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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)							DATE February 2000		
BUDGET ACTIVITY 3 - Advanced Technology Development				PE NUMBER AND TITLE 0603772A Advanced Tactical Computer Science and Sensor Technology					
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	18406	27392	15613	20462	22316	20594	26176	Continuing	Continuing
D101 Tactical Automation	13261	17989	10444	15367	16746	15448	19575	Continuing	Continuing
D243 Sensors and Signal Processing	5145	6460	5169	5095	5570	5146	6601	Continuing	Continuing
D285 Collaborative Telemaintenance	0	2943	0	0	0	0	0	0	2943

A. Mission Description and Justification: This program element develops and demonstrates technologies that provide solutions to command and control (C2), data correlation, tactical surveillance, and combat identification problems. Specifically, this program addresses technologies to provide integrated battlefield situation awareness (SA); synchronization of combined arms forces; synchronization of joint forces; C2 on-the-move; correlation of intelligence data from airborne and space-based sensors; remote projection of maintenance expertise for rapid system repair and reduced logistics footprint; unmanned air vehicle surveillance; and hostile weapons location. Command Post XXI (CP XXI) will provide the enabling technology for the Future Combat Systems (FCS) to have a mobile command post. The US Army Communications-Electronics Research, Development, and Engineering Center, Fort Monmouth, NJ primarily manages this PE. Work in this program element is consistent with the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and Project Reliance. Work in this program element is related to and fully coordinated with efforts in PE 0602783A (Computer and Software Technology), PE 0602782A (Command, Control and Communications Technology), PE 0603006A (Command, Control and Communications Advanced Technology), PE 0602709A (Night Vision Technology), PE 0603710A (Night Vision Advanced Technology), and PE 0602120A (Electronic Surveillance and Fuzing Technology) in accordance with the ongoing Reliance joint planning process.

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<u>B. Program Change Summary</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>
Previous President's Budget (<u>FY 2000 /2001 PB</u>)	18257	22610	19111
Appropriated Value	18456	27610	
Adjustments to Appropriated Value			
a. Congressional General Reductions	-199		
b. SBIR / STTR	-341		
c. Omnibus or Other Above Threshold Reductions		-87	
d. Below Threshold Reprogramming	+562		
e. Rescissions	-72	-131	
Adjustments to Budget Years Since (<u>FY 2000 /2001 PB</u>)			-1774
New Army Transformation Adjustment		TBD	-1724
Current Budget Submit (<u>FY 2001 PB</u>)	18406	27392	15613

Change Summary Explanation: Funding – FY 2001: Projects were adjusted to reflect the new Army Transformation.

UNCLASSIFIED

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BUDGET ACTIVITY 3 - Advanced Technology Development				PE NUMBER AND TITLE 0603772A Advanced Tactical Computer Science and Sensor Technology				PROJECT D101		
COST (In Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
D101	Tactical Automation	13261	17989	10444	15367	16746	15448	19575	Continuing	Continuing
<p>Mission Description and Justification: This is the Army's major science and technology program to provide the architecture and products to implement the digitized battlefield and establish information dominance for US ground forces. It develops advanced computer science and technology solutions to address Army-unique command and control (C2) deficiencies in the area of combined arms operations. Specifically, this project develops technology solutions for digital information transfer and display of horizontal battlefield situation awareness data; synchronization of combined and joint forces; and C2 on-the-move. Key technologies used include: expert-system and artificial-intelligent-agent decision support technology; advanced database and distributed database architectures; data compression; advanced man-machine interfacing; robust information filtering; advanced information display technology; dynamic digital terrain display and manipulation; and automated navigation/geopositioning. Major program goals include improved force synchronization and fratricide reduction through the development and display of a common battlefield view. The Battlespace C2 (BC2) advanced technology demonstration (ATD) will apply technologies for common view of the battlefield to develop prototype software capabilities and architectures supporting the Army digital battle staff requirements for merging situation awareness and battle command with mission planning/rehearsal and battlefield visualization capabilities. The CP XXI ATD will demonstrate digital C2 hardware and software technologies for a functionally and physically agile, rapidly deployable, split-based headquarters. This will enable commanders to execute distributed operations. CP XXI also will provide enabling technologies for FCS. The Logistics C2 (Log C2) ATD will develop course-of-action analysis and support software tools for combat service support and operational commanders. Joint developer/user warfighting demonstrations will be conducted in conjunction with the Mounted, Dismounted, Battle Command, and Combat Service Support Battle Labs. Products will be transitioned to Program Executive Offices (PEOs) (e.g., Command, Control and Communications Systems (C3S), etc.) for integration within their systems and subsequent fielding.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 5328 – Defined/demonstrated information and data flow requirements, command and control element interfaces, and transitional data requirements to provide faster, more accurate, more intuitive mission tailored information to the commander/staff at brigade, division and corps level. • 3663 – Conducted modeling and simulation supporting critical event course of action analysis to streamline mission planning and rehearsal timelines and provide more rapid mission order execution. • 4020 – Conducted systems architecture analyses for multi-echelon command and control functions in a Joint environment. • 250 – Determined logistics operations planning criteria (LOPC) and combat service support (CSS) data requirements critical for the development of automatic decision support tools needed to reduce planning times for the Force XXI decision cycle. <p>Total 13261</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 4877 – Scale, tailor and expand visualization products/tools to the battalion/company level to provide faster, more accurate, more intuitive mission tailored information to the commander/staff at brigade/division level. 										
Project D101		Page 3 of 7 Pages				Exhibit R-2A (PE 0603772A)				

UNCLASSIFIED

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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603772A Advanced Tactical Computer Science and Sensor Technology	PROJECT D101
<p>FY 2000 Planned Program: (continued)</p> <ul style="list-style-type: none"> • 3019 – Develop a human-in-the-loop simulation capability to provide real-time course of action analysis (COAA) and revision during its execution within a wargame simulation. • 3715 – Demonstrate execution monitoring tools which monitor mission plans and alert commanders to significant variation in expectations or execution of the plan, thereby allowing repair/modification of mission plans and resynchronization of forces as required. • 2112 – Demonstrate automated decision support software tools to enable combat commanders to plan weapon system crewing. – Demonstrate enhanced logistics COAA capability for reduced planning time and increased number of operational scenarios evaluated. • 1943 – Select technologies and develop architecture approach for a command post capable of dispersed, highly mobile and on-the-move operation. – Develop semi-automated course of action (COA), COAA, and data warehousing capabilities • 1986 – The objective of this one year congressional special interest effort is to develop enhanced physical and communications security features and improve the ruggedness of the handheld Digital Intelligence Situation Mapboard, which will interchange and display map-based situational awareness information among individual dismounted soldiers and base stations. • 337 – Small Business Innovation Research / Small Business Technology Transfer Programs <p>Total 17989</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 4420 – Demonstrate deliberate COA software with logistics data inputs and automatic alerts for rapid replanning. – Demonstrate decision support software that optimizes weapon system management based on current fuel, ammunition and major end item situational awareness to improve readiness and resource utilization. • 6024 – Demonstrate in the laboratory initial semi-automated COA and COAA tools for a command post capable of dispersed, highly mobile and on-the-move operation. <p>Total 10444</p>		
Project D101	Page 4 of 7 Pages	Exhibit R-2A (PE 0603772A)

UNCLASSIFIED

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BUDGET ACTIVITY 3 - Advanced Technology Development				PE NUMBER AND TITLE 0603772A Advanced Tactical Computer Science and Sensor Technology				PROJECT D243				
COST (In Thousands)				FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
D243 Sensors and Signal Processing				5145	6460	5169	5095	5570	5146	6601	Continuing	Continuing
<p>Mission Description and Justification: The objective of this project is to develop and demonstrate advanced radar and signal processing technologies for reconnaissance, surveillance, target acquisition, counter battery, and navigation applications. Multi-mission, common module, unmanned aerial vehicle (UAV) sensors ATD will demonstrate an interchangeable, lightweight, low cost synthetic aperture/moving target indicator radar (SAR/MTI) and electro-optic/infrared sensor payload (being developed in PE 0603710A) to provide manned and tactical unmanned air vehicles with wide area, all weather surveillance capability. A new generation of ultra-wideband radar, jointly developed by the Army, DARPA, and Air Force, will provide foliage and ground penetrating technology for aerial surveillance and targeting. An electronically scanned radar will be demonstrated to provide army reconnaissance and attack helicopters with a highly reliable, affordable, multirole sensor for targeting, combat identification, and terrain avoidance.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 3614 – Completed SAR/MTI receiver, transmitter component and antenna array design. <ul style="list-style-type: none"> – Completed SAR and MTI mode algorithm definition . – Completed built-in test (BIT) and calibration mode design. – Completed design of gimbal/payload housing with mechanical and electrical interfaces defined. • 1531 – Completed frequency allocation coordination with National Telecommunications and Information Administration and Federal Aviation Administration for the foliage penetration (FOPEN) system. <ul style="list-style-type: none"> – Completed final design review of all FOPEN hardware and software – Airworthiness Release documents reviewed to include Electrical Load Analysis, Substantiation Reports, Certification Plan, Flutter Analysis and Structural Analysis – Completed installation of very high frequency antenna feed networks in RC-12D – Completed bench testing of ground control and display station components <p>Total 5145</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 3876 – Complete MTI/SAR sensor development, subsystem integration and perform laboratory bench testing to verify functionality. <ul style="list-style-type: none"> – Test sensor payloads under environmental extremes for shock, vibration, temperature, altitude, etc. – Develop and test mechanical interface for “plug in/plug out” modularity, electrical interface to include cables, connectors, power, etc, and informational interface to include datalinks, command and control, mission planning, and ground checkout. 												
Project D243				Page 5 of 7 Pages				Exhibit R-2A (PE 0603772A)				

UNCLASSIFIED

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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603772A Advanced Tactical Computer Science and Sensor Technology	PROJECT D243
FY 2000 Planned Program: (continued)		
<ul style="list-style-type: none"> • 2435 • 149 Total 	<ul style="list-style-type: none"> – Conduct instrumented flight testing under dynamic flight conditions to characterize MTI/SAR sensor performance in surveillance and targeting roles. – Conduct engineering flight tests to characterize the capabilities of the FOPEN SAR in detecting tactical targets hidden by foliage and/or camouflage cover. – Refine the algorithms to reduce false alarms to enhance the effectiveness of the automatic target detection and cueing in providing valid targets. – Conduct verification test to evaluate the achieved performance against the exit criteria and determine the readiness of a FOPEN SAR for participation in operational demonstration. – Small Business Innovation Research / Small Business Technology Transfer Programs 	
FY 2001 Planned Program:		
<ul style="list-style-type: none"> • 3177 • 1992 Total 	<ul style="list-style-type: none"> – Complete airborne testing of multimission UAV MTI/SAR sensor payload and data collection and verify performance through data analysis. – Participate in operational demos for military assessment of multifunctional sensor suite on tactical UAV. – Evaluate ground post processing of FOPEN data with a goal of reducing the clutter false alarms by an order of magnitude such that the image analyst can effectively discriminate tactical targets embedded in heavy foliage. – Conduct user tests to demonstrate the real-time application of a FOPEN SAR to meet the need of an all weather detection of concealed threat targets. – Demonstrate/validate the concept of operation for using the FOPEN SAR to support the mission of potential users such as European Command, Southern Command, and Drug Enforcement Administration. 	

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BUDGET ACTIVITY 3 - Advanced Technology Development				PE NUMBER AND TITLE 0603772A Advanced Tactical Computer Science and Sensor Technology				PROJECT D285		
<i>COST (In Thousands)</i>	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
D285 Collaborative Telemaintenance	0	2943	0	0	0	0	0	0	2943	
<p><u>Mission Description and Justification</u> This one year Congressional special interest project expands and validates CECOM's telemaintenance pilot. This capability is needed to project maintenance expertise remotely anywhere, anytime, to rapidly solve fielded system diagnostic and repair problems. The goal is to reduce the cost and logistics footprint associated with current manually-based maintenance methods.</p> <p>FY 1999 Accomplishments: Project not funded in FY 1999.</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 2864 – Design, develop, integrate, and validate the architecture for a collaborative Telemaintenance capability. • 79 – Small Business Innovation Research / Small Business Technology Transfer Programs <p>Total 2943</p> <p>FY 2001 Planned Program: Project not currently funded in FY 2001.</p>										
Project D285			<i>Page 7 of 7 Pages</i>			Exhibit R-2 (PE 0603772A)				