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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy **Date:** February 2018

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604014N / <i>F/A-18 Infrared Search and Track (IRST)</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	0.000	108.700	-	108.700	120.927	56.026	5.423	5.553	Continuing	Continuing
2069: <i>F/A-18 Infrared Search and Track (IRST)</i>	0.000	0.000	0.000	108.700	-	108.700	120.927	56.026	5.423	5.553	Continuing	Continuing

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): P510

A. Mission Description and Budget Item Justification

F/A-18 Infra-Red Search and Track (IRST): The F/A-18 E/F IRST system is a passive long-wave Infra-Red (IR) sensor which provides an alternate fire control system in a high Electronic Attack / Radio Detection and Ranging (RADAR) denied environment. The IRST Block II Engineering Change Proposal (ECP) upgrades two Weapons Replaceable Assemblies (WRAs); the Infra-Red Receiver (IRR) and processor in order to provide full Capabilities Development Document (CDD) capability and enhanced warfighting capability through an improved engagement timeline, improved situational awareness, longer range passive detection and tracking and a larger field of regard with specification performance.

IRST was previously completed under Program Element 0204136N F/A-18 Squadrons and has been transferred to Program Element 0604014N F/A-18 Infrared Search and Track (IRST).

B. Program Change Summary (\$ in Millions)	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	108.700	-	108.700
Total Adjustments	0.000	0.000	108.700	-	108.700
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	108.700	-	108.700

Change Summary Explanation

Technical: Not applicable.
Schedule: Not applicable.

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Appropriation/Budget Activity
1319: *Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)*

R-1 Program Element (Number/Name)
PE 0604014N / *F/A-18 Infrared Search and Track (IRST)*

The FY 2019 funding request was reduced by \$21.973 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy **Date:** February 2018

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604014N / <i>F/A-18 Infrared Search and Track (IRST)</i>	Project (Number/Name) 2069 / <i>F/A-18 Infrared Search and Track (IRST)</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2069: <i>F/A-18 Infrared Search and Track (IRST)</i>	0.000	0.000	0.000	108.700	-	108.700	120.927	56.026	5.423	5.553	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: P510

A. Mission Description and Budget Item Justification

F/A-18 Infra-Red Search and Track (IRST): The F/A-18 E/F IRST system is a passive long-wave Infra-Red (IR) sensor which provides an alternate fire control system in a high Electronic Attack / Radio Detection and Ranging (RADAR) denied environment. The IRST Block II Engineering Change Proposal (ECP) upgrades two Weapons Replaceable Assemblies (WRAs); the Infra-Red Receiver (IRR) and processor in order to provide full Capabilities Development Document (CDD) capability and enhanced warfighting capability through an improved engagement timeline, improved situational awareness, longer range passive detection and tracking and a larger field of regard with specification performance.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Infra-Red Search and Track (IRST)	0.000	0.000	108.700	0.000	108.700
Articles:	-	-	-	-	-
Description: Technology development and engineering and manufacturing development of an IRST sensor for the F/A-18 E/F. Block I supported technology development and engineering and manufacturing development of an IRST sensor for the F/A-18E/F to provide an alternate fire control system in a high Electronic Attack / Radio Detection and Ranging (RADAR) denied environment. Block I systems currently in production will be utilized as test assets for continued integration, tactics development and aircrew familiarization; will be upgraded via retrofit to a Block II configuration prior to fleet delivery. Block II IRST upgrades the Infra-Red Receiver (IRR) and processor to provide full Capabilities Development Document (CDD) capability and enhanced warfighting capability through an improved engagement timeline, improved situational awareness, longer range passive detection and tracking and a larger field of regard with specification performance.					
FY 2018 Plans: N/A					
FY 2019 Base Plans: Continue IRST Block II ECP Development Phase 2 (hardware and software). Conduct IRST Block II Technology Readiness Review. Continue IRST Integration Testing (H14 and H16). Continue development of support					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
equipment. Continue King Air Integration Lab flight testing. Continue Block I/II prototype/EDM conversions and upgrades to full Block II configuration.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: The FY 2019 funding request was increased by \$21.707 million over PE 0204136N F/A-18 Squadrons PU 2069 FY18 funding request of \$86.993 million. Additional FY19 costs above the continuation of efforts initiated in Program Element 0204136N F/A-18 Squadrons PU 2069 in FY 2018 include procurement of test asset hardware conversion kits to upgrade from the Block II prototype to an EDM configuration as well as additional lab assets to support testing. Increase in developmental lab testing, data analysis and operational test planning.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	108.700	0.000	108.700

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

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APN/05250: F-18 Series Mod (OSIP 04-14)	0.000	0.000	86.595	-	86.595	88.435	181.810	211.698	177.619	448.004	1,194.161

Remarks

D. Acquisition Strategy

Infra-Red Search and Track (IRST). The IRST system is an evolutionary Navy acquisition program with Block I and Block II capabilities. The IRST Block I system developed by the Navy provides a basic capability, supported integration of the sensor onto a fuel tank and into the aircraft and supported aeromechanical flight test required for clearance and carrier qualification of the system. IRST Block I is in the Production and Deployment phase following a successful MS-C decision in December 2014 and will support continued integration with the F/A-18E/F Advanced Mission Computer software through flight testing with System Configuration Sets H14 and H16.

IRST Block II is an ECP to upgrade two WRAs that will provide full CDD capability. Early risk reduction activities were initiated in FY2016, the program executed a pre-development In Progress Review (IPR 1) in October 2017 and has a planned pre-production IPR (IPR 2) scheduled for 4th Quarter FY2018 leading to a planned low rate initial production (APN-5 funded) start in FY2019 to achieve an Initial Operating Capability (IOC) in 4th Quarter FY2021.

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E. Performance Metrics
IRST Program achieved MS B on 17 June 2011, achieved MS C on 02 December 2014. IRST Block II Pre-Development IPR-1 was conducted 1st Quarter 2018; Pre-Production IPR-2 is scheduled for 4th Quarter FY 2018. IRST Block II systems are scheduled to begin production in FY2019 and IOC in 4th Quarter FY 2021.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy **Date:** February 2018

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)	Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary Development (Hardware/Software) Infra-Red Search and Track (IRST)	Various	Boeing : St. Louis, MO	0.000	0.000		0.000		49.228	Dec 2018	-		49.228	206.813	256.041	256.041
Hardware Development	MIPR	USAF (MIT) : Hanscom AFB, MA	0.000	0.000		0.000		1.020	Nov 2018	-		1.020	Continuing	Continuing	Continuing
Software (S/W) Development	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		3.348	Dec 2018	-		3.348	Continuing	Continuing	Continuing
IRST Support Equipment Development	WR	NAWCAD : Lakehurst, NJ	0.000	0.000		0.000		0.050	Nov 2018	-		0.050	Continuing	Continuing	Continuing
Primary Development	Various	NSMA : Various	0.000	0.000		0.000		42.518	Nov 2018	-		42.518	0.000	42.518	-
Subtotal			0.000	0.000		0.000		96.164		-		96.164	Continuing	Continuing	N/A

Remarks
NAWCAD Lakehurst, New Jersey, is developing Support Equipment necessary to support the IRST pods. Block II EMD effort ramps up significantly in FY 2019 to support alignment with H16 development and testing in order to achieve IOC in FY 2021.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development Support	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		1.181	Nov 2018	-		1.181	Continuing	Continuing	Continuing
Development Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		3.136	Nov 2018	-		3.136	Continuing	Continuing	Continuing
Development Support	WR	NSWC : Indian Head, MD	0.000	0.000		0.000		0.060	Nov 2018	-		0.060	Continuing	Continuing	Continuing
Development Support	WR	NAWCWD : Pt. Mugu, CA	0.000	0.000		0.000		0.022	Dec 2018	-		0.022	Continuing	Continuing	Continuing
Development Support	WR	FRC Southeast : Jacksonville, FL	0.000	0.000		0.000		0.890	Nov 2018	-		0.890	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 4				PE 0604014N / F/A-18 Infrared Search and Track (IRST)				2069 / F/A-18 Infrared Search and Track (IRST)							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	C/CPFF	NRL : Washington, DC	0.000	0.000		0.000		0.350	Dec 2018	-		0.350	0.000	0.350	0.350
Development Support	WR	NAVSUP : Mechanicsburg, PA	0.000	0.000		0.000		0.042	Jan 2019	-		0.042	0.000	0.042	-
Obsolescence Redesign	Various	Various : Various	0.000	0.000		0.000		0.255	Dec 2018	-		0.255	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		5.936		-		5.936	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		1.696	Nov 2018	-		1.696	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		2.183	Nov 2018	-		2.183	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E)	WR	OPTEVFOR : VX-9	0.000	0.000		0.000		1.500	Dec 2018	-		1.500	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E) - CSS	Various	OPTEVFOR : VX-9	0.000	0.000		0.000		0.120	Jul 2019	-		0.120	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E) - CSS	Various	OPTEVFOR : Norfolk, VA	0.000	0.000		0.000		0.100	Mar 2019	-		0.100	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		5.599		-		5.599	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Various	NAVAIR : Patuxent River, MD	0.000	0.000		0.000		0.020	Oct 2018	-		0.020	Continuing	Continuing	Continuing
Program Management Support - MISC	Various	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.981	Oct 2018	-		0.981	Continuing	Continuing	Continuing

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy **Date:** February 2018

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)	Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)
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Infra-Red Search and Track	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Acquisition Milestones																												
Milestones																												
System Development																												
Engineering and Manufacturing Development																												
Development Testing																												
IRST Block II Software																												
Reviews																												
Test and Evaluation																												
Aircraft Software Release																												
Integration Testing																												
Operational Testing																												
Production Milestones																												
Contract Awards																												
Deliveries																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)	Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Infra-Red Search and Track				
Acquisition Milestones: Milestones: Full Rate Production Decision Review (FRP DR)	3	2021	3	2021
Acquisition Milestones: Milestones: Gate 6 / CSB (IPR 3)	3	2019	3	2019
Acquisition Milestones: Milestones: Gate 6 / CSB (IPR 4)	3	2020	3	2020
Acquisition Milestones: Milestones: Initial Operating Capability (IOC)	4	2021	4	2021
System Development: Engineering and Manufacturing Development: Block II ECP Hardware Development	1	2019	1	2021
System Development: Engineering and Manufacturing Development: Sensor Hardware Conversion and Upgrades (Block I/II Prototype & EDM)	1	2019	4	2020
System Development: Development Testing: King Air Integration Lab Block II Phase I	1	2019	1	2019
System Development: Development Testing: King Air Integration Lab Block II Phase II	2	2019	3	2019
System Development: Development Testing: Block II Test Asset Lab Testing	2	2019	4	2020
System Development: Development Testing: Block II Test Asset Flight Test	3	2019	1	2021
System Development: IRST Block II Software: IRST OFP SW B3	1	2019	2	2019
System Development: IRST Block II Software: IRST OFP SW B4	3	2019	1	2020
System Development: IRST Block II Software: IRST OFP SW Performance Tuning & Modification	2	2020	1	2021
System Development: Reviews: Technology Readiness Review (TRR)	4	2019	4	2019
Test and Evaluation: Aircraft Software Release: SCS H14 Fleet Release	4	2019	4	2019
Test and Evaluation: Aircraft Software Release: SCS H16 Fleet Release	4	2021	4	2021
Test and Evaluation: Integration Testing: SCS H16 Integration Testing	1	2019	1	2020
Test and Evaluation: Operational Testing: SCS H14 Operational Evaluation	1	2019	2	2019
Test and Evaluation: Operational Testing: Verification of Correction of Deficiencies	1	2022	4	2023

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy **Date:** February 2018

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604014N / <i>F/A-18 Infrared Search and Track (IRST)</i>	Project (Number/Name) 2069 / <i>F/A-18 Infrared Search and Track (IRST)</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Test and Evaluation: Operational Testing: SCS H16 Integrated Operational Test & Evaluation (IOT&E)	2	2020	4	2020
Test and Evaluation: Operational Testing: SCS H16 Operational Evaluation	1	2021	2	2021
Production Milestones: Contract Awards: Block II LRIP 3 (APN)	1	2019	1	2019
Production Milestones: Contract Awards: Block II LRIP 4 (APN)	1	2020	1	2020
Production Milestones: Contract Awards: Block II LRIP 5 (APN)	1	2021	1	2021
Production Milestones: Contract Awards: Block II LRIP 6 (APN)	1	2022	1	2022
Production Milestones: Deliveries: Block II Prototype Test Assets (RDTE)	1	2019	3	2019
Production Milestones: Deliveries: Block II EDM Test Assets (RDTE)	2	2020	3	2020
Production Milestones: Deliveries: LRIP 2 (Block I Lot 2 - Qty 12)	2	2019	2	2020
Production Milestones: Deliveries: LRIP 3 (Block II Lot 3 - Qty 6)	2	2021	3	2021
Production Milestones: Deliveries: LRIP 4 (Block II Lot 4 - Qty 12)	2	2022	1	2023
Production Milestones: Deliveries: LRIP 5 (Block II Lot 5 - Qty 25)	2	2023	4	2023