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Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Missile Defense Agency **DATE:** April 2013

APPROPRIATION/BUDGET ACTIVITY 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603901C: <i>Directed Energy Research</i>
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COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
Total Program Element	-	49.563	46.944	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	96.507
MD69: <i>Directed Energy Research</i>	-	46.243	44.560	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	90.803
MD40: <i>Program-Wide Support</i>	-	3.320	2.384	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.704

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

^{##} The FY 2014 OCO Request will be submitted at a later date

Note

Starting in FY 2014, the Directed Energy Research (DER) Program Element, 0603901C, transfers to the Ballistic Missile Defense Technology Program Element, 0603175C. The internal realignment of DER funds into the BMD Technology Program leverages technology interdependencies and gains oversight efficiencies.

A. Mission Description and Budget Item Justification

The Missile Defense Agency (MDA) is conducting research into the transmission and control of directed energy largely above the atmosphere for non-intercept missile defense applications and ultimately boost phase intercepts. The agency works in collaboration with the Office of the Assistant Secretary of Defense for Research and Engineering, the Defense Advanced Research Projects Agency and the High Energy Laser Joint Technology Office in a systems engineering based strategy for the research, development, test and evaluation of high energy laser technologies.

To transition to the next generation high power directed energy platform, MDA is pursuing two promising laser technologies in a competitive environment. These candidate laser systems offer a path to high efficiency, electrically-driven, compact, light-weight high energy lasers for multiple missile defense applications including discrimination and boost phase defense. MDA is pursuing the Diode Pumped Alkali Laser System and fiber combining laser technologies based on their efficiency and scaling potential. A 200 kilowatt (kW) class flight qualifiable laser prototype will be built and tested based on the selected technology for non-intercept Ballistic Missile Defense System (BMDS) enhancement. In parallel with laser development, a surrogate high altitude, long endurance platform will be instrumented to collect high altitude flight environment data to inform the design and flight compatible packaging of the high powered laser payloads. MDA is also investing in a number of advanced technology initiatives which will support the design of the next-generation airborne laser platform.

The Directed Energy Research contributions to the Prioritized Capabilities List include: Prevent Attack - counter emerging or advanced air and missile threats and Persistent Surveillance - improve birth-to-death tracking, identification and targeting.

MD40 Program-Wide Support (PWS) consists of essential non-headquarters management costs in support of the MDA functions and activities across the entire Ballistic Missile Defense System (BMDS).

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B. Program Change Summary (\$ in Millions)	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	49.943	46.944	47.865	-	47.865
Current President's Budget	49.563	46.944	0.000	-	0.000
Total Adjustments	-0.380	0.000	-47.865	-	-47.865
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	2.612	0.000			
• SBIR/STTR Transfer	-2.992	0.000			
• Other Adjustment	0.000	0.000	-47.865	-	-47.865

Change Summary Explanation

FY 2014 funding was transferred to the BMD Technology (0603175C) Program Element.

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COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
MD69: <i>Directed Energy Research</i>	-	46.243	44.560	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	90.803

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

^{##} The FY 2014 OCO Request will be submitted at a later date

Note

N/A

A. Mission Description and Budget Item Justification

The Missile Defense Agency (MDA) is partnering with Federally Funded Research and Development Centers (FFRDCs) and the Defense Advanced Research Projects Agency (DARPA) to pursue advanced laser technologies such as the Diode Pumped Alkali Laser System (DPALS) and fiber laser beam combining systems in a competitive environment, and will monitor other emerging laser technologies for investment and development.

FY 2014 Base Plans have been transferred to Program Element 0603175C, Budget Project MD25.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2012	FY 2013	FY 2014
Title: Directed Energy Research	46.243	44.560	0.000
Description: Laser Technology Development/Airborne Laser Test Bed Closeout			
FY 2012 Accomplishments:			
- MDA completed Airborne Laser Test Bed testing and collated/archived test data and documentation for future MDA and DoD directed energy program use			
- Completed ALTB directed energy model validation and verification			
- Prepared and stored the ALTB and completed disposition of more than 24,000 property line items valued at over \$200M, enabling maximum DoD and Directed Energy re-utilization of high-value assets			
- Demonstrated the architectural feasibility of the Diode Pumped Alkali Laser System (DPALS) and combined fiber lasers for high power applications			
- Improved DPALS laser power by approximately 3 times and efficiency of approximately 50 percent over the past year. The program achieved a power milestone.			
- Collaborated with the Defense Advanced Research Projects Agency (DARPA) on fiber combining laser development to achieve a technology first laser output power of 2.5 kilowatts			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2012	FY 2013	FY 2014
<p>- Investigated lethality, countermeasures, beam propagation, modeling and laser beam combining as well as additional innovative technologies</p> <p>FY 2013 Plans:</p> <ul style="list-style-type: none"> -Make investments to mature high power directed energy technology -Develop next-generation kilowatt-class fiber amplifiers -Develop high power diode-pumped amplifier systems -Develop fiber laser beam combining techniques to validate laser combining architectures -Evaluate concepts for improving technical readiness, reducing risk areas and improving next-generation platform reliability -Estimate life-cycle costs and assess viability for further development -Partner with the High Energy Laser Joint Technology Office, Universities and National Laboratories to improve high-power laser optics, optical coatings and directed energy modeling and simulation -Conduct experiments to characterize the high altitude, low mach flight environment -Remove/de-militarize ALTB hardware, fixtures, tooling and government furnished property <p>FY 2014 Plans:</p> <p>FY 2014 plans have been transferred to Program Element 0603175C, Budget Project MD25.</p>				
Accomplishments/Planned Programs Subtotals		46.243	44.560	0.000
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
<p>The Missile Defense Agency (MDA) Fiscal Year 2014 budget submission reflects an emphasis on high power laser technology research and development and application. The acquisition strategy to conduct this technology development effort consists of three pillars. First, leverage the technical expertise of National Laboratories, Federally Funded Research and Development Centers (FFRDCs) and University Applied Research Centers (UARCs). Second, continue to leverage relevant existing contracts within limits of the Competition in Contracting Act (CICA), taking into account contractor past performance, scope, ceiling and period of performance. Third, for new technology initiatives, seek industry solutions via the Advanced Technology Innovation Broad Agency Announcement (BAA) for competitive procurements.</p>				
E. Performance Metrics				
N/A				

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COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	-	3.320	2.384	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.704

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

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Note

N/A

A. Mission Description and Budget Item Justification

Program-Wide Support (PWS) contains non-headquarters management costs in support of Missile Defense Agency (MDA) functions and activities across the entire Ballistic Missile Defense System (BMDS). It includes Government Civilians, Contract Support Service, and Federally Funded Research and Development Center (FFRDC) providing integrity and oversight of the BMDS as well as, supporting MDA in enabling the development and evaluation of technologies that will respond to the changing threat. In addition, includes Global Deployment personnel and support performing deployment site preparation and activation. Other costs included provide facility capabilities for MDA Executing Agent locations, such as physical and technical security, legal services, travel and agency training, office and equipment leases, utilities, data and unified communications support, supplies and maintenance, materiel and readiness and central property management of equipment, and similar operating expenses. Also includes legal settlements. In keeping with congressional intent, Program Wide Support is allocated on a pro-rata basis and therefore, fluctuates by year based on the total MDA budget.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2012	FY 2013	FY 2014
Title: Program Wide Support	3.320	2.384	0.000
Description: N/A			
FY 2012 Accomplishments: See paragraph A: Mission Description and Budget Item Justification			
FY 2013 Plans: See paragraph A: Mission Description and Budget Item Justification			
FY 2014 Plans: See paragraph A: Mission Description and Budget Item Justification			
Accomplishments/Planned Programs Subtotals	3.320	2.384	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

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0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>	PE 0603901C: <i>Directed Energy Research</i>	MD40: <i>Program-Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A