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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy **Date:** May 2021

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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	172.592	111.061	84.190	48.793	-	48.793	-	-	-	-	-	-
2069: <i>F/A-18 Infrared Search and Track (IRST)</i>	172.592	111.061	84.190	48.793	-	48.793	-	-	-	-	-	-

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

A. Mission Description and Budget Item Justification

The AN/ASG-34A(V)1 F/A-18E/F Infrared Search and Track (IRST) system is a long-wave infrared sensor that provides a passive, out-of-band, alternate fire control system capable of detecting, tracking and engaging airborne targets, at long range, in a heavy electronic attack or radar-denied environment. IRST Block II is the primary out-of-band fire-control system for the F/A-18E/F, critical to organic passive air-to-air kill-chains required to compete with peer adversaries. Enables F/A-18E/F lethality by providing a passive means to detect, track, and target aircraft in highly contested environments in support of the objectives outlined in the National Defense Strategy. IRST enhances survivability by providing a fire-control solution without the need to radiate in the RF spectrum. The IRST system can autonomously, or in combination with other sensors, support the guidance of beyond-visual-range missiles including AIM-120C/D and AIM-9X Block II. The F/A-18E/F IRST system is an evolutionary Navy acquisition program with Block I and Block II capabilities. The USN is committed to further development of this component of the passive kill chain.

This budget request supports Block II development and testing of a redesigned Infrared Receiver (IRR) and processor, enabling full Capabilities Development Document (CPD) capability over a larger field of regard.

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

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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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B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	112.416	84.190	35.102	-	35.102
Current President's Budget	111.061	84.190	48.793	-	48.793
Total Adjustments	-1.355	0.000	13.691	-	13.691
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.355	0.000			
• Rate/Misc Adjustments	0.000	0.000	13.691	-	13.691

Change Summary Explanation

Cost: The FY22 funding request was reduced by \$0.309 million for Rate/Misc adjustments. Increase of \$14.000 million for IRST Block II zero sum realignment from IRST APN-5, Line Item 0515.

Technical: Not applicable.

Schedule:

- Updated IOC from Q4FY21 to Q4FY22
- Updated FRP DR from 3Q FY21 to 1Q FY23
- Extended Block II ECP Hardware Development ending from 1QFY22 to Q3FY22
- Extended Block II Prototype/EDM Conversions from ending Q2FY21 to Q4FY22
- Extended Block II Prototype & Lab Test from ending Q2FY21 to Q4FY22
- Extended Block II Prototype & Flight Test from ending Q3FY21 to Q4FY22
- Completion of H16 OPEVAL extended to 4QFY21
- Updated H16 release from 2QFY21 to 4QFY21
- Combined PRR 1QFY21 and PCA 2QFY21 to 3QFY21
- Added IRST IOT&E Q3FY21-Q4FY22
- Updated VCD from 1QFY22-3QFY23 to 4QFY22 -3QFY24
- Added IROC deliveries 1QFY22-4QFY22
- Updated LRIP 3 deliveries from 2QFY22-3QFY22 to 1QFY23-2QFY23
- Updated LRIP 4 award 2QFY20
- Updated LRIP 4 deliveries from 4QFY22- 1QFY23 to 3QFY23-4QFY23

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<ul style="list-style-type: none">- Updated LRIP 5 award from 1QFY21 to Q4FY21- Update LRIP 5 deliveries 1Q-2QFY24- Added LRIP 6 award 1QFY22- Added Gate 6 Q4FY22- Updated FRP 1 award 1QFY23		

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy **Date:** May 2021

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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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2069: F/A-18 Infrared Search and Track (IRST)	172.592	111.061	84.190	48.793	-	48.793	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: P510

Note

Infrared Search and Track (IRST) was funded in FY16 and prior under PE 0204136N / F/A-18 Squadrons, PU 1662 F/A-18 Improvements. Funding was realigned to a new PU 2069 / F/A-18 IRST in FY17 and then transferred to a new PE 0604014N / F/A-18 IRST under PU 2069 / F/A-18 IRST in FY18.

A. Mission Description and Budget Item Justification

The AN/ASG-34A(V)1 F/A-18E/F Infrared Search and Track (IRST) system is a long-wave infrared sensor that provides a passive, out-of-band, alternate fire control system capable of detecting, tracking and engaging airborne targets, at long range, in a heavy electronic attack or radar-denied environment. IRST Block II is the primary out-of-band fire-control system for the F/A-18E/F, critical to organic passive air-to-air kill-chains required to compete with peer adversaries. Enables F/A-18E/F lethality by providing a passive means to detect, track, and target aircraft in highly contested environments in support of the objectives outlined in the National Defense Strategy. IRST enhances survivability by providing a fire-control solution without the need to radiate in the RF spectrum. The IRST system can autonomously, or in combination with other sensors, support the guidance of beyond-visual-range missiles including AIM-120C/D and AIM-9X Block II. The F/A-18E/F IRST system is an evolutionary Navy acquisition program with Block I and Block II capabilities. The USN is committed to further development of this component of the passive kill chain.

This budget request supports Block II development and testing of a redesigned Infrared Receiver (IRR) and processor, enabling full Capabilities Development Document (CDD) capability over a larger field of regard.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Infra-Red Search and Track (IRST)	111.061	84.190	48.793	0.000	48.793
Articles:	-	-	-	-	-
Description: Technology Development (TD) and Engineering and Manufacturing Development (EMD) of a fully integrated airborne IRST sensor for the F/A-18E/F.					
Block II is an engineering change to the Block I system which redesigns the Infrared Receiver (IRR) and processor to provide full Capabilities Development Document capability over a larger field of regard. Block II will provide longer-range passive detection and tracking performance which enhances warfighting capability through improved engagement timelines and increased situational awareness.					

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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>

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><i>FY 2021 Plans:</i> Continue IRST Block II Development Phase 2 (EMD) effort. Continue IRST regression testing with SCS H16. Convert Block II prototype to Block II EDM configuration. Conduct Block II EDM lab and flight test, and flight worthiness. Investigate and mitigate obsolescence / DMSMS issues. Conduct engineering and logistics analysis for potential redesigns stemming from Operational Testing (OT) and emerging Super Hornet Block III requirements.</p> <p><i>FY 2022 Base Plans:</i> Complete IRST Block II Development Phase 2 (EMD) effort. Conduct Block II flight testing for completion of flight worthiness qualification testing and verification of correction of deficiencies identified in Block II Operational Test. Conduct engineering and logistics analysis for potential redesigns stemming from Operational Testing (OT) and emerging Super Hornet Block III requirements.</p> <p><i>FY 2022 OCO Plans:</i> N/A</p> <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> FY 2021 to FY 2022 decrease of \$35.397 million is due to the planned completion of Block II operational testing, IOC of the Block II system and planned ramp down of testing activities.</p>					
Accomplishments/Planned Programs Subtotals	111.061	84.190	48.793	0.000	48.793

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

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• APN/0515: <i>Infrared Search and Track (IRST)</i>	0.000	97.426	138.827	-	138.827	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

F/A-18E/F Block II IRST is an ECP to the Block I system employing an incremental approach to development and integration. The F/A-18E/F IRST Block II Pre-Development IPR-1 was conducted in October 2017 and the Block II ECP achieved Milestone C on 4 December 2018. Based on lead times required for some hardware components and urgency of need, development is being executed incrementally with some concurrency with production activities. The concurrency risk was accepted based on proven technology elements, high confidence in design stability, and a planned demonstration of readiness for production at rate. The incremental approach to development presently underway and planned for completion in FY22 mitigates concurrency risk by informing a timely, clear and executable path to design validation.

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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>
<p>Data from the incremental development continue to support acceptance of concurrency risk. Flight-testing of the new critical technology began in 2019 with Block I AV6+ systems (an enhanced Block I pod modified to run Block II SW algorithms) conducting a successful live fire and fleet demonstration of the enhanced Block I technology. As of the end of February 2020, 18 of 18 Block I LRIP units have been delivered and converted to the AV6+ configuration to support tactics, techniques, and procedures development; aircrew and maintainer training; and extended fleet demonstrations of IRST. On February 2021, the enhanced Block I completed a highly successful combat deployment with CVW-17 to CENTCOM AOR. Further development of the Block II hardware continued in parallel with the extended fleet demo with flight testing beginning in November 2019 on a Block II capital asset and continuing in March 2020 with prototype sensors which contain all critical HW elements to evaluate Block II performance. The prototype systems are fully integrated with the aircraft and contain all SW elements needed to deliver Capability Development Document (CDD) performance. Analysis of Multi-plane testing of the prototype systems conducted in 2021 has shown considerable margin to CDD Key Performance Parameters. Prototype systems continue to support integration with the F/A-18E/F Advanced Mission Computer software through flight testing with SCS H16. The final hardware configuration slated to begin flight testing in Q2 FY2022 contains enhancements needed for ease of production and maintenance. F/A-18E/F IRST Block II is on track to IOC in Q4 FY2022, bringing critical out-of-band detection and weapon-quality-track capability against advanced air threats.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy **Date:** May 2021

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 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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	Various	Boeing : St. Louis, MO	107.849	51.491	Dec 2019	52.582	Dec 2020	29.767	Dec 2021	-		29.767	-	-	-
Software Development	WR	NAWCWD : China Lake, CA	1.504	1.309	Nov 2019	0.000		0.000		-		0.000	-	-	-
Infrared Search and Track Support Equipment Development	WR	NAWCAD : Lakehurst, NJ	0.045	11.000	Nov 2019	0.000		0.000		-		0.000	-	-	-
Primary Development	Various	NSMA : Various	42.567	37.860	Nov 2019	13.504	Nov 2020	10.839	Nov 2021	-		10.839	-	-	-
Primary Development	WR	COTF : China Lake, CA	0.348	0.000		0.000		0.000		-		0.000	-	-	-
Prior Year Prod Dev no longer funded in FYDP	Various	Various : Various	0.783	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			153.096	101.660		66.086		40.606		-		40.606	-	-	N/A

Remarks
FY22 decrease in Boeing hardware and software development due to ramp down of development activity after system IOCs

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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	3.021	1.351	Nov 2019	0.960	Nov 2020	0.954	Nov 2021	-		0.954	-	-	-
Development Support	WR	NAWCAD : Patuxent River, MD	2.863	1.424	Nov 2019	1.802	Nov 2020	1.808	Nov 2021	-		1.808	-	-	-
Development Support	WR	FRC Southeast : Jacksonville, FL	0.900	0.000		0.513	Nov 2020	0.000		-		0.000	-	-	-
Development Support	C/CPFF	NRL : Washington, DC	0.675	0.338	Dec 2019	0.364	Dec 2020	0.000		-		0.000	-	-	-
Development Support	WR	NAVSUP : Mechanicsburg, PA	0.021	0.000		0.000		0.000		-		0.000	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy **Date:** May 2021

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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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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 : Lakehurst, NJ	0.000	0.000		0.456	Nov 2020	0.000		-		0.000	-	-	-
Obsolescence Redesign	Various	Various : Various	0.250	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			7.730	3.113		4.095		2.762		-		2.762	-	-	N/A

Remarks
FY22 reduction in support is due to the program transitioning from development into production.

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
Developmental Test & Evaluation	WR	NAWCAD : Patuxent River, MD	2.819	2.465	Nov 2019	3.532	Nov 2020	2.532	Nov 2021	-		2.532	-	-	-
Developmental Test & Evaluation	WR	NAWCWD : China Lake, CA	6.724	3.052	Nov 2019	5.055	Nov 2020	2.375	Nov 2021	-		2.375	-	-	-
Operational Test & Evaluation	Various	OPTEVFOR : VX-9	0.100	0.322	Jul 2020	4.592	Jul 2021	0.453	Jul 2022	-		0.453	-	-	-
Subtotal			9.643	5.839		13.179		5.360		-		5.360	-	-	N/A

Remarks
FY22 decrease in Test and Evaluation is due to ramp down of testing activity after system IOCs.

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
Travel	Various	NAVAIR : Patuxent River, MD	0.048	0.044	Oct 2019	0.025	Oct 2020	0.045	Oct 2021	-		0.045	-	-	-
Program Management Support - MISC	Various	NAWCAD : Patuxent River, MD	2.075	0.405	Oct 2019	0.805	Oct 2020	0.020	Oct 2021	-		0.020	-	-	-
Subtotal			2.123	0.449		0.830		0.065		-		0.065	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy **Date:** May 2021

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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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			

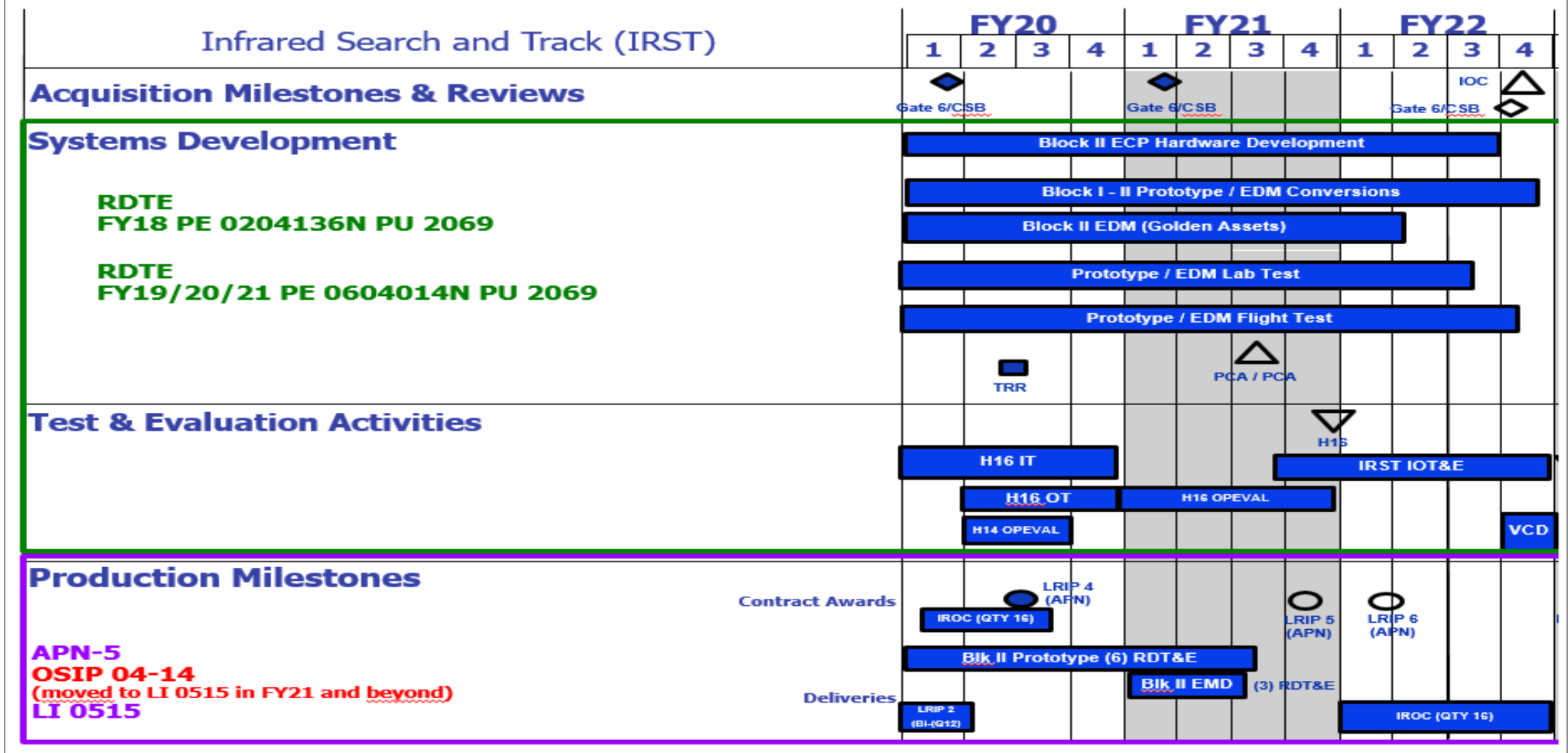
Remarks
Program management support decreases in FY22 due to the program transitioning from development into production.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	172.592	111.061	84.190	48.793	-	48.793	-	-	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
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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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
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: Gate 6 / CSB (IPR)	1	2020	1	2020
Acquisition Milestones: Milestones: Gate 6 / CSB (IPR 1)	1	2021	1	2021
Acquisition Milestones: Milestones: Gate 6 / CSB (IPR 2)	4	2022	4	2022
Acquisition Milestones: Milestones: Initial Operating Capability (IOC)	4	2022	4	2022
System Development: Engineering and Manufacturing Development: Block II ECP Hardware Development & Qualification Testing	1	2020	3	2022
System Development: Engineering and Manufacturing Development: Sensor Hardware Conversion and Upgrades (Block I/II Prototype & EDM)	1	2020	4	2022
System Development: Development Testing: Block II Test Asset Lab and Flight Testing	1	2020	4	2022
System Development: Reviews: Technology Readiness Review (TRR)	2	2020	2	2020
System Development: Reviews: Block II ECP Delta PCA	3	2021	3	2021
Test and Evaluation: Aircraft Software Release: SCS H16 Fleet Release	4	2021	4	2021
Test and Evaluation: Integration Testing: SCS H16 IRST Integration Testing Block II	1	2020	4	2020
Test and Evaluation: Operational Testing: SCS H14 OPEVAL	2	2020	3	2020
Test and Evaluation: Operational Testing: FOT&E (VCD)	4	2022	4	2022
Test and Evaluation: Operational Testing: SCS H16 Operational Testing	2	2020	4	2020
Test and Evaluation: Operational Testing: SCS H16 OPEVAL	1	2021	4	2021
Test and Evaluation: Operational Testing: IRST IOT&E	3	2021	4	2022
Production Milestones: Contract Awards: Block II LRIP 4 (APN)	2	2020	2	2020
Production Milestones: Contract Awards: Block II LRIP 5 (APN)	4	2021	4	2021
Production Milestones: Contract Awards: Block II LRIP 6 (APN)	1	2022	1	2022
Production Milestones: Deliveries: Block II Prototype Test Assets (RDTE)	1	2020	3	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy **Date:** May 2021

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
Production Milestones: Deliveries: Block II EDM Test Assets (RDTE)	1	2021	2	2021
Production Milestones: Deliveries: LRIP 2 (Block I Lot 2 - Qty 12)	1	2020	1	2020