

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 2000		
BUDGET ACTIVITY 07 - Operational System Development				PE NUMBER AND TITLE 0702207F Depot Maintenance (Non-IF)				PROJECT 673326		
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
673326	Precision Measurement & Calibration	1,438	4,744	1,515	1,533	1,558	1,587	1,613	Continuing	TBD
Quantity of RDT&E Articles		0	0	0	0	0	0	0	0	0
<p>(U) <u>A. Mission Description</u> This program develops, tests, and evaluates national and Air Force measurement standards (hardware) and calibration equipment in support of all Air Force programs and activities, including 113 Precision Measurement Equipment Laboratories (PMELs) worldwide. Metrology research and development provides technology to support systems in all phases of development and acquisition, as well as Air Force R&D laboratories, test ranges, ground test facilities, and operational weapons systems support. Rapidly changing technology requires continuing research and development of measurement standards and calibration equipment to ensure modern weapon systems meet Air Force readiness objectives. This program addresses all metrology disciplines and includes the technology areas of laser, infrared, microwave, millimeter wave, optical, physical, mechanical, electrical, electronic, and ionizing radiation measurements. Metrology is a technical discipline devoted to the science of measurements and to the study and improvement of measurement technology. Measurements are the foundation of military system development, quality assurance, hardware conformance testing and system readiness tests. The integrity of these tests is assured through calibration and traceability assurance schemes. The capability to measure and calibrate must parallel the emergence of new technology, new ranges, and new capabilities of military systems. Lack of new measurement capability impedes or blocks the successful exploitation of new technologies, especially in the movement from development laboratory to production to deployment. R&D efforts are essential within the DoD to pace these requirements, otherwise, these same new systems will suffer time delays, excessive cost, and increased risk due to unreliable test results in all phases of development, production, deployment and operation.</p>										
<p>(U) <u>FY 1999 (\$ in Thousands)</u></p>										
(U)	\$680	Completed the development of an enhanced electrical substitution radiometer, tunable lasers for radiometry and detector standards for long wavelength infrared measurements; began the tunable diode fiber laser for optic metrology and radiance response with uniform sources projects; and continued development of other national measurements standards to support Air Force infrared / laser/electro-optical weapon system and support equipment.								
(U)	\$175	Completed noise figure measurement project and continued development of standards for radar support, RF communications systems, and radar cross-section range measurements.								
(U)	\$195	Completed development of methods to characterize micro-electromechanical sensors (MEMS), began development of methods to characterize bench top wind tunnels, and continued development of improved calibration support for coordinate measuring machines (CMMs).								
(U)	\$313	Completed the fast electrical pulse project, began development of improved thin film multi junction thermal converters and continued development of standards for electrical measurements to support high accuracy electronic test equipment.								
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BUDGET ACTIVITY		PROJECT
07 - Operational System Development	0702207F Depot Maintenance (Non-IF)	February 2000 673326
(U) <u>A. Mission Description Continued</u>		
(U) <u>FY 1999 (\$ in Thousands) Continued</u>		
(U) \$75	Completed the beta measurement traceability project, continued the large area alpha radiation source metrology project and the development of national standards for calibration of ionizing radiation hazard instrumentation.	
(U) \$1,438	Total	
(U) <u>FY 2000 (\$ in Thousands)</u>		
(U) \$1,735	Complete the development of an improved blackbody calibrator and the tunable diode lasers for fiber optic metrology projects; begin projects to develop a target simulator radiometer, an improved avalanche photo diode and a domain engineered pyroelectric detector; and continue development of national measurement standards to support Air Force infrared / laser / electro-optical weapon systems and support equipment.	
(U) \$1,024	Complete the development of the microwave high power system; begin projects to develop a full scale co-conical field generation system and a direct comparison power calibration system for 2.4mm, 2.92mm and 3.5mm connectors; and continue development of standards for radar support, RF communications systems, and radar cross-section range measurements.	
(U) \$760	Complete methods to characterize bench top wind tunnels, and continue the development of improved calibration support for coordinate measuring machines (CMMs) and standards to support physical, mechanical and electro-mechanical support equipment.	
(U) \$455	Complete the next generation sampling comparator probe project; begin to develop methods to characterize enhanced wide band oscilloscopes and precision wide band measurement systems; and continue development of standards for electrical measurements to support high accuracy electronic test equipment.	
(U) \$135	Complete the large area alpha radiation source metrology project, begin the low level dosimetry traceability project and continue the development of national standards for calibration of ionizing radiation hazard instrumentation.	
(U) \$635	Begin to develop methods to automate metrology processes.	
(U) \$4,744	Total	
(U) <u>FY 2001 (\$ in Thousands)</u>		
(U) \$680	Continue development of national measurement standards to support Air Force infrared / laser / electro-optical weapon systems and support equipment.	
(U) \$260	Begin to develop WG 50-110 wave guide standards and continue development of standards for radar support, RF communications systems, and radar cross-section range measurements.	
(U) \$130	Complete development of improved calibration support for coordinate measuring machines (CMMs), and continue development of standards to support physical, mechanical and electro-mechanical support equipment.	
(U) \$350	Complete the Hall effect resistance standard project, the frequency response characteristics of capacitors projects and the improved thin film	
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<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 2001 (\$ in Thousands) Continued</u></p> <p style="padding-left: 40px;">multi junction thermoconverter project; and continue development of standards for electrical measurements to support high accuracy electronic test equipment.</p> <p>(U) \$95 Complete the large area beta source project and continue the development of national standards for calibration of ionizing radiation hazard instrumentation.</p> <p>(U) \$1,515 Total</p> <p>(U) <u>B. Budget Activity Justification</u></p> <p>This program is in budget activity 7 - Operational System Development because it supports operational systems.</p> <p>(U) <u>C. Program Change Summary (\$ in Thousands)</u></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 55%;"></th> <th style="width: 10%; text-align: center;"><u>FY 1999</u></th> <th style="width: 10%; text-align: center;"><u>FY 2000</u></th> <th style="width: 10%; text-align: center;"><u>FY 2001</u></th> <th style="width: 15%; text-align: center;"><u>Total Cost</u></th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget (FY 2000 PBR)</td> <td style="text-align: center;">1,496</td> <td style="text-align: center;">1,500</td> <td style="text-align: center;">1,529</td> <td style="text-align: center;">TBD</td> </tr> <tr> <td>(U) Appropriated Value</td> <td style="text-align: center;">1,500</td> <td style="text-align: center;">4,800</td> <td></td> <td></td> </tr> <tr> <td>(U) Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">a. Congressional/General Reductions</td> <td style="text-align: center;">-4</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">b. Small Business Innovative Research</td> <td style="text-align: center;">-50</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">c. Omnibus or Other Above Threshold Reprogram</td> <td></td> <td style="text-align: center;">-26</td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">d. Below Threshold Reprogram</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">e. Rescissions</td> <td style="text-align: center;">-8</td> <td style="text-align: center;">-30</td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">f. Other</td> <td></td> <td></td> <td></td> <td style="text-align: center;">TBD</td> </tr> <tr> <td>(U) Adjustments to Budget Years Since FY 2000 PBR</td> <td></td> <td></td> <td style="text-align: center;">-14</td> <td></td> </tr> <tr> <td>(U) Current Budget Submit/FY 2001 PBR</td> <td style="text-align: center;">1,438</td> <td style="text-align: center;">4,744</td> <td style="text-align: center;">1,515</td> <td style="text-align: center;">TBD</td> </tr> </tbody> </table> <p>(U) <u>Significant Program Changes:</u></p> <p>The additional funding in FY00 is to expedite the completion of several metrology projects such as to: develop the microwave high power system; develop a full scale co-conical field generation capability; improve blackbody calibration; develop target simulator radiometer; develop direct comparison power calibration system; and develop methods to characterize bench top wind tunnels. It will also be used to address requirements in areas such as automated metrology that could not be funded at previous levels.</p>				<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Total Cost</u>	(U) Previous President's Budget (FY 2000 PBR)	1,496	1,500	1,529	TBD	(U) Appropriated Value	1,500	4,800			(U) Adjustments to Appropriated Value					a. Congressional/General Reductions	-4				b. Small Business Innovative Research	-50				c. Omnibus or Other Above Threshold Reprogram		-26			d. Below Threshold Reprogram					e. Rescissions	-8	-30			f. Other				TBD	(U) Adjustments to Budget Years Since FY 2000 PBR			-14		(U) Current Budget Submit/FY 2001 PBR	1,438	4,744	1,515	TBD
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(U) **D. Other Program Funding Summary (\$ in Thousands)**

	<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>Cost to</u>	<u>Total Cost</u>
	<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	

(U) AF RDT&E
(U) Other APPN

(U) **E. Acquisition Strategy**
Primarily accomplish through intergovernmental transfer between the Department of Defense and other Federal Departments. Secondly, accomplish through various funding vehicles.

(U) **F. Schedule Profile**

	<u>FY 1999</u>				<u>FY 2000</u>				<u>FY 2001</u>			
	1	2	3	4	1	2	3	4	1	2	3	4

(U) N/A

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)								DATE February 2000		
BUDGET ACTIVITY 07 - Operational System Development					PE NUMBER AND TITLE 0702207F Depot Maintenance (Non-IF)			PROJECT 673326		
(U) <u>A. Project Cost Breakdown (\$ in Thousands)</u>										
						<u>FY 1999</u>		<u>FY 2000</u>		<u>FY 2001</u>
(U)	Quality Assurance (Develop Measurement Standards & Calibration Support)					1,410		4,715		1,485
(U)	Travel					28		29		30
(U)	Total					1,438		4,744		1,515
(U) <u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U) <u>Performing Organizations:</u>										
<u>Contractor or</u>	<u>Contract</u>									
<u>Government</u>	<u>Method/Type</u>	<u>Award or</u>	<u>Performing</u>	<u>Project</u>						
<u>Performing</u>	<u>or Funding</u>	<u>Obligation</u>	<u>Activity</u>	<u>Office</u>	<u>Total Prior</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>	<u>Total</u>
<u>Activity</u>	<u>Vehicle</u>	<u>Date</u>	<u>EAC</u>	<u>EAC</u>	<u>to FY 1999</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Complete</u>	<u>Program</u>
<u>Product Development Organizations</u>										
National Institute of	MIPR (DD	Varies	TBD	TBD	13,629	1,351	3,820	1,485	Continuing	TBD
Standards & Technology	FORM 448)									
Department of Energy	MIPR (DD	Varies	TBD	TBD		59	260		Continuing	TBD
	FORM 448)									
Technical Support Contracts	Various	Varies	TBD	TBD			635		Continuing	TBD
AFMC	In House	Varies	TBD	TBD	145	28	29	30	Continuing	TBD
<u>Support and Management Organizations</u>										
<u>Test and Evaluation Organizations</u>										
					<u>Total Prior</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>	<u>Total</u>
<u>Subtotals</u>					<u>to FY 1999</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Complete</u>	<u>Program</u>
Subtotal Product Development					13,774	1,438	4,744	1,515	TBD	TBD
Subtotal Support and Management										
Subtotal Test and Evaluation										
Total Project					13,774	1,438	4,744	1,515	TBD	TBD