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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD	PROJECT 2260
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COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2260 Theater High Altitude Area Defense	565,818	341,307	294,647	16,778	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

The Theater High Altitude Area Defense (THAAD) System is being designed to negate theater ballistic missiles (TBM) at long ranges and high altitudes. Its long-range intercept capability will make possible the protection of broad areas, dispersed assets, and population centers against TBM attacks. The THAAD System includes missiles, Palletized Loading System (PLS) launchers, Battle Management/Command, Control, Communications, Computers, Intelligence (BM/C4I) units, THAAD Radars, and support equipment. The THAAD Radar (formerly known as Ground Based Radar) provides threat early warning, threat type classification, interceptor fire control, external sensor cueing, and launch and impact point estimates for the THAAD System. The THAAD Radar is based on state-of-the-art, solid-state, X-band radar technology. THAAD will be interoperable with both existing and future air defense systems. This netted and distributed BM/C4I architecture will provide robust protection against the TBM threat spectrum. THAAD is pursuing integration of THAAD BM/C4I with the Project Manager (PM), Air Defense Command and Control Systems (ADCCS) to take advantage of previous Army developments that can be incorporated into the THAAD program.

The Demonstration/Validation (Dem/Val) program will develop a design for the objective THAAD system and demonstrate the capabilities of the system in a series of 11 flight tests. The residual hardware resulting from the THAAD Dem/Val program, including the User Operational Evaluation System (UOES) missile option, will be used for a prototype system called the UOES. The UOES, used primarily for early operational assessment and for soldiers to influence the final design, will also be available for limited use as a contingency capability during a national emergency. The UOES will consist of 40 missiles with 4 launchers, 2 BM/C4I units, 2 THAAD Radars and support equipment. The THAAD system design will be developed and tested in the Engineering, Manufacturing, and Development (EMD) phase leading to low rate initial production and subsequent fielding in FY94.

During FY95 - FY98 the Dem/Val flight test program will be conducted at White Sands Missile Range (WSMR), New Mexico. The flight test schedule consists of flight and system tests which began on April 21, 1995 with a successful first flight of the THAAD missile. To date, six flight tests have been conducted with the seventh flight planned for February 1997. The targets for the flight test program are being developed under the Tactical Missile Defense Targets contract (Project 3354).

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy.

The THAAD Program continued Dem/Val hardware and software design, development and delivery in support of integration and acceptance testing for flight

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<p>testing at WSMR. The first Dem/Val THAAD radar was delivered to WSMR on July 17, 1995, and has participated in flights 3, 4, 5, and 6. The THAAD Dem/Val Radar has performed in the shadow mode to the test range radar and will be the primary sensor on flight 7. The first UOES Radar was delivered to WSMR May 3, 1996, and completed range integration and test in September 1996. It will be used for flight testing beginning with flight 8 and for the remainder of the Dem/Val flight tests. The first flight was successfully conducted at WSMR on April 21, 1995, proving the THAAD missile propulsion system booster/kill vehicle separation, seeker shroud cover deployment, seeker data, uplink/downlink communications from the Radar Interface Unit (RIU) to the missile, and pre-planned command destruct. The second flight was conducted on July 31, 1995, as a planned non-intercept, guidance and control test. The missile successfully performed the THAAD Energy Management Steering (TEMS) maneuver which resulted in nominal velocities and accelerations. The kill vehicle successfully maneuvered in response to planned In-Flight Target Updates (IFTUs). The third flight was a non-intercept fly-by test against a Storm target on October 13, 1995. The missile collected critical seeker data and the BM/C4I generated the fire control solution and sent the launch command to the interim launcher. During flight 4, on December 13, 1995, much success was demonstrated even though a planned intercept was not accomplished. The PLS launcher was used successfully for the first time, and the seeker and integrated electronics package demonstrated end game homing. During flights 4, 5, and 6, the THAAD Radar successfully tracked both the THAAD interceptor and the target. During flights 4 and 6, it properly maintained track on the interceptor and seeker shrouds during shroud separation. All radar mission events, times, and durations, went as predicted in pre-mission analysis. Flight 6 was conducted July 15, 1996. Data analysis is being performed to assess the segment performance which all appeared to function as planned, with the exception of a component failure in the missile seeker. An intercept was not achieved, however, critical data was obtained on how the seeker viewed the target.</p> <p><u>FY 1996 (\$ in Thousands)</u></p> <ul style="list-style-type: none"> - \$383,000 Major Contracts: Began THAAD system flight tests with BMC4I, THAAD Radar and PLS launcher. Completed flight tests 3-6 at WSMR. Continued system flight testing analysis. Continued THAAD system ground testing to mitigate flight test risk. Completed fabrication and WSMR integration of the UOES #1 Radar. Completed fabrication of UOES #2 Radar and delivered to WSMR. Continued THAAD Radar characterization tests at WSMR. Conducted System Design Review. - \$62,900 Support Contracts: Continued software independent verification and validation. Continued nuclear environment survivability analysis. Continued hit assessment, discrimination, and guidance, navigation and control algorithm development. Continued hit to kill lethality analysis. Continued integration and support of THAAD flight testing. - \$52,333 Integration by Prime Contractor: Continued integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C4I, weapon system deck model, and simulation efforts. Continued system threat vulnerability assessment. Maintained integrated logistics and product assurance efforts. Provided system engineering support to THAAD flight tests to validate test results with predicted performance simulations. Continued pursuing integration of THAAD BM/C4I with the PM, ADCCS, to take advantage of previous Army developments of force operations software. - \$19,700 In-house support: Maintained government salaries and benefits, travel, training. - \$41,375 Targets: Continued development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintained infrastructure to support TMD targets. 		
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<ul style="list-style-type: none"> - \$3,907 Lethality Analysis - Continued lethality simulation code validation. - \$2,603 Operational Test and Evaluation (OT&E)- Conducted independent assessment of the THAAD System - \$565,818 Total 		
<u>FY 1997 (\$ in Thousands)</u>		
<ul style="list-style-type: none"> - \$212,808 Major Contracts: Continue system flight test program and support. Conduct Radar System Test #1 (RST-1). Complete fabrication and integration of UOES radars. Conduct THAAD Radar characterization tests at United States Army Kwajalein Atoll (USAKA) in conjunction with the Theater Critical Measurements Program (TCMP)-2. Conduct Software Specification Review and SDR update. Exercise the UOES missile option. Begin procurement and fabrication of UOES missile components. - \$42,463 Support Contracts: Continue software independent verification and validation. Continue nuclear environment survivability analysis. Continue hit assessment, discrimination, and guidance, navigation and control algorithm development. Continue hit to kill lethality analysis. Continue integration and support THAAD flight testing. - \$56,629 Government Furnished Equipment (GFE)/Other: Continue integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C4I, weapon system deck model, and simulation efforts. Continue system threat vulnerability assessment. Maintain integrated logistics and product assurance efforts. Provide system engineering support to THAAD flight tests to validate test results with predicted performance simulations. Continue pursuing integration of THAAD BM/C4I with PM, ADCCS to take advantage of previous Army developments of force operations software. - \$20,590 In-house support: Maintain government salaries and benefits, travel, training. - \$5,450 Targets: Continue development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintain infrastructure to support TMD targets. - \$1,594 Operational Test and Evaluation (OT&E): Conduct independent assessment of the THAAD System - \$1,773 Small Business and Innovative Research - \$341,307 Total 		
<u>FY 1998 (\$ in Thousands)</u>		
<ul style="list-style-type: none"> - \$194,368 Major Contracts: Continue fabrication and integration of UOES missiles. Complete system flight test program and support - \$30,500 Support Contracts: Continue software independent verification and validation. Continue nuclear environment survivability analysis. Continue hit assessment, discrimination, and guidance, navigation and control algorithm development. Continue hit to kill lethality analysis. Continue integration and support THAAD flight testing. 		
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<ul style="list-style-type: none"> - \$30,100 Integration by Prime Contractor: Continue integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C4I, weapon system deck model, and simulation efforts. Continue system threat vulnerability assessment. Maintain integrated logistics and product assurance efforts. Provide system engineering support to THAAD flight tests to validate test results with predicted performance simulations. Continue pursuing integration of THAAD BM/C4I with PM, ADCCS to take advantage of previous Army developments of force operations software. - \$21,500 In-house support: Maintain government salaries and benefits, travel, training. - \$14,234 Targets: Continue development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintain infrastructure to support TMD targets - \$2,367 Lethality Analysis: Continue lethality simulation code validation. - \$1,578 Operational Test and Evaluation (OT&E): Conduct independent assessment of the THAAD System - \$294,647 Total <p><u>FY 1999 (\$ in Thousands)</u></p> <ul style="list-style-type: none"> - \$16,778 Completes funding of the UOES missiles - \$16,778 Total <p><u>Acquisition Strategy</u> The THAAD Acquisition Strategy approved for the Dem/Val phase specified full and open competition for THAAD system integration, missiles, launchers, and BM/C4I. The TMD Ground Based Radar (GBR) Acquisition Strategy also specified full and open competition for Dem/Val. The Concept Definition phase, completed in 1992, involved three contractor teams and defined concepts and preliminary designs for the THAAD System. The THAAD Dem/Val contract was competitively awarded to Lockheed Missiles and Space Company in September 1992. The Dem/Val program will develop a design for the THAAD System, and the contract contains an option for production of the 40 UOES missiles based on the design demonstrated in the Dem/Val flight test program.. The THAAD Radar (formerly known as TMD-GBR) Dem/Val contract was competitively awarded to Raytheon Company in September 1992. The Dem/Val phase includes the development and test of the Dem/Val TMD-GBR and two UOES TMD-GBRs.</p>		
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B. <u>Program Change Summary (\$ in Thousands)</u>										
	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>Total Cost</u>					
Previous President's Budget	554,755	269,000	0	0	823,755					
Appropriated Value		344,000								
Adjustments to Appropriated Value:										
a. General Reductions (FFRDC, Inflation etc.)		-2,693								
FY 1998 President's Budget Request	565,818	*341,307	294,647	16,778	1,218,550					
Change Summary Explanation:										
*Funding: A request has been submitted to reprogram FY 97 EMD funds to Dem/Val. FY 98 and FY 99 funds were realigned due to the slip in the THAAD flight test schedule.										
Schedule: The Milestone II DAB Review milestone has slipped due to longer than expected Flight 6 failure investigation and Flight 7 preparation. The Flight 6 failure investigation caused Flight 7 to move from September to December 1996. An inertial measurement unit software error, found during software verification testing of FTV-07, further delayed the flight test to late February 1997.										
Technical: None										
C. <u>Other Program Funding Summary (\$ in Thousands)</u>										
	<u>FY 1996</u>	<u>FY 1997</u>	<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>To Compl</u>	<u>Total Cost</u>
THAAD Procurement, SSN C494000*	0	0	0	0	0	33,785	531,715	606,315	Cont	Cont
THAAD MILCON, 0604861C	13,104	0	4,565					4,994	Cont	Cont
THAAD EMD, 0604861C	0	277,508	261,480	578,467	603,213	584,561	413,884	372,674	Cont	Cont
* IN ARMY TOA										
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D. Schedule Profile

	<u>FY 1996</u>				<u>FY 1997</u>				<u>FY 1998</u>				<u>FY 1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Dem/Val Radar Integration and Test (I&T) Complete	*															
System Design Review			*													
UOES Radar 1 I&T Complete				*												
Radar System Test #1					*											
UOES Option Award						X										
UOES Radar 2 I&T Complete					*											
Software Specification Review							X									
Integrated System Tests Complete											X					
Radar System Test #2						X										
Milestone II											X					
1st UOES Missile Delivery															X	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE February 1997	
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD					PROJECT 2260	
A. <u>Project Cost Breakdown (\$ in Thousands)</u>											
					<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>			
a. Prime Contract					383,000	212,808	194,368	16,778			
b. Other Government Activities					52,333	56,629	30,100	0			
c. Support Contracts					62,900	42,463	30,500	0			
d. Program Management					19,700	20,590	21,500	0			
e. Targets					41,375	5,450	14,234	0			
f. Lethality					3,907	0	2,367	0			
g. OT&E					2,603	1,594	1,578	0			
h. Small Business Innovative Research					0	1,773	0	0			
Total					565,818	341,307	294,647	16,778			
B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
LMMS	CPFF	Oct 97			988,344	293,494	181,745	194,368	16,778		1,674,729
RAYTHEON	CPIF/CPAF				430,034	89,506	31,063				550,603
<u>Support and Management Organizations</u>											
SETA	C/CPAF	Oct 97				23,200	16,700	11,050	0		50,950
Other Spt Cont	Various	Multiple			212,338	39,700	25,763	19,450	0		297,251
OGAs	MIPR	Multiple			131,054	53,033	58,219	29,600	0		271,906
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Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program	
SBIR							1,773				1,773	
<u>Test and Evaluation Organizations</u>												
WSMR	MIPR	OCT 97			27,531	19,000	19,000	22,000	0		87,531	
OT&E					1,500	2,603	1,594	1,578	0		7,275	
TARGETS					61,245	41,375	5,450	14,234	0		122,304	
LETHALITY					7,200	3,907	0	2,367	0		13,474	
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)												
Government Furnished Property:												
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date		Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program	
<u>Product Development Property</u>												
N/A					0	0	0	0	0	0	0	
<u>Support and Management Property</u>												
N/A					0	0	0	0	0	0	0	
<u>Test and Evaluation Property</u>												
N/A					0	0	0	0	0	0	0	
Subtotal Product Development					1,418,378	383,000	212,808	194,368	16,778		2,225,332	
Subtotal Support and Management					343,392	115,933	102,455	60,100			621,880	
Subtotal Test and Evaluation					97,476	66,885	26,044	40,179			230,584	
Total Project					1,859,246	565,818	341,307	294,647	16,778		3,077,796	
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