Exhibit R-2, PB 2011 Army RDT&E Budget Item Justification											DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*				R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**Base FY 2011 Estimate**	**OCO FY 2011 Estimate**	**Total FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	84.436	78.923	64.740	0.000	64.740	62.571	67.212	71.936	79.652	0	574.210
C05: *ARMOR APPLIED RESEARCH*	15.050	19.698	25.660	0.000	25.660	23.379	25.120	27.030	30.921	Continuing	Continuing
H77: *National Automotive Center*	14.002	14.465	16.515	0.000	16.515	15.144	15.489	15.785	16.082	Continuing	Continuing
H91: *Ground Vehicle Technology*	25.382	21.482	22.565	0.000	22.565	24.048	26.603	29.121	32.649	Continuing	Continuing
T26: *Ground Vehicle Technologies (CA)*	26.812	21.687	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
T31: *NAT'L AUTO CENTER APP RES INIT (CA)*	3.190	1.591	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) researches and develops automotive technologies that enable Army transformation. The PE supports the research and development of components and subsystems for ground combat/tactical vehicles in the areas of survivability (project C05), advanced automotive technology (project H77), and tank and automotive technology (project H91). Projects T26 and T31 fund congressional special interest items. Work in this PE is related to, and fully coordinated with, PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0602618A (Ballistics Technology, Robotics Technology, 0602105A (Materials Technology), and PE 0602705A (Electronics and Electronic Devices). Work in this PE is coordinated with the U.S. Marine Corps , the Naval Surface Warfare Center, and other ground vehicle developers within the Defense Advanced Research Projects Agency (DARPA) and the Departments of Energy, Commerce, and Transportation. The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.Work in this PE is performed by the Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, MI.

Exhibit R-2, PB 2011 Army RDT&E Budget Item Justification	DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602601A: *Combat Vehicle and Automotive Technology*

B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	89.036	55.937	62.831	0.000	62.831
Current President's Budget	84.436	78.923	64.740	0.000	64.740
Total Adjustments	-4.600	22.986	1.909	0.000	1.909
• Congressional General Reductions		-0.414			
• Congressional Directed Reductions					
• Congressional Rescissions		0.000			
• Congressional Adds		23.400			
• Congressional Directed Transfers					
• Reprogrammings	-3.031	0.000			
• SBIR/STTR Transfer	-1.569	0.000			
• Adjustments to Budget Years	0.000	0.000	1.909	0.000	1.909

Change Summary Explanation

FY10 Congressional directed increases.

Exhibit R-2A, PB 2011 Army RDT&E Project Justification									DATE: February 2010		
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*				R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*				PROJECT C05: *ARMOR APPLIED RESEARCH*			
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**Base FY 2011 Estimate**	**OCO FY 2011 Estimate**	**Total FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
C05: *ARMOR APPLIED RESEARCH*	15.050	19.698	25.660	0.000	25.660	23.379	25.120	27.030	30.921	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project investigates, designs, and evaluates advanced armor concepts, ballistic defeat mechanisms, and armor packaging concepts to achieve lightweight, ballistically-superior armors/structures for combat and tactical vehicles. Armors are being investigated to meet anticipated ground combat and tactical vehicle survivability objectives. Additionally, this project focuses on analysis, modeling, and characterization of potential survivability solutions that could protect against existing and emerging threats. This analysis is used to aid in the down select of technologies entering maturation and development in PE 0603005A/project 221. The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.Work in this project is performed by the Tank Automotive Research, Development, and Engineering Center (TARDEC) Warren, MI and is fully coordinated with work at the Army Research Laboratory (ARL), Aberdeen Proving Ground, MD.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	**FY 2010**	**Base FY 2011**	**OCO FY 2011**	**Total FY 2011**
Program #1	8.916	9.703	10.881	0.000	10.881
Vehicle Armor Protection for Lightweight Combat Systems: This effort designs, fabricates, and investigates add-on lightweight armor packages to protect combat systems against projectiles, warheads, penetrators and blast fragments. In FY09, developed enhancements to ground vehicle armor and third generation mine kits to reduce weight and meet objective and emerging threats; conducted and reported armor space and weight trade studies to support design of next generation add-on armor solutions; assessed blast modeling and simulation tool(s) capability for full level simulation, including impact on crew; and performed material and hull design attachment analysis and developed non-destructive inspection techniques. In FY10, perform initial testing of ground vehicle armor and third generation mine kits to meet emerging threats; analyze and evaluate material/recipes performance for various armor/mine protection areas; and provide initial characterization of next generation armor materials to identify risks for maturation; and mature improved ballistic performance armor with embedded health monitoring. In FY11, will perform armor recipe optimization to establish armor efficiency; will complete ballistic testing of selected armor systems to validate the armor design; will downselect materials/armor systems for entire vehicle protection and procure long lead items for future demonstration builds; and will mature and validate performance					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT C05: *ARMOR APPLIED RESEARCH*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
of multifunctional armor. This work is done in conjunction with program elements 0602105A, 0602618A, and 0603005A. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2 Armor for Tactical Vehicle Survivability: The objective of this effort is to develop structural and add-on armors for tactical vehicles and investigate and characterize effects of mine blasts on lightweight vehicles through modeling and simulation. In FY09, conducted final armor assessments of potential candidates such as Reliability, Availability, Maintainability (RAM) analysis, and thermal modeling for maturation and transition using demonstration vehicles; integrated test bed to assess the survivability suite by conducting analysis of the operational effectiveness modeling. Conducted electrical bench tests to study electrical integration impacts such as electromagnetic (EM) compatibility and interference caused by integration of survivability suite(s) onto vehicles. *FY 2009 Accomplishments:* FY 2009	0.631	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT C05: *ARMOR APPLIED RESEARCH*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #3 Advanced Armor Development: The objective of this effort is to investigate advanced armors for combat and tactical vehicle applications to defeat single and multiple chemical and kinetic energy (CE and KE) emerging threats. In FY09, assessed reactive armor and electromagnetic armor concepts developed under PE 0602618/ Project H80 for defeat of emerging CE and KE threats. Investigated tools and techniques for non destructive evaluation (NDE)/non destructive inspection (NDI) of dissimilar composite armor material joints. Assessed and validated modeling and simulation tools for vehicle level analysis of combat vehicles in collisions and blast threats. In FY10, continue investigation and maturation of candidate reactive and passive armor concepts for single emerging threat(s) (KE) and downselect solutions for maturation with respect to capability, weight, and ease of integration. In FY11, will validate advanced armor designs at the panel level while reducing armor weight; will improve armor recipe to meet threshold areal density while defeating threshold threat. This work is done in conjunction with program elements 0602105A, 0602618A and 0603005A. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	5.503	4.583	8.772	0.000	8.772

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT C05: *ARMOR APPLIED RESEARCH*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #4 Blast Mitigation: This effort matures modeling and simulation (M&S) tools and blast mitigation technologies to improve ground vehicle structural performance against blast threats. Tests are conducted to validate the M&S tools. In FY10, develop advanced crew protection technologies for land mine/explosive events; investigate potential techniques for 3-dimensional vehicle models and crew protection methods for land mine/explosive events; validate survivability enhancements of integral fuel tanks against objective threats; begin development of external fire suppression methods to address fuel, track, and stowage fire vulnerabilities for combat vehicles; and improve blast tolerance of automatic fire extinguishing systems. In FY11, will develop techniques for complete vehicle structure design and crew protection methods for landmine/explosive events; will investigate performance and integration of extinguishing mechanisms; will enhance fire M&S tools to incorporate new extinguishing agents, delivery systems, and predictive capabilities for ballistic events; and will increase cook-off resistance of small arms ammunition via improved stowage without compromising accessibility. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base	0.000	4.861	6.007	0.000	6.007

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT C05: *ARMOR APPLIED RESEARCH*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #5 Small Business Innovative Research/Small Business Technology Transfer Programs. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	0.551	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	15.050	19.698	25.660	0.000	25.660

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H77: *National Automotive Center*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
H77: *National Automotive Center*	14.002	14.465	16.515	0.000	16.515	15.144	15.489	15.785	16.082	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project researches and develops automotive component technologies to meet ground combat and tactical vehicle objectives. The project funds the National Automotive Center (NAC), which conducts shared government and industry technology programs to leverage commercial investments in automotive technology research and development for Army ground combat and tactical vehicle applications. The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan. Work in this project is performed by Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, Michigan and is coordinated with PE 0602705A (Electronics and Electronic Devices).

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #2	8.401	8.494	8.859	0.000	8.859
Alternative Energy: This effort leverages opportunities from industry to develop alternative energy technologies for Army applications. In FY09, investigated thermoelectric power modules on Tactical Wheeled Vehicle (TWV) platforms; continued to conduct experiments for alternative fuels qualification program for ground vehicle systems; expanded mobile micro-grid technology development program with large scale technology experiments; evaluated dual-use advanced automotive technologies on ultra-light, light, medium, and heavy tactical vehicles. Leveraged developments in 3D terrain topology modeling and verification of vehicle design tools in support of a distributed simulation capability. In FY10, investigate waste to energy technologies for application in power generation devices; pursue dual-use power and energy component development; investigate vehicle platform with high output power capabilities tied to power grid and the modeling tools needed to understand this interaction; expand development and commercialization of dual-use simulation-based tools that incorporate 3D terrain topology modeling for validation and verification of vehicle designs; and design and develop an energy storage system on hybrid electric vehicles for forward operations applications utilizing renewable energy sources and/or generator set(s).In FY11, will continue development of waste to energy technologies to reduce fuel consumption in power generation; will continue to conduct experiments with synthetic and renewable fuel blends for alternative					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H77: *National Automotive Center*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
fuels qualification program for ground vehicle systems; will expand development and commercialization of dual-use Modeling and Simulation (M&S) tools by conducting high-density hybrid engine modeling and vehicle thermal management modeling. This work is done in conjunction with program element 0602705A. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #3 Conditioned Based Maintenance (CBM) and Intelligent Systems: This effort advances condition based maintenance and intelligent systems technologies for dual use applications, including the investigation of commercial hybrid electric non-tactical vehicles on military bases to gather performance, reliability and maintainability data. In FY09, continued crash modeling and safety design for TWV's; developed and evaluated dual-use condition-based maintenance/intelligent systems M&S tools. Investigated new data collection and analysis methods for ground vehicles as systems of systems with an emphasis on robustness and focusing on creation of comprehensive vehicle CBM M&S tools. In FY10, continue to develop and evaluate dual-use CBM tools by conducting lithium-ion and lead acid battery characterization experiments and thermo electric power unit studies. In FY11, will expand development and investigation of dual-use CBM tools by developing battery prognostics and diagnostics M&S tools, as well as investigating on-board vehicle health awareness tools	2.100	2.170	2.212	0.000	2.212

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H77: *National Automotive Center*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #4 Power, Energy and Mobility: This effort investigates dual use power, energy, and mobility technologies. In FY09, conducted detailed technology investigation of fuel cell Auxiliary Power Unit (APU); conducted military specification comparison of micro-grid hardware and software; expanded energy capacity range of mobile micro-grid power control module; pursued dual-use power and energy component development including motor and generator concepts; and developed a vehicle platform with high output power capabilities tied to power grid with new vehicle based output controller strategy. Expanded development and commercialization of high-density diesel engine and vehicle thermal management Modeling & Simulation (M&S) tools and investigated new energy conversion options and propulsion system architectures. In FY10, investigate performance capabilities of commercially available technologies applied to military ground vehicle platforms in suspension, torque vectoring differentials, batteries, brakes, electrical subsystems, and alternative chassis structures; develop hybrid electric vehicle requirements and software integration to facilitate the design and development of a communication system between vehicle and the power control using intelligent software; and continue M&S efforts by modeling advanced diesel and hybrid powertrains by developing predictive M&S tools and validating methodologies. In FY11, will develop dual-use automotive subsystems and components that can be modified for application to military platforms and alternative chassis structures; will pursue power and energy component development;	3.501	3.616	3.690	0.000	3.690

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H77: *National Automotive Center*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
will design high-yield renewable energy generation technology architecture and prepare distributed generation transition criteria for PM Mobile Electric Power, and will expand development of methodologies to validate and explore true potential of proposed advanced engine technologies. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #5 Joint Recovery and Distribution System (JRaDS): In FY11, funding for DoD Joint Recovery and Distribution System (JRaDS) Joint Capability Technology Demonstration (JCTD) will reduce risk by enabling the purchase of additional prototype trailer systems and support the broader scoped Operational Military Utility Assessment. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	0.000	0.000	1.754	0.000	1.754

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H77: *National Automotive Center*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #6 Small Business Innovative Research/Small Business Technology Transfer Programs. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	0.185	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	14.002	14.465	16.515	0.000	16.515

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H77: *National Automotive Center*

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H91: *Ground Vehicle Technology*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
H91: *Ground Vehicle Technology*	25.382	21.482	22.565	0.000	22.565	24.048	26.603	29.121	32.649	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project designs, develops, and evaluates a variety of innovative and enabling technologies in the areas of vehicle concepts, virtual prototyping, power, thermal management, propulsion, mobility, survivability, vehicle diagnostics, fuels, lubricants, water purification, intelligent systems, and other component technologies for application to combat and tactical vehicles. The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.Work in this project is performed by the Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, Michigan. Efforts in this project are closely coordinated with the Army Research Laboratory (ARL), the Defense Advanced Research Projects Agency (DARPA), the U.S. Army Engineer Research, Development, and Engineering Center, Edgewood Chemical Biological Center, and the Army Medical Department.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1	3.276	6.549	6.123	0.000	6.123
Pulse Power: This effort focuses on developing technology for compact, high frequency/high energy/high power density components and devices, which are enablers for several advanced electric-based weapon systems. In FY09, evaluated pulse switches, power converters, power and energy storage, and evaluated Si-based Super Gate Turn-Off (SGTO) versus SiC-based thyristors for capability to meet power density and switching speeds required for directed energy weapons. In FY10, design and develop improved gate and bus structure design for high power applications; design and develop SGTO switch technology using SiC for high power applications. In FY11, will investigate full up Si and SiC based SGTO applications such as high power microwaves, electrified armors, and directed energy weapons applications.					
FY 2009 Accomplishments: FY 2009					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H91: *Ground Vehicle Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2 JP-8 Reformation for Military Fuel Cells: This effort investigates JP-8 reformer and desulfurization technologies so that JP-8 may be utilized as a fuel source for fuel cells used in future military vehicle power applications. In FY09, completed integration of fuel reformer for JP-8; conducted endurance and environmental experiments on a JP-8 reformer connected to fuel cell to produce power suitable for auxiliary and light robotic platform propulsion requirements. In FY10, begin tracking sulfur handling capacity and operational temperatures of JP-8 reformer, desulfurization devices, and fuel cell system; and begin design and development on all major reformer fuel cell system components to determine functionality within the claim space limitations. In FY11, will begin maturing major JP-8 reforming fuel cell system components performance and interoperability; will design and develop balance of components for the JP-8 reforming fuel cell system and ensure program specifications meet user capability requirements. This effort is done in coordination with efforts in 0603005A. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	2.404	2.065	2.104	0.000	2.104

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H91: *Ground Vehicle Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #3 Propulsion-Prime Power: The goal of this effort is to design and develop engines and generators and their components with significantly improved performance characteristics, efficiencies, and power densities. In FY09, matured hybrid electric power components for tactical wheeled vehicles; optimized control strategy for higher system power density engine design. In FY10, investigate the performance of modified commercial diesel engines with a control strategy to enable JP-8 fuel operation; and assess compact, high power density hybrid electric components performance. In FY11, will complete common rail fuel pump development and conduct durability experiments with JP-8; will complete the design and fabrication of closed-loop fuel injection system; will conduct initial fuel injection system performance tests; will begin advanced drivetrain efficiency design and development; and will advance powertrain noise abatement technology development. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	2.032	2.018	1.834	0.000	1.834

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H91: *Ground Vehicle Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #4	4.384	2.605	0.000	0.000	0.000
Non-primary Power System (NPS): This effort investigates component technologies for energy storage and generation. In FY09, investigated strategy combining energy storage and power generation components into a non-primary power system.In FY10, develop system controls for advanced power and energy system demonstrator; investigate strategies to reduce non-primary power generation system exhaust noise; and develop techniques to mitigate safety challenges for advanced energy storage devices on vehicles. This effort is done in coordination with efforts in 0603005A. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #5	4.507	3.094	6.295	0.000	6.295
Power & Thermal Management: This effort investigates power and thermal management components, including traction motors, inverters, dc-dc converters, new motor and generator concepts and control strategies to meet objective power requirements.In FY09, developed, verified, and validated power and thermal management models and simulations; designed and developed intelligent power and thermal components; and generated test and evaluation methods for intelligent power and thermal management. In FY10, develop combined power and thermal management system level architecture from modeling and simulation toolset; design and develop integrated electronic power and thermal management device/component level technology; and investigate					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H91: *Ground Vehicle Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
advanced intelligent (learning and adaptive) power management control algorithms using artificial intelligence techniques.In FY11, will develop advanced intelligent (learning and adaptive) control architecture to control multiple vehicular power sources and loads; will initiate development of reliable, cost effective, high temperature power electronic components to reduce system cooling burden. This effort is done in coordination with efforts in 0603005A. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #6 Mobility: This effort focuses on improving drive component performance and reliability through elastomer component development, to reduce the logistics burden associated with the sustainment of manned and unmanned tactical and combat vehicles. In FY09, reformulated, modeled, redesigned, and fabricated high performance track bushings; baselined the improved bushings on standard Abrams track; and initiated laboratory testing of high performance track bushings. In FY10, validate high performance bushings on a standard Abrams track through simulated endurance testing. *FY 2009 Accomplishments:* FY 2009	1.870	1.015	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H91: *Ground Vehicle Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #7 Force Projection: This effort focuses on reducing the logistics footprint by developing water generation, recovery, and purification technologies. In FY09, investigated a water from air prototype system on a mobile platform; assessed in-line and hand-held water monitoring technology to determine the capability to monitor biological and chemical contaminants; formulated and prepared single lubricant product and conducted laboratory assessment of key properties; and created fire resistant fuel formulation for JP-8 with an antimist agent and developed laboratory methods to assess key fire resistant fuel properties. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	2.605	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H91: *Ground Vehicle Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #8	0.000	2.894	4.628	0.000	4.628
Intelligent Systems Technology Research: This effort assesses improved operations of manned platforms through the application of sensing and autonomy technologies developed for unmanned systems. In FY10, determine the sensor data required to allow for safe unmanned system operations in an urban environment; develop embedded real-time dynamic mobility models that predict manned and unmanned vehicle responses and prevent unsafe mobility situations while under robotic control. In FY11, will analyze the integration of robotic sensor data into a network communication model to validate accurate vehicle operations; will develop algorithms from the fused sensor data that will allow more accurate and precise vehicle manipulation within various virtual environments and predict vehicle payload effects; will develop and evaluate approaches to enhance the capabilities for unmanned systems to work in a dynamic environment; and will develop interoperability profiles and architectures to facilitate command and control of the unmanned systems from a common warfighter machine interface. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #9	4.304	1.242	1.581	0.000	1.581
Diagnostics/Prognostics for Condition Based Maintenance: This effort focuses on reduction of maintenance time and cost by developing the tools to gather data from ground vehicles to allow more accurate diagnoses of problems, leading to prediction of failures before they occur. In FY09, developed diagnostic and prognostics					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H91: *Ground Vehicle Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
systems capabilities to monitor and anticipate component and system failures and faults; identified root-cause of failures for critical power train components on Abrams and Bradley engine and transmission; and identified and evaluated commercial monitoring sensor capabilities. Investigated capability to integrate sensors to provide more accurate diagnostics/prognostics as well as architecture to integrate into wireless networks to enable remote monitoring capability. In FY10, develop and evaluate engine and transmission algorithms to determine component and system state of health; and develop and assess engine and transmission algorithms to predict failures and report remaining useful life. In FY11, will leverage past algorithm development to create diagnostics and prognostics on power and energy components (batteries, power converters, alternators). This includes failure mode effects and analysis development, model development, root cause analysis, and algorithm updates. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Accomplishments/Planned Programs Subtotals	25.382	21.482	22.565	0.000	22.565

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT H91: *Ground Vehicle Technology*

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
T26: *Ground Vehicle Technologies (CA)*	26.812	21.687	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Ground Vehicle Technology applied research.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1	1.196	0.000	0.000	0.000	0.000
Institute for Advanced Materials and Manufacturing Strategies (IAMMS): This Congressional Interest Item conducted research to develop advanced manufacturing methods and materials and produced innovative products for potential use by the military. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2	1.595	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
DoD Hydrogen PEM Fuel Cell Medium/Heavy Duty Vehicle Demonstration Program: This one-year Congressional Add conducted root cause failure analysis of the fuel cells powering six transit buses nationwide. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #3 Rapid Up-Armor Synthesis and Crashworthiness Design for Improved Soldier Survivability: This Congressional Interest Item developed numerical tools to design multi-scale materials for structural applications, and investigated new computational design methodologies for improved soldier survivability. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base	1.196	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #4 Nanofluids for Advanced Military Mobility: In FY09 this Congressional Interest Item investigated military grade petroleum, lubricant and oil products with nanoparticles for improvements to properties. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.797	0.497	0.000	0.000	0.000
Program #5 HEV Battery System for Future Combat System: This Congressional Interest Item investigated reduced weight and volume Li-Ion batteries. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	1.595	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #6 Condition Based Maintenance and Mission Assuredness for Ground Vehicles: This Congressional Interest Item developed neural network based simulation models for condition based management. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	2.392	0.000	0.000	0.000	0.000
Program #7 Improved EFP & IED Prot, Testing, Modeling & Proving Using Lithia Alumina Silica (LAS) Glass Ceramics: This Congressional Interest Item developed lightweight ceramic crystallite-reinforced glass for lighter weight, lower cost ballistic windows to protect against IEDs and EFPs.	2.392	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #8 Remote Unmanned Vehicle Checkpoint System: This Congressional Interest Item developed a system to exploit ultra-wideband technology to provide tracking and autonomous robotic vehicle navigation in enclosed spaces. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.997	0.000	0.000	0.000	0.000
Program #9	2.492	3.183	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Turbo Fuel Cell Engine: In FY09 this Congressional Interest Item investigated a turbo that uses the exhaust heat from the fuel cell to improve fuel cell engine performance. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #10 Integrated Vehicle Health Monitoring System: This Congressional Interest Item investigated an embedded sensor integration module to collect performance data with the capability host prognostic/diagnostic algorithms. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base	1.595	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #11 Automotive Tribology Center. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	1.592	0.000	0.000	0.000
Program #12 Smart Oil Sensor. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	0.000	2.388	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #13 Automotive Technology Tactical Metal Fabrication System. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	2.487	0.000	0.000	0.000
Program #14 Advanced Composite Materials Research for Air and Ground Vehicles. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009	0.000	2.785	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #15 Vehicle Systems Engineering and Integration Activities. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	7.959	0.000	0.000	0.000
Program #16 Center for Advanced Vehicle Design and Simulation. This is a Congressional Interest Item.	0.797	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #17 Center for Advanced Vehicle Technology and Fuel Development: This Congressional Interest Item developed new materials to be used in Li-ion batteries focused on advanced material chemistry. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.797	0.000	0.000	0.000	0.000
Program #18	0.997	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Extended Lifecycle Management Environment: This Congressional Interest Item extended the existing Data Management (DM) capabilities within the TARDEC Advanced Collaborative Environment (ACE), by providing enhanced program data management of requirements documents. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #19 Globally Accessible Manufacturing Activity (GAMMA) for Military Repair Parts. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base	1.595	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #20 Tactical Metal Fabrication System (TacFab): In FY09, this Congressional Interest Item researched the possibility of casting parts in the field faster by reverse engineering broken parts into a 3D model needed to create a new part. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	1.993	0.796	0.000	0.000	0.000
Program #21 Illinois Center for Defense Manufacturing: This Congressional Interest Item researched and developed advanced manufacturing processes and technologies for Army benefit. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	1.994	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #22 Advanced Manufacture of Lightweight Materials and Components: This Congressional Interest Item researched and developed manufacturing processes for lightweight, self-healing and self-lubricating materials for potential Army vehicle applications. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	2.392	0.000	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	26.812	21.687	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T26: *Ground Vehicle Technologies (CA)*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T31: *NAT'L AUTO CENTER APP RES INIT (CA)*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
T31: *NAT'L AUTO CENTER APP RES INIT (CA)*	3.190	1.591	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for National Automotive Center applied research.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1	1.595	0.000	0.000	0.000	0.000
Military Fuels Research: In FY09, this Congressional Interest Item researched technology for production of military fuels from non-petroleum sources and employing Fischer-Tropsch (FT). *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2	1.595	1.591	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602601A: *Combat Vehicle and Automotive Technology*	PROJECT T31: *NAT'L AUTO CENTER APP RES INIT (CA)*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Ultra Light Weight Transmission for FCS: In FY09, this Congressional Interest Item investigated an ultra light weight transmission for combat vehicles. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Accomplishments/Planned Programs Subtotals	3.190	1.591	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.