Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603251N *I (U)AIRCRAFT SYSTEMS*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	46.180	25.763	1.519	0.695	-	0.695	0.815	1.519	1.533	1.562	Continuing	Continuing
2777: *Highly Integrated Photonics (HIP)*	28.878	9.595	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	38.473
3331: *C-2 System Development*	17.302	1.686	1.519	0.695	-	0.695	0.815	1.519	1.533	1.562	Continuing	Continuing
9999: *Congressional Adds*	0.000	14.482	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.482

A. Mission Description and Budget Item Justification

This program element supports the study, evaluation, optimization and enhancements of fielded aircraft systems not supported by a system specific Research, Development, Test and Evaluation, Navy program element. The supported efforts will provide a basis to recommend options for improved efficiency, minimization of life cycle cost, and other affordable options. As naval aircraft systems age, and analysis of the programmatic and /or reliability enhancements options allows the Department of the Navy to more effectively understand and manage system lifecycle costs and implications in future airborne platforms.

This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	26.643	1.519	0.717	-	0.717
Current President's Budget	25.763	1.519	0.695	-	0.695
Total Adjustments	-0.880	0.000	-0.022	-	-0.022
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.880	0.000			
• Program Adjustments	0.000	0.000	-0.001	-	-0.001
• Rate/Misc Adjustments	0.000	0.000	-0.021	-	-0.021

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2016	FY 2017
Project: 9999: *Congressional Adds*		
Congressional Add: *Highly Integrated Photonics (HIP) - Cong*	14.482	0.000

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603251N *I (U)AIRCRAFT SYSTEMS*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2016	FY 2017
Congressional Add Subtotals for Project: 9999	14.482	0.000
Congressional Add Totals for all Projects	14.482	0.000

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603251N / *(U)AIRCRAFT SYSTEMS*	Project (Number/Name) 2777 / *Highly Integrated Photonics (HIP)*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
2777: *Highly Integrated Photonics (HIP)*	28.878	9.595	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	38.473
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element supports the requirements study, technology maturation, system design and demonstration of a general-purpose, future-proof avionics network that replaces copper with glass. As both analog and digital onboard information transport and processing requirements continue to grow, life cycle costs associated with maintaining and upgrading current stove-piped networks aboard naval aircraft systems becomes unsustainable. The size, weight, power, high data rate and scalability advantages of a single-mode fiber optic network have significant total ownership cost savings implications that will allow the Department of the Navy to more affordably and effectively meet mission requirements well into the future. The activities funded will provide a networking baseline or standard that can be incorporated into airborne platforms that maximize networking system capability while minimizing associated life cycle costs. While the development under this program does specifically address airborne platforms where size and weight of the cable plant is particularly important, ultimately the network technology developed will have broad applicability to shipboard and submarine platform network requirements as well.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Highly Integrated Photonics Naval Networking	9.595	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: The overarching objective of this activity is to develop and demonstrate a highly integrated Local Area Network for airborne platforms incorporating an optical fiber network that uses wavelength division multiplexing (WDM) to address demanding military network re-configurability, scalability, and technology refresh challenges. The telecommunication network application of WDM technology is fully mature for commercial environments with little constraint on size, weight, and power (SWAP). The program will leverage and enhance the telecommunication standards for optical fiber networks while addressing the SWAP restrictions and severe environmental requirements of military airborne platforms. The functionality of the technology developed cannot be obtained through Commercial-Off-The-Shelf components due to SWAP constraints and the military environment. Effort will involve understanding the properties of engineered optical fiber components and electronic semiconductors as they apply to highly integrated optical fiber networks. Ultimately these higher performance components and networks will address the needs for all classes of military platforms.					
FY 2016 Accomplishments:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603251N / *(U)AIRCRAFT SYSTEMS*	**Project (Number/Name)** 2777 / *Highly Integrated Photonics (HIP)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continue development and testing of components for Technology Readiness Level Six assessment in aircraft System Integration Lab environments. Begin initial flight testing of links to establish readiness for transition to platform/systems applications at acceptable risks. ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** N/A ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	9.595	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Highly Integrated Photonics Naval Networking strategy began as a joint effort with Defense Advanced Research Projects Agency for development and demonstration of Analog and Digital Wavelength Division Multiplex Highly Integrated Photonics for aviation applications with the focus being a future technology refresh for the F-35 and, as an enterprise level technology, other applications. Funding extends the development and technology maturation to a technology/manufacturing readiness level compatible with transition to one, or more, Program(s) of Record.

E. Performance Metrics

Performance that adheres to the conventional Wavelength Division Multiplex optical network protocol standards, wavelengths and interface with Ethernet 10Gbit/s, MIL-STD-1553, and other protocols running concurrently on one or more single-mode fibers along with analog signals. Each critical component has a set of physical, environmental, and operational requirements driven by representative platform, systems, and operational metrics. Includes testing in a Systems/Software Integration Laboratory and in test aircraft.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603251N / *(U)AIRCRAFT SYSTEMS*				Project (Number/Name) 3331 / *C-2 System Development*			
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
3331: *C-2 System Development*	17.302	1.686	1.519	0.695	-	0.695	0.815	1.519	1.533	1.562	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The C-2A Greyhound is a high wing monoplane, twin engine turbo-prop aircraft capable of operating from both a shore base and all operational United States Navy aircraft carrier classes. The mission of the C-2A is to provide rapid response Carrier Onboard Delivery of fleet essential supplies, repair parts, and personnel to sustain at sea operations of deployed battle groups. In addition, the C-2A provides airdrop delivery and mobilization support for special operations forces from land bases and carriers, Search and Rescue, and Humanitarian Relief.

This project will fund required development, analysis, and testing of ARC-210 upgrade and other subsystems required to operate the C-2A to the end of its service life.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Combat Readiness	1.686	1.519	0.695	0.000	0.695
Articles:	-	-	-	-	-
Description: C-2 Combat Readiness establishes an enduring capacity to address obsolescence, safety, and readiness degrader issues for the C-2A(R) aircraft until the end of it's service life. ***FY 2016 Accomplishments:*** Funding is for development and design for C-2 combat readiness. ***FY 2017 Plans:*** Funding provides for the continuation of C-2 combat readiness design, development and test. Studies and analysis of C-2A Hydraulic Systems. ***FY 2018 Base Plans:*** Continuation of C-2A subsystems studies and analysis. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	1.686	1.519	0.695	0.000	0.695

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603251N / *(U)AIRCRAFT SYSTEMS*	**Project (Number/Name)** 3331 / *C-2 System Development*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• APN/0556: *C-2A Series*	7.099	19.066	18.673	-	18.673	17.809	18.118	13.680	0.000	22.396	573.973

Remarks

D. Acquisition Strategy

The C-2 Operational Ground Controllability strategy will be exercised under an Engineering Change Proposal.

E. Performance Metrics

Test and Evaluation scheduled for 3Q FY17. C-2A Hydraulic Systems studies and analysis final report is planned for 4Q FY17.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603251N / *(U)AIRCRAFT SYSTEMS*				Project (Number/Name) 9999 / *Congressional Adds*			
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
9999: *Congressional Adds*	0.000	14.482	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.482
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

N/A

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017
Congressional Add: Highly Integrated Photonics (HIP) - Cong	14.482	0.000
FY 2016 Accomplishments: Develop and test integrated photonic components for modernizing DOD aircraft (and other platform) avionics, sensors, and electronic warfare systems.		
FY 2017 Plans: N/A		
Congressional Adds Subtotals	14.482	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A