

UNCLASSIFIED

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603854A Artillery Systems Advanced Development
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COST (In Thousands)	FY1998 Actual	FY 1999 Estimate	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	301160	313526	282937	120457	0	0	0	0	0	1249605
D505 Crusader - Advanced Development*	298012	311257	282937	120457	0	0	0	0	0	1241461
DC68 DC68	3148	2269	0	0	0	0	0	0	0	8144

*In FY 2002/2003 the database erroneously reflects the spread of the pay increase to this line, should have been given to PE 0604854A/project D503. What appears above is the correct amounts for FY 2002/2003.

A. Mission Description and Budget Item Justification: This program element supports the Program Definition and Risk Reduction (PDRR) efforts for the Crusader – Advanced Development Program. The Crusader system is the Army’s next generation artillery system consisting of a self-propelled howitzer (SPH) and a resupply vehicle (RSV). Crusader will have significantly increased capabilities in the areas of lethality, mobility, survivability, resupply, command and control, and sustainability by capitalizing on emerging, advanced technologies. The SPH will also achieve increased lethality levels through independent operations. The RSV will have significantly increased capabilities in the areas of resupply, mobility and survivability and will provide a single source of ammunition, fuel, propellant and other supplies for the SPH. Beginning in FY 1999, efforts previously funded in PE 0603640A, Project DB91, Artillery Propellant Development will be funded within this program element.

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President’s Budget (FY 1999 PB)	314017	313166	309059	126386
Appropriated Value	324380	317166		
Adjustments to Appropriated Value				
a. Congressional General Reductions	-10363	-3640		
b. SBIR / STTR	-7874			
c. Omnibus or Other Above Threshold Reductions	-2583			
d. Below Threshold Reprogramming	-2400			
e. Rescissions				
Adjustments to Budget Years Since FY 1999 PB			-26122	-5929
Current Budget Submit (FY 2000/ 2001 PB)	301160	313526	282937	120457

Change Summary Explanation: FY 2000/2001 reduction due to realignment of funds to higher priority requirements.

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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603854A Artillery Systems Advanced Development	PROJECT D505
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COST (In Thousands)	FY1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D505 Crusader - Advanced Development*	298012	311257	282937	120457	0	0	0	0	0	1241461

*In FY 2002/2003 the database erroneously reflects the spread of the pay increase to this line, should have been given to PE 0604854A/project D503. What appears above is the correct amounts for FY 2002/2003.

A. Mission Description and Justification: This project supports the Program Definition and Risk Reduction (PDRR) efforts for the Crusader – Advanced Development Program. The Crusader system is the Army’s next generation artillery system consisting of a self-propelled howitzer (SPH) and a resupply vehicle (RSV). Crusader will have significantly increased capabilities in the areas of lethality, mobility, survivability, resupply, command and control, and sustainability by capitalizing on emerging, advanced technologies. The SPH will also achieve increased lethality levels through independent operations. The RSV will have significantly increased capabilities in the areas of resupply, mobility and survivability and will provide a single source of ammunition, fuel, propellant and other supplies for the SPH. Beginning in FY99, efforts previously funded in PE 0603640A, Project DB91, Artillery Propellant Development will be funded within this project. Beginning in FY00, work previously executed in Project DC68 will transition to Project D505.

FY 1998 Accomplishments:

- 269102 Product development: Continued development efforts under the Crusader PDRR contract. Continued efforts in support of maturation, integration and risk reduction of critical technologies. Continued component prototype fabrication and demonstration. Conducted system level review. Conducted PEO/CMDT IPR. Received delivery of key system components, such as Resupply Magazines, RSV-Hull, Gun Turret, Bench Top Electronics, Projectile Load Arm and Engine & Transmission. Initiated component integration efforts in the System Integration Facility (SIF).
 - 21438 Support and management: Continued project management efforts; to include scientific and engineering analysis, product development team support and engineering management services.
 - 7472 Test and evaluation: Purchased ammo for EDT and continued EDT-A testing.
- Total 298012

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FY 1999 Planned Program:		
<ul style="list-style-type: none"> • 266058 • 19081 • 14450 • 11668 Total 	<ul style="list-style-type: none"> Product development: Continue developmental efforts under the Crusader PDRR contract. Continue efforts in support of maturation and continue integration and risk reduction of critical technologies. Initiate long lead item buys. Initiate system prototype fabrication (Version I SPH/RSV). Initiate integration and checkout. Complete component fabrication and demonstration. Type Classification of MACS XM231. Delivery of 1 (RSV-) engineering development test article to be used in Performance/RAM Testing. Support and management: Continue project management efforts; to include scientific and engineering analysis, product development team support and engineering management services. Test and evaluation: Finalize EDT-A testing. Initiate testing of RSV(-). Initiate Safety Certification Activity. Purchase of ammunition and propellant for program testing. Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR) Programs 	
FY 2000 Planned Program:		
<ul style="list-style-type: none"> • 248130 • 19268 • 15539 Total 	<ul style="list-style-type: none"> Product Development: Continue developmental efforts under Crusader PDRR contract. Continue efforts in support of integration and risk reduction of critical technologies. Continue long lead item buys. Continue automotive maturation. Complete integration and checkout of Version 1 SPH and RSV. Initiate Integration and Checkout of Version 2 SPH. Type classification of MACS XM232. Select Production Facility site. Delivery of 2 SPH and 1 RSV engineering development test articles to be used in DT/OT, EUT and Reliability Growth Testing. Support and Management: Continue project management efforts; to include engineering analysis, product development team support and engineering management activities. Finalize coordination and development of MSII activities. Test and Evaluation: Continue testing of RSV(-). Initiate EDT/EUE of Version 1 SPH and RSV. Finalize Safety Certification activity. Establish Cannon Interim Safety Fatigue Life. Initiate System Reliability Growth Testing. Initiate Ballistic Hull and Turret Survivability Testing. Purchase of ammunition and propellant for program testing. 	
FY 2001 Planned Program:		
<ul style="list-style-type: none"> • 105310 • 9734 • 5413 Total 	<ul style="list-style-type: none"> Product Development: Finalize development efforts under Crusader PDRR contract. Complete efforts in support of integration and risk reduction of critical technologies. Complete automotive maturation. Complete integration and checkout of Version 2 SPH. Support and Management: Complete project management efforts; to include engineering analysis, product development team support and engineering management activities. Conduct MSII. Test and Evaluation: Finalize EDT/EUE of Version 1 SPH and RSV and conduct EUT. Conduct EDT/EUT and Reliability Growth Test of SPH2. Finalize Safety Certification activity. Finalize Ballistic Hull and Turret Survivability Testing. Purchase of ammunition and propellant for program testing. 	
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B. Other Program Funding Summary	<u>FY 1998</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>	<u>To Comp</u>	<u>Total Cost</u>
RDTE, BA5, Army, PE 0604854, D503			60577	315253	411143	258066	295415	23988	0	1364442
Procurement, WCTV, Army, G83500					41607	95543	382601	628003	9437130	10584884
Procurement, WCTV, Army, G83600					32967	80240	314331	499726	7633500	8560764
RDTE, BA5, Army, PE 0604854, D2KT		100	396	1145	200	3330	5404	20111	10000	40686
RDTE, BA4, Army, PE 0603640, DB91	7983								0	115572
Procurement, Ammo, Army, ER 8021			42938	55602	73182	93248	54184	78394	Cont	Cont
RDTE, BA5, Army, PE 0604645, D175		4470	2899	2214					0	43281
Procurement, Ammo, Army, ER 8017		1510	14061	45917	53257	53921	54032	56430	Cont	Cont

C. 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 March 1996, the contract with UDLP was restructured to reflect the change from LP to SP. 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. On 29 January 1997, UDLP signed a contract modification worth \$804.9M that definitized the remainder of PDRR and details the scope of work through MSII. 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.

D. Schedule Profile	<u>FY 1998</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>
PEO/Cmdt In-Process-Review (IPR)	4 th Qtr*							
Integration Checkout		4 th Qtr						
Safety Certification Activity		4 th Qtr						
MACS XM231 TC		4 th Qtr						
Select Production Facility			4 th Qtr					
MACS XM232 TC			4 th Qtr					
Milestone II				2 nd Qtr				

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D. Schedule Profile	<u>FY 1998</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>
EMD Continuation Review				4 th Qtr				
LRIP IPR						4 th Qtr		
FUE								4 th Qtr

*Milestone completed

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ARMY RDT&E COST ANALYSIS (R-3)										DATE February 1999		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603854A Artillery Systems Advanced Development						PROJECT D505		
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. Systems Contractor	SS/CPIF	UDLP, Minneapolis, MN	434289	238173	Oct-98	231729	Oct-99	99472	Oct-00	0	1003663	
b. Systems Development Engineering	PO	ARDEC, Picatinny Arsenal, NJ	34871	18796	Oct-98	9751	Oct-99	3424	Oct-00	0	66842	
c. Systems Development Engineering	PO	TACOM, Warren, MI	2237	940	Oct-98	1482	Oct-99	863	Oct-00	0	5522	
d. Systems Development Engineering	PO	ARL, Adelphi, MD	2676	1766	Oct-98	800	Oct-99	400	Oct-00	0	5642	
e. Systems Development Engineering	PO	Various OGAs	827	5109	Oct-98	3640	Oct-99	837	Oct-00	0	10413	
f. Systems Development Engineering	Various	Various contracts	78	1274	Dec-98	728	Dec-99	314	Dec-00	0	2394	
Subtotal Product Development:			474978	266058		248130		105310			1094476	
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	PO	PM Crusader, Picatinny Arsenal, NJ	11816	6472	Oct-98	6628	Oct-99	3397	Oct-00	10	28323	
b. Development Support	PO	ARDEC, Picatinny Arsenal, NJ	16767	6955	Oct-98	7039	Oct-99	3653	Oct-00	0	34414	
c. Integrated Logistics Support	PO	RIA, Rock Island, IL	271	149	Oct-98	150	Oct-99	80	Oct-00	0	650	
d. Development Support	PO	TACOM, Warren, MI	3971	1488	Oct-98	1528	Oct-99	788	Oct-00	-	7775	
e. Development Support	PO	ARL, Adelphi, MD	1950	853	Oct-98	798	Oct-99	403	Oct-00	0	4004	
f. Development Support	PO	Various OGAs	2171	707	Oct-98	805	Oct-99	441	Oct-00	0	4124	
g. Development Support	Various	Various contracts	4501	366	Oct-98	166	Oct-99	85	Oct-00	0	5118	
Subtotal Support Costs:			41447	16990		17114		8847		10	84408	

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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. Development Test and Evaluation	PO	TECOM (YPG, AZ; CSTA, APG, MD)	2091	1170	Oct-98	5842	Oct-99	2193	Oct-00	0	11296	
b. Ammunition and propellant	PO	Various	6029	13280	Dec-98	9697	Dec-99	3220	Dec-00	0	32226	
Subtotal Test and Evaluation:			8120	14450		15539		5413			43522	
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. Project Management Support	SS/FP	Vector Research, Inc., VA	739	670	Nov-98	600	Nov-99	300	Nov-00	0	2309	
b. Project Management Support	SS/FP	System Research & Integration, Inc., VA	101	100	Nov-98	105	Nov-99	55	Nov-00	0	361	
c. Project Management Support	SS/FP	GSA, VA	130	160	Nov-98	165	Nov-99	85	Nov-00	0	540	
d. Project Management Support	SS/FP	Unknown	0	287	Nov-98	400	Nov-99	0	-	0	687	
e. Systems Engineering Support	SS/FP	PRC, VA	294	494	Nov-98	504	Nov-99	257	Nov-00	0	1549	
f. Software Development Support	SS/FP	Mitre Corporation, VA	991	380	Nov-98	380	Nov-99	190	Nov-00	0	1941	
g. SBIR/STTR				11668							11668	
Subtotal Management Services:			2255	13759		2154		887			19055	
Project Total Cost:			526800	311257		282937		120457		10	1241461	

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