

# ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

May 2009

BUDGET ACTIVITY <b>5 - System Development and Demonstration</b>		PE NUMBER AND TITLE <b>0604746A - Automatic Test Equipment Development</b>			
COST (In Thousands)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	11546	18521	15320	Continuing	Continuing
L59     DIAGNOST/EXPERT SYS DE	8178	14954	11759	Continuing	Continuing
L65     Test Equipment Development	3368	3567	3561	Continuing	Continuing

**A. Mission Description and Budget Item Justification:** This program element (PE) provides for development and testing of general-purpose test equipment and of state-of-the-art diagnostics and prognostics technology, software, and systems to support the increasingly complex electronic components of the Army's new and upgraded weapon systems. It focuses on implementation of commercial test and diagnostic technologies across multiple weapon platforms to minimize the cost of troubleshooting and maintenance of Army equipment in the field.

Modular, reconfigurable automatic and semi-automatic systems are developed under this program to satisfy weapon system test and diagnostics requirements. The Next Generation Automatic Test System (NGATS) currently under development will provide state-of-the-art test and diagnostic capabilities to support current and future weapon systems. It is a Future Combat Systems associated program, is the platform for transitioning Agile Rapid Global Combat Support System (ARGCS) technologies into the Army weapon system support structure, and will replace several aging automatic test systems (ATS) which are becoming prohibitively expensive to operate and maintain.

This PE also provides for continued development and improvement of measurement equipment with emphasis on the incorporation of digital electronics and tailoring of configurations to improve deployability, mobility, and survivability of the support equipment. Artificial intelligence and anticipatory maintenance applications are being developed to support the integration of self-diagnostic capabilities in Army weapons and support systems. The goal of these efforts is to reduce logistics burdens and improve readiness by minimizing the need for external testers and improving the troubleshooting abilities of soldiers in the field.

FY2010 funding for this program continues development in accordance with DoD and Army policies of the Army standard Next Generation Automatic Test System which will improve deployability and mobility of test and diagnostic equipment and replace aging and obsolete automated equipment currently supporting a number of the Army's vital warfighting systems. It will also develop or significantly modify test equipment to satisfy modular force and homeland security support requirements that cannot be accommodated with test equipment currently available in the commercial marketplace.

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**BUDGET ACTIVITY**  
**5 - System Development and Demonstration**

**PE NUMBER AND TITLE**  
**0604746A - Automatic Test Equipment Development**

<u><b>B. Program Change Summary</b></u>	FY 2008	FY 2009	FY 2010
Previous President's Budget (FY 2009)	9961	23582	15633
Current BES/President's Budget (FY 2010)	11546	18521	15320
Total Adjustments	1585	-5061	-313
Congressional Program Reductions		-5061	
Congressional Rescissions			
Congressional Increases	1843		
Reprogrammings	3		
SBIR/STTR Transfer	-261		
Adjustments to Budget Years			-313

**Change Summary Explanation:**

FY2008: \$1,843K in Supplemental funds provided to support GWOT aviation and ground testing.

FY2009: \$5,000K Congressional reduction for "NGATS excessive growth."

# ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

**May 2009**

<b>BUDGET ACTIVITY</b> <b>5 - System Development and Demonstration</b>	<b>PE NUMBER AND TITLE</b> <b>0604746A - Automatic Test Equipment Development</b>			<b>PROJECT</b> <b>L59</b>	
COST (In Thousands)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	Cost to Complete	Total Cost
L59      DIAGNOST/EXPERT SYS DE	8178	14954	11759	Continuing	Continuing

**A. Mission Description and Budget Item Justification:** This project funds development of and system enhancements for the Next Generation Automatic Test System (NGATS). The NGATS is a general-purpose automatic test system (ATS) that will provide test and diagnostic capabilities required to support current and future weapons and combat support systems, will facilitate retirement of aging and obsolete test equipment that is imposing increasing logistics and operations and support cost burdens, and is a Future Combat Systems associated program. It is the platform for transitioning Agile Rapid Global Combat Support System (ARGCS) technologies into the Army weapon system support structure. The ARGCS initiative was sponsored by the Department of Defense, and all Services are expected to transition demonstrated technologies into their automatic test systems programs. This project also provides for continuing efforts to upgrade and improve general-purpose automatic test equipment to satisfy test and diagnostic requirements of the Army's new and upgraded weapon systems, and for development and adaptation of automatic test equipment required to overcome existing deficiencies and voids in organic test and diagnostic capabilities; development and testing of common procedures utilizing existing test program sets and software applications; and market surveys of commercially available test equipment, methods, and procedures to determine applicability to Army requirements. The test and diagnostic systems and procedures developed under this project are essential for ensuring the operational readiness, accuracy, and effectiveness of the Army's warfighting systems.

<u>Accomplishments/Planned Program:</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>
FY08: Complete NGATS developmental testing (Increment 1) (including environmental, dynamic, E3, reliability, and log demo)	650		
FY08: Complete NGATS (Increment 1) operational testing (OT)	900		
FY08-FY09: Develop initial NGATS logistics (including provisioning, calibration, and technical data)	2338	3000	
FY08: Test and evaluate Abrams and Bradley electronic test program sets (TPS) for use on NGATS	2790		
FY08-FY09: Continue development of the NGATS electro-optics (EO) subsystem to include the capability to support new ground and aerial sensors for unmanned air and ground vehicles	500	1000	
FY08-FY09: Develop and test hardware and software required for Increment 2 systems (Avenger, Multiple Launch Rocket System, Tube-Launched, Optically-Tracked, Wire-Guided (TOW) Missile System, Paladin and Common Remotely Operated Weapons Station (CROWS) II) and EO TPSs for Abrams and Bradley systems	500	1954	
FY08-FY09: Develop NGATS Net Centric maintenance capability to support condition-based maintenance (CBM+), embedded diagnostics and Smart TPS development for all supported platforms	500	500	
FY09: Complete NGATS design improvements and testing resulting from OT		1000	
FY09: Complete fabrication of developmental hardware		2500	
FY09-FY10: Rehost, test and evaluate the Abrams/Bradley TPSs for NGATS first unit equipped		4599	2000
FY10: Continue development of NGATS integrated EO subsystem			2500

<b>ARMY RDT&amp;E BUDGET ITEM JUSTIFICATION (R2a Exhibit)</b>	<b>May 2009</b>
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<b>BUDGET ACTIVITY</b> <b>5 - System Development and Demonstration</b>	<b>PE NUMBER AND TITLE</b> <b>0604746A - Automatic Test Equipment Development</b>	<b>PROJECT</b> <b>L59</b>
FY10: Develop software capabilities to incorporate Common Logistics Operating Environment (CLOE) and embedded diagnostics data collection and analysis for closed loop diagnostic maintenance in support of condition-based maintenance		950
FY10: Complete rehost of Abrams and Bradley electronic and electro-optic (EO) test program sets (TPS) for use with NGATS onboard EO subsystem		1450
FY10: Develop and test hardware/software for NGATS increment 2 system and TPSs		3500
FY10: Develop enhanced Smart TPS hardware and software		500
FY10: Initiate redesign, test and evaluation of Abrams and Bradley TPSs		859
FY09: Small Business Innovative Research/Small Business Technology Transfer Programs		401
<b>Total</b>	<b>8178</b>	<b>14954</b>

<b><u>B. Other Program Funding Summary</u></b>	FY 2008	FY 2009	FY 2010	To Compl	Total Cost
OPA3, MB4000, Integrated Family of Test Equipment (IFTE)	159677	46093	102844	Continuing	Continuing

Comment:

**C. Acquisition Strategy** This developmental project consists of cooperative in-house and competitive and sole-source contractual actions. When the necessary expertise and capability are available within the Department of Defense, services required for the individual development projects are ordered from the government source; otherwise, commercial contracts are used. Equipment required for developmental projects is obtained by contract from the commercial supplier. Developmental efforts for the Next Generation Automatic Test System (NGATS) are being completed under a sole-source contract awarded to the prime contractor for the Integrated Family of Test Equipment off-platform testers. NGATS will follow an evolutionary acquisition strategy using spiral development. The NGATS Increment 1 will replace the Direct Support Electrical Systems Test Set (DSESTS). Increments 2 and 3 will replace the Base Shop Test Facility (BSTF) (V)3 and BSTF (V)5 systems respectively.

# ARMY RDT&E COST ANALYSIS (R3)

May 2009

BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT		
5 - System Development and Demonstration			0604746A - Automatic Test Equipment Development							L59		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Prototype Development	SS/CPFF(5)	Northrop Grumman, Rolling Meadows, IL	13472					2000	2-3Q	Cont.	Cont.	Cont.
Hardware/Support Items Development	SS/CPFF(5)	Northrop Grumman, Rolling Meadows, IL	47000	1299	2-4Q	3605	2-4Q	5000	2Q	Cont.	Cont.	Cont.
Software Development/Verification/Validation	SS/CPFF(5)	Northrop Grumman, Rolling Meadows, IL	4239	4304	2-4Q	9447	2-4Q	2267	2-4Q	Cont.	Cont.	Cont.
Subtotal:			64711	5603		13052		9267		Cont.	Cont.	Cont.
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Project Management/Technical Support		Various	43590	525	1-4Q	1001	1-4Q	1542	1-4Q	Cont.	Cont.	Cont.
Other Direct		Various	1390	500	1-4Q	500	1-4Q	500	1-4Q	Cont.	Cont.	Cont.
Subtotal:			44980	1025		1501		2042		Cont.	Cont.	Cont.
III. Test And Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Operational Testing	Various	Various	2814	900	1-3Q					Cont.	Cont.	Cont.
Developmental Testing	Various	Various	597	650	1-3Q			450	1-3Q	Cont.	Cont.	Cont.
Subtotal:			3411	1550				450		Cont.	Cont.	Cont.
Remarks: Test Program Set (TPS) test and evaluation is included in the product development cost.												
IV. Management Services	Contract	Performing Activity &	Total	FY 2008	FY 2008	FY 2009	FY 2009	FY 2010	FY 2010	Cost To	Total	Target

# ARMY RDT&E COST ANALYSIS (R3)

May 2009

BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT		
<b>5 - System Development and Demonstration</b>			<b>0604746A - Automatic Test Equipment Development</b>							<b>L59</b>		
	Method & Type	Location	PYs Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Complete	Cost	Value of Contract
SBIR/STTR						401	3Q				401	
Subtotal:						401					401	
<b>Project Total Cost:</b>			<b>113102</b>	<b>8178</b>		<b>14954</b>		<b>11759</b>		<b>Cont.</b>	<b>Cont.</b>	<b>Cont.</b>

# Schedule Profile (R4 Exhibit)

May 2009

BUDGET ACTIVITY  
**5 - System Development and Demonstration**

PE NUMBER AND TITLE  
**0604746A - Automatic Test Equipment Development**

PROJECT  
**L59**

Event Name	FY 08				FY 09				FY 10				FY 11				FY 12				FY 13				FY 14				FY 15			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(1) Milestone C, (2) Full Rate Production Decision Review					▲ <sub>1</sub> MS C								▲ <sub>2</sub> FRP-DR																			
(3) Full Materiel Release, (4) First Unit Equipped					FMR ▲ <sub>3</sub> ▲ <sub>4</sub> FUE																											
NGATS Prototype Development (Increment 1)																																
NGATS System Development and Demonstration (SDD) (Increment 1)																																
NGATS Testing (Increment 1)																																
NGATS Production (Increment 1)																																
NGATS SDD (Increment 2)																																
NGATS Testing (Increment 2)																																
NGATS Production (Increment 2)																																
NGATS SDD (Increment 3)																																
NGATS Testing (Increment 3)																																
NGATS P3I - NETCENTRIC																																
FCS and New Systems Test Capability																																

# Schedule Detail (R4a Exhibit)

May 2009

BUDGET ACTIVITY <b>5 - System Development and Demonstration</b>		PE NUMBER AND TITLE <b>0604746A - Automatic Test Equipment Development</b>					PROJECT <b>L59</b>	
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<u>Schedule Detail</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014</u>	<u>FY 2015</u>
Milestone C		3Q						
Full Rate Production Decision Review				2Q				
Full Materiel Release				2Q				
First Unit Equipped				3Q				
NGATS Prototype Development (Increment 1)	1Q							
NGATS System Development and Demonstration (SDD) (Increment 1)	1Q - 4Q							
NGATS Testing (Increment 1)	1Q - 4Q	1Q - 4Q						
NGATS Production (Increment 1)		4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q	
NGATS SDD (Increment 2)		4Q	1Q - 4Q					
NGATS Testing (Increment 2)			4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q		
NGATS Production (Increment 2)							2Q - 4Q	1Q - 4Q
NGATS SDD (Increment 3)			4Q	1Q - 4Q	1Q - 4Q			
NGATS Testing (Increment 3)					4Q	1Q - 4Q	1Q - 4Q	
NGATS P3I - NETCENTRIC						4Q	1Q - 4Q	1Q - 4Q
FCS and New Systems Test Capability						4Q	1Q - 4Q	1Q - 4Q

Test program set (TPS) compatibility testing runs continually throughout the product development process

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<b>BUDGET ACTIVITY</b> <b>5 - System Development and Demonstration</b>	<b>PE NUMBER AND TITLE</b> <b>0604746A - Automatic Test Equipment Development</b>			<b>PROJECT</b> <b>L65</b>	
COST (In Thousands)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	Cost to Complete	Total Cost
L65 Test Equipment Development	3368	3567	3561	Continuing	Continuing

**A. Mission Description and Budget Item Justification:** This project supports development and demonstration of state-of-the-art calibration standards and techniques, and upgrades/improvements to existing Army calibration systems. It provides for feasibility studies, market research, inventory analyses, bid sample testing, and prototyping to support calibration systems and general-purpose test and diagnostic equipment acquisitions. Primary efforts under this project include testing of an up-armor ready AN/GSM-421(V2) tactical calibration capability, development of calibration capability for chemical and biological agent detection systems and night vision testers, improvement of test and measurement equipment performance envelopes via preplanned product improvements (P3I), and development/evaluation of advanced technology and higher reliability calibration systems and general-purpose test, measurement and diagnostic equipment (TMDE). Preplanned product improvements are underway to current test and measurement systems to overcome deficiencies and voids in existing organic capabilities and to ensure the operational readiness, accuracy, effectiveness, and safety of Army weapons and combat support systems. These improvements will employ reconfigurable open electronics architecture and computer-based instrumentation wherever feasible and will be focused on reducing test equipment footprints to improve deployability and mobility in areas of operation.

<u>Accomplishments/Planned Program:</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>
FY08-FY10: Develop hardware via preplanned product improvements to enhance TMDE systems' performance capabilities	580	600	605
FY08-FY10: Test and integrate hardware developed for preplanned product improvements	775	827	850
FY08-FY10: Develop, evaluate, and integrate test and measurement equipment	1007	1100	1052
FY08-FY10: Continue development and evaluation of test and calibration procedures	200	210	230
FY08-FY10: Perform market research and evaluation of commercial equipment, and develop performance specifications for acquisitions	806	730	824
FY09: Small Business Innovative Research/Small Business Technology Transfer Programs		100	
<b>Total</b>	<b>3368</b>	<b>3567</b>	<b>3561</b>

<u>B. Other Program Funding Summary</u>	FY 2008	FY 2009	FY 2010	To Compl	Total Cost
OPA3, N10000, Calibration Sets Equipment	63382	9660	16844	Continuing	Continuing
OPA3, N11000, Test Equipment Modernization	29161	22377	19343	Continuing	Continuing

Comment:

# ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

May 2009

BUDGET ACTIVITY

**5 - System Development and Demonstration**

PE NUMBER AND TITLE

**0604746A - Automatic Test Equipment Development**

PROJECT

**L65**

**C. Acquisition Strategy** Projects are focused on use of commercial and nondevelopmental item technologies. When programmatic and engineering expertise and capability are available within the Department of Defense, services required for the individual development projects are acquired from the government source; otherwise, commercial services contracts are used to provide these capabilities. Equipment required for development projects is obtained from the commercial supplier. Candidate commercial equipment and nondevelopmental items are identified and evaluated through market research and government testing and evaluation.

# ARMY RDT&E COST ANALYSIS (R3)

May 2009

BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT		
5 - System Development and Demonstration			0604746A - Automatic Test Equipment Development							L65		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	Various	Various	6882	1408	1-2Q	1360	1-2Q	1499	1-2Q	Cont.	Cont.	Cont.
Procedures Development and Evaluation	Various	Various	2108	200	1-3Q	210	1-3Q	230	1-3Q	Cont.	Cont.	Cont.
Government Engineering		Various	1670	515	1-4Q	515	1-4Q	520	1-4Q	Cont.	Cont.	Cont.
Subtotal:			10660	2123		2085		2249		Cont.	Cont.	Cont.
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Technical Support Services	Various	Various	967	300	2Q	310	2Q	320	2Q	Cont.	Cont.	Cont.
Subtotal:			967	300		310		320		Cont.	Cont.	Cont.
III. Test And Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Testing	Various	Various	1631	595	1-2Q	612	1-2Q	620	1-2Q	Cont.	Cont.	Cont.
Subtotal:			1631	595		612		620		Cont.	Cont.	Cont.
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Program Management Personnel		Various	882	350	1-4Q	460	1-4Q	372	1-4Q	Cont.	Cont.	Cont.
SBIR/STTR						100	3Q				100	

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BUDGET ACTIVITY	PE NUMBER AND TITLE						PROJECT		
<b>5 - System Development and Demonstration</b>	<b>0604746A - Automatic Test Equipment Development</b>						<b>L65</b>		
Subtotal:	882	350		560		372	Cont.	Cont.	Cont.
<b>Project Total Cost:</b>	<b>14140</b>	<b>3368</b>		<b>3567</b>		<b>3561</b>	<b>Cont.</b>	<b>Cont.</b>	<b>Cont.</b>

# Schedule Profile (R4 Exhibit)

May 2009

BUDGET ACTIVITY  
**5 - System Development and Demonstration**

PE NUMBER AND TITLE  
**0604746A - Automatic Test Equipment Development**

PROJECT  
**L65**

Event Name	FY 08				FY 09				FY 10				FY 11				FY 12				FY 13				FY 14				FY 15			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Test and Measurement Equipment - Development	[Redacted]																															
Test and Measurement Equipment - Testing	[Redacted]																															
Market research and evaluation of comm equipment/development of performance spec	[Redacted]																															

**Schedule Detail (R4a Exhibit)**

**May 2009**

<b>BUDGET ACTIVITY</b> <b>5 - System Development and Demonstration</b>		<b>PE NUMBER AND TITLE</b> <b>0604746A - Automatic Test Equipment Development</b>					<b>PROJECT</b> <b>L65</b>	
<b><u>Schedule Detail</u></b>	<b><u>FY 2008</u></b>	<b><u>FY 2009</u></b>	<b><u>FY 2010</u></b>	<b><u>FY 2011</u></b>	<b><u>FY 2012</u></b>	<b><u>FY 2013</u></b>	<b><u>FY 2014</u></b>	<b><u>FY 2015</u></b>
Test and Measurement Equipment - Development	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q
Test and Measurement Equipment - Testing	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q
Market research and evaluation of comm equipment/development of performance spec	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q