

*INVITATION
TO ATTEND THE*

*SECOND JOINT MILITARY/CIVILIAN CONFERENCE
ON
INTELLIGENT VEHICLE TECHNOLOGY TRANSFER*

The **Department Of Defense** Space and Naval Warfare Systems Command (SPAWAR) cordially invites you to attend the Second Joint Military/Civilian Conference on Intelligent Vehicle Technology Transfer (IVTT), which is also supported by: the Office of the Secretary of Defense (OSD) Director of Defense Research and Engineering (DDR&E) Office of Technology Transition; the **Department of Transportation** (DOT) Intelligent Transportation Systems Joint Program Office (DOT ITS JPO); and the **Department of Commerce** (DOC) Intelligent Systems Division of the National Institute of Standards and Technology (ISD NIST), and hosted by the Army Tank Automotive Research, Development and Engineering Center (TARDEC). For the convenience of participants, this Conference is being held in conjunction with the SAE 2007 World Congress (16-19 April, Cobo Center, Detroit, MI)

Dates: Thursday and Friday, 12-13 April 2007

Time: 8 A.M. (Please See Agenda Below)

Location: U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC), 6501 E 11 Mile Rd, Warren, Michigan 48397 (Please See Directions Below)

Conference Fee: \$200 (Includes Proceedings, Two Breakfasts, Two Lunches, One Networking Dinner, and Three Refreshment Breaks)

Accommodations: Are the Responsibility of the Participant (Information Below)

Enclosed: Announcement with information on Conference Purpose, Background, Agenda, Registration Forms, Directions and Accommodations

Seating Is Limited. At this time (after 25 March 07), only U.S. citizens may register. Please RSVP (with enclosed Registration Form) by 9 April 2007 to:

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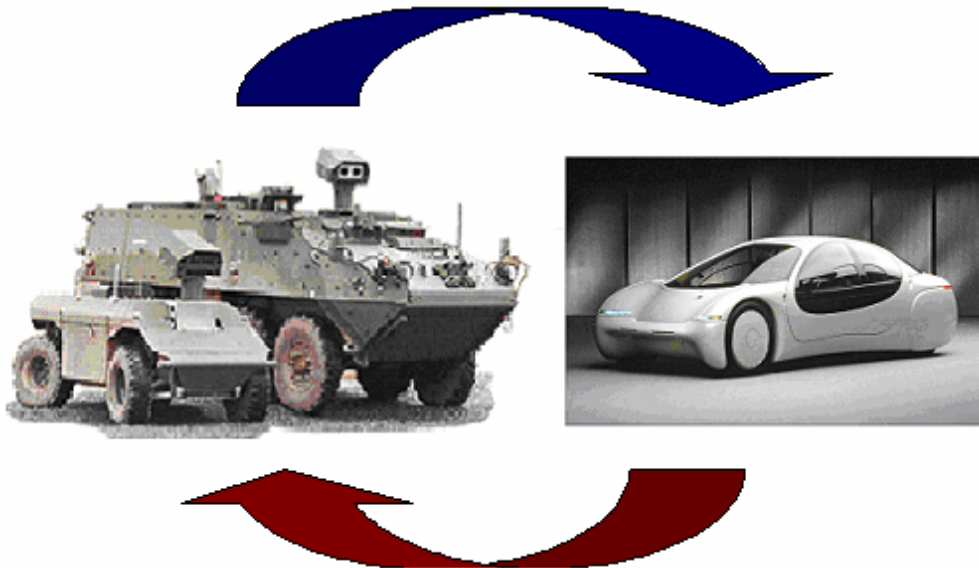
We look forward to your participation in this important Conference.

ANNOUNCEMENT OF THE SECOND JOINT MILITARY/CIVILIAN CONFERENCE ON INTELLIGENT VEHICLE TECHNOLOGY TRANSFER

Thursday and Friday, 12-13 April 2007

At The

U.S. Army Tank Automotive Research, Development and Engineering
Center (TARDEC), 6501 E 11 Mile Rd, Warren, MI 48397



The **Department of Defense** (DOD) Space and Naval Warfare Systems Command (SPAWAR) is sponsoring the second Conference on Intelligent Vehicle Technology Transfer. The conference is also supported by: the Office of the Secretary of Defense (OSD) Director of Defense Research and Engineering (DDR&E) Office of Technology Transition; the **Department of Transportation** (DOT) Intelligent Transportation Systems Joint Program Office (DOT ITS JPO); and the **Department of Commerce** (DOC) Intelligent Systems Division of the National Institute of Standards and Technology (ISD NIST), and hosted by the Army Tank Automotive Research, Development and Engineering Center (TARDEC).

The Conference is **unclassified** and open to all interested participants from **government, industry, academia, and media**, whether associated with the **defense or automotive industries**. Attendance is **limited to 300 participants**. Because of security constraints, all attendees **must register in advance** of the conference (there is no provision for on-site registration) and non-U.S. citizens are requested to provide additional information, as indicated on the attached registration form. The **conference fee** is a modest \$200, which includes proceedings, 2 breakfasts, 2 lunches, 1 dinner, and 3 refreshment breaks). **(Please see the enclosed registration form).**

Robotic Technology Inc. was tasked to support **SPAWAR** with this Conference and facilitate the Intelligent Vehicle Technology Transfer Process. **Please disseminate this Announcement to anyone who might be interested in attending.**

PURPOSE OF THE CONFERENCE

The **objective** of this Conference is to continue developing the foundation and framework for establishing a **technology transfer process** that will be useful for the development of intelligent vehicles for **military and civilian applications and markets**.

The Department of Defense (DOD) and the Department of Transportation (DOT) are both supporting the development of what are known as **intelligent vehicles**. The **DOD** intends to deploy a variety of autonomous intelligent vehicles (robots) to **reduce human casualties** on the battlefield and **increase the global combat efficiency and effectiveness** of the U.S. military against conventional and unconventional forces. The **DOT** supports intelligent vehicle technology to **reduce human casualties** on the nation's highways and increase the **efficiency and effectiveness of the U.S. transportation system**. The military's rapid progress in intelligent vehicle technology can directly benefit the commercial development of intelligent cars, trucks, and buses, reducing time and expense for the automotive industry. Conversely, technology transferred from the commercial sector to DOD, and its industry contractors, will reduce the cost and increase the availability of commercial-off-the-shelf (COTS) intelligent vehicle systems and components for military services. Society as a whole will benefit from the **mutual technology transfer** between the military and commercial sectors.

A **formal process** for sharing – and leveraging – intelligent vehicle technology among various government agencies and their industry and academic stakeholders will facilitate the advent of intelligent vehicles, a **quickly emerging and transformational technology**, which offers enormous potential benefits for the military and civil sectors alike in the 21st century. U.S. government agencies which will benefit from intelligent vehicle technology transfer include: the Department of Defense (DOD), Department of Transportation (DOT), Department of Energy (DOE), and the National Aeronautics and Space Administration (NASA). This conference follows the previous successful IVTT Conference and Workshops and which were held during 2005 and 2006.

For the convenience of participants, the IVTT Conference is being held in conjunction with the **SAE 2007 World Congress** (16-19 April 07, Cobo Center, Detroit, Michigan).

DOD INTELLIGENT VEHICLE TECHNOLOGY AND PROGRAMS

Advanced intelligent vehicle technology which the DOD can transfer to DOT includes:

- **Control Systems**
- **Sensor Systems**
- **Mobility Systems**
- **Interface Systems**

The DOD is supporting the development of a number of intelligent ground vehicles through several **intelligent vehicle programs**, including the **Joint Robotics Program**

(JRP), the **Future Combat System** (FCS) Program, and programs supported by the Defense Advanced Research Projects Agency (DARPA) and other agencies. The DOD programs are developing and fielding first-generation unmanned ground vehicles with current technologies while pursuing advanced technologies critical to autonomous vehicles that can be inserted into first generation vehicles in an evolutionary manner, to be followed by second generation intelligent, autonomous vehicles. The JRP, for example, is currently developing **22 distinct intelligent vehicle systems** across a variety of weight classes, from less than 8 pounds (micro) to more than 30,000 pounds (large). DOD expects **vehicle intelligence** to be sufficient for **complete autonomy** to be achieved by 2020, whereupon human intervention required for the vehicles to perform their missions will approach zero. Well before 2020 – perhaps as soon as 2010 – DOD expects vehicles to possess an appreciable level of **intelligent autonomy**.

Intelligent vehicle systems are under development by **DOD agencies** including:

- **Robotic Systems Joint Project Office**
- **Air Force Research Laboratory (Robotics Group)**
- **Program Management Office for EOD (Navy)**
- **US Army Tank Automotive Research, Development and Engineering Center (TARDEC)**
- **Space and Naval Warfare Systems Center (SPAWAR)**
- **Air Armament Center Agile Combat Support (AAC/YBC) Program Office**
- **Product Manager, Force Protection Systems**
- **Aviation and Missile Research, Development & Engineering Center (AMRDEC)**
- **Defense Advanced Research Projects Agency (DARPA)**
- **Product Manager, Robotic and Unmanned Sensors**
- **Army Research Laboratory (ARL)**

DOT INTELLIGENT VEHICLE TECHNOLOGIES

The **DOT's vision for intelligent vehicles** is a system involving roads, vehicles, and drivers, where drivers:

- Operate in a significantly **safer** environment
- Enjoy **greater mobility and efficiency** as a result of the widespread use of vehicle-based autonomous and infrastructure-cooperative **driving assistance** features

DOT predicts that the widespread deployment of advanced **driver assistance** systems can significantly reduce motor vehicle crashes. Each year more than **41,000 Americans die** as a result of about **6 million crashes** – the equivalent of 115 each day, or one every 13 minutes. While the magnitude of the highway death toll is shocking, the impact of highway injuries is even greater. Traffic crashes injure more than 3.2 million Americans per year, with crash survivors often sustaining multiple injuries and requiring long hospitalizations. Crashes cost the U.S. economy more than **\$230 billion a year** and consume a greater share of national health care costs than any

other cause of illness or injury. While new technology offers potential safety solutions, it also poses new problems - some in-vehicle technology may become a dangerous distraction to drivers. The National Highway Traffic Safety Administration (NHTSA) estimates that **driver inattention**, from all sources, causes 20 to 30 percent of the 6.3 million accidents per year.

Because **driver error** remains the leading cause of crashes, cited in more than 90 percent of police crash reports, the intelligent vehicle mission is to reduce the number and severity of crashes through driver assistance systems. These safety systems, now in various stages of development, assume *partial control* of vehicles to avoid collisions. The focus on **preventing** crashes, by helping drivers avoid hazardous mistakes, is a significant new direction for DOT safety programs; in the past the primary focus was on crash **mitigation** (i.e., alleviating the severity of crash-related injury to persons and property).

The current DOT intelligent vehicle vision is focused on **driver assistance systems**. Driver assistance systems warn drivers of danger or, in more advanced versions, intervene to prevent or mitigate accidents (e.g., intermittent automated braking or steering). They can save lives. But the technology transfer between DOD and DOT should include consideration of the technical, economical, and social issues concerning ultimate **autonomy for cars, trucks, and buses**, just as the military intends for combat vehicles. In a future **civil version** of the military's autonomous vehicles, the owners or passengers will be able to enter the car at home, order it the destination, have it proceed to the destination (while the passengers read, talk on the phone, work on the computer, sleep, or watch videos), get dropped off at their destinations, and then have the car park itself. The "built-in chauffeur" will be **safer** and **more efficient** than a human driver. Also, the increasing millions of baby boomers who will soon transform into infirm elderly and lose their driving privileges will gain the freedom to travel in their own cars without the debilitating dependence on others. New kinds of enterprises will arise to support, and service this transformative technology, while old ones disappear.

A **technology transfer** between DOD and DOT will cover the spectrum of interim technology for driver assistance and semi-autonomy, as well as advanced technology for full autonomy. **Autonomous ground vehicles** have been successfully demonstrated many times – but in constrained circumstances. They can travel at high speed on roads with light traffic. They can stay in a lane, or safely change lanes to pass slower vehicles (checking traffic in the adjacent lane before doing so). They can travel off-road, over rough terrain and through vegetation, day or night. As part of the Future Combat System (FCS), the DOD intends to field autonomous ground vehicles within the decade. However, autonomous vehicles cannot yet deal with the complexity of intersections, traffic, and pedestrians, whether of Times Square or downtown Rome. The Defense Advanced Research Projects Agency (DARPA) sponsored the 150-mile cross-country Grand Challenge, which was successfully completed by several autonomous vehicles in only the second year of competition. This year, it is sponsoring the first **Urban Grand Challenge**, where autonomous vehicles must successfully negotiate the complexities of driving in the urban environment.

Since the 1990 initiation of the DOT's Intelligent Transportation System Program, there has been remarkable progress in commercializing advanced technology in the nation's vehicles and transportation system. Some of the technology, like the Global Positioning System (GPS) and infrared sensors, originated with the DOD. **Current and near-term commercially-feasible intelligent vehicle technology** (which largely did not exist at the birth of ITS in 1990) includes: GPS navigation and automated crash notification; adaptive cruise control; road-departure warning; crash warning and automated crash avoidance; near object detection system (back-up object detection); automated parking; automated lane tracking and lane change warning; and rollover prevention.

The technology for enabling **autonomous intelligent cars and trucks** will have a **transformational** – or disruptive – effect on the **automotive industry** and society in general. It is critical that vehicle manufacturers and their vendors enhance the intended beneficial consequences and mitigate the unintended adverse consequences of this inevitable technology.

STEERING COMMITTEE

A **Steering Committee** of volunteers was formed at the initial Workshop held at NIST on 26 July 05, further expanded at the Conference held 2-3 November 05 and with subsequent Workshops. The **purpose** of the Steering Committee is to provide valuable guidance and assistance for the initiation and subsequent operation of the IVTT. The Steering Committee will convene for a meeting once or twice a year, and participate in IVTT on-going decision-making through the proposed IVTT website, email, and voice communications. Anyone interested in participating is encouraged to join by contacting: RobertFinkelstein@compuserve.com.

The current members of the Steering Committee are:

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AGENDA: Thursday, 12 April 07

- 0800-0900** Continental Breakfast and Networking
- 0900-0915** Welcome to TARDEC and the Second Conference
Presenter: Dr. Grace Bochenek, Director, TARDEC
- 0915-0945** Overviews of Intelligent Vehicle Technology and the Technology Transfer Process
Presenter: Dr. Robert Finkelstein, President, Robotic Technology Inc.
- 0945-1015** Military Intelligent Vehicle Technology and Programs
Presenter: Mr. Cliff Hudson, Deputy for Business, SPAWAR
- 1015-1045** Military Robotic Vehicle Programs and Plans
Presenter: Col. Terry Griffin, Program Manager, Robotic Systems Joint Project Office
- 1045-1115** Break and Refreshments
- 1115-1145** Autonomous Intelligent Vehicles In The Future Combat System (FCS)
Presenter: Mr. Glenn Rossi, Manager, Future Combat Systems Program, Boeing
- 1145-1215** DOD Technology Transition Program
Presenter: TBD, DOD, DDR&E, Office of Technology Transition
- 1215-1300** Lunch and Networking
- 1300-1330** Autonomous Vehicle Development at the National Institute of Standards and Technology
Presenter: Mr. Roger Bostelman, Manager, Intelligent Control of Mobility Systems, NIST
- 1330-1400** Safety Implications for Intelligent Cars and Trucks
Presenter: Mr. Ray Resendes, Chief, DOT NHTSA Intelligent Technology Research Division
- 1400-1430** Cooperative Resources for Intelligent Vehicles
Presenter: Ms. Caroline Michaels, Ground Vehicle Standards, SAE
- 1430-1500** Intelligent Vehicle Infrastructure
Presenter: Ms. Suzanne Murtha, Director, Vehicle Safety Systems, ITS America
- 1500-1530** Intelligent Vehicle Technology: A Daimler Chrysler Perspective
Presenter: Mr. Christopher Wilson, VP, Daimler Chrysler
- 1530-1600** Intelligent Vehicle Technology: A General Motors Perspective
Presenter: Dr. Bakhtiar Litkouhi, Director, GM R&D Labs, General Motors
- 1600-1630** Break and Refreshments
- 1630-1700** Intelligent Vehicle Technology: A Ford Perspective
Presenter: Dr. James McBride, Team Leader, Intelligent Vehicle Systems, Ford
- 1700-1730** Autonomous Trucks, Buses, and Heavy Vehicles
Presenter: Mr. Conal Deedy, Director, Govt. & External Projects, Volvo Technology of America
- 1730-1800** International Status of Intelligent Vehicle Technology
Presenter: Mr. Richard Bishop, President, Bishop DOT Consulting
- 1830-2200** **Networking Dinner** (Delicious Buffet at the Gazebo, one mile from TARDEC: 31104 Mound Rd, Warren, MI 48092; (586) 979-6030; please see enclosed map)

AGENDA: Friday, 13 April 07

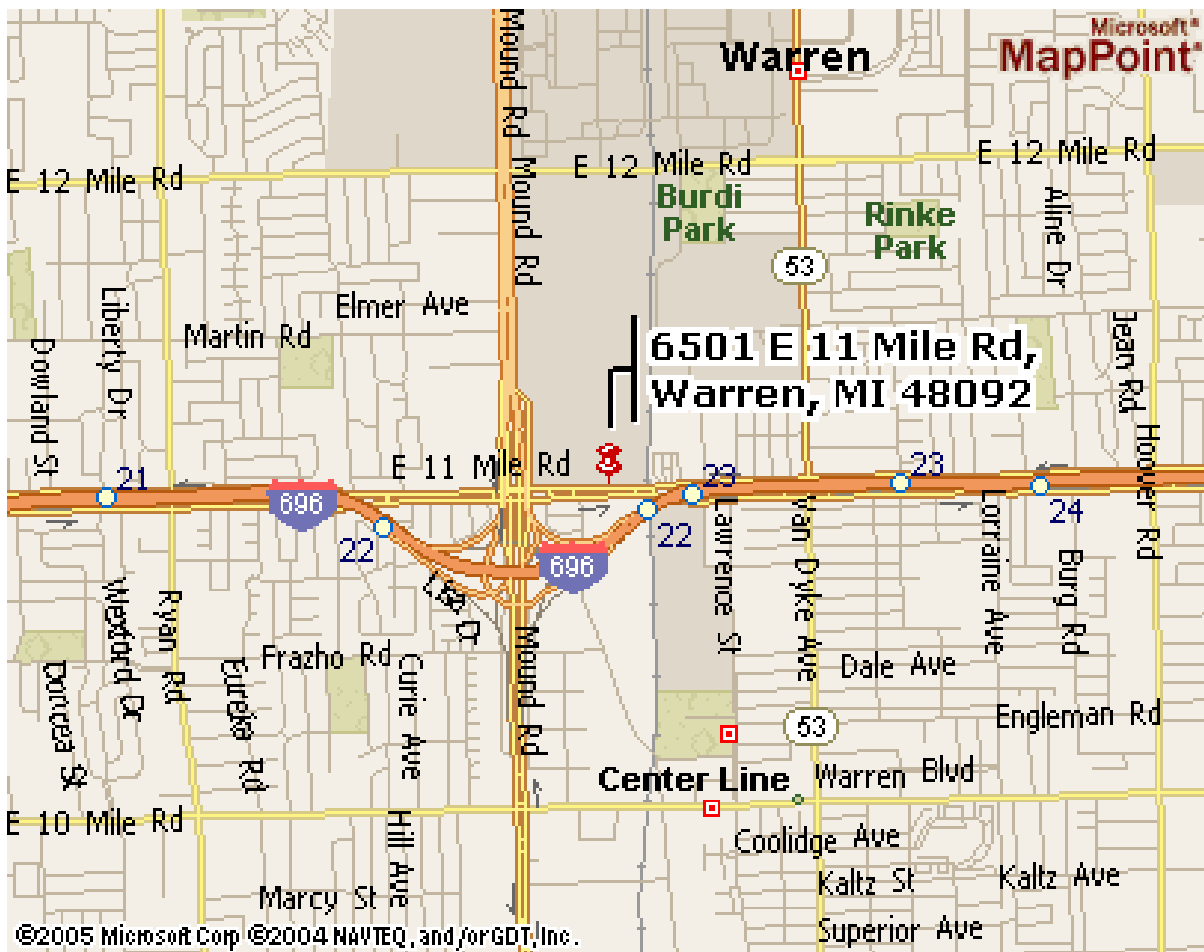
- 0800-0900** Continental Breakfast and Networking
- 0900-0930** Intelligent Systems Update
Presenter: Dr. Jim Overholt, Director, Joint Center for Unmanned Ground Vehicles (JC-UGV), TARDEC
- 0930-1000** Connected Vehicle Proving Center: A Resource for Intelligent Vehicles
Presenter: Mr. Scott J. McCormick, President, Connected Vehicle Association
- 1000-1030** Intelligent Vehicle Technology Transfer: The Roadmap
Presenter: Dr. Robert Finkelstein, President, Robotic Technology Inc.
- 1030-1200** **Plenary Discussion** with Panel of Presenters and Steering Committee Members
Topics: The Technology Transfer Process; OEM and Vendor Technology Needs and Wants; State of Intelligent Vehicle Technology; Impact of Autonomous Vehicles on the Military, Automotive Industry, and Society; A Transformative Technology: Strength, Weaknesses, Opportunities, and Threats
- 1200-1300** Lunch and Networking
- 1300** Adjourn

DIRECTIONS TO TARDEC AND NEARBY ACCOMMODATIONS

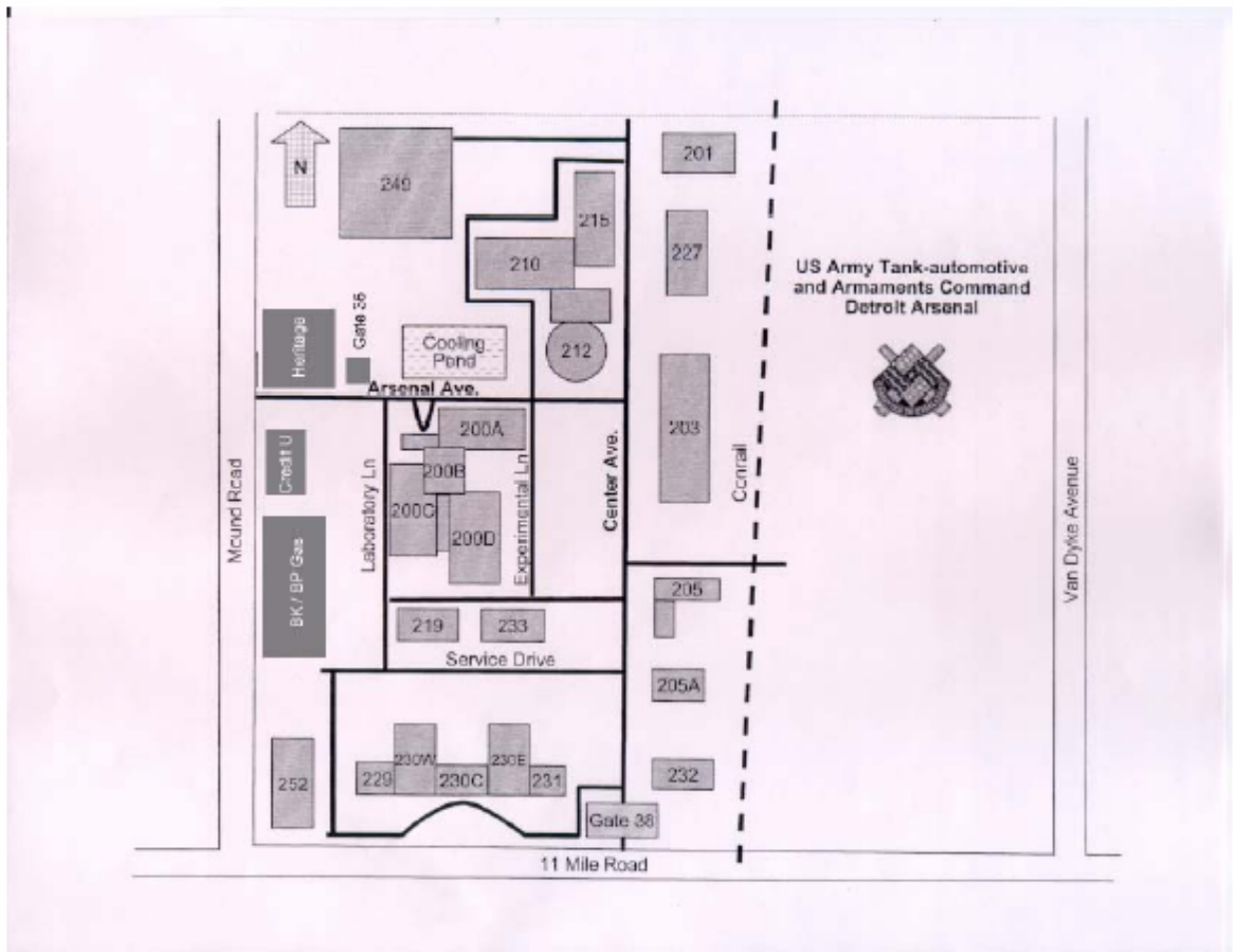
US Army TARDEC, 6501 E 11 Mile Rd, Warren, MI 48397

Directions to the facility (e.g., from the airport and other key origins):

- Take eastbound I-94 freeway toward Detroit
- Exit on to northbound I-75 freeway
- Exit on to eastbound I-696 freeway
- Take the northbound Mound Road exit
- Turn Mound Road north
- Turn right at the Detroit Arsenal Gate, just after the BP gas station
- Immediately notify the security guard that you are with the Intelligent Vehicle Technology Transfer Conference
- The guard will instruct you on how to obtain your visitor's badge for access to the facility



TACOM/TARDEC Map



Hotels/Motels – Vicinity of TARDEC

Disclaimer: These commercial establishments have no official relationship with TARDEC. We provide this information as a convenience to TARDEC visitors and conference attendees. TARDEC does not endorse or guarantee the quality or services provided by these establishments.

(NOTE: The hotel numbers correspond to locations on the map above)

- 1 - Hampton Inn, 7447 Convention Blvd., Warren, MI 48092, **586-977-7270**
- 2 - Candlewood Inn, 7010 Convention Blvd. Warren, MI 48092, **586-978-1261**
- 3 - Fairfield Inn, 7454 Convention Blvd. Warren, MI 48092, **586-939-1700**
- 4 - Sterling Inn (Best Western) {SW corner of Van Dyke and 15 Mile Rd.}, 34911 Van Dyke, Sterling Heights, MI 48310, **586-979-1400**
- 5 - Knights Inn, 7500 Miller Rd. Warren, MI 48092, **586-978-7500**
- 6 - Van Dyke Park Hotel, 31800 Van Dyke, Warren, MI 48093, **586-939-2860**
- 7 - Baymont Inn, 30900 Van Dyke, Warren, MI 48093, **586-574-0550**
- 8 - Courtyard Marriott (shuttle service to/from Metro Airport), 30190 Van Dyke, Warren, MI 48093, **586-751-5777**
- 9 - Homewood Suites, 30180 Civic Center Dr. Warren, MI 48093, **586-751-1627**
- 10 - Residence Inn, 30120 N. Civic Center Dr. Warren, MI 48093, **586-558-8050**
- 11 - Ramada Inn, 30000 Van Dyke, Warren, MI 48093, **586-573-7600**
- 12 - Studio Plus, 30125 N. Civic Center Rd., Warren, MI 48093, **586-558-5554**
- 13 - Holiday Inn Express, 11500 Eleven Mile Rd., Warren, MI 48089, **586-574-9700**