NWS08-2008-000132

Abstract for an Invited Paper
for the NWS08 Meeting of
the American Physical Society

Radiation Detection for Homeland Security Applications

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In the past twenty years or so, there have been significant changes in the strategy and applications for homeland security. Recently there have been significant at deterring and interdicting terrorists and associated organizations. This is a shift in the normal paradigm of deterrence and surveillance of a nation and the 'conventional' methods of warfare to the 'unconventional' means that terrorist organizations resort to. With that shift comes the responsibility to monitor international borders for weapons of mass destruction, including radiological weapons. As a result, countries around the world are deploying radiation detection instrumentation to interdict the illegal shipment of radioactive material crossing international borders. These efforts include deployments at land, rail, air, and sea ports of entry in the US and in European and Asian countries. Radioactive signatures of concern include radiation dispersal devices (RDD), nuclear warheads, and special nuclear material (SNM). Radiation portal monitors (RPMs) are used as the main screening tool for vehicles and cargo at borders, supplemented by handheld detectors, personal radiation detectors, and x-ray imaging systems. This talk will present an overview of radiation detection equipment with emphasis on radiation portal monitors. In the US, the deployment of radiation detection equipment is being coordinated by the Domestic Nuclear Detection Office within the Department of Homeland Security, and a brief summary of the program will be covered. Challenges with current generation systems will be discussed as well as areas of investigation and opportunities for improvements. The next generation of radiation portal monitors is being produced under the Advanced Spectroscopic Portal program and will be available for deployment in the near future. Additional technologies, from commercially available to experimental, that provide additional information for radiation screening, such as density imaging equipment, will be reviewed. Opportunities for further research and development to improve the current equipment and methodologies for radiation detection for the important task of homeland security will be the final topic to be discussed.