

**1. Title:**

“Mobile Robotics Activities in DOE Laboratories”

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**3. Presentation Preference:** “Oral Presentation”

#### **4. Principal Author's Autobiography:**

Ron Lujan has 32 years of experience supporting DOE facilities at the INEEL and Hanford, including 10 years as Manager of the INEEL Remote, Robotics and Automated Systems Program. He was the DOE-EM Laboratory Team Lead for the DOE Robotics and Intelligent Machines Technology Roadmap. He is currently a member of the American Nuclear Society Robotics and Remote Systems Division Executive Committee.

#### **5. Abstract:**

This paper will briefly outline major activities in Department of Energy (DOE) Laboratories focused on mobile platforms, both Unmanned Ground Vehicles (UGV's) as well as Unmanned Air Vehicles (UAV's). The activities will be discussed in the context of the construct used by the DOE Technology Roadmap for Robotics and Intelligent Machines (RIM)<sup>1</sup> published in 1998; namely, Perception, Reasoning, Action, and Integration. The activities to be discussed span from research and development to deployment in field operations. The activities support customers in other agencies. The discussion of "perception" will include hyperspectral sensors, complex patterns discrimination, multisensor fusion and advances in LADAR technologies, including real-world perception. "Reasoning" activities to be covered include cooperative controls, distributed systems, ad-hoc networks, platform-centric intelligence, and adaptable communications. The paper will discuss "action" activities such as advanced mobility. In the RIM construct, "integration" includes the Human Machine Interface. Accordingly the paper will discuss adjustable autonomy and the collaboration of operator(s) with distributed UGV's and UAV's. Integration also refers to the applications of these technologies into systems to perform operations such as perimeter surveillance, large-area monitoring and reconnaissance. Also, tools such as modeling and simulation will be discussed. Unique facilities and test beds for advanced mobile systems will be described. Given that this paper is an overview, rather than delve into specific detail in these activities, other more exhaustive references and sources will be cited.

#### **6. Keywords:**

Advanced awareness, autonomy, mobility and HMI

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<sup>1</sup> "Robotics and Intelligent Machines in the U.S. Department of Energy, A Critical Technology Roadmap", October 1998, Sandia Report SAND98-2401/2.

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