



Science & Technology Day 2007

Robotics Equipment Exhibition

By Mr. Bill Waddell and Mr. Bob Barnes



The Science and Technology Day and Robotics Equipment Exhibition 2007 were held in USAWC seminar classrooms and the Root Hall Gymnasium on Thursday, 22 February 2007. Robotics Day 2007 integrated the science of autonomous vehicles and robotics and associated strategic issues into the Army War College's core curriculum. This year's event represented the combined efforts of the Center for Strategic Leadership (CSL) Command and Control Group and the Department of Command, Leadership and Management (DCLM). The concept of the event was to provide students with access to resident experts in the field of military autonomous vehicles and other technologies where they could ask the tough questions concerning the application of autonomous warfare to current operations. Additionally, leading proponents of science and technology were given an opportunity to address Army War College students concerning the changes taking place in robotics. This exchange and discussion provided a new dimension to the Joint Processes and Landpower Development (JPLD) course of the core curriculum and enriched the students' knowledge of current and emerging technology they will experience on the battlefield. Finally, students were given hands-on opportunities to experience current and emerging robotic systems.

Mr. Bill Waddell is the Director of the Command and Control Group at the U.S. Army War College and is the overall coordinator of the Robotics Day event.

Mr. Bob Barnes works for Booz Allen Hamilton, and is the contract lead for all aspects of the Science and Technology Robotics Day and the Joint Military Robotics Elective course for both Resident and Distance Education USAWC students.

The Robotics Day activities officially opened on the evening of 21 February with a social hour and dinner at the Letort View Community Center (LVCC). This provided interested students, staff and faculty the opportunity to meet and greet the guest instructors and exhibitors. Dr John Parmentola, Director of Army Research and Laboratory Management, was the guest speaker. His discussion on the future of technology set the stage for the academic interactions and exhibits on the following day.



The next morning was dedicated to seminar classroom presentations by guest experts from the Department of Defense (DoD), academia and commercial industry. Eighteen guest instructors from the DoD robotics community of government employees, active duty officers, and contractors assisted DCLM faculty instructors in seminar discussions concerning the implementation and application of robotics to the battlefield. The list of guest instructors included Dr. Parmentola; Ms. Ellen Purdy, Director of the DoD Joint Robotics Ground Enterprise; Dr. Jon Bornstein, Director of Robotics at the U.S. Army Research Laboratory; Colonel Terry Griffin, USMC, Director of Joint Robotics Systems Joint Project Office; and Mr. Byron Brezina, Director of the Navy's NAVSEA EOD Technical Division. Other organizations providing expertise included General Dynamics Robotic Systems, the Foster-Miller Corporation, Training and Doctrine Command (TRADOC) Army Capabilities Integration Center (ARCIC), the U.S. Army Tank-Automotive Research, Development and Engineering Center (TARDEC), and the Army's Rapid Equipping Force (REF).

Subjects discussed in the seminars included the individual application of specific robotic capabilities, the ethical challenges with the integration of autonomous vehicles and weapons into the battlefield, and the potential changes to future warfare, especially considering the potential for other nations to acquire robotic capabilities. In some seminars the discussion moved to the implications of autonomous and robotic systems on the theory and law of war, and the awareness of international law and ethical considerations for senior leaders. Although currently there are not a great number of offensive systems deployed in military operations, the capabilities have been developed to deploy partially or fully autonomous weapons systems to combat operations. One such specific system demonstrated during the event, the Talon Swords from the Foster-Miller Corporation (pictured on the left), will be the first full-scale deployment of a robotic offensive weapon system to a military theater of operation, although it will not be configured in a fully autonomous mode. This deployment will open a new level for the integration of autonomous operations and the decision making required.



Following the conclusion of the morning's seminar sessions Dr. Parmentola provided a Noontime Lecture for interested students, staff and faculty concerning robotics issues and futures. The lecture was widely attended and focused on the future of science and technology for the Army.

The afternoon was dedicated to the Robotics Equipment Exhibition, which provided demonstrations of the latest military and civilian research and development in the development of robotics and deployed operational systems, giving students and other attendees the opportunity to experience first hand developed technologies in the areas of air and land autonomous vehicles. This "hands-on" portion of the day provided the realism to compliment the seminar discussions, providing information to the students who will be faced with the issues of integrating robotic systems into military operations in the future. War College students, in future assignments may be called upon to make operational and strategic level decisions concerning the application or employment of autonomous or semi-autonomous vehicles. Many of the displayed robotic systems are currently deployed or may soon be deployed to operational theaters where they will take on operational duties for the protection of



soldiers or to provide surveillance. In addition, Robotics Day 2007 provided opportunities for enhanced knowledge of robotics for all personnel assigned to Carlisle Barracks, selected high school and ROTC students, the local press and TV media, and other interested U.S. Army organizations. Several of these invited organizations attended the event to learn about the area of autonomous vehicle technology and the science behind the systems.



In and around the Root Hall gymnasium were thirty four different robotic systems. Five large ground robots and one Unmanned Air System (UAS) were displayed outside the gymnasium in front of Root Hall. Included in the capabilities were aerial surveillance, ground surveillance and protection, autonomous logistics, battlefield medical robotics, and experimental vehicles. Organizations contributing to these displays included the AAI Corporation, General Dynamics Robotics Systems (GDRS), U.S. Army Product Manager Force Protection Systems, and the U.S. Army Research Development and Engineering Command (RDECOM). The exhibits included a set-up of the Shadow UAS for airborne surveillance, the Tactical Amphibious Ground System (TAGS) unmanned ground vehicle for battlefield medical support, the Mobile Detection Assessment and Response System (MDARS) for ground surveillance, the tactical autonomous combat chassis (TAC-C) that provides a basic vehicle for experimentation, and the Robotic Truck Chassis UGV for logistics.

Twenty eight smaller ground robots were displayed inside Root Hall gym by the AAI Corp., GDRS, Triad Aerial LLC, iRobot Corp., Foster-Miller Corp., Robotic Systems Joint Project Office, U.S. Army Research, Development and Engineering Command, Naval Explosive Ordnance Disposal Technology Division, U.S. Army Medical Research and Materiel Command, and the U.S. Army Rapid Equipping Force. These Robots included surveillance systems, ordinance disposal systems, ultra small air vehicles, medical support vehicles, offensive robotic weapons systems, developmental hover craft, and small, high speed maneuvering robots, several of which are either deployed or being deployed to current military operations. The small robots included various unmanned ground vehicles in the TALON and Packbot series from Foster-Miller and iRobot, configured for an assortment of missions, including the previously mentioned offensive operations with an M240 gun installed.

The Navy's EOD Technical Division brought a series of medium-size robots being used in theater for counterinsurgency operations and improvised explosive device (IED) and ordinance disposal. (See photo on the right) The Army's RDECOM brought a series of small surveillance robots being used currently for force protection operations in U.S. Central Command (CENTCOM). There were also several experimental small hovering vehicles from AAI corporation and TRIAD Aerial LLC. The Army's Rapid Equipping Force brought several small robots and UAS mockups for demonstration purposes. Exhibitors





provided operational and strategic level information concerning the deployment and application of their systems. In some cases, those visiting were given opportunity to control and operate selected robotic systems. Exhibitors discussed the impact of their systems on the future of military operations, as well as the immediate capabilities of the systems that are being deployed to locations like Iraq and Afghanistan.

Over 400 visitors attended the Robotics Equipment Exhibition. Feedback by the guest instructors, exhibitors, and resident students showed a high level of satisfaction with the overall program, particularly the integration of experts into the academic portion of the day. The combination of the seminar classroom discussion, the displays, and the availability of experts greatly enhanced the Joint Processes and Landpower Development course, and integrated this emerging area of future warfare into the curriculum for future leaders to ponder during their tenure at the U.S. Army War College.

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