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<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)</b>	DATE <b>February 2000</b>
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<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>	<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>
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COST <i>(In Thousands)</i>	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	19618	23836	49316	97718	60598	78489	64036	Continuing	Continuing
D097 C3I Interoperability Network Activity	4693	3122	1896	1907	1814	1818	1823	Continuing	Continuing
D098 Tactical Radio Accessories	451	0	2186	0	0	0	0	0	2637
D485 C4I Systems Certification	4559	5268	3998	3985	3853	3851	3850	Continuing	Continuing
D589 Army Systems Engineering & Warfighter Technical Support	9915	7709	8411	8422	8609	8669	8667	Continuing	Continuing
D591 Weapons System Technical Architecture	0	1055	2455	2395	2363	1320	1319	Continuing	Continuing
D615 JTRS Ground Domain Integration	0	4867	28542	79171	42117	62831	48377	80000	345905
D629 Tactical Communications System-Engineering Development	0	1815	1828	1838	1842	0	0	0	7323

**A. Mission Description and Justification:** This PE supports efforts to develop interoperability of Army programs and products, horizontally and vertically for the digitized battlefield. Project D097 supports development of the C4I Interoperability Network. Also included is the Army portion of engineering development efforts is support of the Combat Survivor Evader Locator System (CSEL) in Project D098. This includes follow-on programs to demonstrated technologies evolving from Wireless Network Access, Communications Network Planning and Management and initiatives to establish a Multiband Radio Integrated testbed. Project D485 supports C4I Systems Certification. It evaluates system's interoperability for the Army XXI battlefield digitization effort, in support of the Vice Chief of Staff of the Army (VCSA) and Army Acquisition Executive (AAE), to identify interoperability issues, develop certification recommendations, and provide architecture assessments by the Digital Integration Lab (DIL). Project D589 Army Systems Engineering & Warfighter Technical Support efforts is recommended by the Army Science Board and directed by the Army Acquisition Executive (AAE) and Vice Chief of Staff of the Army (VCSA). The ASE provides essential technology expertise on all Systems Engineering and Technical Architecture (SE/TA) matters critical to gain Information Dominance and foster interoperability among all Army systems. The Weapons Systems Technical Architecture, Project D591, supports development of the Joint Technical Architecture-Army (JTA-A) which provides the 'building code' foundation for designing, building, fielding, and supporting interoperable systems in an expedient and cost-effective manner. The Near -Term Digital Radio System (NTDRS) is not a new start: It was funded in PE0603713A, D370 in FY1999 & prior and in D615 FY2000. The Army development effort for the Joint Tactical Radio System (JTRS) hardware is funded in D615 in FY 2001-2005. Project D629, Tactical Communications System – Demonstration Validation, provides for insertion of selected proven communications technology from program elements 0602782A, Project AH92 applied research and 0603006A, advanced technology development, into the next phase of development. Note: This is not a new start effort, previously this effort was funded under PE/Proj. 0603805A/D246.



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COST ( <i>In Thousands</i> )	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D097 C3I Interoperability Network Activity	4693	3122	1896	1907	1814	1818	1823	Continuing	Continuing

**A. Mission Description and Justification: Project D097 - C3I Interoperability Network:** Support warfighter systems' interoperability with a virtual command, control, communications, computer, intelligence, electronic warfare and sensor (C4IEWS) Digital Integration Lab (DIL) to help integrate the Army's programs and products, horizontally and vertically for the digitized battlefield, by replicating current and future tactical battlefield environments and enabling/facilitating comprehensive evaluations of new prototypes, evolutionary system developments, new technologies, commercial products, software and systems interoperability. Develop and operate the communications Army Interoperability Network (AIN) to electronically interconnect remote C4IEWS systems, labs/testbeds, field/integration sites, develops facilities and Battle Labs. Develop and apply protocol test tools to assure the capability to support and assess interoperability and compliance with the Joint/Army Technical Architecture's Variable Message Format (VMF) and MIL-STD-188-220 protocol standards suites.

**FY 1999 Accomplishments:**

- 490 Provided external DIL connectivity to remote battlefield digitization sites for digitization experimentation and tests.
- 331 Upgraded, operated and supported secure DIL Evaluation & Certification Testbed and other facilities supporting experiments/certifications needed for battlefield digitization for Army FDD, Y2K, Joint as well as STO/ACTD/ATD experimentation and evaluation.
- 100 Acquired/updated DIL hardware and software interfacing systems, test tools, and supporting systems for 1st Digitized Division and TA/SA evaluations
- 125 Acquired DIL automated scenario drivers and test analysis tools for FDD evaluations and TA/SA evaluations.
- 350 Developed Prototype Test Tool (PTT) Monitor/decoder V2.1 capabilities to support the Technical Architecture's MIL-Std-188-220B Sync mode, and conformance testing.
- 100 Developed and fielded lower Tactical Internet PTT network Analyzer capability to support MIL-STD-188-220B network operation and performance analysis in FDD
- 260 Developed and fielded VMF test tool, Rel.5, to support correct C4IEWS systems implementation of Technical Architecture's VMF test tool populated with Joint Re-issue 3 database.
- 140 Developed message generation scripting capability for VMF Test Tool (VTT) to support First Digitized Division (FDD), second Digitized Division and the First Digitized Corps.
- 1080 Began Operating Environment (OE) Implementation and COE Process Maturation by defining the OE extensions, identified 3 Application Program Interface (API) implementations, participating in the DII COE RT TWG, and began developing a conformance plan and test suites.

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<ul style="list-style-type: none"> <li>417 Developed a functional description for the EBC Weapon Interface. Processed the EBC Weapon Interface Requirements into DOORs. Completed the Draft EBC API.</li> </ul>		
<p><b>FY 1999 Accomplishments: (continued)</b></p> <ul style="list-style-type: none"> <li>500 Developed User Interface Standards by defining user interface requirements specification, updating the style guide, defining the common component specification, describing the environment and operations for common screens, and implementing agreement for JVMF messages</li> <li>800 Developed Army Weapon COE concept and continued maturing Joint Real Time DII COE kernel</li> </ul>		
Total	4693	
<p><b>FY 2000 Planned Program:</b></p>		
<ul style="list-style-type: none"> <li>834 Provide external DIL connectivity to remote battlefield digitization sites for digitization experimentation and tests.</li> <li>830 Upgrade, operate and support DIL Evaluation &amp; Certification Testbed and other facilities supporting experiments/certifications needed for battlefield digitization for Army FDD, Y2K, Joint (e.g. Joint Contingency Force AWE) as well as STO/ACTD/ATD experimentation and evaluations.</li> <li>367 Acquire/update DIL hardware and software interfacing systems, test tools, and supporting systems for 1st Digitized Division and TA/SA evaluations</li> <li>150 Acquire DIL automated scenario drivers and test analysis tools for FDD evaluations and TA/SA evaluations.</li> <li>100 Develop PTT Monitor/Decoder V2.2 to support Technical Architecture's Mil-Std-188-220B remaining features</li> <li>125 Develop PTT Conformance Tester V2.1 to add full generation capability</li> <li>250 Develop PTT Network Analyzer V2 (full capability) for Mil-Std-188-220B CNR network operation &amp; performance</li> <li>200 Develop VMF test tool, Rel 6, to support correct C4IEWS system implementations of Technical Architecture's VMF Reissue 4+</li> <li>200 Develop VMF Reissue 4+ VMF database</li> <li>66 Small Business Innovation Research/Small Business Technology Transfer( SBIR/STTR) Programs</li> </ul>		
Total	3122	
<p><b>FY 2001 Planned Program:</b></p>		
<ul style="list-style-type: none"> <li>596 Provide external DIL connectivity to remote battlefield digitization sites for digitization experimentation, and tests.</li> <li>400 Upgrade, operate and support DIL Evaluation &amp; Certification Testbed and other facilities supporting experiments/certifications needed for battlefield digitization for Army Second Digitized Division (SDD) and First Digitized Corps (FDC) digitization efforts, Joint, Allied as well as STO/ACTD/ATD experimentation and evaluations.</li> <li>250 Acquire/update DIL hardware and software interfacing systems, test tools, and supporting systems for SDD and FDC TA/SA evaluations</li> <li>50 Acquire DIL automated scenario drivers and test analysis tools for SDD and FDC evaluations and TA/SA evaluations.</li> <li>300 Develop graphical interface and integrate background map, automate analysis function, and re-certify</li> </ul>		
Project D097		

<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)</b>							DATE <b>February 2000</b>	
<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>				<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>			<b>PROJECT</b> <b>D097</b>	
<ul style="list-style-type: none"> <li>• 300 Develop monitor decode V.3., develop conformance test V.3.1 for 188-220C standard version.</li> </ul> <p>Total 1896</p> <p><b>B. <u>Other Program Funding Summary:</u></b> None</p> <p><b>C. <u>Acquisition Strategy:</u></b> The efforts funded in this project are non-system specific, supporting interoperability across multiple systems. The contractual efforts/services are obtained from existing competitive omnibus support services contracts.</p>								
<b>D. <u>Schedule Profile</u></b>								
	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2004</u>	<u>FY 2005</u>
Maintain and upgrade remote connectivity between digitization sites	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
DIL Testbed support for DAWE, FDD, JCF, SDD & FDC	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Acquire DIL testbed systems to support message compliance certification	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Develop, maintain, certify Protocol Test Tool	4Q	4Q	4Q					
Develop, maintain, certify VMF Test Tool	4Q	4Q	4Q					
<p>Project D097</p> <p align="center">Page 5 of 32 Pages</p> <p align="right">Exhibit R-2A (PE 0604805A)</p>								

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<b>ARMY RDT&amp;E COST ANALYSIS (R-3)</b>										DATE <b>February 2000</b>		
<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>					<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications</b>					<b>PROJECT</b> <b>D097</b>		
<b>Systems - Engineering Development</b>												

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Labor (internal Govt)		USACECOM FM NJ	908	664	01/01/99	1020	01/01/00	710	01/01/01	Cont'd	3302	
b. Travel		USACECOM FM NJ	36	15	01/01/99	25	01/01/00	15	01/01/01	Cont'd	91	
c. Systems Management		USA TARDEC Warren MI	7								7	
d. Systems Engineering		USA AMCOM Huntsville AL	325	2797							3122	
e. Systems Engineering	MIPR	USA TACOM Picatinny, NJ	143								143	
f. Contract Services												
1)Surge Support Contract	C/CPFF	DCS Corp. Alexandria VA	500								500	
2)Systems & Software Engineering	C/CPFF	SAIC Corp. San Diego CA	90								90	
3) Battlefield Automated Sys. Engrg Spt (BASES)	C/CPFF	EER System Corp Lanham MD	60								60	
g. Inflation Withhold												
Subtotal Product Development:			2069	3476		1045		725			7315	

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Software Development	C/CPFF	Arinc, Ft Monmouth NJ	1543	649		525	3/99	490	03/00	Cont'd	3207	
b. Software Development	C/CPAF	Telos, Ft Monmouth NJ	699	323		518	*	100	03/00	Cont'd	1640	
c. Development Support	C/CPFF	CSC, Ft Monmouth NJ	150	34		280	*	150	03/00	Cont'd	614	
d. Development Support	C/CPFF	C3I, Ft Monmouth NJ	150	147		300	*	301	03/00	Cont'd	898	
e. Technical Support	C/CPFF	Nations, Monmouth NJ	21	29		20	7/99	30	03/00	Cont'd	100	
f. Equipment	FFP	USA CECOM	450	35		354		100		Cont'd	939	
g. Telecommunications	MIPR	USASC Ft Huachuca AZ	40			80	1/00	0	1/01	Cont'd	120	
Subtotal Support Costs:			3053	1217		2077	*	1171	*		7518	

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Remark: \*Contracts cited are 5 year (1 base year + 4 option years). Future award dates imply future competitive award, contractor TBD.

III. Test and Evaluation: Not applicable

IV. Management Services: Not applicable

			Total PYs Cost	<u>FY 1999</u> Cost		<u>FY 2000</u> Cost		<u>FY 2001</u> Cost		Cost To Complete	Total Cost
Project Total Cost:			5122	4693		3122		1896		Cont'd	14833

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<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>	<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	<b>PROJECT</b> <b>D098</b>
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COST (In Thousands)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D098 Tactical Radio Accessories	451	0	2186	0	0	0	0	0	2637

**A. Mission Description and Justification: Project D098 - Tactical Radio Accessories:** This project will provide for PM participation in the development efforts for the Combat Survivor Evader Locator System (CSEL), a joint program led by the Air Force. This program will provide service, joint, and/or composite operational recovery/rescue forces with the capability to pinpoint the location of and establish communication with downed personnel in need of extraction from hostile territories. The CSEL system will include the capability to pass data directly into the standard warfighter command, control, communications, computer, and intelligence (C4I) systems. The user's equipment will consist of a small hand-held unit used for geopositioning, over-the-horizon data communications, and two-way line-of-sight voice communications.

**FY 1999 Accomplishments:**

- 451 Program Management Support

Total 451

**FY 2000 Planned Program:** Project funded in FY2000.

**FY 2001 Planned Program:**

- 692 Program Support
- 310 Test Support/Analysis
- 1184 LRIP Contract

Total 2186

<b>B. <u>Other Program Funding Summary</u></b>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Compl</u>	<u>Total Cost</u>
ARMY, OPA2 B03200, Combat Survivor Evader Locator (CSEL)	0	0	0	13169	23840	19864	19843	57000	133741

**C. Acquisition Strategy:** The joint Air Force led acquisition strategy is a research and development approach for the handheld unit

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BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>	PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	PROJECT <b>D098</b>
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<b>D. Schedule Profile</b>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
USAF Option 1 Deliveries	2Q						
CT/OA 2		4Q					
Army LRIP Decision			1Q				
USAF Option 2 Contract Award (LRIP)			1Q				
USAF Option 2 Deliveries (LRIP)				1Q			
USAF Option 3 Contract Award				1Q			
CT 3				1Q			
IOTE				2Q			
Milestone Decision III				4Q			

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<b>ARMY RDT&amp;E COST ANALYSIS (R-3)</b>										DATE <b>February 2000</b>		
<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>					<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications</b>					<b>PROJECT</b> <b>D098</b>		
					<b>Systems - Engineering Development</b>							
<b>I. Product Development</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Total PYs Cost</b>	<b>FY 1999 Cost</b>	<b>FY 1999 Award Date</b>	<b>FY 2000 Cost</b>	<b>FY 2000 Award Date</b>	<b>FY 2001 Cost</b>	<b>FY 2001 Award Date</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
a. Engineering / Manufacturing Development*	SS	Boeing North America Los Angeles AFB						1184	1Q	0	1184	1184
Subtotal Product Development:								1184			1184	
Remark: * LRIP Contract, quantity 100.												
<b>II. Support Costs</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Total PYs Cost</b>	<b>FY 1999 Cost</b>	<b>FY 1999 Award Date</b>	<b>FY 2000 Cost</b>	<b>FY 2000 Award Date</b>	<b>FY 2001 Cost</b>	<b>FY 2001 Award Date</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
a. Battery Analysis Study	MIPR	JPO, Los Angeles AFB						250	2Q		250	
b. Technical Support	MIPR	CECOM C2SID						60	2Q		60	
Subtotal Support Costs:								310			310	
III. Test and Evaluation: Not Applicable												
<b>IV. Management Services</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Total PYs Cost</b>	<b>FY 1999 Cost</b>	<b>FY 1999 Award Date</b>	<b>FY 2000 Cost</b>	<b>FY 2000 Award Date</b>	<b>FY 2001 Cost</b>	<b>FY 2001 Award Date</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
a. Program Management Support**	MIPRs	Miscellaneous	4179	451	1-4Q			692	1Q		5322	
Subtotal Management Services:			4179	451				692			5322	
Remark: ** A portion of the FY1999 funding is being carried over to FY2000 to support program management requirements for CSEL.												
<b>Project Total Cost:</b>			4179	451				2186			6816	

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BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>				PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>				PROJECT <b>D485</b>				
COST (In Thousands)				FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D485 C4I Systems Certification				4559	5268	3998	3985	3853	3851	3850	Continuing	Continuing
<p><b>A. <u>Mission Description and Justification:</u> C4I Systems Certification:</b> Evaluate system's interoperability for the Army XXI battlefield digitization effort, in support of the Vice Chief of Staff of the Army (VCSA) and Army Acquisition Executive (AAE), to identify interoperability issues, develop certification recommendations, and provide architecture assessments by the Digital Integration Lab (DIL). Interoperability certification recommendations and assessments are provided to the Army Digitization Office (ADO) and Army System Engineer. Establish and sustain interoperability between Army C4I systems, and between the Army and Joint/Allied C4I communities in support of DOD 4630.5, DODI 4630.8, CJSCI 6212.01, and AR73-1. Provide the Army focal point for the review, staffing, coordination, and development of Army positions for interface interoperability standards and specifications. Participate in Joint/Allied and intra-Army interoperability certification testing and represent the Army in the Joint/Allied Configuration Management Process. Develop and configuration manage two key elements of the Joint/Army Technical Architectures - the Variable Message Format (VMF) message and the MIL-STD-188-220 protocol standards, in support of Army Science Board directive and approved Technical Architectures.</p> <p><b>FY 1999 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>• 640 Evaluated and certified IT/C4ISR systems interoperability for FDD, Joint experiments to assure compliance with the Technical and System Architectures</li> <li>• 560 Provided DIL System Engineering and Integration support for conduct of experiments and evaluations to support FDD, Joint Contingency Force AWE, &amp; Joint Tests.</li> <li>• 330 Provided systems engineering, integrated support &amp; field support for identification and resolution of systems' discrepancies and inconsistencies identified during evaluations.</li> <li>• 300 Evaluated and validated Technical and Systems Architectures, including development of tools for compliance evaluation.</li> <li>• 545 Developed and published 188-220B and 47001B application header standards.</li> <li>• 325 Developed/Approved Army/Joint VMF messages.</li> <li>• 332 Obtained Joint Approvals for (43) Army's VMF ICP's for FDD and Y2K</li> <li>• 65 Updated and Maintained VMF data base for evolving standards and provided two new versions to customers</li> <li>• 110 Conducted 6 Army and Joint Configuration control boards</li> <li>• 609 Evaluated, processed and obtained approval of 1100 change proposals</li> <li>• 650 Conducted 10 Joint Certification Testing to include 24 operational systems, and developed over 500 problem reports for analysis by Joint services</li> <li>• 93 Represented the Army in over 24 Joint TADILs, USMTF, OSD tactical data link management plan TDLMP, Joint Interface Requirements</li> </ul> <p>Total 4559</p>												
Project D485				Page 11 of 32 Pages				Exhibit R-2A (PE 0604805A)				

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<b>FY 2000 Planned Program:</b>		
•	609 Evaluate and certify IT/C4ISR systems interoperability for FDD, Joint experiments to assure compliance with the Technical and System Architectures	PROJECT <b>D485</b>
•	550 Provide DIL System Engineering & Integration support for conduct of experiments & evaluations to support FDD, JCF AWE, & Joint Tests.	
•	200 Provide systems engineering, integrated support & field support for identification and resolution of systems' discrepancies and inconsistencies identified during evaluations.	
•	200 Evaluate and validate Technical and Systems Architectures, including development of tools for compliance evaluation.	
•	325 Develop, evolve and approve Army/Joint VMF TIDP	
•	325 Obtain joint approvals for Army's VMF ICPs for FDD and other battlefield digitization requirements	
•	90 Update VMF databases per evolving VMF standards	
•	575 Develop 'C' versions of Mil-Stds 188-220 & 2045-47001 for TA and evolving Battlefield Digitization requirements	
•	608 Provide engineering evaluations and Army CM of TADIL joint messages	
•	605 Provide engineering evaluations and Army CM of USMTF joint messages	
•	708 Direct & manage Army's joint certification testing/analysis for system certifications; represent Army's consolidated positions at JARPs	
•	100 TDLMP Management	
•	250 NATO message development/harmonization support	
•	123 Small Business Innovation Research/Small Business Technology Transfer( SBIR/STTR) Programs	
Total	5268	
<b>FY 2001 Planned Program:</b>		
•	500 Evaluate and certify IT/C4ISR systems interoperability for SDD, and FDC as well as conduct Joint experiments to assure compliance with the Technical and System Architectures	
•	450 Provide DIL System Engineering and Integration support for conduct of experiments and evaluations to support SDC & FDC, and Joint tests	
•	150 Provide systems engineering, integrated support & field support for identification and resolution of systems' discrepancies and inconsistencies identified during evaluations.	
•	150 Evaluate and validate Technical and Systems Architectures, including development of tools for compliance evaluation.	
•	412 Develop and publish 188-220D/47001D	
•	640 Develop/Joint Approve new VMF messages and change proposals	
•	70 Update/maintain VMF database and provide two new versions to customers	
•	120 Conduct Army and Joint configuration control boards	
•	550 Evaluate, process and obtain Joint Approval of TADIL (A,B,J, USMTF) change proposals	
Project D485	Page 12 of 32 Pages	Exhibit R-2A (PE 0604805A)

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<p><b>FY 2001 Planned Program: (continued)</b></p> <ul style="list-style-type: none"> <li>• 836 Conduct joint certification testing for system implementing TADILs (A, B, J, VMF, and USMTF), generate associated trouble reports and convene Joint analysis review panels.</li> <li>• 120 Represent the Army in Joint TADILs, USMTF, OSD Tactical Data Link Management Plan (TDLMP), joint interface requirement reviews.</li> </ul> <p>Total 3998</p> <p><b>B. Other Program Funding Summary:</b> None</p> <p><b>C. Acquisition Strategy:</b> The efforts funded in this project are non-system specific, interoperability experimentation, evaluation and certification across multiple systems. The contractual efforts/services are obtained from existing competitive omnibus support services contracts.</p>								
<b>D. Schedule Profile</b>								
	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2004</u>	<u>FY 2005</u>
Evaluate, certify systems for & support DAWE	1-4Q							
Evaluate, certify systems for and support FDD	4Q	1-4Q	1-2Q					
Evaluate, certify systems for and support Joint Contingency Force AWE	1-4Q	1-4Q						
Evaluate, experiment, and provide systems integration for testing of ACTD, ATD & STO's.	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Complete FDD CMP/DII COE evaluation Capability	3Q							
Experiment/Evaluate Joint Interoperability in conjunction with CIPO initiatives	4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
DIL/CUBE Testing/experimentation of AFATDS/TBMCS interoperability for Spiral and JEFX Tests	4Q	1-4Q						
Evaluate, certify systems for and support SDD & FDC		4Q	1-4Q	1-4Q				
Develop and maintain Joint VMF Standards and standard databases	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Joint approval/publication of 188-220 & 47001 series standards	1-4Q	1-4Q	1-4Q					
Project D485 <span style="float: right;">Page 13 of 32 Pages</span> <span style="float: right;">Exhibit R-2A (PE 0604805A)</span>								

<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)</b>							DATE <b>February 2000</b>		
BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>				PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>				PROJECT <b>D485</b>	
<b>D. Schedule Profile</b>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2004</u>	<u>FY 2005</u>	
Joint Certification testing, and configuration management and control of TADIL/USMTF standards	1-4Q	1-4Q	1-4Q						

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<b>ARMY RDT&amp;E COST ANALYSIS (R-3)</b>										DATE <b>February 2000</b>		
BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>				PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>						PROJECT <b>D485</b>		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Labor (internal Govt)		USACECOM FM NJ	3232	1307	01/01/99	1380	01/01/00	1380	01/01/01	Cont'd.	7299	
b. Travel		USACECOM FM NJ	70	25	01/01/99	25	01/01/00	25	01/01/01	Cont'd.	145	
c. Inflation Withhold												
Subtotal Product Development:			3302	1332		1405		1405			7444	
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Development Support	C/CPFF	Arinc, Ft Monmouth NJ	2613	1011	10/93	1433	3/99	1018	*	Cont'd	6075	
b. Development Support	C/CPAF	Telos, Ft Monmouth NJ	2002	834	12/95	1110	3/99	800	*	Cont'd	4746	
c. Development Support	C/CPFF	CSC, Ft Monmouth NJ	1310	765	03/95	722	3/99	250	*	Cont'd	3047	
d. Development Support	C/CPFF	C3I, Ft Monmouth NJ	850	85	07/96	250	3/99	172	*	Cont'd	1357	
e. Development Support	SS/CPFF	Mitre, Ft Monmouth NJ	280	0	10/98	0		0			280	
f. Technical Support	C/CPFF	Marconi, Ft Monmouth NJ	72	38	12/95	38		38			186	
g. Equipment	Reqn	USACECOM	85	206	*	150	1/00	150		Cont'd	591	
h. Equipment (Development Support)	FFP	GTE, Tauton MA	0	128							128	
i. Telecommunications	MIPR	USASC Ft Huachuca AZ	500	160		160	1/00	165		Cont'd	985	
Subtotal Support Costs:			7712	3227		3863		2593			17395	
Remark: *Contracts/awards cited are 5 year (1 base year + 4 option years). Future award dates imply future competitive award, contractor TBD.												
III. Test and Evaluation: Not applicable IV. Management Services: Not applicable												
Project Total Cost:			11014	4559		5268		3998			24839	

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000			
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development				PE NUMBER AND TITLE 0604805A Command, Control, Communications Systems - Engineering Development				PROJECT D589		
COST (In Thousands)		FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D589 Army Systems Engineering & Warfighter Technical Support		9915	7709	8411	8422	8609	8669	8667	Continuing	Continuing
<p><b>A. <u>Mission Description and Justification:</u> Army Systems Engineering &amp; Warfighter Technical Support:</b> The ASE provides essential technology expertise on all Systems Engineering and Technical Architecture (SE/TA) matters critical to gain Information Dominance and foster interoperability among all Army systems. The Joint Technical Architecture-Army (JTA-A) provides the ‘building code’ foundation for designing, building, fielding, and supporting interoperable systems in an expedient and cost-effective manner. Army System Engineer (ASE) supports CIO/DISC4/ADO in defining and maintaining the JTA-A and technically influences development and implementation of the JTA. ASE identifies new and emerging standards for integration of new technologies into existing Army Systems and ATD/ACTDs to support Army 2010. The ASE's work efforts associated with the development and implementation of the JTA-A under this project are critical path elements to achieve the Army’s DIV XXI, CORPS XXI, and Army XXI digitization mission, provide the ability to fight and win on tomorrow’s battlefield, and assure compatibility with both Joint and Coalition Warfighters. WTS provides essential technical field expertise, on-site architectural/system analysis and execution planning to integrate emerging technologies and support the next generation of digitization across all 21<sup>st</sup> Century Battlefield Operating Systems. Promotes joint experiments in conjunction with Joint C4ISR Battle Center (JBC) to foster interoperability between Army Systems and those of other services both joint and coalition. WTS conducts interservice coordination to identify candidate systems, provides expert analysis to define appropriate architecture, evaluates notional designs and conducts performance/cost benefit analysis to recommend viable tradeoffs. Selects target architecture and works with warfighter to engineer appropriate field experiments (Battlelab Warfighter Experiments (BLWE), Army Warfighter Experiments (AWE) and warfighter rotations) to allow selection of appropriate systems and sub-systems for follow-on development and acquisition. Performs technical coordination/integration activities to accelerate system enhancements providing solutions to current user problems in the field capturing soldier ingenuity through on-the-spot soldier input/feedback. Supports development of the operational architecture and implementation of new warfighter information technologies throughout the force structure to achieve Army Enterprise Architecture (AEA) objectives. Develops notional technology driven C4ISR architectures for Army After Next (AAN) in support of AEA.</p> <p><b>FY 1999 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>• 1269 Conducted Major design evaluations for Joint Technical Architecture-Army (JTA-A) Interoperability. (Future Scout Calvary System, Tactical UAV, WIN-T, Army Battle Command System Version 5.0)</li> <li>• 1280 Ensured JTA-A Interop Implementation and Assess JTA-A compatibility for Army and S&amp;T Programs (1<sup>st</sup>. Lt. Division Force Sys. Architecture, 1st. Digitized Corps system Architecture)</li> <li>• 800 Assessed JTA-A interop for Army Systems, (I3A, AMC-ISA)</li> <li>• 600 Technically influenced the development/implementation of Joint Technical Architecture (JTA)</li> <li>• 382 Maintained existing JTA-A Information Technical Standards</li> <li>• 400 Investigated information technical standards for inclusion in JTA-A/JTA</li> </ul>										
Project D589		Page 16 of 32 Pages				Exhibit R-2A (PE 0604805A)				

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<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)</b>		DATE <b>February 2000</b>
<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>	<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	<b>PROJECT</b> <b>D589</b>
<p><b>FY 1999 Accomplishments: (continued)</b></p> <ul style="list-style-type: none"> <li>• 169 Technically influenced commercial and international standards forums</li> <li>• 280 Developed preliminary JMTK Reference Architecture and upgraded Mapping API for the Weapon System Technical Architecture Working Group COE. Participated in the DII COE MCG&amp;I. Updated WSTA framework, adding economic factors, and a JTA impact assessment was completed. Developed the Weapon System Technical Architecture Working Group Long Range PM plan.</li> <li>• 2554 Developed Joint Contingency Force (JCF) experimentation plans. Proposed enroute mission planning and rehearsal (EMPRS) initiative and coordinated technical efforts for the same. Developed EMPRS System Architecture – Detail (SA-D) (net vis implementation). Developed major bill of materials (MBOM) for EMPRS. Integrated EMPRS into JCF architecture. Supported synchronization of wideband information data management.</li> <li>• 700 Identified joint experiments and provided inter-service coordination and experimentation design support to Joint Battle Center (JBC). Supported JCF Army Warfighting Experiment (AWE) with joint coordination, early planning and implementation of JCF initiatives. Engineered Joint Intelligence Surveillance and Reconnaissance (JISR) and LINK 16 joint experiments. Conducted Army portion of All Service COMBAT ID Evaluation and Test</li> <li>• 354 Planned and integrated C4ISR concepts for wargames for Army After Next (AAN) exercises. Aligned tech base programs with emerging Army user requirements for 2025 Hybrid Force. Integrated EMPRS as Light Force initiative for Strike Force C4IEWS technology driven architecture concepts.</li> <li>• 243 Conducted information exchange meetings with other services, and provided field engineering support to user experiments and engineered product improvement/technical insertion into post Force XXI AWE systems</li> <li>• 884 Developed and updated the Open Environment Application Program Interface and build prototype efforts to API for WSTAWG DII COE real time prototype effort</li> </ul> <p>Total 9915</p> <p><b>FY 2000 Planned Program:</b></p> <ul style="list-style-type: none"> <li>• 1260 Conduct Major design evaluations for Joint Technical Architecture-Army (JTA-A) Interoperability.</li> <li>• 1292 Ensure JTA-A Interop Implementation and Assess JTA-A compatibility for Army and S&amp;T Programs.</li> <li>• 779 Assess JTA-A interop for Army Systems.</li> <li>• 808 Technically influence the development/implementation of Joint Technical Architecture (JTA).</li> <li>• 591 Maintain existing JTA-A Information Technical Standards.</li> <li>• 608 Investigate information technical standards for inclusion in JTA-A/JTA.</li> <li>• 469 Technically influence commercial and international standards forums.</li> </ul>		
Project D589	Page 17 of 32 Pages	Exhibit R-2A (PE 0604805A)

<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)</b>							DATE <b>February 2000</b>		
BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>			PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>			PROJECT <b>D589</b>			
<ul style="list-style-type: none"> <li>• 616 Engineer joint Strike Force C4IEWS research &amp; development experiment with upgraded EMPRS. Extend JCF architecture into the joint architecture in conjunction with Atlantic Command and the Joint Battle Center. Participate in other Joint Architecture development.</li> <li>• 730 Introduce early C4IEWS AAN concepts into existing programs. Conduct requirements oriented review of next generation tech base programs. Develop plans for the establishment of new ATDs, ACTDs that address emerging architectural deficiencies.</li> </ul> <p><b>FY 2000 Planned Program: (continued)</b></p> <ul style="list-style-type: none"> <li>• 392 Integrate digitization technology down to soldier. Provide field engineering support to user experiments. Discover architectural deficiencies through participation in final stages of experiment and continue to enhance solutions to refine the architecture.</li> <li>• 164 Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs</li> </ul> <p>Total 7709</p> <p><b>FY 2001 Planned Program:</b></p> <ul style="list-style-type: none"> <li>• 1350 Conduct Major design evaluations for Joint Technical Architecture-Army (JTA-A) Interoperability.</li> <li>• 1321 Ensure JTA-A Interop Implementation and Assess JTA-A compatibility for Army and S&amp;T Programs.</li> <li>• 800 Assess JTA-A interop for Army Systems.</li> <li>• 815 Technically influence the development/implementation of Joint Technical Architecture (JTA).</li> <li>• 623 Maintain existing JTA-A Information Technical Standards.</li> <li>• 640 Investigate information technical standards for inclusion in JTA-A/JTA.</li> <li>• 469 Technically influence commercial and international standards forums.</li> <li>• 950 Support early Strike Force field experimentation. Extend digitization experiment to joint/coalition forces. Support the development of conceptual joint/coalition experiment of digitization across all force levels – Light, Strike and Heavy</li> <li>• 850 Plan and integrate early AAN with total force digitized/network centric concept. Plan for next generation digitization systems. Incorporate after action; lesson learned transition into Strike Force.</li> <li>• 593 Implement distributive/network centric concepts to Force XXI. Engineer product improvement/technical insertion to Strike Force Systems Headquarters and subordinate systems.</li> </ul> <p>Total 8411</p> <p><b>B. <u>Other Program Funding Summary:</u></b> None</p> <p><b>C. <u>Acquisition Strategy:</u></b> The efforts funded in the project are non-system specific, therefore no acquisition strategy is provided.</p>									
<b>D. <u>Schedule Profile</u></b>			<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Project D589			Page 18 of 32 Pages			Exhibit R-2A (PE 0604805A)			

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)						DATE February 2000		
BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>			PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>				PROJECT <b>D589</b>	
<b>D. Schedule Profile</b>	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	
TA - JTA-A 6.0	4Q	1Q						
TA - JTA 3.0	4Q							
TA - JTA-A 7.0		2Q						
TA - JTA 4.0		2Q						
TA - JTA-A 8.0, A.X			3Q	3Q	3Q			
TA - JTA 5.0			3Q					
SA - 1DFSAs Updates	3Q	3Q	3Q	3Q	3Q	3Q		
SA - 1LDFSAs	4Q							
SA - AMC-ISA	4Q	3Q	3Q	3Q	3Q	3Q		
SA - I3A	4Q							
SA - 1DCSA Updates		2Q	2Q	2Q	2Q	2Q		
SA - I3A Updates		3Q	3Q					
EMPRS SA-D	3Q							
ASCIET Joint Experiment	2Q							
JCF AWE R&D Architecture	2Q							
AAN Planning Conference 1	1Q							
JCF AWE Initiative Implementation		2Q						
JCF AWE Support		2Q						
AAN Concept Introduction		1Q						
Joint STRIKE Force Initiatives		1Q						
JCF AWE After Action Technology Insertions			3Q					
STRIKE Force AWE			3Q					
AAN Joint/Coalition concept integration			1Q	2Q	3Q	3Q		

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ARMY RDT&E COST ANALYSIS (R-3)										DATE February 2000		
BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>				PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>						PROJECT <b>D589</b>		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Government Systems Engineering Support		ASEO, Ft Monmouth, NJ	3095	1678		1775		1766		Con't	8314	
Engineering Support		ISEC, Ft Huachuca, AZ	592	592		400		400		Con't	1984	
Engineering Support		AMCOM, Huntsville AL	0	280							280	
Engineering Support		USA TACOM, Warren MI	0	84							84	
Contract Systems Engineering Support	C & FPI	CSC, Eatontown, NJ	2083	1308	1 Oct 98	1462	1 Oct 99	1518	1 Oct 00	0	6371	
	SS & FP	MITRE, Tinton Falls, NJ	1215	1167	1 Oct 98	1370	1 Oct 99	1370	1 Oct 00	0	5122	
	C & FP	Battelle, Alexandria, VA	100	100	30 Nov 98	200	30 Nov 99	200	30 Nov 00	0	600	
	C & FP	SRC, Atlanta GA.	170	100	30 Nov 98	100	30 Nov 99	100	30 Nov 00	0	470	
	C & FP	GTE Internetworking, Cambridge, MA	0			300	1 Nov 99	300	1 Nov 00	0	600	
	TBD	UDLP, Minn. MN.	0	400						0	400	
	TBD	Rayethon, Dallas Tx.	0	300						0	300	
	TBD	DCS, Alexandria Va.	0	100						0	100	
Systems Engineering and Integration		WTS - ISIO CECOM, Ft Monmouth, NJ	951	1361		866		1149		Con't	4327	
	C & T&M-WR	C3ISGI, Tinton Falls, NJ(Sole Source in 98)	706	1105	9 Sep 98	700	9 Sep 98 (3 yrs)	980	9 Sep 98 (3 yrs)	0	3491	
	C & T&M	LSI, Lakehurst, NJ	0	405	05/28/99					0	405	
	C & T&M	SAIC, Falls Church VA	0	374	07/21/99					0	374	
Travel		ASEO/ISIO CECOM, Ft Monmouth, NJ	489	333		330		330		Con't	1482	

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<b>ARMY RDT&amp;E COST ANALYSIS (R-3)</b>										DATE <b>February 2000</b>		
<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>				<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>						<b>PROJECT</b> <b>D589</b>		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Overhead		ASEO/ISIO CECOM, Ft Monmouth, NJ	340	228		206		298			1072	
Subtotal Product Development:			9741	9915		7709		8411			35776	
II. Support Costs: Not applicable												
III. Test and Evaluation: Not applicable												
IV. Management Services: Not applicable												
Project Total Cost:			9741	9915		7709		8411			35776	

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000			
BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>			PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>					PROJECT <b>D591</b>		
COST (In Thousands)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost	
D591 Weapons System Technical Architecture	0	1055	2455	2395	2363	1320	1319	Continuing	Continuing	
<p><b>A. <u>Mission Description and Justification:</u> Weapons System Technical Architecture:</b> The Joint Technical Architecture-Army (JTA-A) provides the ‘building code’ foundation for designing, building, fielding, and supporting interoperable systems in an expedient and cost-effective manner. The Weapons System Technical Architecture (WSTA) identifies new and emerging standards for integration of new technologies into existing Army Weapon Systems in support of Army digitization efforts. WSTA will define weapon system domain exceptions and extensions to the JTA and JTA-Army. It will promote an open systems approach in Army weapon systems. It will work to expand the Defense Information Infrastructure Common Operation Environment concept to properly accommodate Army weapon systems.</p> <p><b>FY 1999 Accomplishments:</b> Project not funded in FY 1999</p> <p><b>FY 2000 Planned Program:</b></p> <ul style="list-style-type: none"> <li>• 100 Provide Weapons Domain Analysis by developing the reference architecture for weapons mapping software.</li> <li>• 340 Conduct an interoperability demonstration with PEO IEW. Develop interoperability threads for Weapon Interoperability Certification Tests.</li> <li>• 586 Compile Version 3.0 OE API to include distributed comms for interoperability and Version 2.0 Map Server API with complete weapon requirements.</li> <li>• 29 Small Business Innovation Research/Small Business Technology Transfer( SBIR/STTR) Programs</li> </ul> <p>Total 1055</p> <p><b>FY 2001 Planned Program:</b></p> <ul style="list-style-type: none"> <li>• 350 Update the WSTAWG Framework Version 4.0, develop reference architecture, and perform cost analyses.</li> <li>• 610 Mature the Mapping API and OE API.</li> <li>• 450 Conduct an interoperability demonstration with STRICOM. Continue maturation of interoperability threads, and update the EBC Draft API.</li> <li>• 310 Develop Security Architecture and continue to work with NSA on security certification of an RTOS.</li> <li>• 735 Develop the Weapon COE Prototype and conduct Life Cycle Software Engineering.</li> </ul> <p>Total 2455</p> <p><b>B. <u>Other Program Funding Summary:</u></b> Not Applicable</p>										
Project D591			Page 22 of 32 Pages				Exhibit R-2A (PE 0604805A)			

<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)</b>	DATE <b>February 2000</b>
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BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>	PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	PROJECT <b>D591</b>
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**C. Acquisition Strategy:** The efforts funded in this project are non-system specific, interoperability experimentation, evaluation and certification across multiple systems. The contractual efforts/services are obtained from existing competitive omnibus support services contracts.

<b>D. Schedule Profile</b>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Develop/refine reference Architecture for Weapons mapping software		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Conduct interoperability demonstration		2-3Q	2-3Q				
Complete Version 3.0 OE		4Q					
Update WSTAWG Framework Version 4.0			1-4Q				
Develop Weapon Common Operating Environment Prototype			2-4Q				
Insert/update new computer science technology advances into weapon system software			3-4Q	1Q		3-4Q	
Institutionalize processes for life cycle software maintenance					1-4Q		1-4Q

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<b>ARMY RDT&amp;E COST ANALYSIS (R-3)</b>										DATE <b>February 2000</b>		
<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>					<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>					<b>PROJECT</b> <b>D591</b>		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Product Development	MIPR	US Army AMCOM, Huntsville, AL				1055	TBD	2455	TBD	Cont	3510	
Subtotal Product Development:						1055		2455			3510	
II. Support Costs: Not applicable												
III. Test and Evaluation: Not applicable												
IV. Management Services: Not applicable												
Project Total Cost:						1055		2455			3510	

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<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)</b>	DATE <b>February 2000</b>
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<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>	<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	<b>PROJECT</b> <b>D615</b>
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COST (In Thousands)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D615 JTRS Ground Domain Integration	0	4867	28542	79171	42117	62831	48377	80000	345905

**A. Mission Description and Justification:** The Near-Term Digital Radio System (NTDRS) program is a Research and Development Program that maximizes the use of Non-Development Item (NDI) and Commercial Off-The-Shelf (COTS) hardware and software. The program provides an interim solution to the long term Army need for greatly enhanced data capacities at Tactical Operations Centers. NTDRS will provide the Army's Tactical Internet Tactical Operation Center (TOC) to Tactical Operation Center (TOC) data distribution from Battalion to Brigade and for all mobile TOC platforms from Division and below in the First Digitized Division and may serve as the proof of concept leading to the integration of the NTDRS waveform/network into the Joint Tactical Radio System (JTRS) Program. FY 2000 funding is the final year of the RDTE dollars in support of the NTDRS. Funding for the NTDRS in FY 1999 and prior resides in PE0603713A, D370. The JTRS Software Architecture Development effort is the responsibility of the JTRS Joint Program Office and is funded under PE0604280A. Beginning in FY 2001, Project D615 supports the Army unique initiatives for the JTRS program. The JTRS is a Research and Development program that will lead to the Services acquiring a family of affordable, scaleable, high-capacity, interoperable Line of Sight (LOS) and Beyond Line of Sight (BLOS) tactical radios. JTRS activity in this program element supports the Army hardware development and testing. The Army must develop hardware that is built to JTRS architecture standards, supports an open standards architecture and a set of software-based, and legacy tactical waveforms. Together, the architecture, the hardware, and the software will yield software programmable and hardware configurable digital radio systems that provide increased interoperability, flexibility and adaptability. The open standards based architecture will also provide the path for future hardware and software growth of delivered systems at minimal cost by allowing the Services to take advantage of advances in technology being realized in the commercial wireless communications marketplace. The JTRS will provide operational forces with an upgraded communications capability for more effective battlespace management and interoperability among Command, Control, Communications, Computers and Intelligence (C4I) Systems supporting the warfighters' goal of realizing a fully digitized battlespace.

**FY 1999 Accomplishments:** The NTDRS program was funded under PE 0603713A, project D370 prior to FY2000.

- FY 2000 Planned Program:**
- 1022 NTDRS Program Management
  - 606 Completion of NTDRS Testing
  - 2515 Completion of NTDRS Engineering Development and deployment to FDD
  - 593 NTDRS System Integration/Program Technical Support
  - 131 Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR)
- Total 4867

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<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>	<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	<b>PROJECT</b> <b>D615</b>
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**FY 2001 Planned Program:**

- 1613 JTRS PMO Support
  - 500 Army Integration – Hardware
  - 1875 Army Integration – JTRS Software/Labs
  - 2254 JTRS System – Power Amp, COSITE, Antenna, etc.
  - 22300 JTRS Hardware Development and Cost of Prototypes
- Total 28542

<b>B. Other Program Funding Summary</b>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Compl</u>	<u>Total Cost</u>
OPA, Army, ADDS, BU1400/EPLRS*	46855	53003	32675	31920	33857	39657	19143	17657	795183
OPA, Army, ADDS, BU1400/JTRS*							20472	1583443	1603915
RDTE, JTRS, 0603280A/D155	13404								13404
RDTE, JTRS, 0604280A/D162		36520	62218	80065	65691	50917	40121	0	335532

Note: \*The BU1400 BLIN is established to procure EPLRS through the FY04 timeframe, which will meet the current AAO. This same BLIN will be used as the core procurement funding line for JTRS, as "productionized" systems become available. Transition to the procurement of JTRS in lieu of EPLRS may occur sooner than FY 05; if segments of the JTRS evolve to a point where production can be initiated earlier (FY03 or FY04).

**C. Acquisition Strategy:** The NTDRS program maximizes the use of Non-Developmental Item (NDI) and Commercial Off-the-Shelf (COTS) hardware and software. An RDTE contract was awarded competitively in January 1996. The NTDRS was successfully tested in the Division XXI AWE in November 1997, Electronic Proving Ground (EPG) Field Test I in February 1998, and the FBCB2 LUT in August 1998. During FY1999, NTDRS was successfully tested at EPG in Feb/Mar 1999 and successfully participated in other experimental exercises, such as the Navy/USMC Urban Warrior and Navy Fleet Battle Experiment Echo. NTDRS successfully provided TOC-to-TOC data communications capability at the NTC-99-05 rotation in March 1999. This is the first digital data network to enable the ATCCS hosts to intercommunicate between Brigade and Battalion and fight the battle-on-the-move, covering a geographical area of over 1800 square kilometers using only 19 radios for the NTC-99-05. In FY2000 NTDRS will complete design and testing efforts and the NTDRS will participate in the FBCB2 EPG Field Test, FDTE/Limited User Test II (LUTII) and Joint Contingency Force (JCF) exercises to provide the Army's Tactical Internet TOC-TOC data communications. Planned distribution of the NTDRS into the FDD for continued experimentation purposes is scheduled for 4Q FY 2000. Beginning in FY2001 project D615 will support JTRS Army Unique hardware development. The JTRS will support an evolutionary acquisition strategy. The JTRS Joint Program Office (JPO) is responsible for common core activities including developing, maintaining, and evolving the JTRS open standards architecture, providing re-coded versions of legacy waveforms to operate on JTRS architecture compliant hardware, and providing a certifying infrastructure for hardware/software compliance. Following the architecture's validation and a market survey of industry's capabilities, a program review will occur. Following that review, the Services, which retained acquisition and weapon system integration responsibility, will begin

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<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)</b>	DATE <b>February 2000</b>
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<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>	<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	<b>PROJECT</b> <b>D615</b>
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acquiring scaleable JTRS systems commensurate with Service migration plans. The Army portion of the system integration effort will be performed within this Project. Through industry teaming, the JTRS program and architecture will capitalize on previous government sponsored software definable radio activity such as NTDRS, EPLRS, SPEAKEasy, JCIT, TCDL, GLOMO, ULTRACOM, and WRN as well as similar efforts occurring in the commercial wireless information transfer sector. The development of this open standards architecture will foster and facilitate increased competition at all levels for initial acquisitions as well as for future hardware and software upgrades. Further procurement actions will be made by the services to acquire this "proven certified" technology in production configurations to replace the legacy radios in the DoD inventory today.

<b>D. Schedule Profile</b>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
ABCS SE-00-01 (NTDRS Participation)		1Q					
FDTE & LUTII		3Q					
EPG NTDRS FTIII		3/4Q					
JCF Army Warfighting Experiment		4Q					
ABCS SE-00-02 (Participation)		4Q					
Complete NTDRS FDD Deployment		4Q					
JTRS Architecture Provided by JPO		4Q					
JPO MDAP Review			1Q				
Army Milestone II Review			1Q				
JTRS Block II Army Ground & Airborne Domain EMD/LRIP Award			2-3Q				
JTRS Block I EPG Field Test				1-2Q			
JTRS Army Block III Dismountable & Handheld Domain EMD/LRIP Award					2-3Q		
IOT&E for JTRS Block II Army Ground & Airborne Domain					3-4Q		
Army Milestone III Review for JTRS Block II Ground & Airborne Domain						1Q	
IOT&E for JTRS Army Block III Dismountable & Handheld Domain							2-3Q
Full Rate Production Award JTRS Block II Airborne Domain							2-3Q
Army Milestone III Review for JTRS Block III Dismountable & Handheld Domain							4Q

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<b>ARMY RDT&amp;E COST ANALYSIS (R-3)</b>	DATE <b>February 2000</b>
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<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>	<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	<b>PROJECT</b> <b>D615</b>
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY1999 Cost	FY1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. NTDRS CPIF/T&M Efforts (Projected)	C/T&M/CPIF	ITT Ft. Wayne				2515	2Q				2515	
b. JTRS Army Integration – Software/LABS	MIPR	TBD						1875	2/3Q		1875	
c. JTRS Army Integration – Hardware	MIPR	TBD						500	2/3Q		500	
d. JTRS System – Power Amp, COSITE, Antenna, etc.	TBD	TBD						2254	2/3Q		2254	
e. JTRS Hardware Development and Cost of Prototypes	TBD	TBD						22300	2/3Q		22300	
Subtotal Product Development:						2515		26929			29444	

Remark: \*NTDRS - prior to FY 2000 were charged against 0603713A, D370.

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY1999 Cost	FY1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. NTDR System Integration	MIPR	TBD				134	TBD				134	
b. Test Support	MIPR	RDEC				132	2Q				132	
c. Training Support	PWD	EPS				61	2Q				61	
d. Frequency Allocation	MIPR	Joint Spectrum Mgmt				11	2Q				11	
e. Test/Installation Spt	PWD	Ventronnix				69	2Q				69	
f. Technical Spt	PWD	C3I				186	2Q				186	
Subtotal Support Costs:						593					593	

Remark: \*NTDRS - prior to FY 2000 were charged against 060713A, D370.

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<b>ARMY RDT&amp;E COST ANALYSIS (R-3)</b>	DATE <b>February 2000</b>
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<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>	<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	<b>PROJECT</b> <b>D615</b>
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III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY1999 Cost	FY1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. NTDRS Field Testing	MIPR	EPG, Ft. Huachuca				606	TBD				606	
Subtotal Test and Evaluation:						606					606	

Remark: \*NTDRS - prior to FY 2000 were charged against 0603713A, D370.

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY1999 Cost	FY1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
c. NTDRS Program Support	MIPR	Ft. Monmouth, NJ				1022	TBD				1022	
d. JTRS PMO Support	MIPR	TBD						1613	1/2Q		1613	
e. SBIR/STTR Taxes						131					131	
Subtotal Management Services:						1153		1613			2766	

Remark: \*NTDRS - prior to FY 2000 were charged against 0603713A, D370.

Project Total Cost:						4867		28542			33409	
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BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>				PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>				PROJECT <b>D629</b>		
COST (In Thousands)		FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D629 Tactical Communications System-Engineering Development		0	1815	1828	1838	1842	0	0	0	7323
<p><b>A. Mission Description and Justification:</b> This program's focus is on the evaluation of emerging communication protocols and enhancements in a controlled lab/testing environment for future Army networks beyond the First Digitized Division (FDD). This approach also provides a method to address and discover interoperability issues early in the development cycle. By providing continuous feedback to the Army System Engineering Office, it is anticipated that technologies can be selected for future versions of the Joint Technical Architecture – Army (JTA-A) faster and with more confidence. Technologies and products come from a variety of sources to include Commercial Industry, Standards Bodies, DARPA, and the Army Communications Science &amp; Technology programs. Execution of this mission is a critical step in the evolution and maturation of communications networks beyond FDD, while at the same time enhancing the Army's tactical communications and demonstrating interoperability within the Army and Joint Community. Output from this task will directly feed future versions of the JTA-A and the Weapons System Technical Architecture Working Group (WSTAWG).</p> <p>Note this program was previously funded under PE/Project 0603805A/D246.</p> <p><b>FY 1999 Accomplishments:</b> Project was funded under PE/Project 0603805A/D246.</p> <p><b>FY 2000 Planned Program:</b></p> <ul style="list-style-type: none"> <li>• 1688 Evaluate/integrate emerging new protocols/technologies (i.e., IPV6, reliable multicast, etc.) to enhance the Army's tactical communications. Provide recommendations to the Army System Engineering Office (ASEO) for incorporation into the JTA-A and Weapons System Technical Architecture working group.</li> <li>• 100 Evaluate emerging standards for interfaces with different echelons and platforms related to Airborne networking/communications technologies.</li> <li>• 27 Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR)</li> </ul> <p>Total 1815</p> <p><b>FY 2001 Planned Program:</b></p> <ul style="list-style-type: none"> <li>• 1728 Evaluate interoperability and evaluate advanced technologies (i.e., mobile technologies, quality of service, (QOS), etc.) for the Army tactical communications. Provide recommendations/assessments to the Army System Engineering Office (ASEO) for incorporation into the JTA-A and Weapons System Technical Architecture working group.</li> <li>• 100 Evaluate architectural capabilities, feasibility, and interoperability transmission capabilities of emerging protocols for higher data rate communications on an airborne platform. Provide recommendations to ASEO for inclusion into the JTA-A.</li> </ul> <p>Total 1828</p> <p>Project D629</p>										

<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)</b>	DATE <b>February 2000</b>
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BUDGET ACTIVITY <b>5 - Engineering and Manufacturing Development</b>	PE NUMBER AND TITLE <b>0604805A Command, Control, Communications Systems - Engineering Development</b>	PROJECT <b>D629</b>
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**B. Other Program Funding Summary:** Not Applicable

**C. Acquisition Strategy:** The objective of this program is to validate new TI Capabilities required for Force XXI. In FY97, laboratory integration testing was conducted to reduce risk for Task Force XXI AWE. Similar laboratory was performed in FY98 for Division XXI and for the FBCB2 Limited User Test (LUT). In FY99 new services and components will be added and tested to validate critical technologies for Force XXI beyond FDD.

<b>D. Schedule Profile</b>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
System Integration		4Q	3Q	3Q			
Address Architecture Issues		2-4Q	2-4Q	2-4Q			
Laboratory Testing		1-4Q	1-4Q	1-4Q	1-4Q		
Systems Integration (Airborne Communications)		4Q	2-4Q				
Video Demonstration		4Q	4Q				

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<b>ARMY RDT&amp;E COST ANALYSIS (R-3)</b>										DATE <b>February 2000</b>		
<b>BUDGET ACTIVITY</b> <b>5 - Engineering and Manufacturing Development</b>					<b>PE NUMBER AND TITLE</b> <b>0604805A Command, Control, Communications Systems - Engineering Development</b>					<b>PROJECT</b> <b>D629</b>		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY1999</u> Cost	<u>FY1999</u> Award Date	<u>FY 2000</u> Cost	<u>FY 2000</u> Award Date	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
b. Systems Engineering	PO	CECOM RDEC, Ft. Monmouth, NJ				1355	01/01/00	1368	01/01/01	Cont'd	2723	
c. Contract Services												
1)	Rqmts	MITRE				410	12/30/99	410	12/30/00	Cont'd	820	
2)	C-T&M PSLA	LSI				50	03/01/00	50	03/01/01	Cont'd	100	
Subtotal Product Development:						1815		1828			3643	
Remark: <b>NOTES:</b> <b>Performing Activity &amp; Location</b> MITRE – MITRE, Eatontown, NJ LSI – Lear Sigler Inc, Lakehurst, NJ  <b>Contract Method and Type</b> C-T&M – Competitive, Time and Materials -Rqmts-Requirements  II. Support Costs: Not applicable  III. Test and Evaluation: Not applicable  V. Management Services: Not applicable												
Project Total Cost:						1815		1828			3643	