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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy **Date:** February 2020

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)
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	68.087	104.505	112.416	84.190	-	84.190	35.102	25.937	9.870	10.069	0.000	450.176
2069: F/A-18 Infrared Search and Track (IRST)	68.087	104.505	112.416	84.190	-	84.190	35.102	25.937	9.870	10.069	0.000	450.176

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

A. Mission Description and Budget Item Justification

The AN/ASG-34(V) 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. 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 Block I system provided a basic airborne IRST capability, supported integration of the sensor onto a fuel tank and into the aircraft, and supported aeromechanical flight test required for full flight envelope clearance and carrier qualification. IRST Block I is in the Production and Deployment phase following a successful Milestone C decision in December 2014, and is supporting continued integration with the F/A-18E/F Advanced Mission Computer software through flight testing with SCS H14 and H16.

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

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

B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	108.689	113.456	83.645	-	83.645
Current President's Budget	104.505	112.416	84.190	-	84.190
Total Adjustments	-4.184	-1.040	0.545	-	0.545
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.040			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-4.184	0.000			
• Program Adjustments	0.000	0.000	0.182	-	0.182

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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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• Rate/Misc Adjustments	0.000	0.000	0.363	-	0.363
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Change Summary Explanation

Technical: Not applicable.

Schedule:

Completion of Block II ECP Hardware Development to account for Qualification Testing that goes out to 2QFY22.
 Completion of Sensor Hardware Conversion and Upgrades (Block I/II Prototype & EDM) moved in 4QFY20 to 2QFY21
 Completion of King Air Integration Lab (KAIL), now referred to as Test Bed Operations, Integration Lab Block II Phase I moved from 2QFY19 to 1QFY19
 Completion of Block II Test Asset Lab and Flight Testing moved from 1QFY21 to 3QFY21
 Updated Block II schedule to reflect PRR in 1QFY21
 Completion of Block II EDM Test Assets moved from 4QFY20 to 2QFY21
 Incorporated Gate 6 to Acquisition Milestones in 1QFY20 and 1QFY21
 Incorporated Capability Enhancement Requirement in 1QFY23
 FRP 1 (Block II Lot 4-Qty 40)4thQFY24 to 2ndQFY25

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy										Date: February 2020		
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)			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
2069: F/A-18 Infrared Search and Track (IRST)	68.087	104.505	112.416	84.190	-	84.190	35.102	25.937	9.870	10.069	0.000	450.176
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-34(V) 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. 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 Block I system provided a basic airborne IRST capability, supported integration of the sensor onto a fuel tank and into the aircraft, and supported aeromechanical flight test required for full flight envelope clearance and carrier qualification. IRST Block I is in the Production and Deployment phase following a successful Milestone C decision in December 2014, and is supporting continued integration with the F/A-18E/F Advanced Mission Computer software through flight testing with SCS H14 and H16.

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

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Infra-Red Search and Track (IRST)	104.505	112.416	84.190	0.000	84.190
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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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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)

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>FY 2020 Plans: Continue IRST Block II Development Phase 1 and 2 (EMD) efforts. Continue IRST regression testing with SCS H16. Convert Block I EDM systems to Block II prototype configuration. Continue Block II prototype lab and flight test, and flight worthiness.</p> <p>FY 2021 Base Plans: 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>FY 2021 OCO Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: FY20 to FY21 has a net decrease of \$28.226M. This is due to completion of the Block II Phase 1 hardware development contract and planned ramp down of Block II Phase 2 hardware development efforts.</p>					
Accomplishments/Planned Programs Subtotals	104.505	112.416	84.190	0.000	84.190

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APN/0515: Infrared Search and Track (IRST)	0.000	0.000	158.055	-	158.055	209.592	193.459	203.338	21.634	53.618	839.696

Remarks

D. Acquisition Strategy

The F/A-18E/F IRST system is an evolutionary Navy acquisition program with Block I and Block II capabilities.

The Block I system provided a basic airborne IRST capability, supported integration of the sensor onto a fuel tank and into the aircraft, and supported aeromechanical flight test required for full flight envelope clearance and carrier qualification. IRST Block I is in the Production and Deployment phase following a successful Milestone C decision in December 2014, and is supporting continued integration with the F/A-18E/F Advanced Mission Computer software through flight testing with SCS H14 and H16.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy **Date:** February 2020

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 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	30.733	49.228	Dec 2018	46.138	Dec 2019	52.582	Dec 2020	-		52.582	30.324	209.005	209.005
Hardware Development	MIPR	USAF (MIT) : Hanscom AFB, MA	0.060	1.020	Jul 2019	0.000		0.000		-		0.000	0.000	1.080	-
Software Development	WR	NAWCWD : China Lake, CA	1.423	3.348	Nov 2018	4.359	Nov 2019	0.000		-		0.000	0.000	9.130	-
Infrared Search and Track Support Equipment Development	WR	NAWCAD : Lakehurst, NJ	0.045	0.050	Nov 2018	0.812	Nov 2019	0.000		-		0.000	0.000	0.907	-
Primary Development	Various	NSMA : Various	24.217	38.334	Nov 2018	40.368	Nov 2019	13.504	Nov 2020	-		13.504	15.773	132.196	-
Subtotal			56.478	91.980		91.677		66.086		-		66.086	46.097	352.318	N/A

Remarks
FY21 increase in Boeing hardware/software development supports increased software corrections identified during increased flight testing to support Initial Operating Capability in FY21.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	1.143	1.181	Nov 2018	1.205	Nov 2019	0.960	Nov 2020	-		0.960	4.036	8.525	-
Development Support	WR	NAWCAD : Patuxent River, MD	1.637	3.136	Nov 2018	3.261	Nov 2019	1.802	Nov 2020	-		1.802	6.344	16.180	-
Development Support	WR	NSWC : Indian Head, MD	0.000	0.060	Nov 2018	0.062	Nov 2019	0.000		-		0.000	0.000	0.122	-
Development Support	WR	NAWCWD : Pt. Mugu, CA	0.000	0.022	Dec 2018	0.023	Nov 2019	0.000		-		0.000	0.000	0.045	-
Development Support	WR	FRC Southeast : Jacksonville, FL	0.900	0.890	Nov 2018	0.908	Nov 2019	0.513	Nov 2020	-		0.513	1.999	5.210	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy **Date:** February 2020

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 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	C/CPFF	NRL : Washington, DC	0.339	0.350	Dec 2018	0.357	Dec 2019	0.364	Dec 2020	-		0.364	1.529	2.939	2.939
Development Support	WR	NAVSUP : Mechanicsburg, PA	0.020	0.042	Jan 2019	0.043	Jan 2020	0.000		-		0.000	0.000	0.105	-
Development Support	WR	NAWCWD : Lakehurst, NJ	0.000	0.000		0.000		0.456	Nov 2020	-		0.456	1.917	2.373	-
Obsolescence Redesign	Various	Various : Various	0.250	0.255	Dec 2018	0.260	Dec 2019	0.000		-		0.000	1.582	2.347	-
Subtotal			4.289	5.936		6.119		4.095		-		4.095	17.407	37.846	N/A

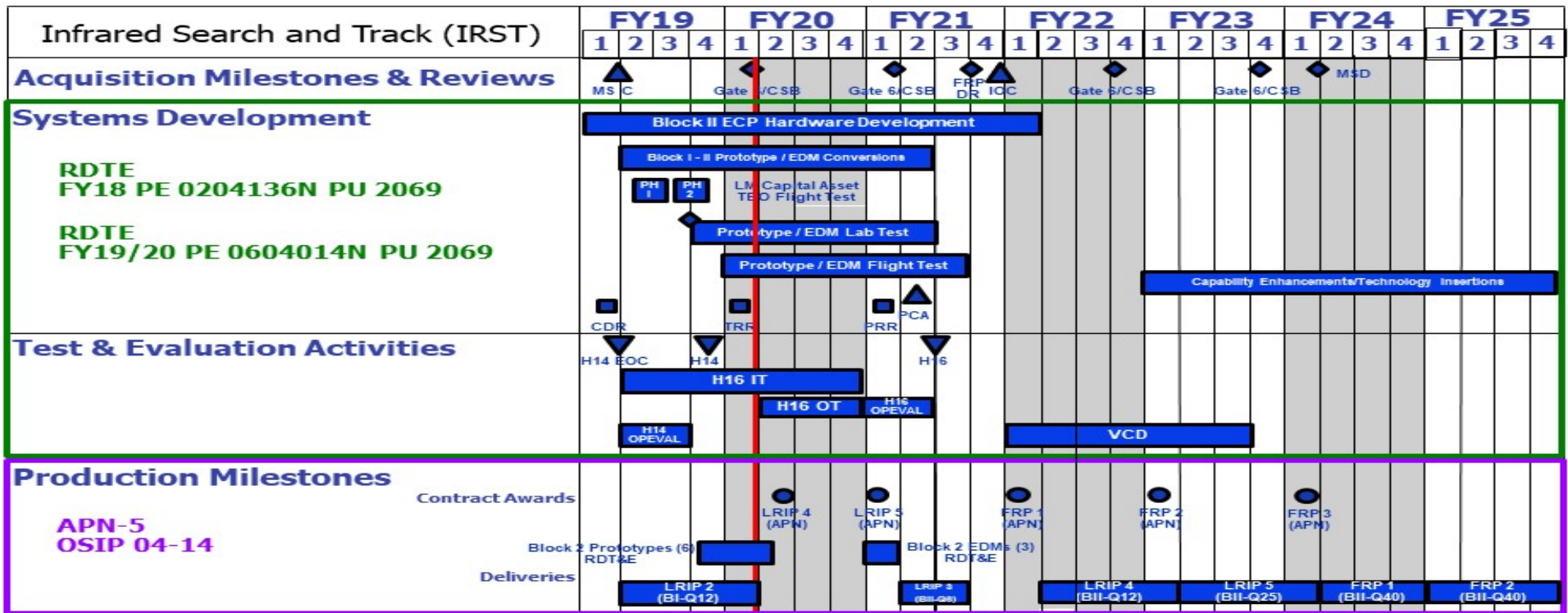
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Developmental Test & Evaluation	WR	NAWCAD : Patuxent River, MD	1.429	1.696	Dec 2018	3.816	Nov 2019	3.532	Nov 2020	-		3.532	8.222	18.695	-
Developmental Test & Evaluation	WR	NAWCWD : China Lake, CA	4.824	2.183	Nov 2018	5.349	Nov 2019	5.055	Nov 2020	-		5.055	4.343	21.754	-
Operational Test & Evaluation	Various	OPTEVFOR : VX-9	0.100	1.720	Jul 2019	4.435	Jul 2020	4.592	Jul 2021	-		4.592	1.420	12.267	-
Subtotal			6.353	5.599		13.600		13.179		-		13.179	13.985	52.716	N/A

Remarks
Increase in FY21 due to H16

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	0.020	0.020	Oct 2018	0.020	Oct 2019	0.025	Oct 2020	-		0.025	0.105	0.190	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
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 2021 Navy		Date: February 2020
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
<i>Infra-Red Search and Track</i>				
Acquisition Milestones: Milestones: Full Rate Production Decision Review (FRP DR)	3	2021	3	2021
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: Block II ECP Milestone C	1	2019	1	2019
Acquisition Milestones: Milestones: Initial Operating Capability (IOC)	4	2021	4	2021
Acquisition Milestones: Milestones: Material Support Date	1	2024	1	2024
System Development: Engineering and Manufacturing Development: Block II ECP Hardware Development & Qualification Testing	1	2019	1	2022
System Development: Engineering and Manufacturing Development: Sensor Hardware Conversion and Upgrades (Block I/II Prototype & EDM)	1	2019	2	2021
System Development: Engineering and Manufacturing Development: Capability Enhancement Requirement	1	2023	4	2025
System Development: Development Testing: Test Bed Operations Integration Lab Block II Phase I	2	2019	2	2019
System Development: Development Testing: Test Bed Operations Integration Lab Block II Phase II	3	2019	3	2019
System Development: Development Testing: Block II Test Asset Lab and Flight Testing	2	2019	3	2021
System Development: Reviews: Block II ECP System CDR	1	2019	1	2019
System Development: Reviews: Technology Readiness Review (TRR)	1	2020	1	2020
System Development: Reviews: Block II ECP Delta PCA	2	2021	2	2021
System Development: Reviews: Block II ECP PRR	1	2021	1	2021
Test and Evaluation: Aircraft Software Release: SCS H14 Fleet Release	4	2019	4	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy **Date:** February 2020

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: Aircraft Software Release: SCS H16 Fleet Release	3	2021	3	2021
Test and Evaluation: Integration Testing: SCS H16 IRST Integration Testing Block II	2	2019	4	2020
Test and Evaluation: Operational Testing: SCS H14 Operational Testing Block I	2	2019	4	2019
Test and Evaluation: Operational Testing: FOT&E (VCD)	1	2022	3	2023
Test and Evaluation: Operational Testing: SCS H16 Operational Testing	2	2020	4	2020
Production Milestones: Contract Awards: Block II LRIP 4 (APN)	2	2020	2	2020
Production Milestones: Contract Awards: Block II LRIP 5 (APN)	1	2021	1	2021
Production Milestones: Contract Awards: Block II FRP 1 (APN)	1	2022	1	2022
Production Milestones: Contract Awards: Block II FRP 2 (APN)	1	2023	1	2023
Production Milestones: Contract Awards: Block II FRP 3 (APN)	1	2024	1	2024
Production Milestones: Deliveries: Block II Prototype Test Assets (RDTE)	4	2019	2	2020
Production Milestones: Deliveries: Block II EDM Test Assets (RDTE)	1	2021	1	2021
Production Milestones: Deliveries: LRIP 2 (Block I Lot 2 - Qty 12)	2	2019	1	2020
Production Milestones: Deliveries: LRIP 3 (Block II Lot 1 - Qty 6)	2	2021	3	2021
Production Milestones: Deliveries: LRIP 4 (Block II Lot 2 - Qty 12)	2	2022	2	2023
Production Milestones: Deliveries: LRIP 5 (Block II Lot 3 - Qty 25)	2	2023	2	2024
Production Milestones: Deliveries: FRP 1 (Block II Lot 4 - Qty 40)	2	2024	4	2024
Production Milestones: Deliveries: FRP 2 (Block II Lot 5 - Qty 40)	1	2025	4	2025