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Nuclear Explosion Monitoring R&D Roadmap

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This talk reviews research and development highlights and accomplishments (https://na22.nnsa.doe.gov/mrr) as well as future research directions of the Ground-based Nuclear Explosion Monitoring R&D (GNEM R&D) program within the U.S. National Nuclear Security Administration's Office of Nuclear Detonation Detection, NA-222. GNEM R&D's mission is "...to develop, demonstrate, and deliver advanced technologies and systems to operational monitoring agencies to fulfill US monitoring requirements and policies for detecting, locating, and identifying nuclear explosions."* Work sponsored by GNEM R&D and collaborators is conducted by world-class scientists and engineers in national laboratories, universities, and private industry. In the past ten years, significant progress has been made in detection, location and identification with substantial improvements yet possible. There is increasing interest in GNEM R&D technology particularly in light of its relevance to the Comprehensive Nuclear Test Ban Treaty. GNEM R&D direction is captured in roadmaps: waveform technologies, including seismic, hydroacoustic, and infrasound and radionuclide monitoring. The roadmaps have the same four areas: source physics, signal propagation, sensors, and signal analysis. Within each area illustrative R&D themes, program metrics, and future R&D directions will be presented. The goals of the R&D program are to: perform innovative scientific research, deliver capability-enhancing technologies to monitoring agencies and to motivate and nurture human capital to meet future monitoring challenges.

* Nuclear Explosion Monitoring Research and Engineering Program Strategic Plan, DOE/NNSA/NA-22-NEMRE-2004, https://na22.nnsa.doe.gov/cgi-bin/prod/nemre/index.cgi?Page=Strategic+Plan