Geophysical Research Abstracts
Vol. 14, EGU2012-9627, 2012
EGU General Assembly 2012

Real Time Wide Area Radiation Surveillance System

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We present the REWARD project, financed within the FP7 programme, theme SEC-2011.1.5-1 (Development of detection capabilities of difficult to detect radioactive sources and nuclear materials - Capability Project).
Within this project, we propose a novel mobile system for real time, wide area radiation surveillance. The system is based on the integration of new miniaturized solid-state radiation sensors: a CdZnTe detector for gamma radiation and a high efficiency neutron detector based on novel silicon technologies. The sensing unit will include a wireless communication interface to send the data remotely to a monitoring base station which also uses a GPS system to calculate the position of the tag.
The system will also incorporate middleware and high level software to provide web-service interfaces for the exchange of information, and that will offer top level functionalities as management of users, mobile tags and environment data and alarms, database storage and management and a web-based graphical user interface. Effort will be spent to ensure that the software is modular and re-usable across as many architectural levels as possible.
Finally, an expert system will continuously analyze the information from the radiation sensor and correlate it with historical data from the tag location in order to generate an alarm when an abnormal situation is detected. The system will be useful for many different scenarios, including such lost radioactive sources and radioactive contamination. It will be possible to deploy in emergency units and in general in any type of mobile or static equipment. The sensing units will be highly portable thanks to their low size and low energy consumption. The complete system will be scalable in terms of complexity and cost and will offer very high precision on both the measurement and the location of the radiation. The modularity and flexibility of the system will allow for a realistic introduction to the market. Authorities may start with a basic, low cost system and increase the complexity of it based on the latest needs and also on the budget.