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

DATE: February 2002

BUDGET ACTIVITY: 07 - Operational System Development

PE NUMBER AND TITLE: 0708011F Industrial Preparedness

PROJECT: 2865

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
2865	Manufacturing Technology	55,464	58,406	37,581	40,319	41,023	40,627	41,361	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0

(U) A. Mission Description

DoD Manufacturing Technology (ManTech) program is mandated by Section 2521, Title 10, United States Code. The ManTech program identifies and resolves critical advanced manufacturing capability issues in response to warfighter needs. ManTech also develops, demonstrates, and transitions advanced manufacturing techniques to reduce costs, improve quality/capability, and shorten cycle times of weapon systems during design, development, production, and sustainment. ManTech projects respond specifically to System Program Office acquisition and sustainment requirements to reduce cost, schedule, cycle time, and risks during transition of technology. Where mature processes are not available, laboratory-developed initial process capabilities are matured and inserted into weapon system programs. ManTech also goes beyond just factory floor manufacturing/repair processes. It encompasses every activity within an industrial enterprise, ranging from business management (e.g., tools for Integrated Product Process Development) to supplier base interactions and performance. The strategies and best practices of world-class enterprises are analyzed and the performance of defense suppliers benchmarked. The world's best industrial practices are adapted and validated in multiple pilot projects and then deployed in defense applications. The ManTech program efforts also enhance repair/remanufacture capabilities to affordably sustain the aging weapon systems inventory, thereby reducing total ownership costs. In order to respond rapidly to warfighter needs, ManTech objectives are conducted through partnership with all industry levels, from large prime contractors to small material and parts vendors, as well as Air Logistics Centers. Program emphasis is on the aeronautical, sustainment, armament/directed energy, and space/launch vehicle sectors of the industrial base. Note: In FY 2002, Congress added $5.2 million to this program for Advanced Low-Observable Coatings ($4.2 million) and Laser Peening for F-119 Engine ($1.0 million).

(U) FY 2001 ($ in Thousands)

(U) $21,430 Continued to invest in cost-effective and efficient manufacturing technology demonstrations for critical, high quality, reliable structural, propulsion, and electronic components and assemblies required for future and legacy aircraft. Maintained pilot efforts in high leverage activities to validate potential benefits accrued from flexible manufacturing, commercial/military integration, quality processing, and supplier improvements. Performed long-term projects to develop lean enterprise integration tools. Initiated an effort to catalog and implement lean concepts.

(U) $19,238 Enhanced current weapon system mission readiness by establishing/demonstrating cost-effective repair and remanufacturing technologies for affordable sustainment. Reduced repair and maintenance cycle time for aging systems. Developed remanufacturing capabilities to rapidly

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(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

generate standardized replacement parts on demand. Initiated an effort to address technologies for turbine engine life extension.

(U) $2,654 Furthered the manufacturing state-of-the-art for advanced tactical missiles. Established and demonstrated efficient and cost-effective manufacturing methods for high performance, high reliability electronics, lightweight structures, and efficient propulsion methods. Identified and implemented manufacturing improvements required to transition precision-guided munition subsystems into production. Conducted high-payoff pilot projects to validate potential benefits accrued from using production best practices. Initiated a program to establish affordable manufacturing processes for Micro-Electro-Mechanical Systems applied to inertial measurement units.

(U) $6,342 Established and demonstrated affordable, flexible manufacturing processes to reduce the cost and lead time of higher performance spacecraft and launch vehicles. Provided effective and efficient manufacturing technology for critical high quality, reliable electronic components/assemblies for surveillance, tracking communications links, and data/signal processing. Conducted pilot efforts in high-payoff endeavors for efficient, low-cost capability to produce components and weapon systems in the spacecraft, launch vehicles, and command, control, communications, and intelligence industrial base sectors. Maintained efforts to rapidly respond to space sector manufacturing issues.

(U) $3,800 Started tasks associated with affordable processing of Specialty Aerospace Metals (e.g., laser forming, casting, welding, forging).

(U) $2,000 Started scale-up of semi-automatic production process for Nickel Metal-Hydride Replacement Battery effort.

(U) $55,464 Total

(U) FY 2002 ($ in Thousands)

(U) $25,809 Launch affordable and efficient manufacturing technology investigations for critical, high quality and reliable structural, propulsion, and electronic components and assemblies required for existing and next generation aircraft (e.g., missile warning sensor). Conduct high-value pilot efforts to verify advantages of flexible manufacturing, commercial/military integration, quality processing, and supplier improvements (e.g., Composites Affordability Initiative). Leverage specialty aerospace metals work into metals affordability initiatives focused on laser forming, casting, welding, and forging. Focus long-term projects using lean enterprise integration tools. Deliver final version of the Lean Enterprise Self-Assessment Tool and Transition to Lean Roadmaps to aerospace industry. Complete Lean Education curriculum for Defense Acquisition University. Continue rapid response productivity improvement efforts with selected high value programs. Continue activities aimed at manufacture of more affordable low observable coatings. Establish processing parameters for optimized manufacture of high strength, low weight fiber composites for transition to C-17. Plan effort to reduce high-cycle fatigue damping in engine components. Complete investigations for manufacturing modeling and simulation activity to reduce the number of engineering change orders generated in manufacturing enterprises (Integrated Manufacturing Simulation for Affordability).

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

(U)	$13,930	Provide cost-effective repair and manufacturing technologies for affordable sustainment of existing weapon systems to enhance mission readiness. Complete reconfigurable tool for rapid, accurate sheet metal stretch forming. Complete transition of lean concepts applied to maintenance, repair, and overhaul activities at organic and contractor depots. Reduce repair and maintenance cycle time for aging systems and established remanufacturing capabilities which rapidly generate standardized replacement parts on demand. Continue pilot efforts to assess benefits derived from inserting electronic parts obsolescence management tools into weapon system production programs. Initiate technical effort to extend the life of critical, high-value rotating engine components exposed to high cycle fatigue environments. Continue rapid response productivity improvement efforts to overcome structural damage of hot trailing edges found in the wake of hot engine exhaust, improve Air Logistics Center depaint capabilities, and implement sustainment improvements for Air Logistic Center engine refurbishment shops.
(U)	$7,687	Pursue efficient and cost-effective manufacturing methods for high performance, high reliability electronics, lightweight structures, and efficient propulsion methods for advanced tactical missiles. Establish system-level, pilot efforts to assess potential benefits accrued from inserting best practices from small and medium size suppliers into weapon system production programs (e.g., Joint Direct Attack Munition, AIM-9X). Initiated joint program with Navy to provide lower drift rate Inertial Measurement Unit (IMU) for Micro-Electro-Mechanical Systems. Continue rapid response productivity improvement efforts to: increase production (surge) rate of IMUs for precision guided munitions; provide high quality glass material acceptable for use in airborne laser turret windows; and enhance low observable coatings for structural composite airframes in air launched munitions.
(U)	$5,830	Provide affordable, flexible manufacturing process development to reduce cost and lead-time for higher performance spacecraft and launch vehicles. Establish effective and efficient manufacturing technology for critical high quality, reliable electronic components and assemblies required for surveillance, tracking communications links, and data/signal processing. Conduct pilot efforts to demonstrate enhanced and efficient manufacturing capability for low-rate production capability of components and weapon systems in the space, launch, and command, control, communications, and intelligence industrial base sectors. Continue efforts to rapidly respond to space sector manufacturing issues (e.g., leverage standard modular spacecraft architecture using flexible multi-mission production lines to achieve cost and cycle time reductions). Continue rapid response productivity improvement effort to improve affordability of space based radar/electronic components.
(U)	$4,159	Develop tasks associated with Congressional Add for Advanced Low-Observable Coatings (e.g., increase sputtering rate during coating application).
(U)	$991	Develop tasks associated with Congressional Add for Laser Peening for F-119 Engine (e.g., increase damage tolerance of integrally bladed rotors).
(U)	$58,406	Total

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(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands)

(U)	$19,998	Continue affordable and efficient manufacturing technology investigations for critical, high quality and reliable structural, propulsion, stealth, and electronic components and assemblies required for existing and next generation aircraft. Continue high-value pilot efforts to verify advantages of flexible manufacturing, commercial/military integration, quality processing, and supplier improvements (e.g., Composites Affordability Initiative). Leverage specialty aerospace metals work into metals affordability initiatives focused on laser forming, casting, welding, and forging. Continue activities aimed at manufacture of more affordable low-observable coatings. Start effort to reduce high-cycle fatigue damping in engine components. Initiate rapid response productivity improvement effort to address manufacturing issues related to agile acquisition of low-rate production airframes (e.g., unmanned air vehicles).
(U)	$12,457	Pursue cost-effective repair and manufacturing technologies for affordable sustainment of aircraft and turbine engine components. Continue pilot efforts to assess benefits derived from inserting electronic parts obsolescence management tools into weapon system production programs. Continue technical effort to extend the life of critical, high-value rotating engine components exposed to high cycle fatigue environments (Engine Rotor Life Extension effort). Complete a rapid response productivity improvement effort to overcome structural damage of hot trailing edges found in the wake of hot engine exhaust.
(U)	$4,026	Continue development of efficient and cost-effective manufacturing methods for high performance, high reliability electronics for advanced tactical missiles and aircraft missile sensors. Continue joint program with Navy to provide a lower drift-rate Inertial Measurement Unit (IMU) for Micro-Electro-Mechanical Systems. Complete rapid response productivity improvement efforts to increase production (surge) rate of IMUs for precision-guided munitions and provide high quality glass material acceptable for use in airborne laser turret windows.
(U)	$1,100	Develop risk reduction efforts addressing critical manufacturing issues for various space systems (e.g., Space Based Radar). Focus efforts on components such as electronically scanned arrays, optics, and thermal management sub-systems to improve productivity, reliability, and affordability.
(U)	$37,581	Total

(U) B. Budget Activity Justification

ManTech is part of Budget Activity 7, Operational System Development, to provide support for systems in design, production, and/or operational use. ManTech is part of the Industrial Preparedness Program Element supporting the Defense Planning Guidance and the Air Force Planning Guidance.

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(U) C. Program Change Summary ($ in Thousands)

		FY 2001	FY 2002	FY 2003	Total Cost
(U)	Previous President's Budget	58,342	53,782	54,415	
(U)	Appropriated Value	58,882	58,982		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions		-576		
	b. Small Business Innovative Research	-1,436			
	c. Omnibus or Other Above Threshold Reprogram				
	d. Below Threshold Reprogram	-1,442			
	e. Rescissions	-540			
(U)	Adjustments to Budget Years Since FY 2002 PBR			-16,834	
(U)	Current Budget Submit/FY 2003 PBR	55,464	58,406	37,581	TBD

(U) Significant Program Changes:
Program funding was reduced due to higher priority Air Force requirements.

(U) D. Other Program Funding Summary ($ 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
(U)	AF RDT&E									
(U)	Other APPN									

Not Applicable.

(U) E. Acquisition Strategy
All major contracts in this Program Element were awarded after full and open competition.

(U) F. Schedule Profile

FY 2001	FY 2002	FY 2003

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(U) F. Schedule Profile Continued

		FY 2001				FY 2002				FY 2003			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	Manufacturing technology for aeronautical systems												
(U)	Request for Proposal Release		*				X			X			
(U)	Contract Awards				*			X			X		
(U)	Repair/remanufacture technologies for weapons systems												
(U)	Request for Proposal Release		*	*		*				X			
(U)	Contract Awards				*		X				X		
(U)	Manufacturing technologies for missiles, munitions, directed energy												
(U)	Request for Proposal Release				*	*				X			
(U)	Contract Awards						*	X			X		
(U)	Manufacturing technologies for space and launch systems												
(U)	Request for Proposal Release					*				X			
(U)	Contract Awards						X				X		

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

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(U) A. Project Cost Breakdown ($ in Thousands)

		FY 2001	FY 2002	FY 2003
(U)	Manufacturing technologies for aeronautical systems	21,430	25,809	19,998
(U)	Repair/remanufacture technologies for weapon system sustainment	19,238	13,930	12,457
(U)	Manufacturing technologies for missiles, munitions, and directed energy weapons	2,654	7,687	4,026
(U)	Manufacturing technologies for space and launch systems	6,342	5,830	1,100
(U)	Nickel Metal-Hydride Replacement Battery effort	2,000	0	
(U)	Specialty Aerospace Metals	3,800	0	
(U)	Advanced Low Observable Coatings		4,159	
(U)	Laser Peening for F-119 Engine		991	
(U)	Total	55,464	58,406	37,581

(U) B. 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 2001	Budget FY 2001	Budget FY 2002	Budget FY 2003	Budget to Complete	Total Program
Product Development Organizations										
Various	Various	Various	N/A	N/A	19,068	19,575	22,030	14,581	Continuing	TBD
Howmet	Cost Share	Jul 95	N/A	N/A	12,935	3,500	0	0	0	16,435
Composites Affordability Initiative (Consortium)	Various	Various	N/A	N/A	13,055	5,150	5,000	5,000	3,500	31,705
Sustainment Initiative	Various	Various	N/A	N/A	2,430	4,822	4,475	0	3,100	14,827
Engine Forging Initiative	Various	May 99	N/A	N/A	1,200	3,000	2,000	0	0	6,200
Parts Obsolescence Initiative	Various	Various	N/A	N/A	3,120	5,449	3,761	4,000	245	16,575
Small/Medium Supplier Initiative	Various	Various	N/A	N/A	300	2,650	3,325	0	0	6,275
ManTech for Affordable	Various	Various	N/A	N/A	1,875	3,475	3,665	0	2,500	11,515

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(U) Performing Organizations Continued:

Product Development Organizations										
Spacecraft										
Laser Shock Peening, Inc.	CS	Aug 98	N/A	N/A	1,700	1,343	0	0	0	3,043
Coherent Technology, Inc.	CS	Jun 97	N/A	N/A	2,100	0	0	0	0	2,100
Turbine Engine Life Extension	TBD	TBD	N/A	N/A	0	200	2,500	5,000	7,300	15,000
Affordable Missile Warning Sensor	TBD	TBD	N/A	N/A	0	200	2,500	2,500	0	5,200
Integrated Manufacturing and Simulation for Affordability	TBD	TBD	N/A	N/A	0	300	2,000	0	15,200	17,500
Electro Energy, Inc.	Various	Various	N/A	N/A	0	2,000	0	0	0	2,000
Specialty Aerospace Metals	Various	Various	N/A	N/A	0	3,800	0	0	Continuing	TBD
Metals Affordability Initiative	Various	Various	N/A	N/A	2,000	0	2,000	3,000	Continuing	TBD
Low Observable Structures	TBD	TBD	N/A	N/A	0	0	0	1,500	Continuing	TBD
Affordable Missile Guidance	TBD	TBD	N/A	N/A	0	0	0	1,500	Continuing	TBD
High Cycle Fatigue	TBD	TBD	N/A	N/A	0	0	0	500	Continuing	TBD
Advanced Low Observable Coatings	TBD	TBD	N/A	N/A	0	0	991	0	0	991
Laser Peening for F-119 Engine	TBD	TBD	N/A	N/A	0	0	4,159	0	0	4,159
Support and Management Organizations										
In house support										
Test and Evaluation Organizations										

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Subtotals	Total Prior to FY 2001	Budget FY 2001	Budget FY 2002	Budget FY 2003	Budget to Complete	Total Program
Subtotal Product Development	59,783	55,464	58,406	37,581	TBD	TBD
Subtotal Support and Management						
Subtotal Test and Evaluation						
Total Project	59,783	55,464	58,406	37,581	TBD	TBD