Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification								DATE: May 2009		
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 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	87.144	89.036	55.937						Continuing	Continuing
C05: ARMOR APPLIED RESEARCH	9.169	15.437	19.801						Continuing	Continuing
H77: National Automotive Center	13.717	14.178	14.541						Continuing	Continuing
H91: Ground Vehicle Technology	29.483	25.434	21.595						Continuing	Continuing
T26: Ground Vehicle Technologies (CA)	20.284	24.219	.000						Continuing	Continuing
T31: NAT'L AUTO CENTER APP RES INIT (CA)	14.491	9.768	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) researchs 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 2010 Army RDT&E Budget Item Justification	DATE: May 2009
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 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	93.622	55.234	59.496	
Current BES/President's Budget	87.144	89.036	55.937	
Total Adjustments	-6.478	33.802	-3.559	
Congressional Program Reductions	.000	-.298		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	34.100		
Total Reprogrammings	-4.682	.000		
SBIR/STTR Transfer	-1.796	.000		

Change Summary Explanation

FY09 funding increase is due to congressional adds.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER C05	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
C05: ARMOR APPLIED RESEARCH	9.169	15.437	19.801						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 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Small Business Innovative Research/Small Business Technology Transfer Programs.	.000	.388	.000	
Armor for Tactical Vehicle Survivability: The objective of this effort is to evaluate structural and add-on armors for tactical vehicles and investigate and characterize effects of mine blasts on lightweight vehicles using modeling and simulation. In FY08, assessed new armor solutions for implementation into tactical wheeled vehicle (TWV) survivability (0603005A). Assessed optimized armor/non-armor survivability technologies as a layered survivability suite for FY09 testing and potential demonstration platform(s). In FY09, conduct final armor assessments of potential candidates for maturation and transition using demonstration vehicles; and fabricate test bed(s) to assess the integrated survivability suite(s). Conduct electrical bench tests to study electrical integration impacts such as electromagnetic (EM) compatibility and interference caused by integration of survivability suite(s) onto vehicles.	.647	.630	.000	
Advanced Armor Development:	.000	5.503	4.601	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
The objective of this effort is to investigate advanced armors (primarily reactive and electromagnetic solutions) for combat and tactical vehicle applications to defeat single and multiple chemical and kinetic energy (CE and KE) emerging threats. In FY09, assess reactive armor and electromagnetic armor concepts developed under PE 0602618/Project H80 for defeat of emerging CE and KE threats. Investigate tools and techniques for non destructive evaluation (NDE)/non destructive inspection (NDI) of dissimilar material joints. Assess and validates modeling and simulation (M&S) tools for vehicle level analysis of combat vehicles in collisions and blast threats. In FY10, will continue to investigate and test candidate reactive and passive armor concepts for single emerging threat (KE) and downselect solutions for maturation with respect to capability, weight, and ease of integration.				
Vehicle Armor Protection for Lightweight Combat Systems: This effort designs, fabricates, and evaluates add-on lightweight armor packages to protect combat systems against projectiles, warheads, penetrators and blast fragments. In FY08, demonstrated optimized second generation add-on armor (upgraded performance B-Kit armor package for objective projectile, fragment, and mine threats at reduced weights) and structure configurations for future combat vehicles; conducted ballistic tests to verify final armor designs and integrated into second generation full sized concept vehicle structure (spaceframe demonstrator). In FY09, develop enhancements to ground vehicle armor and third generation mine kits to reduce weight and meet objective and emerging threats; conduct and report armor space and weight trade studies to support design of next generation add-on armor solutions; assess blast modeling and simulation tool(s) capability for full level simulation, including impact on crew; and perform material and hull design attachment analysis and develop non-destructive evaluation and inspection techniques. In FY10, will perform initial testing of third generation armor systems to meet emerging threats; will analyze and evaluate material/recipes performance for various armor/mine protection areas; and will provide initial characterization of next generation armor materials to identify risks for maturation; and will build improved ballistic performance armor with embedded health monitoring. This work is done in conjunction with program elements 0602105A, 0602618A, and 0603005A.	8.522	8.916	10.313	
Blast Mitigation: This effort matures modeling and simulation (M&S) tools to predict ground vehicle structural performance against blast threats. Tests are also conducted to validate the M&S tools.	.000	.000	4.887	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER C05

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10, will develop advanced crew protection technologies for land mine/explosive events; will investigate potential techniques for 3-dimensional vehicle design and crew protection methods for land mine/explosive events; will validate survivability enhancements of integral fuel tanks against objective threats; will begin development of external fire suppression methods to address fuel, track, and stowage fire vulnerabilities for combat vehicles; and will improve blast tolerance of automatic fire extinguishing systems.				
Total	9.169	15.437	19.801	

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 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER H77	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
H77: National Automotive Center	13.717	14.178	14.541						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.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Alternative Energy: This effort leverages opportunities from industry to develop alternative energy technologies for Army applications. In FY08, developed thermoelectric power modules using waste exhaust heat to power low current sensing devices; conducted qualification experiments for alternative fuels program for ground vehicle systems; and developed mobile micro-grid Electronic Power Conditioning Control (EPCC) module. In FY09, evaluate thermoelectric power modules on Tactical Wheeled Vehicle (TWV) platforms; continue to conduct qualification experiments for alternative fuels program for ground vehicle systems; expand mobile micro-grid technology development program with large scale technology demonstration; evaluate dual-use advanced automotive technologies on ultra-light, light, medium, and heavy tactical vehicles. Leverage developments in 3D terrain topology modeling and verification of vehicle designs tools in support of a distributed simulation capability. In FY10, will investigate waste to energy technologies for application in power generation devices; will pursue dual-use power and energy component development; will evaluate vehicle platform with high output power capabilities tied to power grid with new vehicle based output controller strategy; will expand development and commercialization of dual-use simulation-based tools that incorporate 3D terrain topology modeling for validation and verification of vehicle designs; and will design and build an energy storage system on hybrid electric vehicles for forward operations applications utilizing renewable energy sources and/or generator set.	8.232	7.908	8.724	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Small Business Innovative Research/Small Business Technology Transfer Programs.	.000	.177	.000	
Conditioned Based Maintenance (CBM) and Intelligent Systems: This effort advances condition based maintenance and intelligent systems technologies for dual use applications, including the evaluation of commercial hybrid electric non-tactical vehicles on military bases to gather performance, reliability and maintainability data. In FY08, developed and evaluated inline oil sensing technology to provide condition data including viscosity, oxidation, and lubricant contaminants. In FY09, continue crash modeling and safety design for TWV's; develop and evaluate dual-use condition-based maintenance/intelligent systems M&S tools. Evaluate 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, will 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.	2.055	2.103	2.181	
Power, Energy and Mobility: This effort investigates dual use power, energy, and mobility technologies. In FY08, expanded hybrid-hydraulic hybrid technology light tactical vehicle and fuel cell alternative power unit on-vehicle investigations; and pursued dual-use power and energy component development. In FY09, conduct detailed technology evaluation of fuel cell APU; conduct military specification comparison of micro-grid hardware and software; expand energy capacity range of mobile micro-grid power control module; pursue dual-use power and energy component development including motor and generator concepts; and develop vehicle platform with high output power capabilities tied to power grid with new vehicle based output controller strategy. Expand development and commercialization of high-density diesel engine and vehicle thermal management M&S tools and investigate new energy conversion options and propulsion system architectures. In FY10, will evaluate 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; will develop hybrid electric vehicle requirements and software integration to facilitate the design and build of a communication system between vehicle and the power control using intelligent software. Continue M&S efforts by modeling advanced diesel and hybrid powertrains by developing predictive M&S tools and optimization methodologies.	3.430	3.990	3.636	
Total	13.717	14.178	14.541	

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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 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER H91	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
H91: Ground Vehicle Technology	29.483	25.434	21.595						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 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 2008	FY 2009	FY 2010	FY 2011
Non-primary Power System (NPS): This effort investigates component technologies for energy storage and generation. In FY09, investigate optimal strategy combining energy storage and power generation components into a non-primary power system. In FY10, will develop system controls for advanced power and energy system demonstrator; will investigate strategies to reduce non-primary power generation system exhaust noise; and will develop techniques to mitigate safety challenges for advanced energy storage devices on vehicles. This effort is done in coordination with efforts in 0603005A.	.000	4.384	2.619	
Propulsion-Prime Power: The goal of this effort is to design engines and generators and their components with significantly improved performance characteristics, efficiencies, and power densities. In FY08, completed fabrication of the Opposed Piston/Opposed Cylinder (OPOC) engine and performed fuel economy optimization: initiated OPOC engine performance and durability test demonstration. Initiated concept analysis for design	7.594	2.032	2.029	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
of a tactical wheeled vehicle (TWV) engine for lower heat rejection and higher system power density. Initiated concept analysis for design of a fuel injection system for heavy fuel operation. In FY09, perform hybrid electric power component test and evaluation (T&E) for TWV; optimize control strategy for higher system power density engine design. In FY10, will evaluate the performance of modified commercial diesel engines with control strategy to enable JP-8 fuel operation; and will assess compact, high power dense hybrid electric components performance environment.				
Small Business Innovative Research/Small Business Technology Transfer Programs.	.000	.052	.000	
JP-8 Reformation for Military Fuel Cells: This effort investigates JP-8 reformer and desulphurization technologies so that JP-8 can be utilized as a fuel source for fuel cells used in future military vehicle power applications. In FY08, optimized a logistics fuel reformer sized to transportable system for processing JP-8 for fuel cell use. In FY09, complete integration of fuel reformer system for JP-8; conduct endurance and environmental testing on JP-8 reformer connected to fuel cell to produce power suitable for auxiliary and light robotic platform propulsion requirements. In FY10, will begin tracking sulfur handling capacity and operational temperatures of JP-8 reformer, desulfurization devices and fuel cell system; will begin development on all major reformer fuel cell system components to ensure functionality within the claim space limitations; and will finalize test plan for JP-8 reforming fuel cell system. This effort is done in coordination with efforts in 0603005A.	5.806	3.900	2.076	
Hybrid Electric Vehicle Components: The objective of this effort is to design, fabricate, and evaluate components for energy storage, power distribution and power management. In FY08, designed and fabricated high power density DC-DC converter using silicon carbide (SiC); demonstrated innovative thermal management techniques achieving superior heat rejection rates and high inlet coolant temperatures compatible with SiC technologies; and conducted computational fluid dynamics analysis on cooling systems to optimize their integration in vehicle platforms.	4.701	.000	.000	
Pulse Power: This effort focuses on providing technology for compact, high frequency/high energy/high power density components and devices, which are enablers for several advanced electric-based weapon systems.	2.177	3.276	6.583	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009			
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 NUMBER H91	
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
In FY08, increased pulse width of Si and SiC switches by 10X, increased power density of converters by 3X, and increased power density for batteries and capacitors by 2X to provide compact power conditioning and energy/power storage for applications such as EM gun, laser, and other directed energy weapons. In FY09, evaluate pulse switches, power converters, and power, and energy storage. Evaluate Si-based Super Gate Turn-Off (SGTO) versus SiC-based thyristors for capability to meet power density and switching speeds required for High Energy Laser application. In FY10, will develop improved gate and bus structure design for high power applications; will develop SGTO switch technology using SiC for high power applications.					
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 the occur. In FY08, developed diagnostic/prognostic algorithms for ground vehicle condition based maintenance. In FY09, develop diagnostic and prognostics systems capabilities to monitor and anticipate component and system failures and faults; identify root-cause of failures for critical power train components of Abrams and Bradley engine and transmission; and evaluate and identify commercial monitoring sensor capabilities. Investigate 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, will develop and evaluate engine and transmission algorithms to determine component and system state of health; and will develop and assess engine and transmission algorithms to predict failures and report remaining useful life.		1.300	4.433	1.242	
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, develop, verify, and validate power and thermal management models and simulation; design and develop intelligent power and thermal components; and generate test and evaluation plan for intelligent power and thermal management. In F10, will develop combined power and thermal management system level architecture from modeling and simulation toolset; will design and develop integrated electronic power and thermal management device/component level technology; and will investigate advanced intelligent (learning and adaptive) power management control algorithms using artificial intelligence techniques. This effort is done in coordination with efforts in 0603005A.		.000	3.507	3.110	
Force Projection:		5.212	2.855	.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
This effort focuses on reducing the logistics footprint by developing water generation, recovery, and purification technologies. In FY08, developed and tested alternative disinfection technology for water purification; analyzed rate and transformation of water contaminants for reduced health risks and improved water quality. In FY09, investigate a water from air prototype system on a mobile platform; assess in-line and hand-held water monitoring technology to determine the capability to monitor biological and chemical contaminants; formulate and prepare single lubricant product and conduct laboratory assessment of key properties; and create Fire Resistant Fuel formulation for JP-8 with antimist agent and develop laboratory methods to assess key Fire Resistant Fuel properties.				
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, will analyze the sensor data required to allow for safe unmanned system operations in an urban environment; and will use modeling and simulation to develop embedded real-time dynamic mobility models to predict manned and unmanned vehicle responses to prevent unsafe mobility situations while under robotic control.	.000	.000	2.906	
Mobility: This effort focuses on improving drive component performance and reliability, fuels and lubricants, minefield clearance, counter obstacle bridging, and gap crossing technologies to reduce the logistics burden associated with the sustainment of manned and unmanned tactical and combat vehicles. In FY08, completed technical and economic feasibility report for single lubricant technology, developed additives, and identified synthetic base stocks for making a single lubricant; completed Abrams track bushings failure analysis and track elastomer laboratory. In FY09 reformulate, model, redesign, and fabricate high performance track bushings; install the improved bushings onto standard Abrams track; and initiate laboratory testing of high performance track bushings. In FY10, will test new high performance bushings on a standard Abrams track to validate track system durability improvements.	2.693	.995	1.030	
Total	29.483	25.434	21.595	

C. Other Program Funding Summary ($ in Millions)

N/A

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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 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER T26	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**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)	20.284	24.219	.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 2008	FY 2009	FY 2010	FY 2011
Nano-Engineered Multi-Functional Transparent Armor	.773	.000	.000	
Light Weight Composite Brake for Armored Wheeled Vehicles	.772	.000	.000	
Center for Advanced Vehicle Design and Simulation	1.545	.000	.000	
Digital Engine/Hydraulic Valve Actuation Technology	.773	.000	.000	
Secure Mobile MANET System	1.159	.000	.000	
Institute for Advanced Materials and Manufacturing Strategies (IAMMS)	2.319	1.163	.000	
SkyPure-Water from Air	1.545	.000	.000	
Automotive Research Equipment Purchase	1.545	.000	.000	
DoD Hydrogen PEM Fuel Cell Medium/Heavy Duty Vehicle Demonstration Program	3.091	1.550	.000	
Extreme-Condition Vehicle Tribology for Military Vehicle Technology at Northwestern University	.966	.000	.000	
Quick Reaction Advanced Tactical Vehicle Technology	2.705	.000	.000	
Rapid Up-Armor Synthesis and Crashworthiness Design for Improved Soldier Survivability	1.546	1.163	.000	
Center for Tribology and Coatings	1.545	.000	.000	
Nanofluids for Advanced Military Mobility	.000	.775	.000	
Ground Vehicle Reliability Modeling for Condition Based Maintenance	.000	.775	.000	
Fire Resistant Fuels (pending transfer to 0603005A)	.000	3.100	.000	

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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 NUMBER T26

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
HEV Battery System for Future Combat System	.000	1.550	.000	
Condition Based Maintenance and Mission Assuredness for Ground Vehicles	.000	2.325	.000	
Improvied EFP & IED Prot,Testing,Modeling & Proving Using Lithia Alumina Silica (LAS) Glass Ceramics	.000	2.325	.000	
Ultra Light Weight Transmission for FCS	.000	1.549	.000	
Remote Unmanned Vehicle Checkpoint System	.000	.969	.000	
Turbo Fuel Cell Engine	.000	2.422	.000	
Integrated Vehicle Health Monitoring System	.000	1.550	.000	
SBIR/STTR	.000	.678	.000	
Superlattice Semiconductors for Mobile SS Lighting and Solar Power Applications (pending transfer to 0603005A)	.000	2.325	.000	
Total	20.284	24.219	.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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER T31	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**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)	14.491	9.768	.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 2008	FY 2009	FY 2010	FY 2011
Tactical Metal Fabrication System (TacFab)	2.319	1.937	.000	
Extended Lifecycle Management Environment	.000	.969	.000	
Illinois Center for Defense Manufacturing	.000	1.938	.000	
Advanced Manufacture of Lightweight Materials and Components	1.545	2.325	.000	
Globally Accessible Manufacturing and Maintenance Activity (GAMMA)	2.319	.000	.000	
Military Fuels Research	1.545	1.550	.000	
Hydraulic Hybrids, Advanced Materials, and Multi-fuel Engine Research (HAMMER) Program	3.864	.000	.000	
Light Utility Vehicle	.966	.000	.000	
Advanced Digital Hydraulic Hybrid Drive System	1.933	.000	.000	
Center for Advanced Vehicle Technology and Fuel Development	.000	.775	.000	
SBIR/STTR	.000	.274	.000	
Total	14.491	9.768	.000	

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER T31

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.