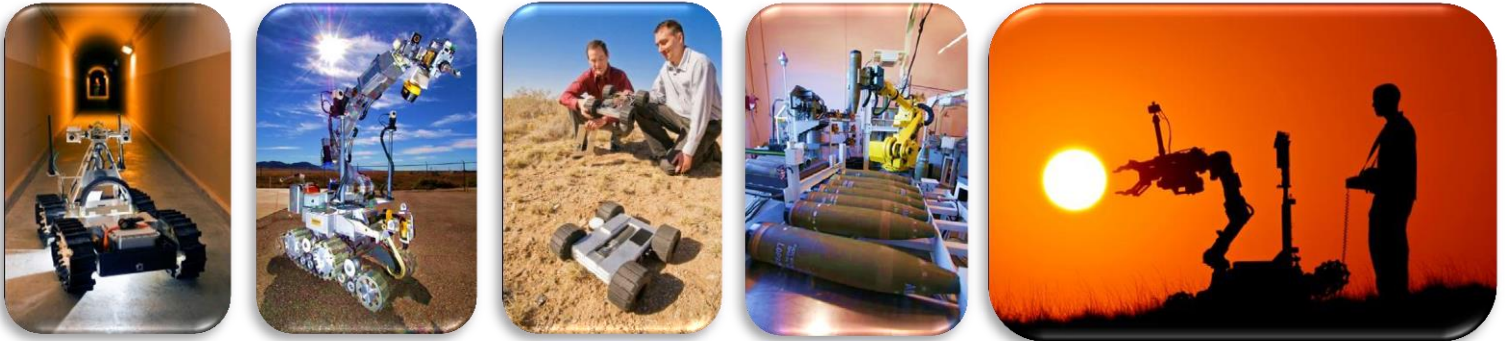


Intelligent Systems, Robotics, and Cybernetics (ISRC)



The Intelligent Systems, Robotics, and Cybernetics group (ISRC) at Sandia National Laboratories has the capabilities, expertise, and experience to develop advanced automation solutions for high consequence tasks and missions for a variety of customers. Our expertise in advanced controls, enhanced perception, robust manipulation, advanced mechanical design, unique mobility, and fail-safe design and integration enable us to design, develop, and implement robotic and non-robotic automation solutions that our customers can trust to handle their most challenging high consequence tasks and missions.

Advanced Controls, Enhanced Perception, and Cybernetics

Advanced controls capabilities that include distributed optimal control of cooperative robotic systems, distributed electrical systems, single-operator control of teams of heterogeneous unmanned systems, embedded control system design, software development, and our Brain-Emulating Cognition Control Architecture (BECCA).

Enhanced perception capabilities that include 3D geometric modeling and texture mapping, 3D video motion detection, simultaneous localization and mapping, and augmented reality training.

Cybernetic capabilities that include implantable sensors with neural interfaces, a dynamic prosthetic socket, and modular integrated microsystems.

Innovative Designs

We leverage Sandia's capabilities in miniaturization of electronics and components as well as advances in material sciences and power sources to create innovative systems that are launching revolutions in areas such as medicine, space exploration, and surveillance. We have fabrication capabilities that enable the development of mezo and miniature scaled hopping, crawling, wheeled, tracked, and articulated miniature mechanical vehicles. The development of miniature, autonomous vehicles coupled with our advanced control technology has enabled the development of swarms of miniature, autonomous vehicles capable of performing tasks that are difficult or impossible to do today such as locating and disabling land mines, detecting chemical and biological weapons, and verifying treaties. We specialize in small-scale multi-domain engineered systems that exploit mechanical, electrical / electronic, magnetic, fluid, thermal and chemical phenomena and advanced materials.

Robust Manipulation

The ISRC has a long history of automating robots for difficult manipulation tasks. Leveraging Sandia-developed sensor technologies to locate objects in the environment coupled with automated motion planners and force sensing and control technologies has enabled the development of advanced robot manipulators that can move to desired locations, perform safe interactions with hazardous materials, and can even perform fine manipulation tasks such as opening doors and performing surgery.



Unique Mobility

At the ISRC we specialize in developing advanced mobility technologies to support a broad range of tasks and missions. Utilizing our expertise in mechanical design and fabrication, video and vision processing, communications systems, embedded computing, control, and navigation, we develop advanced mobility systems that have been fielded for use for a variety of tasks including: surveillance and reconnaissance, autonomous exterior/interior intrusion detection, de-mining, improvised explosive devices disablement, and accident response.

High Consequence Automation and Fail-Safe Design and Integration

We design, develop, and integrate fail-safe components into our systems creating high-surety systems that are robust to a variety of failure modes, giving our customers increased confidence that our systems can safely perform high consequence tasks



Contact Information

robotics@sandia.gov

www.sandia.gov/research/robotics

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Sandia National Laboratories