

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

February 2002

BUDGET ACTIVITY 4 - Demonstration/validation		PE NUMBER AND TITLE 0603854A - Artillery Systems - Dem/Val						PROJECT 505	
COST (In Thousands)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
505 ARTILLERY SYSTEMS DEM/VAL	341765	444091	246465	0	0	0	0	0	2121702

A. Mission Description and Budget Item Justification: This supports the Crusader Advanced Development Program. The Crusader system is the Army's next generation self-propelled howitzer (SPH) and Artillery Resupply Vehicles (RSVs) and is the first installment of the Objective Force in the Army Transformation. Crusader has significantly increased capabilities in the areas of lethality, mobility, survivability, resupply, command and control and sustainability by capitalizing on mature, state-of-the-art technologies. The combination of Crusader's unique capabilities, including vehicle speed, rate of fire, range, and exploitation of computers and communications yield unparalleled fire support capabilities for US forces. The Crusader vehicles have been designed specifically to facilitate air transportability - with a minimum of a combination of any two vehicles air transportable in either a C5 or C17 aircraft. The mix of resupply vehicles (tracked and wheeled) also gives the Commander in theater additional flexibility in responding to the threat, by adapting his Tactics, Techniques and Procedures with the most appropriate utilization and interaction of the tracked and wheeled resupply vehicles. This system supports the Legacy-to-Objective transition path of the Transformation Campaign Plan (TCP).

FY 2001 Accomplishments:

- 308647 Product Development: The lighter weight configuration vehicle design progressed toward detailed design. Completed most subsystem level Preliminary Design Reviews, with a System Level PDR scheduled for 1QFY02. Buildup of the hardware and software that supported the Early User Experimentation continued on schedule - Crusader Integrated Test Stand is being assembled and checked out while Release 3 software was in the process of its checkout and migration to target electronic hardware.
- 20200 Support and Management: Continued project management efforts; including engineering analysis, product development team support and engineering management activities. Continued coordination of activities toward successful completion of MS B.
- 12918 Test and Evaluation: Continued to test the vehicles at Yuma Proving Grounds. Over 2500 rounds have been fired from the fully automated vehicle, while over 2328 rounds were fired from a surrogate vehicle equipped with the XM297 armament system. Performed extended duration, reliability testing of ammunition handling subsystems. Continued survivability risk reduction testing. Purchased ammunition and propellant for program testing.

Total 341765

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- 410614 Product Development: Initiated Detailed Design efforts for the 40 ton vehicles under the Crusader PDRR contract. Complete Element and System level Preliminary Design Reviews. Continue integration and risk reduction of critical technologies. Complete checkout and test of Software Release 3. Accept delivery of new prototype Powerpack/Drive Train and initiate subsystem testing. Continue to mature weight reduction initiatives. Complete configuring the Crusader Integrated Test Stand (CITS) and initiate demonstration of system performance/performance growth.
- 19636 Support and Management: Continue project management efforts; to include engineering analysis, product development team support and engineering management activities. Continue coordination and development of MS B documentation and activities toward successful 3QFY03 review.
- 13841 Test and Evaluation: Continue testing of SPH 1 and XM297 Cannon testing at YPG. Fired 3925 rounds to date on SPH1. Initiate PDRR Performance test and evaluation of Powerpack. Continue Survivability Risk Reduction Testing. Purchase of ammunition and propellant for program testing. Conduct Early User Experimentation. Complete Reliability Testing at GDAS. Initiate demonstration of Milestone B Exit Criteria.

Total 444091

FY 2003 Planned Program

- 232440 Product Development: Complete Detailed Design efforts under Crusader PDRR contract phase. Complete efforts in support of integration and risk reduction of critical technologies under PDRR contract phase. Checkout and test Software Release 5 on the Integrated Crusader Emulator (ICE). Start integrating new Powerpack/Drive Train into chassis. Start Powerpack SDD deliveries. Complete component Maturation/Weight reduction initiatives under PDRR contract phase. Configure Turret and Resupply Test Stands and demonstrate system performance/performance growth.
- 9218 Support and Management: Complete project management efforts: to include engineering analysis, product development team support and engineering management activities under PDRR phase. Complete coordination and development of Milestone B documentation. Conduct Milestone B.
- 4807 Test and Evaluation: Complete testing of SPH 1 and XM297 Cannon at YPG under PDRR contract phase. Finalize Milestone B Performance of Powerpack. Complete Survivability Risk Reduction Testing under PDRR contract phase. Purchase ammunition and propellant for program testing. Complete Milestone B Exit Criteria Demonstration.

Total 246465

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<u>B. Program Change Summary</u>	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2002 PB)	352051	447949	246377
Appropriated Value	355309	447949	0
Adjustments to Appropriated Value	0	0	0
a. Congressional General Reductions	0	-3858	0
b. SBIR / STTR	-10286	0	0
c. Omnibus or Other Above Threshold Reductions	0	0	0
d. Below Threshold Reprogramming	0	0	0
e. Rescissions	-3258	0	0
Adjustments to Budget Years Since FY2002 PB	0	0	88
New Army Transformation Adjustment	0	0	0
Current Budget Submit (FY 2003 PB)	341765	444091	246465

<u>C. Other Program Funding Summary</u>	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
RDTE, BA5, Army, PE 0604854, D503	1	39120	228747	452838	424772	495468	193890	32300	1867136
Procurement, WTCV, Army, G83500	0	0	0	24702	94221	258300	641564	3347760	4366547
Procurement, WTCV, Army, G83600	0	0	0	13237	52933	116103	250563	1222518	1655354
RDTE, BA5, Army, PE 0604854, D2KT	218	197	397	1188	199	3288	5370	30200	41142
Procurement, Ammo, Army, ER 8021	39565	71910	122411	108802	99327	80070	184940	Continue	Continue
Procurement, WTCV, Army, G83601	0	0	0	5876	23462	53043	115285	585458	783124
Procurement,OPA, Army, D16500*	0	0	0	0	0	3697	10170	80594	94461

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C. Other Program Funding Summary: *Funding summary represents a portion of the overall funding in D16500, Other Procurement, Army. This funding is associated with the ReSupply Vehicle - Wheeled (RSV-W).

D. Acquisition Strategy: On 29 December 1994, a Sole Source-CPIF contract award was made selecting United Defense, Limited Partnership (UDLP) as the prime contractor for the PDRR phase of Crusader. General Dynamics Land Systems (Warren, MI) and General Dynamics Armament Systems (Burlington, VT) are the major sub-contractors in the areas of mobility and resupply respectively. On 19 March 1996, the Army changed the armament system for Crusader from liquid propellant (LP) to solid propellant (SP) as a consequence of cost and persistent technical problems. In June 1996, UDLP selected the government's Advanced Solid Propellant Armament System (XM297 cannon and Modular Artillery Charge System (MACS) as the basis for SP Crusader. On 6 November 1996, TACOM -ARDEC signed a Memorandum of Agreement (MOA) with UDLP establishing a unique teaming arrangement for the Government to provide engineering services to UDLP for the development of the SP armament system. Delay in the decision to switch from LP to SP and alignment of program activities to match fiscal profile required an adjustment in the schedule portion of the Acquisition Program Baseline (APB). On 23 October 1997, the Office of the Secretary of Defense approved Crusader's revised APB. The revised APB leveraged acquisition reform initiatives and featured a single continuous objective development path. The seamless transition from PDRR to SDD eliminated inefficiencies in ramping down/up during the milestone decision. During the period of Oct-Dec 1999, Crusader went through a redefinition effort for reduced weight and increased transportability. A revised program schedule and budget was developed to support this effort. Additionally, in June 2000, a revision to the Crusader Acquisition Strategy was signed to support this path forward. The FY01 President's Budget reflected this change. Due to this restructure of both cost and schedule an adjustment to the Acquisition Program Baseline (APB) was required. On 18 December 2000, the Office of the Secretary of Defense approved Crusader's revised APB. The strategy for development of the lightweight Crusader is to build on the successful development to date on major subsystems; e.g. continue development and testing of the XM297 cannon, exercise the resupply subsystem and software in the Systems Integration Facility (SIF), and continue electronics and software development. The strategy is to continue these efforts, without a break, develop weight reduction technologies and initiatives, and re-design the system with the current contractor team.

<u>E. Schedule Profile</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Delivery of SPH 1 & initiate testing *							
Select Powerpack/Drivetrain Developer *							
Delivery of prototype Powerpack/Drivetrain		4Q					
Delivery of Gen 1 Electronics *	3Q						

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E. Schedule Profile (continued)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Milestone B			3Q				

*Milestone completed

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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Systems Contractor	SS/CPIF	UDLP, Minneapolis, MN	855971	226187	1Q	348766	1Q	190260	1Q	0	1621184	0
b . Systems Development Engineering	PO	PM Crusader, Picatinny Arsenal, NJ	25434	8365	1Q	8965	1Q	4672	1Q	0	47436	0
c . Systems Development Engineering	PO	ARDEC, Picatinny Arsenal, NJ	64768	14014	1Q	19015	1Q	10053	1Q	0	107850	0
d . Systems Development Engineering	PO	TACOM, Warren, MI	3004	624	1Q	684	1Q	345	1Q	0	4657	0
e . Systems Development Engineering	PO	ARL, Adelphi, MD	6532	2691	1Q	1323	1Q	476	1Q	0	11022	0
f . Systems Development Engineering	PO	Various OGAs	9573	5685	1Q	7771	1Q	3934	1Q	0	26963	0
g . Systems Development Engineering	Various	Various contracts	16802	51081	1-2Q	24090	1-2Q	22700	1-2Q	0	114673	0
Subtotal:			982084	308647		410614		232440		0	1933785	0

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II. Support Cost	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Development Support	PO	ARDEC, Picatinny Arsenal, NJ	37577	11387	1Q	10300	1Q	5160	1Q	0	64424	0
b . Integrated Logistics Support	PO	RIA, Rock Island, IL	911	281	1Q	213	1Q	111	1Q	0	1516	0
c . Development Support	PO	TACOM, Warren, MI	7875	2111	1-2Q	2126	1-2Q	1257	1-2Q	0	13369	0
d . Development Support	PO	ARL, Adelphi, MD	3275	480	1-2Q	880	1-2Q	285	1-2Q	0	4920	0
e . Development Support	PO	Various OGAs	4815	1713	1-3Q	1540	1-3Q	628	1-3Q	0	8696	0
f . Development Support	Various	Various contracts	10692	1132	1-3Q	869	1-3Q	206	1-3Q	0	12899	0
Subtotal:			65145	17104		15928		7647		0	105824	0

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III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Development Test and Evaluation	PO	TECOM (YPG, AZ; CSTA, APG, MD)	10005	5707	1-3Q	7222	1-3Q	3775	1-3Q	0	26709	0
b . Ammunition and propellant	PO	Various	22981	7211	1-3Q	6619	1-3Q	1032	1-3Q	0	37843	0
Subtotal:			32986	12918		13841		4807		0	64552	0

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Project Management Support	SS/FP	Vector Research, Inc., MI	1722	554	1-2Q	875	1-2Q	175	1-2Q	0	3326	0
b . Project Management Support	SS/FP	GSA, VA	405	141	1-2Q	145	1-2Q	74	1-2Q	0	765	0
c . Project Management Support	SS/FP	System Research & Integration, Inc., VA	130	0		0		0		0	130	0
d . Project Management Support	SS/FP	Camber, Inc., NJ	440	122	1-2Q	63	1-2Q	0	1-2Q	0	625	0

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IV. Management Services (continued)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
e . Project Management Support	SS/FP	SAIC, VA	2113	784	1-2Q	803	1-2Q	401	1-2Q	0	4101	0
f . Project Management Support	SS/FP	Robbins Gioia, VA	253	0		0		0		0	253	0
g . Project Management Support	SS/FP	Genisys, TX	191	8	1-2Q	0		0		0	199	0
h . Project Management Support	SS/FP	PRC, VA	0	116	1-2Q	135	1-2Q	70	1-2Q	0	321	0
i . Systems Engineering Support	SS/FP	PRC, VA	402	0		0		0		0	402	0
j . Systems Engineering Support	SS/FP	LMI, VA	458	0		0		75	1-2Q	0	533	0
k . Systems Engineering Support	SS/FP	SAIC, VA	81	0		0		0		0	81	0
l . Systems Engineering Support	SS/FP	Camber Inc, NJ	142	232	2Q	300	1-2Q	100	1-2Q	0	774	0
m . Systems Engineering Support	SS/FP	TBD	0	258	1-2Q	67	1-2Q	35	1-2Q	0	360	0

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IV. Management Services (continued)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
n . Systems Engineering Support	SS/FP	VRI, MI	0	90	4Q	0		0		0	90	0
o . Software Development Support	SS/FP	Mitre Corporation, VA	1549	162	1Q	262	1Q	131	1Q	0	2104	0
p . Software Development Support	SS/FP	SAIC, VA	753	217	1-2Q	0		0		0	970	0
q . Software Development Support	SS/FP	High Performance Technology Inc (HPT-I), VA	236	412	1-2Q	391	1-2Q	213	1-2Q	0	1252	0
r . Software Development Support	SS/FP	Averstar Inc, OK	0	0		217	1-2Q	104	1-2Q	0	321	0
s . Software Development Support	SS/FP	Camber Inc, NJ	291	0		275	1-2Q	100	1-2Q	0	666	0
t . Software Development Support	SS/FP	PRC, NJ	0	0		175	1-2Q	93	1-2Q	0	268	0
Subtotal:			9166	3096		3708		1571		0	17541	0
Project Total Cost:			1089381	341765		444091		246465		0	2121702	0