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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense **Date:** February 2016

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research	R-1 Program Element (Number/Name) PE 0602251D8Z I Applied Research for the Advancement of S&T Priorities
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	40.168	48.131	42.206	-	42.206	49.271	53.038	53.773	54.888	Continuing	Continuing
P227: Applied Research for the Advancement of S&T Priorities	-	40.168	48.131	42.206	-	42.206	49.271	53.038	53.773	54.888	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Applied Research for the Advancement of Science and Technology (S&T) Priorities program element (PE) enables the early launch of S&T applied research projects to shape Components' investments. The PE is oriented toward the design, development, and improvement of prototypes and new processes to meet general mission area requirements, and to translate promising research into solutions for military needs. Efforts are situated within the Department of Defense (DoD) S&T priorities and focus areas, and will include feasibility evaluations and non-system specific technology efforts. Investigations conducted in this PE facilitate concept exploration efforts and studies of alternative concepts. Efforts are formulated and managed by teams of subject matter experts drawn from the Office of the Secretary of Defense, the Military Services, and Defense Agencies. The PE also provides support to the S&T Communities of Interest.

B. Program Change Summary (\$ in Millions)

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	41.905	48.226	48.088	-	48.088
Current President's Budget	40.168	48.131	42.206	-	42.206
Total Adjustments	-1.737	-0.095	-5.882	-	-5.882
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.978	-			
• Realignment for Higher Priority Programs	-	-	-5.556	-	-5.556
• FY15 Reprog. for Cancelled Account	-0.016	-	-	-	-
• Other Reprogrammings	-0.743	-	-	-	-
• FFRDC Reduction	-	-0.095	-	-	-
• Economic Assumptions	-	-	-0.326	-	-0.326

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense										Date: February 2016		
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602251D8Z / <i>Applied Research for the Advancement of S&T Priorities</i>				Project (Number/Name) P227 / <i>Applied Research for the Advancement of S&T Priorities</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
<i>P227: Applied Research for the Advancement of S&T Priorities</i>	-	40.168	48.131	42.206	-	42.206	49.271	53.038	53.773	54.888	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Applied Research for the Advancement of Science and Technology (S&T) Priorities program element (PE) enables the early launch of S&T applied research projects to shape Components' investments. The PE is oriented toward the design, development, and improvement of prototypes and new processes to meet general mission area requirements, and to translate promising research into solutions for military needs. Efforts are situated within the seven DoD S&T priorities and focus areas, and will include feasibility evaluations and non-system specific technology efforts. Investigations conducted in this PE facilitate concept exploration efforts and studies of alternative concepts. Efforts are formulated and managed by teams of subject matter experts drawn from the Office of the Secretary of Defense, the Military Services, and Defense Agencies. The PE also provides support to the S&T Communities of Interest.

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

	FY 2015	FY 2016	FY 2017
Title: Applied Research for the Advancement of S&T Priorities	28.136	33.181	30.000
Description: The S&T priorities include: Electronic Warfare (EW), Human Systems, Counter Weapons of Mass Destruction (CWMD), Engineered Resilient Systems (ERS), Data to Decisions (D2D), Autonomy, Quantum Science and Engineering, and Cyber Security.			
FY 2015 Accomplishments:			
Continued efforts within the ERS, Autonomy, and D2D areas. Initiated program in Quantum Science and Engineering. Accomplishments included:			
ERS:			
- Released Version 1.1 and 1.2 ERS Architecture			
- Developed lifecycle cost models that address the entire life of Air Force unmanned platforms			
- Improved visualization and automated tradespace reduction techniques			
- Used hi-fidelity, high-performance computing simulations to examine rotor blade performance on cargo rotorcraft			
- Created a standard modeling library for the retention and use of UH-60 helicopter data			
- Launched second release of ERS Knowledge Management environment			
Autonomy:			
- Developed virtual terrain and simulated entities to increase the complexity of autonomous squad behavior			
- Constructed three rotorcraft capable of autonomous and stable flight; demonstrated in simulation the software to perform mapping, task allocation, trajectory planning, and frontier identification			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Validated, refined, and further developed estimators of trust in Autonomy - Demonstrated proof-of-concept Tactical Battle Management in virtual simulation <p>D2D:</p> <ul style="list-style-type: none"> - Integrated live text analytics with signals analysis - Integrated target queuing framework from stored text data - Integrated text and signals analysis into cloud architecture - Demonstrated overall system performance <p>Quantum Science and Engineering Program:</p> <ul style="list-style-type: none"> - Launched tri-Service effort to develop scalable network technologies and accelerate critical building blocks for quantum networks <p>FY 2016 Plans: Continue concept exploration efforts that focus on the S&T priority areas. In FY 2016, the challenge areas within the priorities include:</p> <p>Autonomy:</p> <ul style="list-style-type: none"> - Demonstrate trust optimization in Autonomy - Automate learning of tactics to enhance validity of air combat effectiveness evaluation - Enable manned and unmanned synchronized teaming in tactical reconnaissance, surveillance, and target acquisition missions <p>Quantum Science and Engineering Program</p> <ul style="list-style-type: none"> - Continue efforts on scalable, integrated quantum memory nodes - Continue efforts on two-node, quantum network with memory - Continue efforts leading to demonstration of secure application across a quantum network <p>Cyber:</p> <ul style="list-style-type: none"> - Enhance mission assurance and effectiveness - Develop techniques for secure operations - Build upon cyber technology foundations <p>FY 2017 Plans: Continue concept exploration efforts that focus on the S&T priority areas. In FY 2017, the challenge areas within the priorities include:</p>				

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<p>Quantum Science and Engineering Program</p> <ul style="list-style-type: none"> - Continue efforts on scalable, integrated quantum memory nodes - Continue efforts on two-node, quantum network with memory - Continue efforts leading to demonstration of secure application across a quantum network <p>Cyber:</p> <ul style="list-style-type: none"> - Enhance mission assurance and effectiveness - Develop techniques for secure operations - Build upon cyber technology foundations 				
<p>Title: S&T Communities of Interest</p> <p>Description: The S&T Communities of Interest task facilitates cooperation and collaboration among Components and optimizes development of selected S&T efforts across the DoD enterprise. Efforts include technology roadmapping, and the integration of technology planning to Department strategic objectives. Select technology areas are examined by the Communities of Interest, and projects are initiated to address gaps or opportunities.</p> <p>FY 2015 Accomplishments: Continued to provide technical support to Communities of Interest. Initiated a new set of two-year projects to address technology opportunities or gaps identified by Communities of Interest. Concluded seven projects initiated in FY 2014: Accelerated Materials Discovery and Delivery; Reusable Military Space Launch Concepts; Pedigree-based Training/Licensure of Autonomous Systems; Context-aware Information Retrieval for Decision Support; Cyber Operational Architecture Training System; Integrated Satellite Communications (SATCOM) Tactical Resiliency; and Technology Investigation and Assessment for the Development of Digital Read Out Integrated Circuits.</p> <p>FY 2016 Plans: Continue to provide technical support to Communities of Interest. Conclude projects initiated in FY 2015, and select a new set of projects to address gaps identified by Communities of Interest.</p> <p>FY 2017 Plans: Continue to provide technical support to Communities of Interest. Conclude projects initiated in FY 2016, and select a new set of projects to address gaps identified by Communities of Interest.</p>		12.032	14.950	12.206
Accomplishments/Planned Programs Subtotals		40.168	48.131	42.206
C. Other Program Funding Summary (\$ in Millions)				
N/A				

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

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Project performance metrics specific to each effort are identified in the project plans established by the program leads and the Communities of Interest. Individual project success will be monitored through these metrics.

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