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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)							DATE February 2000		
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development				PE NUMBER AND TITLE 0604716A Terrain Information - Engineering Development (TIARA)					
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
Total Program Element (PE) Cost	6320	5308	6082	7138	5603	4721	5000	Continuing	Continuing
D579 Field Army Map System - Engineering Development	3208	5308	5595	6327	4796	4721	5000	Continuing	Continuing
D598 High Volume Map Production (HVMP) Equipment	0	0	487	811	807	0	0	0	2105
D653 Digital Topography Support System - WRAP	3112	0	0	0	0	0	0	0	3112

A. Mission Description and Budget Item Justification: The Project Director for Combat Terrain Information Systems (PD CTIS) is responsible for developing, procuring, and fielding of topographic support systems for the Army. Program Management responsibility and Milestone Decision Authority have been assigned to the Program Executive Officer for Command, Control and Communications Systems (PEO C3S). CTIS systems provide automated terrain analysis, terrain data management and graphics reproduction in support of Intelligence Preparation of the Battlefield (IPB), Command and Control, Terrain Visualization, weapons and sensor systems, and other topographic information customers. CTIS consists of two versions of the Digital Topographic Support System (DTSS) [i.e., HMMWV (DTSS-Light (L)) and 5-ton (DTSS-Heavy (H))], DTSS-Deployable (DTSS-D), DTSS-Base (DTSS-B) and the High Volume Map Production (HVMP) equipment. A Pre-Planned Product Improvement (P3I) program will be conducted to address technology insertion, cyclic upgrade of Commercial Off-the-Shelf equipment and modernization initiatives for the Topographic Support System (TSS). The DTSS-L was a successful FY98/99 Warfighter Rapid Acquisition Program (WRAP)/Force XXI Initiative. Experimentation results from the Div XXI Army Warfighter Experiment (AWE) identified technological enhancements necessary to support the First Digital Division (FDD). WRAP funding supports the development of these enhancements. PD CTIS has management responsibility for planning system integration and execution of assigned products from development through hand-off to the Readiness Command. The DTSS-H, DTSS-L, DTSS-D, and DTSS-B fall under the Field Army Mapping System - Engineering Development (D579) project. The HVMP falls under the D598 project. DTSS-L WRAP falls under the D653 project.

UNCLASSIFIED

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
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B. Program Change Summary	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>
Previous President's Budget (<u>FY 2000/2001</u> PB)	6157	5348	6120
Appropriated Value	6229	5348	
Adjustments to Appropriated Value			
a. Congressional General Reductions	-72		
b. SBIR / STTR	-163		
c. Omnibus or Other Above Threshold Reductions	+350	-22	
d. Below Threshold Reprogramming			
e. Rescissions	-24	-18	
Adjustments to Budget Years Since <u>FY 2000/2001</u> PB			-38
Current Budget Submit (<u>FY 2001</u> PB)	6320	5308	6082

Change Summary Explanation: Funding - FY 1999 – (+350) Additional funding provided for Y2K compliance.

UNCLASSIFIED

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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development				PE NUMBER AND TITLE 0604716A Terrain Information - Engineering Development (TIARA)				PROJECT D579		
<i>COST (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	
D579 Field Army Map System - Engineering Development	3208	5308	5595	6327	4796	4721	5000	Continuing	Continuing	
<p>A. <u>Mission Description and Budget Item Justification:</u> This Project funds development of the DTSS-L (HMMWV), DTSS-H (5-ton), DTSS-D (COTS) and DTSS-B (COTS). The current terrain analysis, topographic and reproduction support provided by Army Engineer Terrain Teams is a slow, labor intensive process that does not meet the needs of the Force XXI battlefield on which the commander must have the ability to rapidly obtain terrain information and topographic products. The DTSS will provide digital maps and updates to commanders and weapons platforms in support of mission planning (e.g., Imagery exploitation, Cover and Concealment, other IPB), rehearsal (e.g., 3D fly through, simulations) and execution (e.g., Common Tactical Picture, route planning). The DTSS automates terrain analysis and visualization, data base development/update/management/distribution, and graphics reproduction. The Combat Terrain Information Systems (CTIS) Modernization Plan emphasizes the development of a combined, integrated, tactically deployable, fully autonomous terrain analysis and graphics reproduction capability. These capabilities are being provided in 5-ton (DTSS-H) and HMMWV (DTSS-L) configurations. Fielding of the DTSS-H was completed in Dec 99. The DTSS-H systems will eventually be replaced by DTSS-Ls as part of a HQDA approved cyclic upgrade program. The DTSS-L is highly mobile and capable of supporting a full range of military operations, as well as peacetime stability and support operations. Both the DTSS-L and DTSS-H have been Type Classified-Standard. The DTSS-D provides a Commercial Off the Shelf (COTS) configuration that is capable of operating all of the terrain analysis software. The DTSS-D consists of transportable workstations and peripherals that can be set up to augment the tactical configurations. The DTSS-D does not include tactically deployable shelters and vehicles or tactical communications. The DTSS-D has been Type Classified-Standard. The DTSS-B was procured in response to a USAEUR initiative to develop the capability to generate terrain information over sparsely mapped areas to support training, mission rehearsal and contingency operations. The DTSS-B is designed to augment NIMA capabilities at the EAC level by providing quick response, special purpose mapping, terrain analysis and data base generation. The DTSS-B includes a Top Secret – SCI component that is capable of handling national technical means information in a secure environment. The DTSS-B has been Type Classified-Standard. CTIS systems will be deployed from Brigade through EAC. Products developed as part of the CTIS RDT&E program (e.g., improved Army Battle Command Systems (ABCS) interoperability, migration to Joint Technical Architecture – Army (JTA-A) and Defense Information Infrastructure Common Operating Environment (DII COE), improved data base management and distribution, automated feature extraction, improved tactical decision aid functionality, rapid terrain visualization, improved graphics reproduction) will be incorporated into all of the DTSS hardware and software architectures. Additionally, the TSS is outdated and must be modernized to keep pace with Army digitization. The modernization initiatives associated with the TSS include updating the Operations, Distribution and Photomechanical Sections with computer workstations, copiers and printers. The Survey section will be downsized to a HMMWV configuration and the Drafting section will be updated to include digital cartographic equipment.</p>										
Project D579			Page 3 of 9 Pages			Exhibit R-2A (PE 0604716A)				

UNCLASSIFIED

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604716A Terrain Information - Engineering Development (TIARA)	PROJECT D579
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FY 1999 Accomplishments:

- 2558 Continue P3I development for DTSS – improved ABCS interoperability, JTA-A/DII COE migration, Y2K compliance, map server architecture
 - 300 Conduct architecture analysis for FY00 COTS cyclic upgrade of DTSS-D
 - 350 Completed Y2K compliance
- Total 3208

FY 2000 Planned Program:

- 4865 Continue P3I development for DTSS – continue JTA-A/DII COE migration, COTS upgrades, system architecture improvements, TSS upgrades
 - 300 Conduct architecture analysis for FY01 COTS cyclic upgrade of DTSS-B
 - 143 Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR)
- Total 5308

FY 2001 Planned Program:

- 4977 Continue P3I development for DTSS – rapid terrain visualization, automated feature extraction, artificial intelligence applications, TSS upgrades
 - 618 Conduct evaluation of system upgrade alternatives for DTSS-H
- Total 5595

B. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
OPA - KA2550 - DTSS	17807	24388	20030	4460	4499	20163	19937	Cont	Cont

C. Acquisition Strategy: The Acquisition Strategy for the DTSS - Light EMD phase was to utilize Army standard equipment and the Common Hardware/Software (CHS) computer workstations in conjunction with non-development item (NDI) components to develop an integrated baseline hardware configuration. The previous Combat Terrain Information Systems (CTIS) System Engineering and Integration (SE&I) contractor (Lockheed Martin Corp) executed the EMD phase, performing system integration, and provided units for formal test and evaluation. Milestone III for the DTSS-L was successfully completed in Jan 98. Production of the DTSS-L commenced in February 1999. Previously existing DTSS units have been upgraded to a 5-ton ISO 20-foot shelter configuration (DTSS-H). Funding to support cyclic upgrades to the DTSS-H (DTSS-H will be replaced by DTSS-L in FY02/03 timeframe) and DTSS-L has been programmed on a 5-yr. upgrade cycle. Acquisition of the DTSS-D and DTSS-B was completed in FY 1995 and FY 1996, respectively. Based upon CINC, TRADOC and PEO C3S User Evaluation approvals, the DTSS-D was Type Classified - Standard and added to the gaining unit's Table of Organization and Equipment. Funding to support a 5-yr. cyclic upgrade program for the DTSS-D and DTSS-B will commence in FY 2000 and FY 2001, respectively. The DTSS-B has also been Type Classified-Standard. The acquisition of the DTSS-D and DTSS-B relied upon existing contracts and commercial-off-the-shelf to the fullest extent possible.

UNCLASSIFIED

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604716A Terrain Information - Engineering Development (TIARA)	PROJECT D579

The Project Office will continue with this strategy for the cyclic upgrade program. The pre-planned product improvement program (P3I) will be executed with the current SE&I contractor (Litton/TASC, Inc.). The contracting strategy for the DTSS-Light program was to execute the EMD phase through the previous SE&I contractor, Lockheed Martin Corporation. A Competitive Cost Plus Fixed Fee (CPFF) contract was awarded for both the previous and existing CTIS SE&I contracts. A competitively awarded, Firm Fixed Price (FFP) contract was awarded to Sechan Electronics, Inc. for the Full Rate Production of the DTSS-Light. Production of the DTSS-H was accomplished through Firm Fixed Price (FFP) production contracts with Lockheed Martin Corporation (5) and SFA Inc. (4). The computer workstations for CTIS programs are being procured through the project manager for CHS.

D. Schedule Profile	<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>
Procurement of Institutional Training Classroom	1-2Q						
Award DTSS-L Production Contract/Options	2Q	1Q	1Q				
DTSS-L Production	2-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Complete Fielding of DTSS-H		1Q					
Field DTSS Build 6.2 Software		3Q					
Continue DTSS P3I Program		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Upgrade Analysis of TSS		2-4Q					
DTSS-L FUE		4Q					
Field DTSS-L		4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Cyclic Upgrade and Fielding of DTSS-D		3-4Q	1-2Q				
Field DTSS Build 7.0 Software			1Q				
DTSS-L IOC			4Q				
Cyclic Upgrade and Fielding of DTSS-B			3-4Q	1Q			
Field DTSS Build 8.0 Software				1Q			
Field TSS Upgrade				3-4Q	1-4Q	1-3Q	
Field DTSS Build X.X Software					1Q	1Q	1Q
Cyclic Upgrade of DTSS-L						2-4Q	1-4Q
Conduct Cyclic Upgrade of Institutional Training Classroom						2-3Q	
Cyclic Upgrade of DTSS-D							3-4Q

UNCLASSIFIED

ARMY RDT&E COST ANALYSIS (R-3)	DATE February 2000
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604716A Terrain Information - Engineering Development (TIARA)	PROJECT D579
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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. Primary Hardware Development	C/CPFF C/CPFF	Loral Corp, OH Lockheed Martin, PA	23280	0		0	N/A	0	N/A	0	23280	
b. Primary Hardware Development	C/CPFF	TASC, Reston, VA	0	100	Dec 98	900	Oct 99	1000	Oct 00	Cont	Cont	
Subtotal Product Development:			23280	100		900		1000		Cont	Cont	

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 C/CPFF	Loral Corp, OH Lockheed Martin, PA	34919	0		0	N/A	0	N/A	0	34919	
b. Software Development	C/CPFF	TASC, Reston, VA	571	1566	Dec 98	2487	Oct 99	2767	Oct 00	Cont	Cont	
c. SBIR/STTR				0		143		0		0	143	
Subtotal Support Costs:			35490	1566		2630		2767		Cont	Cont	

III. Test and Evaluation	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. DT/OT*	MIPR	TECOM	685								685	
b. FOT&E**				20	Dec 98	150	Nov 99	150	Nov 00	Cont	Cont	
Subtotal Test and Evaluation:			685	20		150		150		Cont	Cont	

Remark: *DT/OT = Combined Developmental and Operational Testing
 **FOT&E = Follow-on Test and Evaluation

UNCLASSIFIED

ARMY RDT&E COST ANALYSIS (R-3)	DATE February 2000
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604716A Terrain Information - Engineering Development (TIARA)	PROJECT D579
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IV. Management Services	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. Contractor Eng Support	MIPR	MITRE, McLean, VA	1200	352	Oct 98	400	Oct 99	400	Oct 00	Cont	Cont	
b. Government Eng Support	MIPR	CECOM, et.al.	1142	250	Nov 98	275	Nov 99	275	Nov 00	Cont	Cont	
c. Program Mgmt Support*	Requisition	Various		120	Jan 99	153	Nov 99	203	Nov 00	Cont	Cont	
d. Program Mgmt Personnel	MIPR	TEC, Ft. Belvoir, VA	2616	800	Oct 98	800	Oct 99	800	Oct 00	Cont	Cont	
Subtotal Management Services:			4958	1522		1628		1678		Cont	Cont	

Remark: *This category primarily covers Office Automation

Project Total Cost:			64413	3208		5308		5595		Cont	Cont	
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UNCLASSIFIED

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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development				PE NUMBER AND TITLE 0604716A Terrain Information - Engineering Development (TIARA)				PROJECT D598																																									
<i>COST (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																																								
D598 High Volume Map Production (HVMP) Equipment	0	0	487	811	807	0	0	0	2105																																								
<p>A. <u>Mission Description and Budget Item Justification:</u> This Project funds the development of the High Volume Map Production (HVMP) equipment. The current high volume graphics reproduction support provided by the Reproduction Subsection of the Topographic Support System is a time consuming labor intensive process. The HVMP will provide a tactical capability to rapidly reproduce large volumes of graphics (maps, charts, situation overlays, imagery, etc.) material. The HVMP will be capable of reproducing information from hardcopy as well as softcopy via a direct digital interface. It is envisioned that the HVMP will be housed in tactical vehicles (e.g., HMMWV or 5-ton). A total of 16 HVMPs will be produced to support the printing squad of the engineer topographic company located at Corps and Echelons Above Corps.</p> <p>FY 1999 Accomplishments: Project not funded in FY 1999</p> <p>FY 2000 Planned Program: Project not funded in FY 2000</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 487 Initiate Engineering and Manufacturing Development of the HVMP <p>Total 487</p>																																																	
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;">B. <u>Other Program Funding Summary</u></td> <td style="text-align: center;"><u>FY 1999</u></td> <td style="text-align: center;"><u>FY 2000</u></td> <td style="text-align: center;"><u>FY 2001</u></td> <td style="text-align: center;"><u>FY 2002</u></td> <td style="text-align: center;"><u>FY 2003</u></td> <td style="text-align: center;"><u>FY 2004</u></td> <td style="text-align: center;"><u>FY 2005</u></td> <td style="text-align: center;">To <u>Compl</u></td> <td style="text-align: center;">Total <u>Cost</u></td> </tr> <tr> <td>OPA – KA2590 – HVMP</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">458</td> <td style="text-align: center;">1541</td> <td style="text-align: center;">1540</td> <td style="text-align: center;">1650</td> <td style="text-align: center;">5189</td> </tr> </table>										B. <u>Other Program Funding Summary</u>	<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>	To <u>Compl</u>	Total <u>Cost</u>	OPA – KA2590 – HVMP	0	0	0	0	458	1541	1540	1650	5189																				
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OPA – KA2590 – HVMP	0	0	0	0	458	1541	1540	1650	5189																																								
<p>C. <u>Acquisition Strategy:</u> The Acquisition Strategy for the HVMP is to utilize Commercial Off-the-Shelf (COTS) and Non-developmental Item (NDI) components integrated with Army standard hardware (trucks, shelters, power equipment) to develop an integrated hardware baseline. The contracting strategy for the HVMP is to execute the EMD phase through the current SE&I contractor, Litton/TASC, Inc. A Cost Plus Fixed Fee contract was awarded to the CTIS SE&I contractor. A competitively awarded Firm Fixed Price contract is anticipated for the Full Rate Production.</p>																																																	
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D. <u>Schedule Profile</u>	<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>																																										
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Project D598			Page 8 of 9 Pages				Exhibit R-2A (PE 0604716A)																																										

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604716A Terrain Information - Engineering Development (TIARA)	PROJECT D653
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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
D653 Digital Topography Support System - WRAP	3112	0	0	0	0	0	0	0	3112

A. Mission Description and Budget Item Justification: This project funds the Digital Topography Support System (DTSS) Warfighting Rapid Acquisition Program (WRAP) Force XXI Initiative. Several technological enhancements to the DTSS were identified during the Div XXI AWE that were determined to be necessary to support the First Digital Division. The DTSS is the only system that will provide digital topographic support to maneuver brigades. It provides the digital topographic support that is the underpinning for the entire digitization effort and will provide the topographic data required by all ABCS systems. DTSS products support mission planning and execution functions. WRAP will fund RDT&E efforts to address an improved digital interface with other ABCS systems, digital data communications using the Global Broadcast System (GBS), data subsetting/tailoring for ABCS, and data storage/interface with the ABCS digital geospatial data server (Map Server). WRAP funding provides for the acceleration of RDT&E efforts for required improvements by 2 years, significantly reducing the delay between availability of commercial technologies and integration/evaluation for fielding to the FDD.

FY 1999 Accomplishments:

- 3112 Development of technological enhancements (improved ABCS interoperability, GBS interface, data tailoring, Map Server)
- Total 3112

FY 2000 Planned Program: Project not funded in FY 2000

FY 2001 Planned Program: Project not funded in FY 2001

B. Other Program Funding Summary: Not Applicable

C. Acquisition Strategy: The Acquisition Strategy for execution of the WRAP/Force XXI initiative is to accomplish the development effort through the current CTIS SE&I contractor (Litton/TASC, Inc.). A Cost Plus Fixed Fee contract was awarded to the CTIS SE&I contractor.

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Initiate development of technology enhancements	2Q						