

Army looks to hydrogen to lighten soldiers' load

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Researchers at Missouri University of Science and Technology are developing a portable, hydrogen-generating power system to power everything from laptops to communications gear for soldiers in the battlefield.

The system transforms jet fuel into hydrogen and will relieve soldiers from having to carry heavy loads of batteries. Individual soldiers carry between 20 to 40 pounds of batteries on standard four-day missions. The batteries power soldiers' personal portable electronics, such as GPS systems and night-vision goggles.

“The military, for very good reasons, can operate all of its hardware -- from tanks to naval ships -- off of one single fuel, JP-8, which is similar to civilian aviation fuel,” says Jonathan Wenzel, assistant research engineer in chemical and biological engineering at Missouri S&T. “Jet fuel, like gasoline, is a mixture of hundreds of different chemicals that contain hydrogen and carbon, called hydrocarbons.”

The system works by reacting jet fuel with water to produce hydrogen. Small amounts of carbon dioxide, methane, carbon monoxide and ethane are also released during the process.

When the power unit is in the battlefield, the need for soldiers to carry heavy, cumbersome batteries could be eliminated, as convoys already carry fuel for their vehicles. The single reliance on jet fuel provides logistical benefits, as the military wouldn't have to stockpile batteries and

distribute them on the battlefield. The quiet, odor-free process also doesn't produce a thermal signature with its exhaust, unlike the jet fuel and diesel electric generators that are currently used in the field.

“Think about how loud and smelly the generators are that many people bought in the last ice storm,” says Wenzel, who is working under the direction of Dr. KB Lee, professor of chemical and biological engineering at Missouri S&T.

A small scalable unit could be built to produce a small amount of hydrogen or increased to provide enough energy to power an entire navy ship. In addition, the system could generate sanitary drinking water with the addition of a fuel cell.

Source: Missouri University of Science and Technology

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