6 R&D 100 Awards

R&D 100 Awards Logo.

Maintaining the Lead

Researchers at Oak Ridge National Laboratory have received six R&D 100 awards, given annually by R&D magazine to the year's most technologically significant new products. ORNL led all other Department of Energy national labs in number of awards received in 2007 and remains the leading all-time winner among DOE labs with 134. ORNL researchers (in bold) were recognized for the following inventions, all but one of which were funded by DOE:

- ***Piranha***, developed by **Mark Elmore, Brian Klump, Robert Patton, Thomas Potok, Joel Reed** and **Jim Treadwell**. The Piranha knowledge discovery engine uses intelligent agent technology and a very large cluster computer to analyze large volumes of text data with unprecedented speed and accuracy. Piranha sorts huge numbers of text documents into groups that are easily processed by people. The system can find similar documents to a document of interest; remove duplicated documents, such as identical news stories from different sources, and automatically classify documents by topic. Because of the scalability of the agent architecture and better algorithms, Piranha runs 100 times faster than other search engines and can work with continuously changing data sets. The U.S. military and the Department of Homeland Security are among the users of Piranha to analyze large sets of streaming data.

- ***Pharos Neutron Detector System***, developed by **Richard Riedel, Ronald Cooper** and **Lloyd Clonts**. Pharos is a small, low-power, neutron detection system that can be used to identify nuclear materials at airports and harbors. Pharos can determine the direction and distance from which neutrons come, allowing the system to track targets after they have been identified. The system's advantages include large-area detector coverage, extremely low power requirements and digital communication capability.

- ***Cast Nickel Aluminide for Improved Productivity of Steel Heat-Treating Furnaces***, developed by Duraloy Technologies, Mittal Steel USA, Anthony Martocci (consultant), **Vinod Sikka, Michael Santella** and **Jeffrey McNabb**. Cast nickel aluminide has a unique combination of high-temperature strength and oxidation resistance, which is critical for continuous operation of steel plate heat-treating furnaces. The nickel aluminide eliminates the need for frequent furnace shutdowns, greatly reducing energy use, carbon dioxide emissions and costs.

- ***High-Performance LMO-enabled, High Temperature Superconducting Wires***, developed by SuperPower Inc., **Parans Paranthaman, Tolga Aytug** and **Amit Goyal**. This high-current, second-generation superconducting wire with a lanthanum manganate buffer exhibits the unique combination of strength, flexibility, fabricability, throughput and low cost needed for power-grid applications, including coils and motors. The wire set three world records for superconducting in 2006. As replacements for copper power cables, ORNL-SuperPower cables will carry more electricity much more efficiently and can be retrofitted to the standard grid infrastructure.

- ***Large Area Imager for Standoff Detection***, developed by Lawrence Livermore National Laboratory, Space Sciences Laboratory at the University of California at Berkeley, **Lorenzo Fabris, Thomas Karnowski** and **Klaus-Peter Ziock**. The Large Area Imager is a search instrument that can find radiation sources within a 100-meter swath while traveling at 40 kilometers per hour. Compared with other instruments, the device locates radiation sources 25 times faster with unprecedented sensitivity to weak sources. The Department of Homeland Security funded this project.

- ***Armstrong Process CP Ti and Ti Alloy Powder and Products***, developed by International Titanium Powder, **Craig Blue, Jim Kiggans, Stephen Nunn, Phil Sklad, William Peter, John Rivard, Art Clemons**, BAE Systems, AMETEK, National Energy Technology Laboratory and Red Devil Brakes. The Armstrong Process is a new method of producing titanium powder that reduces costs significantly. Titanium's strength, low mass and corrosion resistance make the metallic element ideal for many manufacturing uses, but titanium is prohibitively costly because of the difficulty and expense of extracting the metal from ore. Some believe this process extracts titanium from ore much more cheaply than conventional methods, making the metal feasible in many new applications. This process—which can produce titanium continuously, unlike other methods—is the most significant development in the titanium industry in 50 years.