Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Defense Advanced Research Projects Agency	Date: March 2014
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602383E / *BIOLOGICAL WARFARE DEFENSE*

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
Total Program Element	-	15.131	24.537	44.825	-	44.825	52.560	55.647	53.623	60.747	-	-
BW-01: *BIOLOGICAL WARFARE DEFENSE*	-	15.131	24.537	44.825	-	44.825	52.560	55.647	53.623	60.747	-	-

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

DARPA's Biological Warfare Defense project is budgeted in the Applied Research Budget Activity because its focus is on the underlying technologies associated with the detection, prevention, treatment and remediation of biological, chemical, and radionuclide threats.

Efforts to counter existing and emerging biological, chemical and radiological threats include countermeasures to stop the pathophysiologic processes that occur as a consequence of an attack, host immune response enhancers, medical diagnostics for the most virulent pathogens and their molecular mechanisms, collection of environmental trace constituents to support chemical mapping, tactical and strategic biological, chemical, and radiological sensors, and integrated defense systems. This program also includes development of a unique set of platform technologies and medical countermeasures synthesis that will dramatically decrease the timeline from military threat detection to countermeasure availability.

B. Program Change Summary ($ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	19.236	24.537	28.825	-	28.825
Current President's Budget	15.131	24.537	44.825	-	44.825
Total Adjustments	-4.105	-	16.000	-	16.000
• Congressional General Reductions	-0.025	-			
• Congressional Directed Reductions	-1.300	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.275	-			
• SBIR/STTR Transfer	-0.505	-			
• TotalOtherAdjustments	-	-	16.000	-	16.000

Change Summary Explanation

FY 2013: Decrease reflects Congressional reductions for Sections 3001 & 3004, sequestration adjustments, reprogrammings, and the SBIR/STTR transfer.
FY 2015: Increase reflects new emphasis placed on chemical and nuclear threat defense.

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Medical Countermeasures	15.131	24.537	26.825

Description: To further develop an expedited medical countermeasure capability, emerging technologies will be integrated to address the safety and efficacy considerations in the risk/benefit package necessary to successfully counter naturally emerging or engineered biological warfare threats and new emerging chemical and radiological threats. These technologies will also be focused on reduction of time, risk, and cost associated with new therapeutic development. For example, this program will develop in vitro tissue constructs (IVTC) that will emulate human response to therapeutic compounds, thereby significantly reducing the cost and time for evaluating safety and efficacy of therapeutics.

FY 2013 Accomplishments:
- Assembled two or more IVTCs to recapitulate the function of intact human physiological systems.
- Demonstrated a modular platform able to sustain the integrated IVTCs for 1 week.
- Demonstrated that integrated IVTCs respond and react to test compounds in a manner that corresponds to the known effects of those compounds on human physiological systems.
- Demonstrated an automated prototype system for the construction and maturation of IVTCs.

FY 2014 Plans:
- Demonstrate that the modular platform can be used to predict the kinetics of metabolism and elimination that test compounds are known to exhibit in human physiological systems.
- Design and build additional modules that are compatible with the expanded set of IVTCs and enable the platform to sustain the integrated IVTCs for 2 weeks.
- Demonstrate that the expanded set of IVTCs individually respond and react to test compounds in a manner consistent with the known effects of those compounds on the corresponding human tissues.
- Demonstrate that a modular arrangement of the expanded set of IVTCs can be used to predict the kinetics of metabolism and elimination that the test compounds are known to exhibit in human physiological systems.
- Investigate novel radiation dosimeter approach to mitigate exposure.

FY 2015 Plans:
- Demonstrate an expanded set of IVTCs able to reproduce the function of four human physiological systems.
- Demonstrate an automated prototype system for monitoring the health and response of IVTCs to test compounds.
- Design and build additional modules that are compatible with the expanded set of IVTCs and enable the platform to sustain the integrated IVTCs for 3 weeks.
- Demonstrate that the expanded set of four IVTCs individually respond and react to test compounds in a manner consistent with the known effects of those compounds on the corresponding human tissues.

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
- Demonstrate that a modular arrangement of the expanded set of four IVTCs can be used to predict the absorption, distribution, metabolism and elimination that the test compounds are known to exhibit in human physiological systems. - Develop models for understanding, predicting, and reducing the epigenetic impacts following exposure to ionizing radiation.			
Title: Unconventional Approaches to Chemical Weapons Defense (CWD) ***Description:*** The Unconventional Approaches to CWD program will develop and demonstrate approaches to inactivate hazardous chemical agents for a number of DoD applications including personnel protection, therapeutics, and bulk demilitarization of chemical weapons caches. Existing approaches to deactivating warfare agents are difficult to implement in non- and semi-permissive environments or are too slow/expensive to achieve over large permissive environments. These limitations coupled with the emergence of new, low cost technologies for producing chemical weapons drive a need for countermeasures that are simple and fast to implement and improve U.S. strategic response to emerging chemical threats. Approaches to be considered under the Unconventional Approaches to CWD program include creation of catalysts to accelerate the hydrolysis of chemical agents, development of approaches utilizing smart-chemistry to achieve stand-off demilitarization, construction of a small rapid remediation approach for use in semi-permissive environments, and identification of drugs or antidotes designed to protect those demilitarizing chemical agents in semi-permissive environments. ***FY 2015 Plans:*** - Demonstrate increased decomposition rate of chemical agents using novel catalysts. - Demonstrate continuous method for demilitarization of chemical agents using non-potable water. - Identify novel strategies particularly those intrinsic to the human body to enhance warfighter protection against chemical agents.	-	-	7.100
Title: Defense Against Mass Terror Threats ***Description:*** The objective of the Defense Against Mass Terror Threats program is to identify and develop technologies that have the potential to significantly improve U.S. ability to reduce the risk of mass casualties in the wake of a nuclear attack. Challenges in reducing U.S. vulnerability to a nuclear attack include monitoring radiation levels and exposure in urban areas and mitigating the lethal short and long term effects of ionizing radiation. One goal of this program is to develop new sensors and sensing networks that can economically and reliably provide wide area monitoring of radionuclide signatures. Another goal is to investigate new therapies and decontamination strategies that can mitigate both the long- and short-term biophysical health impacts of exposure to ionizing radiation. ***FY 2015 Plans:*** - Investigate novel therapies for repairing cellular damage and mutagenesis associated with long term susceptibility to various cancers from exposure to ionizing radiation. - Develop the requirements for a low cost, pervasive detection network for wide area monitoring of radionuclide exposure.	-	-	10.900

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
- Demonstrate novel manufacturing approaches that can lower the cost of radiation detectors without compromising performance.			
Accomplishments/Planned Programs Subtotals	15.131	24.537	44.825

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Specific programmatic performance metrics are listed above in the program accomplishments and plans section.