of OGC-SWE model is to enable all types of Web and/or Internet-accessible sensors, instruments, and imaging devices to be accessible and, where applicable, controllable via the Web. The vision is to define and approve the standards foundation for "plug-and-play" Web-based sensor networks. For this purpose, OGC-SWE specifications include a standard model for representing and exchanging observation results ("Observations and Measurements") and an information model and encodings that enable discovery and tasking of Web-resident sensors, and exploitation of sensor observations ("SensorML").

Of special interest for SANY, and therefore beside above mentioned challenges all SWE services, including the underlying models, for retrieving sensor data, for sensor planning tasks as well as for subscribing to specific alert types. Furthermore SANY demonstrates its results along three validation sub projects in the risk management domain (e.g. air pollution risks).

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*Abstract only*