

## ALRE inventors, inventions receive honors

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From left to right: Rear Adm. Randy Mahr, commander, Naval Air Warfare Center Aircraft Division (left) and Vice Adm. David Architzel, former commander, Naval Air Systems Command (third from right) presented Bill Leach, Aircraft Launch and Recovery Equipment (ALRE) Science and Technology (S&T) Transition Team lead; Andy Hernandez-Fabian, ALRE S&T transition team member; Glenn Shevach, ALRE S&T transition team member and Jacob Abujaber, ALRE Advanced Arresting Gear Energy Storage Capacitor Banks and Energy Dumps team lead with certificates for their invention. Capt. James Donnelly, ALRE program manager and Kathy Donnelly, director, Support Equipment and ALRE Department (4.8) were on hand at Joint Base McGuire-Dix-Lakehurst, N.J. for the presentation. Larry Venetsky and Jim Raevis were not present for the photo. (U.S. Navy photo)

NAVAL AIR SYSTEMS COMMAND, PATUXENT RIVER, Md. — Navy inventions to benefit aircraft launch and recovery were honored during the Naval Air Warfare Center Aircraft Division patent ceremony held here Sept. 12.

“You are the knowledge capital of NAVAIR,” said Rear Adm. Randy Mahr, NAWCAD commander, as he addressed the award recipients at the River’s Edge Conference Center. “You are who we depend on here.”

Mahr reminded the inventors that nearly 60 years ago, William and Max Baer submitted a patent application for a lever that would help even the deceleration speed of aircraft landing on the flight deck, improving the arresting gear equipment already being used on aircraft carriers. The inventors’ original drawings are among the first patents that Naval Air Systems Command still has on file.

Continuing in the Baers’ footsteps, several of the inventions recognized were developed by Aircraft Launch and Recovery Equipment (ALRE) Program Office (PMA-251) teammates. Other inventions that received recognition could benefit ALRE.

### **Robotic Gesture Recognition System**

An aircraft carrier flight deck runs like a well-oiled machine in order to maintain safety of the crew and efficient air operations. Integrating unmanned air vehicles on aircraft carriers poses a new challenge that NAVAIR veteran Larry Venetsky and former teammate Jeffrey Tieman are making great strides in resolving.

“How do you tell unmanned aircraft to move from point A to point B, fold or unfold the wings, position it precisely before the launch or raise the hook after the arrestment?” Venetsky asked. “The vehicle doesn’t have a pilot who can understand signals from the ‘yellow shirt’ [aircraft handler].”

Venetsky and Tieman have patented a robotic gesture recognition software that will allow the unmanned air vehicles to be able to accept the same aircraft commands that manned aircraft use.

This invention spurred several Small Business Innovation Research (SBIR) projects and recently kicked off an effort to develop interactive devices for handling unmanned air vehicles on the carrier flight deck. The commands would be delivered by a human, picked up by various sensors and then decoded by a computer, producing the

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necessary deck handling responses.

### **Electromagnetic Fire Suppression System**

Bill Leach, ALRE Science and Technology (S&T) transition team lead and former NAVAIR aircraft fire protection team lead along with Glenn Shevach, ALRE S&T transition team member and Marco Tedeschi, aircraft fire protection teammate, developed a way to extinguish fire using electromagnetic energy.

Leach said inevitably catapult trough fires happen, but aircraft carriers are prepared to put them out.

"We have ships out there with big buckets of steam to launch the planes, and they run a tap off that bucket to put out the fires," Leach said. "With the onset of EMALS [Electromagnetic Aircraft Launch System], there's no more steam. What subsystem is going to be able to put out the trough fire? We now have a big bucket of electrons. Can put out the fire with electrons or electricity?"

Leach said that theory is what fueled his team's idea for the electromagnetic fire suppression system invention. They've successfully passed the proof of concept stage, having already put out small fires using wires and electricity. The team is hopeful it will come to fruition to support the future aircraft carriers.

"There's already the possibility of a potential customer," Leach said, referring to EMALS that will replace the current steam catapult launch system on aircraft carriers beginning with the Gerald R. Ford (CVN 78).

The team submitted an invention disclosure in spring 2012, which is a document submitted to NAWCAD business office prior to seeking a full patent, for the electromagnetic fire suppression technology.

### **Pinless Connector**

Glenn Shevach, ALRE S&T transition team member, along with Integrated Diagnostics and Automated Test Systems (IDATS) teammates Andy Hernandez-Fabian and Ivan Touevski, submitted an invention disclosure in November 2011 for a connector technology that will alleviate many of the maintenance issues associated with militarized equipment connectors. The inventors are currently exploring applicability to several Navy/Marine Corps aircraft, as well as commercial applications.

### **Jet Blast Deflector (JBD) Liquid Nitrogen Cooling System**

Jacob Abujaber, ALRE Advanced Arresting Gear Energy Storage Capacitor Banks and Energy Dumps team lead, has created a new cooling system for aircraft carriers' JBD panels that protect the crew and flight deck as jets launch from the ship.

Abujaber, who submitted his invention disclosure in March 2011, said because liquid nitrogen is environmentally safe, inexpensive, and nonflammable and can be easily produced, it will be a more efficient and effective coolant system for the JBD panels during high energy jet launches.

"This will enhance the present and future capabilities of JBD's and allow future jets that produce high energy engine thrust and heat to operate on Navy carriers," Abujaber said.

He added that his invention will also significantly reduce JBD cooling assembly corrosion caused by seawater and diminish the frequency of replacing JBD panels damaged by overheating, ultimately saving the fleet money.

### **Swaging Link**

Jim Raevis, Compact Swaging Machine (CSM) team lead submitted an invention disclosure for a swaging link in fall 2010.

"It's a bit humbling to be recognized for simply doing what comes naturally as an engineer, though very appreciated," said Raevis.

His invention will complement the new CSM process being developed for the fleet. CSM is an advanced hydraulic system that uses up to 800 tons of pressure to swage, or form, a terminal onto an aircraft carrier purchase cable. The terminal connects to the cross deck pendant that stretches across the flight deck and engages the arresting hook of an aircraft allowing for a smooth, controlled arrestment.

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Raevis said the swaging link will allow a new method of attachment for swaged cables to be joined together.

"The use of this invention will simultaneously reduce purchase cable and cross deck pendant terminal manufacturing time from approximately 90 minutes per terminal to approximately 30 minutes," Raevis said. "It will also no longer require manufacturers at Joint Base McGuire-Dix-Lakehurst, N.J., to maintain the hazardous molten lead treatment process."

NAWCAD currently holds 147 patents with 57 being active and 17 patent-pending at the U.S. Patent and Trade Office. Over the last decade, royalties on licenses using these patents brought in more than \$1.9 million to the Navy.

"A lot of emphasis goes into not only securing intellectual property, but actually marketing it to industry," Leach said. "It does no good to have just a patent; it means something only when it's manufactured. The command understands and emphasizes this and has really made a play to encourage inventions, not just for invention sake but for meaningful use that will eventually get out and serve the fleet."