

Exceptional service in the national interest



Sandia News Tips

Sandia National Laboratories is a multi-program laboratory operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corp., for the U.S. Department of Energy's National Nuclear Security Administration. With main facilities in Albuquerque, N.M., and Livermore, Calif., Sandia has major research and development responsibilities in national security, energy and environmental technologies and economic competitiveness.

Innovative solutions

Sandia applies its wide-ranging expertise in such major innovations as the [“Sandia Hand”](#) and an ultra-compact neutron generator dubbed the [neutristor](#). The robotic Sandia Hand can disarm improvised explosives devices, or IEDs, and solves the challenges of durability, dexterity and cost that have prevented widespread adoption of other robotic hands. The neutristor moved away from conventional neutron generator tube configuration to a solid-state package that can be adapted for medical and industrial uses. In [high-performance supercomputing](#), Sandia is designing an operating system that can handle the million trillion mathematical operations needed each second in future exascale computers. A test of [magnetically imploded tubes](#) succeeded at Sandia's Z machine — the world's most powerful pulsed-power accelerator — represents a real step toward controlled nuclear fusion at scientific break-even energies or better. Sandia also is working to improve [seismic detection](#) of shallow tunnels in regions where tunnels pose a security threat, and its nanomaterials researchers developed a technique to improve the effectiveness of [radiation detection](#) in cargo and baggage.

Tomorrow's cures

Sandia research and development has important applications in healthcare. To better understand [traumatic brain injuries](#) suffered by more than 160,000 soldiers, scientists are linking supercomputer simulations of how

blast waves affect the brain with clinical studies of veterans suffering mild traumatic brain injuries, with the goal of improving military helmet designs. Sandia engineers are improving amputees' control over [prosthetics](#), using the amputee's own nervous system and off-the-shelf chemistry lab equipment to create new ways for nerve bundles to interact with mechanical devices. And Sandia researchers developed the [SpinDx](#), which can count white blood cells, analyze important protein markers and process up to 64 assays from a single sample in minutes, meaning heart attacks, strokes, infections and other medical conditions could be detected much sooner than they are today.

Green energy

Sandia scientists are leading research for the emerging concentrating solar power industry at the newly upgraded [National Solar Thermal Test Facility](#), the only facility of its kind. The overhaul added state-of-the-art test capabilities, and resulting research should add more solar power to the electric grid. Working with the real estate industry, Sandia devised a way to accurately measure the [value](#) of home solar photovoltaic installations. In addition, Sandia wind energy researchers are re-evaluating [vertical axis wind turbines](#), which could transform offshore wind technology, and Sandia is collaborating on five [Regional Test Centers](#) that allow industry to assess the performance, reliability and bankability of large-scale photovoltaic energy systems. Sandia has researched solar, wind and

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geothermal energy technologies for decades, and continues to develop safe, reliable, sustainable and cost-effective solutions for the nation's growing energy needs.

A smarter electric grid

Sandia researchers have developed a family of [liquid salt electrolytes](#) for new batteries that could cost-effectively store three times more energy than today's batteries. Resulting devices may economically and reliably incorporate large-scale intermittent renewable energy sources such as solar and wind into the nation's electric grid. In addition, Sandia has developed an experimental "[smart outlet](#)" that autonomously measures, monitors and controls electrical loads without a connection to a central computer or system. The idea is to make the power grid more distributed and intelligent, capable of reconfiguring itself as conditions change. Sandia also is the lead designer for [SPIDERS](#), the Smart Power Infrastructure Demonstration for Energy Reliability and Security, which is working to reduce the risks of power outages at such critical facilities as hospitals or military installations by building smarter, more secure and robust microgrids that incorporate renewable energy.

Technology transfer: Where science and business meet

Technology transfer experts at Sandia are responsible for moving technology from research and development to the market, and Sandia's partnerships with companies like Intel, Boeing and General Motors help boost U.S. competitiveness. Sandia engineers have found a way to clean up high-level [radioactive contamination](#) in wastewater, designed more efficient and cost-effective materials for LEDs and high-powered transistors, developed a [decontamination foam](#) that also can clean up methamphetamine labs, came up with an advanced [membrane](#) technology for water

purification, and developed a laser-guided bullet whose fins correct its flight to hit a target more than a mile away. A Sandia engineer even helped improve a physician's design of [trauma shears](#), so emergency personnel can quickly expose an injury to treat it.

Challenging basic assumptions

Basic research is key to Sandia's work, and challenging scientific assumptions enables the nation to push scientific frontiers. A Sandia [modeling study](#) contradicted geologists' long-held belief that pore sizes and chemical composition are uniform throughout a given slice of sedimentary rock, which could increase production from oil reservoirs and water aquifers. Sandia researchers also came up with a unique approach to creating [materials](#) whose properties won't degenerate during temperature swings, needed to improve microelectronics circuits such as those in cell phones. In addition, Sandia discovered an unexpected voltage increase in two barely separated nanowires, which means designers of next-generation devices using [nanowires](#) to deliver electric currents — including telephones, handheld computers, batteries and certain solar arrays — must allow for such boosts. And Sandia's novel design of an [air sampler](#) the size of an ear plug should cheaply and easily collect atmospheric samples to improve computer climate models.

Supporting space exploration

Sandia's [Kauai Test Facility](#), which celebrated its 50th anniversary in 2012, supports the Labs' evolving national security missions with design, development, system engineering, integration, testing and demonstration of advanced technologies, payloads and systems. In addition, Sandia experiments at the International Space Station are providing information that could lead to more effective use of the logjam of information beamed down from increasingly powerful satellite sensors.

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