



Secretary of Defense visits SPAWAR Systems Center

The Robotic Systems Branch was one of six groups (out of 1200 potential candidates at the Center) selected to present to Secretary of Defense Donald Rumsfeld on his August 26th visit to SSC San Diego. Code 2371, led by Branch Head Robin Laird, displayed 17 robots from eight different projects. Bart Everett, 237's Associate Division Head for Robotics, pointed out that the majority of these systems were in fact funded by the Office of the Secretary of Defense (OSD), under the umbrella of the Joint Robotics Program, chaired by Mike Toscano, Office of the Assistant Secretary of Defense for Acquisition, Technology and Logistics (AT&L). Projects represented included the Man Portable Robot System (MPRS), the Unmanned Ground Vehicle (UGVx), the Unmanned Surface



SECDEF and Bart Everett with Foster-Miller's TALON

Vehicle (joint venture with SAIC), the Mobile Detection Assessment Response System-Interior/Exterior (MDARS-E and MDARS-I), the Unmanned Ground Vehicle/Unmanned Air Vehicle Integration, and the Autonomous Mobile Communications Relay. The major emphasis for SECDEF, however, was on systems being developed for use in force-protection and tactical applications, particularly those currently used in Operation Enduring Freedom.

Assisting in this regard was Colonel Bruce Jette, US Army, who led the Robotic Tiger Team that recently performed a quick-response technology insertion in Afghanistan to place commercially available small robot systems in the hands of actual warfighters engaged in life-threatening roles. Prior to the visit by SECDEF, Colonel Jette briefed Code 2371 on the results of this summer's efforts in Afghanistan. The tiger

team was made up of representatives from iRobot (www.irobot.com), Exponent (www.exponent.com), University of Southern California's Institute for Creative Technologies (www.ict.usc.edu), and US Army active duty personnel. Their goals were to improve mission capability while decreasing risk to the soldier; assess the full range of tactics, techniques, and procedures (TTPs) for small robots in an operational environment; and examine the entire process involved in rapid integration of robotic systems. The mission was very aggressive, with a 90-day timeline, but an equally important follow-on component is the communication of success to the military, the media, and the robotics community.



PackBot's first mission in Kandahar

The iRobot PackBot and the Exponent Markbot were the primary platforms used by the team, both controlled by the M7, a custom-designed, wearable operator control unit (OCU) developed by Exponent. Designed, built, and delivered in less than 40 days, the M7 provided mapping, GPS, communications, and situational awareness.



M7 wearable controller

The M7 includes the following components: 500-MHz Pentium III processor with 256-MB of RAM; custom thermal dissipation enclosure; Kaiser ElectroOptics helmet-mounted display, 800x600 VGA, 24-bit color; a global positioning system; Win 2000 on 1-GB compact flash main storage, 1-GB IBM Microdrive secondary storage; and a universal serial bus (USB) personal device network, including joystick or other pointing device. The M7 system weighs less than 10 pounds and runs for 13.5 hours on a standard SINGARS battery.

Based on the experiences of the team, Colonel Jette has recommended to the Vice Chief of Staff that the Army continue to pursue spiral fielding of robots and establish an equipping strike force, a supporting sustainment process, and a supporting technology mining team.

During SECDEF's visit to SSC SD, Arnie Mangolds from Fos-

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SECDEF, Bart Everett and COL Jette with iRobot's PackBot

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ter-Miller and Tom Frost from iRobot (each with extensive in-theatre experience) were on hand to demonstrate their respective robots, the TALON and the PackBot.

Mr. Mangolds is a Vice-President of Foster-Miller, Inc., in charge of the military systems small robotics group. He developed the first remote mine flail now in use in Bosnia, Kosovo, and Afghanistan. He was field leader of the Foster-Miller robotic search and rescue effort at the World Trade Center after September 11th, and was program manager of the first use of ground robotics by Special Forces in Afghanistan.

Mr. Frost is the project manager for the Defense Advanced Research Projects Agency (DARPA) Tactical Mobile Robots (TMR) Program at iRobot Corporation. He was a member of Colonel Jette's team in Afghanistan and also led iRobot's search and rescue team at the World Trade Center.

The Foster-Miller TALON and the iRobot PackBot were initially developed (under Code 2371 technical supervision) for the TMR program.

Colonel Jette, assisted by live demonstrations of these small, man-portable platforms, was

able to provide fresh insights to SECDEF into the very successful missions conducted over the summer that clearly demonstrated a robot's ability to significantly decrease human risk during actual compound and cave-clearing evolutions.

Also demonstrated for SECDEF was the MPRS URBOT (Urban Robot), originally developed by Code 2371 for the US Army Engineer School at Fort Leonard Wood, MO, for underground tunnel, sewer, and cave reconnaissance. Three URBOTS were used in rescue/recovery operations at the World Trade Center site. More recently, two URBOTS have been deployed in Afghanistan with Navy Explosive Ordnance Disposal Mobile Unit 3. Recent feedback indicates that the URBOTS have been very useful for cave exploration and reconnaissance, as well as limited mine clearing applications. Other members of the joint coalition forces have expressed very strong interest in the robot's capabilities, and the platforms will remain in theatre for continued support of Operation Enduring Freedom.

Lieutenant Colonel Eugene Stockel, US Army, Product Manager for Physical Security Equipment (PM-PSE), Fort Belvoir, VA, was also on hand. PM-PSE is responsible for develop-



SECDEF, Dr. Bob Kolb, Bart Everett and LTC Eugene Stockel

ment, acquisition, and fielding of physical security and force protection equipment and technologies in support of a broad spectrum of missions from Homeland Security to protecting US Forces forward-deployed in the war on terror. Much of the technology in the projects on display for SECDEF was initially developed during a lengthy and fruitful relationship (10-plus years) between PM-PSE and SSC San Diego. The MDARS-I program will be fielded next year, with the MDARS-E program to enter production shortly thereafter.

Code 2371 engineer Narek Manouk performed an impressive demonstration of the URBOT being recovered into the marsupial carrier of the fully autonomous MDARS-E platform. MDARS offers tremendous potential for enhancing physical security and force-protection capabilities in fixed facilities, and critical logistical support in command, control and force-projection facilities, such as ports, airfields, and bases. Tactical extensions of the MDARS Exterior platform now include the URBOT marsupial carrier, a weapons pod, and an autonomous launch capability for Allied Aerospace's iStar vertical-takeoff unmanned air vehicle.

Secretary Rumsfeld expressed his strong appreciation for the prominent joint-service role played by

SSC San Diego in supporting so many Army applications under the OSD Joint Robotics Program.



Handheld Standoff Mine Detection System on the TALON

Two weeks later, Newt Gingrich again visited San Diego to receive additional information in the areas of non-linear dynamics and also robotic mine-countermeasures. Code 2371 submitted a proposal that outlined a three-phased approach which focused on getting robots into the hands of users, developing TTPs, and using feedback to target areas for future development and testing.



PackBot traverses ammunition dump in Afghanistan

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