

UNCLASSIFIED



Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-510



Infrared Search and Track (IRST)

As of FY 2020 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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Sensitivity Originator

No originator information is available at this time.

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
\$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
\$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
\$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name

Infrared Search and Track (IRST)

DoD Component

Navy

Responsible Office

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References

SAR Baseline (Production Estimate)

Assistant Secretary of the Navy (Research, Development & Acquisition) (ASN(RDA)) Approved Acquisition Program Baseline (APB) dated February 13, 2017

Approved APB

Assistant Secretary of the Navy (Research, Development & Acquisition) (ASN(RDA)) Approved Acquisition Program Baseline (APB) dated December 5, 2018

Mission and Description

The F/A-18E/F (Block II and later aircraft) Infrared Search and Track (IRST) system is a centerline-mounted store consisting of a passive long-wave infrared sensor and aerodynamic structural assembly integrated onto the front end of an external fuel tank.

The IRST system will provide the F/A-18E/F an alternative fire control solution with the ability to search for, detect, and track targets in a high electronic attack / radar-denied environment. It will also give the F/A-18E/F the ability to guide Beyond Visual Range missiles to engage those targets.

Executive Summary

Program Highlights Since Last Report

The F/A-18E/F Infrared Search and Track (IRST) Block II is an Engineering Change Proposal (ECP-6497) to the Block I system that upgrades the sensor's optics, processor and software to increase system performance and achieve full CPD capabilities. The re-programming of Appropriation Procurement Navy (APN)-5 to RDT&E in the FY 2016 President Budget (PB), to support the Block II development, pushed the F/A-18E/F IRST over the threshold for the MDAP, and the program was reclassified as an ACAT IC on November 5, 2015.

The IRST Block II Sensor underwent a delta Sub-System Critical Design Review (CDR) May 22-23, 2018, and demonstrated sufficient maturity to justify a Block II LRIP procurement. A successful delta system-level CDR was held November 13-14, 2018. The IRST Block II Phase 2 contract for the continued engineering development effort was awarded August 17, 2018. The IRST Infrared Optimized Configuration contract to upgrade 16 sets of Weapon Replaceable Assemblies of the Block I pods and upgraded Sensor Assembly Structure kits was definitized October 25, 2018. On December 4, 2018, the MS C Decision Review for the IRST program was held to assess program readiness to continue the Block II Production and Deployment phase. All criterion were successfully met, and the program received MS C approval and authorization to procure Block II LRIP units. The IRST Block II LRIP III undefinitized contract action for six deliveries was awarded December 28, 2018.

There are no significant software-related issues with this program at this time.

History of Significant Developments Since Program Initiation	
History of Significant Developments Since Program Initiation	
Date	Significant Development Description
1st Quarter FY 2008	The F/A-18E/F IRST program was designated as an ACAT III new start in 2008. In the Summer of 2008, early prototyping of the IRST system was underway. With the use of independent research and development funding, The Boeing Company used the F-14D baseline IRST with improved hardware to demonstrate passive ranging proof of concept. An ADM was issued by PEO for Tactical Aircraft Programs, approving the IRST system entry into the Technical Development (TD) phase. As a result of the ADM, System Requirements Reviews 1 & 2 were conducted. A funding reduction resulted in the baseline changing from planned delivery of the CDD-required ninety-two to sixty-eight units.
3rd Quarter FY 2010	The IRST program completed the following System Functional Review in May.
1st Quarter FY 2011	<p>The Preliminary Design Review was held in November. The system PDR reflected a major change driven by a funding reduction for Program Objective Memorandum, which rendered the planned program unexecutable. The IRST program management implemented a phased, evolutionary approach to delivery of the required IRST capability and the program was reclassified as an ACAT II program.</p> <p>The IRST CDD was updated to capture an evolutionary acquisition approach and was approved in April 2011. In June 2011, the IRST program completed a successful Milestone B in and entered the Engineering Manufacturing and Development (EMD) phase. The resultant EMD contract was awarded to Boeing in Aug 2011.</p>
1st Quarter FY 2012	The IRST Block I initial product baseline was established at the Critical Design Review (CDR).
3rd Quarter FY 2013	The IRST program conducted a Delta CDR in April and Test Readiness Review in July.
1st Quarter FY 2014	IRST Block I entered the Production and Deployment phase after a successful Milestone C (MS) C event.
2nd Quarter FY 2015	As a result of the successful MS C event, the IRST Block I LRIP I contract for six systems was awarded in January 2015. In March 2015, ASN(RDA) released the ADM authorizing the entry into the Production and Deployment phase and the procurement of LRIP Lot I units.
1st Quarter FY 2016	In November 2015, USD (AT&L) approved the IRST APB, delegated the MDA for the IRST program to the Navy, and designated the program as a ACAT IC due to the reprogramming of APN-5 funds to RDT&E in FY 2016 for Block II development. The IRST program completed a successful Navy Gate 6 / In Process Review. As a follow-up, a LRIP Lot II decision meeting was held in August. As a result of this meeting, an ADM was issued in September 2016 authorizing the procurement of 12 additional Block I LRIP systems and concurrence to begin development efforts on the Block II efforts. In December 2016, the IRST program completed the Functional Configuration Audit (FCA) baseline and awarded the IRST Block I LRIP II contract for 12 systems.
2nd Quarter FY 2017	An updated APB was approved in February 2017 to reflect the acceleration of the IRST Initial Operational Capability (IOC) by two years. The IRST Block II Phase 1 undefinitized contract action for six Block II engineering change proposal test assets was awarded in May 2017. The contract was definitized on August 2017.
3rd Quarter FY 2018	IRST Sensor Sub-Systems (Infrared Receiver and Processor) delta CDR was conducted in May 2018 with the Government Technical Review Board assessing that the design maturity was sufficient to justify an accelerated procurement. The IRST Block II Phase 2 development contract to support CDR, and non-recurring engineering and hardware development was awarded in August.

1st Quarter FY 2019	The Block I Infrared Optimized Configuration contract for sixteen hardware kits awarded in October 2018. Parallel activities were conducted to mature the Block II initial product baseline with a successful Critical Design Review conducted in November. The IRST program completed the IRST Block II on 4 December 2018.
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Threshold Breaches

APB Breaches

Schedule		<input type="checkbox"/>
Performance		<input type="checkbox"/>
Cost	RDT&E	<input type="checkbox"/>
	Procurement	<input type="checkbox"/>
	MILCON	<input type="checkbox"/>
	Acq O&M	<input type="checkbox"/>
O&S Cost		<input type="checkbox"/>
Unit Cost	PAUC	<input type="checkbox"/>
	APUC	<input type="checkbox"/>

Nunn-McCurdy Breaches

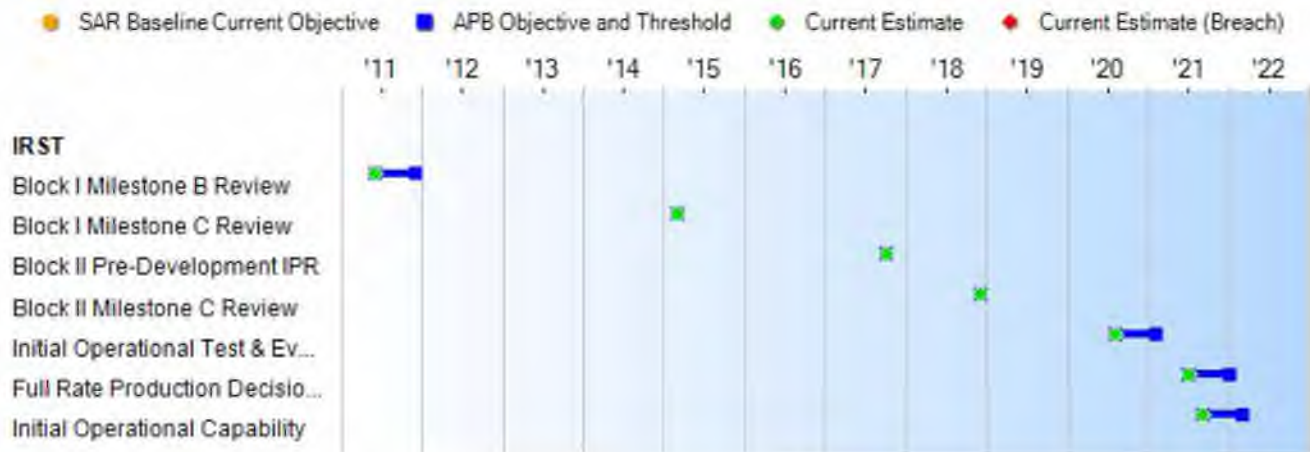
Current UCR Baseline

PAUC	None
APUC	None

Original UCR Baseline

PAUC	None
APUC	None

Schedule



Schedule Events				
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold	Current Estimate	Current Estimate
Block I Milestone B Review	Jun 2011	Jun 2011	Dec 2011	Jun 2011
Block I Milestone C Review	Mar 2015	Mar 2015	Mar 2015	Mar 2015
Block II Pre-Development IPR	Jul 2017	Oct 2017	Oct 2017	Oct 2017
Block II Milestone C Review	Jun 2018	Dec 2018	Dec 2018	Dec 2018
Initial Operational Test & Evaluation (Start)	Aug 2020	Aug 2020	Feb 2021	Aug 2020
Full Rate Production Decision Review (FRPDR)	Jul 2021	Jul 2021	Jan 2022	Jul 2021
Initial Operational Capability	Sep 2021	Sep 2021	Mar 2022	Sep 2021

(Ch-1)

Change Explanations

(Ch-1) The Block II Milestone C review changed from June 2018 to December 2018 to allow sufficient time to complete the delta system level CDR and complete MS C required documentation.

Acronyms and Abbreviations

IPR - In Process Review

Performance

Performance Characteristics				
SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Demonstrated Performance	Current Estimate
Operational Availability				
>/0.95	>/0.95	>/0.8	TBD	>/0.95

Classified Performance information is provided in the classified annex to this submission.

Requirements Reference

F/A-18E/F Infrared Search and Track CDD, Change 2, dated October 20, 2014

Change Explanations

None

Track to Budget

RDT&E

Appn	BA	PE		
Navy	1319	07	0204136N	
	Project	Name		
	1662	F/A18 Improvement		(Shared) (Sunk)
	2069	F/A18 Infrared Search and Track (IRST)		(Sunk)
Navy	1319	04	0604014N	
	Project	Name		
	2069	F/A-18 Infrared Search and Track (IRST)		(Sunk)

Procurement

Appn	BA	PE		
Navy	1506	05	0204136N	
	Line Item	Name		
	0525	F-18 Series		(Shared)
Navy	1506	05	0204161N	
	Line Item	Name		
	0605	Spares and Repair Parts		

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2008 \$M			BY 2008 \$M	TY \$M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	764.0	799.7	879.7	796.7	878.6	926.4	926.3
Procurement	1150.6	1192.4	1311.6	1182.1	1468.5	1511.8	1511.8
Flyaway	--	--	--	811.9	--	--	1031.6
Recurring	--	--	--	804.3	--	--	1021.1
Non Recurring	--	--	--	7.6	--	--	10.5
Support	--	--	--	370.2	--	--	480.2
Other Support	--	--	--	247.0	--	--	327.6
Initial Spares	--	--	--	123.2	--	--	152.6
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1914.6	1992.1	N/A	1978.8	2347.1	2438.2	2438.1

Current APB Cost Estimate Reference

Program Office Cost Estimate dated December 04, 2018

Cost Notes

The CAPE office of OSD completed an ICE in December 2018 in support of the IRST Block II Milestone (MS) C event. The summarized risks identified by ICE are below:

The F/A-18E/F IRST program is accepting schedule risks, particularly with respect to testing and concurrency to accelerate delivery of the critical capability.

The IRST program is accepting concurrency risks demonstrated by the plan to procure more than half of the fleet hardware prior to September 2022.

The F/A-18E/F IRST program has no production Block II configured test assets yet; however, prototype deliveries commence October 2019.

The F/A-18E/F IRST relies on the Contractor's government Integrated Master Schedule (IMS) and does not yet have a fully updated Test & Evaluation Master Plan (TEMP).

Additionally, the CAPE ICE recommended that:

Due to the major effect that reliability has on long-term sustainment costs, particular attention should be placed on reliability during IRST system development so the Navy avoids the necessity of paying high depot-level repairable cost over the life cycle of the program.

Within six months, the Program Office will update the IMS and TEMP to include the current plans for testing of IRST Block

II.

The Naval Air Systems Command Cost Department completed the Component Cost Position in November 2018 to support of the IRST MS C event.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	9	3	3
Procurement	170	170	170
Total	179	173	173

Cost and Funding

Funding Summary

Appropriation Summary									
FY 2020 President's Budget / December 2018 SAR (TY\$ M)									
Appropriation	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
RDT&E	550.6	108.7	113.5	83.6	34.8	25.6	9.5	0.0	926.3
Procurement	341.6	84.5	106.3	196.9	247.2	216.5	221.1	97.7	1511.8
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2020 Total	892.2	193.2	219.8	280.5	282.0	242.1	230.6	97.7	2438.1
PB 2019 Total	779.8	221.2	254.7	284.1	309.0	183.2	205.4	96.0	2333.4
Delta	112.4	-28.0	-34.9	-3.6	-27.0	58.9	25.2	1.7	104.7

Quantity Summary										
FY 2020 President's Budget / December 2018 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Development	3	0	0	0	0	0	0	0	0	3
Production	0	18	6	12	25	40	40	29	0	170
PB 2020 Total	3	18	6	12	25	40	40	29	0	173
PB 2019 Total	9	18	6	12	25	40	40	29	0	179
Delta	-6	0	0	0	0	0	0	0	0	-6

Cost and Funding

Annual Funding By Appropriation

Annual Funding							
1319 RDT&E Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2007	--	--	--	--	--	--	3.5
2008	--	--	--	--	--	--	4.8
2009	--	--	--	--	--	--	16.8
2010	--	--	--	--	--	--	24.6
2011	--	--	--	--	--	--	58.0
2012	--	--	--	--	--	--	40.2
2013	--	--	--	--	--	--	93.1
2014	--	--	--	--	--	--	59.7
2015	--	--	--	--	--	--	45.0
2016	--	--	--	--	--	--	42.7
2017	--	--	--	--	--	--	94.1
2018	--	--	--	--	--	--	68.1
2019	--	--	--	--	--	--	108.7
2020	--	--	--	--	--	--	113.5
2021	--	--	--	--	--	--	83.6
2022	--	--	--	--	--	--	34.8
2023	--	--	--	--	--	--	25.6
2024	--	--	--	--	--	--	9.5
Subtotal	3	--	--	--	--	--	926.3

Annual Funding 1319 RDT&E Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2008 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2007	--	--	--	--	--	--	3.5
2008	--	--	--	--	--	--	4.7
2009	--	--	--	--	--	--	16.4
2010	--	--	--	--	--	--	23.7
2011	--	--	--	--	--	--	54.5
2012	--	--	--	--	--	--	37.2
2013	--	--	--	--	--	--	85.2
2014	--	--	--	--	--	--	53.9
2015	--	--	--	--	--	--	40.1
2016	--	--	--	--	--	--	37.4
2017	--	--	--	--	--	--	80.9
2018	--	--	--	--	--	--	57.4
2019	--	--	--	--	--	--	89.8
2020	--	--	--	--	--	--	91.9
2021	--	--	--	--	--	--	66.4
2022	--	--	--	--	--	--	27.1
2023	--	--	--	--	--	--	19.5
2024	--	--	--	--	--	--	7.1
Subtotal	3	--	--	--	--	--	796.7

Consistent with FY 2020 PB controls as of January 15, 2019.

Annual Funding								
1506 Procurement Aircraft Procurement, Navy								
Fiscal Year	Quantity	TY \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
2015	6	59.5	--	--	59.5	29.6	89.1	
2016	12	78.3	--	--	78.3	36.9	115.2	
2017	--	--	--	--	--	2.5	2.5	
2018	--	132.3	--	--	132.3	2.5	134.8	
2019	6	46.6	--	--	46.6	37.9	84.5	
2020	12	67.7	--	--	67.7	38.6	106.3	
2021	25	159.2	--	--	159.2	37.7	196.9	
2022	40	177.8	--	--	177.8	69.4	247.2	
2023	40	169.7	--	--	169.7	46.8	216.5	
2024	29	125.9	--	--	125.9	95.2	221.1	
2025	--	4.1	--	10.5	14.6	52.1	66.7	
2026	--	--	--	--	--	14.9	14.9	
2027	--	--	--	--	--	11.4	11.4	
2028	--	--	--	--	--	2.2	2.2	
2029	--	--	--	--	--	1.8	1.8	
2030	--	--	--	--	--	0.7	0.7	
Subtotal	170	1021.1	--	10.5	1031.6	480.2	1511.8	

Annual Funding								
1506 Procurement Aircraft Procurement, Navy								
Fiscal Year	Quantity	BY 2008 \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
2015	6	52.4	--	--	52.4	26.0	78.4	
2016	12	67.5	--	--	67.5	31.8	99.3	
2017	--	--	--	--	--	2.1	2.1	
2018	--	109.6	--	--	109.6	2.0	111.6	
2019	6	37.8	--	--	37.8	30.8	68.6	
2020	12	53.9	--	--	53.9	30.7	84.6	
2021	25	124.2	--	--	124.2	29.5	153.7	
2022	40	136.0	--	--	136.0	53.1	189.1	
2023	40	127.3	--	--	127.3	35.1	162.4	
2024	29	92.6	--	--	92.6	70.0	162.6	
2025	--	3.0	--	7.6	10.6	37.5	48.1	
2026	--	--	--	--	--	10.5	10.5	
2027	--	--	--	--	--	7.9	7.9	
2028	--	--	--	--	--	1.5	1.5	
2029	--	--	--	--	--	1.2	1.2	
2030	--	--	--	--	--	0.5	0.5	
Subtotal	170	804.3	--	7.6	811.9	370.2	1182.1	

Cost Quantity Information		
1506 Procurement Aircraft Procurement, Navy		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2008 \$M
2015	6	88.9
2016	12	140.6
2017	--	--
2018	--	--
2019	6	37.8
2020	12	53.9
2021	25	124.2
2022	40	136.0
2023	40	127.3
2024	29	95.6
2025	--	--
2026	--	--
2027	--	--
2028	--	--
2029	--	--
2030	--	--
Subtotal	170	804.3

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	12/2/2014	12/4/2018
Approved Quantity	6	43
Reference	Milestone C ADM	Block II LRIP III Milestone C ADM
Start Year	2015	2018
End Year	2017	2021

The Current Total LRIP Quantity is more than 10% of the total production quantity in order to field the Resource Sponsor's required number of IRST systems prior to CY 2024.

Foreign Military Sales

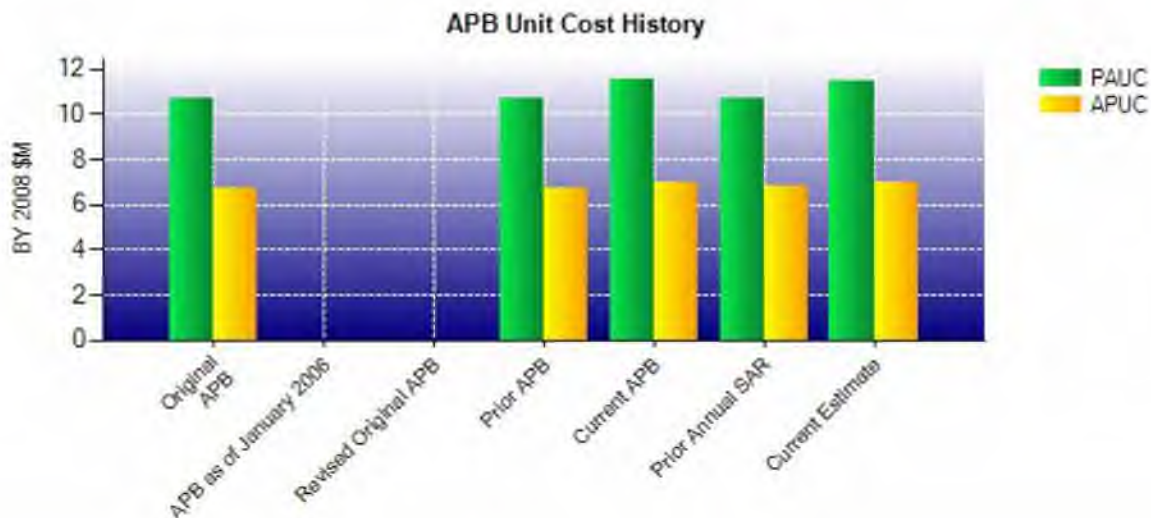
None

Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2008 \$M	BY 2008 \$M	% Change
	Current UCR Baseline (Dec 2018 APB)	Current Estimate (Dec 2018 SAR)	
Program Acquisition Unit Cost			
Cost	1992.1	1978.8	
Quantity	173	173	
Unit Cost	11.515	11.438	-0.67
Average Procurement Unit Cost			
Cost	1192.4	1182.1	
Quantity	170	170	
Unit Cost	7.014	6.954	-0.86
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2008 \$M	BY 2008 \$M	% Change
	Original UCR Baseline (Feb 2017 APB)	Current Estimate (Dec 2018 SAR)	
Program Acquisition Unit Cost			
Cost	1914.6	1978.8	
Quantity	179	173	
Unit Cost	10.696	11.438	+6.94
Average Procurement Unit Cost			
Cost	1150.6	1182.1	
Quantity	170	170	
Unit Cost	6.768	6.954	+2.75



APB Unit Cost History					
Item	Date	BY 2008 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Feb 2017	10.696	6.768	13.112	8.638
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Feb 2017	10.696	6.768	13.112	8.638
Current APB	Dec 2018	11.515	7.014	14.094	8.893
Prior Annual SAR	Dec 2017	10.657	6.786	13.036	8.632
Current Estimate	Dec 2018	11.438	6.954	14.093	8.893

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
13.112	0.051	0.321	0.000	0.758	0.541	0.000	-0.690	0.981	14.093

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
8.638	0.046	0.000	0.000	0.771	0.139	0.000	-0.702	0.254	8.893

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	N/A	N/A	N/A
Milestone B	N/A	N/A	Jun 2011	Jun 2011
Milestone C	N/A	N/A	Mar 2015	Mar 2015
IOC	N/A	N/A	Sep 2021	Sep 2021
Total Cost (TY \$M)	N/A	N/A	2347.1	2438.1
Total Quantity	N/A	N/A	179	173
PAUC	N/A	N/A	13.112	14.093

Cost Variance

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	878.6	1468.5	--	2347.1
Previous Changes				
Economic	-1.9	-5.2	--	-7.1
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-10.7	+5.2	--	-5.5
Other	--	--	--	--
Support	--	-1.1	--	-1.1
Subtotal	-12.6	-1.1	--	-13.7
Current Changes				
Economic	+3.0	+13.0	--	+16.0
Quantity	-23.3	--	--	-23.3
Schedule	--	--	--	--
Engineering	--	+131.1	--	+131.1
Estimating	+80.6	+18.5	--	+99.1
Other	--	--	--	--
Support	--	-118.2	--	-118.2
Subtotal	+60.3	+44.4	--	+104.7
Total Changes	+47.7	+43.3	--	+91.0
CE - Cost Variance	926.3	1511.8	--	2438.1
CE - Cost & Funding	926.3	1511.8	--	2438.1

Summary BY 2008 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	764.0	1150.6	--	1914.6
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-10.1	+4.2	--	-5.9
Other	--	--	--	--
Support	--	-1.1	--	-1.1
Subtotal	-10.1	+3.1	--	-7.0
Current Changes				
Economic	--	--	--	--
Quantity	-19.0	--	--	-19.0
Schedule	--	--	--	--
Engineering	--	+108.5	--	+108.5
Estimating	+61.8	+13.1	--	+74.9
Other	--	--	--	--
Support	--	-93.2	--	-93.2
Subtotal	+42.8	+28.4	--	+71.2
Total Changes	+32.7	+31.5	--	+64.2
CE - Cost Variance	796.7	1182.1	--	1978.8
CE - Cost & Funding	796.7	1182.1	--	1978.8

Previous Estimate: December 2017

RDT&E	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+3.0
Quantity variance resulting in a reduction of six Engineering Development Model (EDM) quantities from nine to three EDMs. (Quantity)	-19.0	-23.3
Adjustment for current and prior escalation. (Estimating)	-1.4	-1.6
Revised estimate to reflect service-wide funding adjustments. (Estimating)	+63.2	+82.2
RDT&E Subtotal	+42.8	+60.3

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+13.0
Additional funding for the Infrared Optimization Configuration kits in FY 2018. (Engineering)	+108.5	+131.1
Revised estimate due to Congressional Mark in FY 2019 for production early-to-need. (Estimating)	-21.5	-26.4
Revised estimate to reflect service-wide funding adjustments. (Estimating)	+35.3	+45.9
Adjustment for current and prior escalation. (Estimating)	-0.7	-1.0
Adjustment for current and prior escalation. (Support)	-0.7	-0.7
Decrease in Other Support to update for actuals. (Support)	-7.9	-9.5
Decrease in Initial Spares to reflect service-wide funding adjustments. (Support)	-84.6	-108.0
Procurement Subtotal	+28.4	+44.4

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: IRST Block I LRIP II
Contractor: The Boeing Company
Contractor Location: 6200 James S. McDonnell Blvd
 St. Louis, MO 63134
Contract Number: N00019-17-C-0026/3
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: December 15, 2016
Definitization Date: December 15, 2016

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
82.1	84.2	12	82.1	84.2	12	78.2	82.1

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/29/2018)	+9.8	-3.1
Previous Cumulative Variances	+3.0	+0.3
Net Change	+6.8	-3.4

Cost and Schedule Variance Explanations

The favorable net change in the cost variance is due to subcontractors Lockheed Martin (LM) and Santa Barbara Focal Plane's underrun in support and touch assumptions due to good performance effort and less-than-planned Infrared Receiver engineering level of effort.

The unfavorable net change in the schedule variance is due to LM late deliveries and material in Orlando as well as test failures. Furthermore, Boeing is experiencing delays due to late material and data within Target Module and Maintenance teams.

Contract Identification

Appropriation: RDT&E
Contract Name: Block II Phase 1
Contractor: The Boeing Company
Contractor Location: 6200 James S McDonnell Boulevard
 St. Louis, MO 63134
Contract Number: N00019-17-C-0024/4
Contract Type: Cost Plus Incentive Fee (CPIF)
Award Date: May 25, 2017
Definitization Date: August 22, 2017

Contract Price

Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
80.0	N/A	6	84.9	N/A	6	84.1	80.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a contract modification to incorporate IRST Block II Phase 1 Sensor Critical Design Review support that increased the value by \$4.9M in June 2018.

Contract Variance

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/29/2018)	-1.3	-5.7
Previous Cumulative Variances	-0.2	-2.0
Net Change	-1.1	-3.7

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to additional subcontractor labor efforts to support completion of complex design efforts.

The unfavorable net change in the schedule variance is due to the subcontractor experiencing technical complexity and additional design analysis within their Infrared Receiver and Processor design efforts and late material deliveries.

Contract Identification

Appropriation: RDT&E
Contract Name: IRST Block II Phase 2
Contractor: The Boeing Company
Contractor Location: 6200 James S McDonnell Boulevard
 St. Louis, MO 63134
Contract Number: N00019-18-C-0022/5
Contract Type: Cost Plus Incentive Fee (CPIF)
Award Date: August 17, 2018
Definitization Date: August 17, 2018

Contract Price

Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
152.5	N/A	0	164.6	N/A	3	164.6	164.6

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a contract modification to procure one IRST Block II engineering development model and two IRST Block I upgrades to infrared optimized configuration that increased the value by \$12.1M in November 2018.

Contract Variance

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/29/2018)	-0.2	-0.3
Previous Cumulative Variances	--	--
Net Change	-0.2	-0.3

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to baseline timing of both Boeing and Lockheed Martin (LM). Boeing has not definitized its contract with LM. The integrated baseline review is scheduled for April 2019.

The unfavorable cumulative schedule variance is due to baseline timing of both Boeing and LM. Boeing has not definitized its contract with LM. The integrated baseline review is scheduled for April 2019.

Notes

This is the first time this contract is being reported.

The contract quantity represents three weapon replaceable assemblies - one engineering development model and two infrared optimized configuration units.

Contract Identification

Appropriation: Procurement
Contract Name: Infrared Optimized Configuration (IROC)
Contractor: The Boeing Company
Contractor Location: 6200 James S McDonnell Boulevard
 St. Louis, MO 63134
Contract Number: N00019-19-F-2410/6
Contract Type: Cost Plus Incentive Fee (CPIF)
Award Date: October 25, 2018
Definitization Date:

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
155.0	N/A	16	155.0	N/A	16		

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (CPIF) contract.

General Contract Variance Explanation

Cost and schedule variances are not reported for this contract, because earned value management reporting has not yet commenced due to an undefinitized contract award. The contract will be definitized in April 2019.

Notes

This is the first time this contract is being reported.

The undefinitized contract was awarded with a not-to-exceed value of \$155M.

Contract Identification

Appropriation: Procurement
Contract Name: IRST Block II LRIP III
Contractor: The Boeing Company
Contractor Location: 6200 James S McDonnell Boulevard
 St. Louis, MO 63134
Contract Number: N00019-19-C-0019/7
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: December 28, 2018
Definitization Date:

Contract Price

Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
55.0	N/A	6	55.0	N/A	6		55.0

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FPIF) contract.

General Contract Variance Explanation

Cost and schedule variances are not reported for this contract, because earned value management reporting has not yet commenced due to an undefinitized contract award. The contract will be definitized in June 2019.

Notes

This is the first time this contract is being reported.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	3	3	3	100.00%
Production	6	6	170	3.53%
Total Program Quantity Delivered	9	9	173	5.20%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	2438.1	Years Appropriated	13
Expended to Date	562.8	Percent Years Appropriated	54.17%
Percent Expended	23.08%	Appropriated to Date	1085.4
Total Funding Years	24	Percent Appropriated	44.52%

The above data is current as of March 11, 2019.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	December 04, 2018
Source of Estimate:	POE
Quantity to Sustain:	170
Unit of Measure:	System
Service Life per Unit:	19.11 Years
Fiscal Years in Service:	FY 2021 - FY 2043

Total O&S Costs reflect those accepted portions of both the Naval Air Systems Command (NAVAIR) Component Cost Position and OSD CAPE ICE, as presented at the Milestone C event on December 4, 2018. The estimates are consistent with the APB approved on December 5, 2018. The CAPE O&S Cost Estimating Structure (CES) element 3.0 Maintenance and element 4.6 Sustaining Support / Data and Technical Publications costs are variable and based on system flight hours. For CAPE O&S CES element 4.1 Sustaining Support/System Specific Training and associated personnel costs are estimated based on the annual requirement for those elements. The CAPE O&S element 4.2 Sustaining Support/Support Equipment Replacement and Repair is estimated as a total requirement and then applied on an annual basis. The CAPE O&S CES element 5.1 Continuing System Improvements/Hardware Modifications is based on the total number of operating and pipeline pods. The CES element 5.2 Continuing System Improvements/Software Maintenance is based on current Software Lines of Code (SLOC) count and accounts for SLOC count growth in out-years.

The service life of the IRST system is limited by the availability of the F/A-18 E/F aircraft. The estimate uses Naval Synchronization Toolset data version 18-01 to model F/A-18 E/F aircraft availability.

Total System Procurement: 170

Total System Years: 3,249

Service Life Per Unit: 19.11 (Calculated by dividing Total System Years by Total System Procurement)

Average Flight Hours per Fleet System per month: 40.3

Total Life-Cycle Flight Hours: 815,355

Sustainment Strategy

The IRST Sustainment Strategy is based on the following assumptions:

The IRST system will be operated by F/A-18E/F aircraft assigned to land and carrier based squadrons. The current plan is for six IRST assets per squadron to be fielded to 24 operating F/A-18E/F squadrons. These squadrons are to be located at Naval Air Station (NAS) Oceana, NAS Lemoore and Marine Corps Air Station Iwakuni, Japan; and will deploy aboard aircraft carriers based on the most current operational schedule.

The IRST program is an evolutionary acquisition program with Block I and Block II systems. Procurement involves the acquisition of eighteen Block I systems, followed by 152 Block II systems and retrofits of the eighteen Block I systems to the Block II configuration. The 18 Block I LRIP systems will be used to initially support IRST tactics development, aircrew familiarization, test and evaluation, maintainer training, software configuration set testing, and a "speed-to-the-fleet" technical demonstration initiative. The Block I systems are not intended to be permanently fielded to fleet squadrons. The program will reach IOC upon delivery of the first six Block II IRST systems in late FY 2021.

The IRST system logistics concept will leverage logistics support processes currently in place for the F/A-18E/F aircraft. No specialized logistics processes should be required to support the IRST system.

The IRST hardware support will be a joint effort between The Boeing Company, Lockheed Martin Missiles and Fire Control, Integral Aerospace, Meggitt Defense Systems Inc., Naval Aircraft Warfare Center-Aircraft Division Lakehurst, In-Service Support Center (ISSC) Jacksonville, ISSC North Island, Naval Supply Systems Command, and NAVAIR. The planned IRST support concept is a three-level (organizational to intermediate to depot) maintenance concept. A Level-of-Repair Analysis was conducted on the Block I system that resulted in a recommendation for a three-level support infrastructure for all weapons replaceable assemblies except the Inertial Measurement Unit and Processor. The Original Equipment Manufacturer will provide interim support until intermediate-level and organic depot maintenance capabilities

are stood up, which will occur no later than four years post IOC.

Antecedent Information

No Antecedent.

Annual O&S Costs BY2008 \$M			
Cost Element	IRST	N/A (Antecedent)	
	Average Annual Cost Per System	N/A	
Unit-Level Manpower	0.000	--	
Unit Operations	0.001	--	
Maintenance	0.281	--	
Sustaining Support	0.030	--	
Continuing System Improvements	0.106	--	
Indirect Support	0.000	--	
Other	--	--	
Total	0.418	--	

Item	Total O&S Cost \$M			
	IRST			N/A (Antecedent)
	Current Production APB Objective/Threshold	Current Estimate		
Base Year	1354.6	1490.1	1358.9	N/A
Then Year	1953.0	N/A	2020.7	N/A

Disposal cost is not included in the O & S Cost of the current APB objective and threshold for this program, nor is it included in the Current Estimate listed above.

Equation to Translate Annual Cost to Total Cost

*The average annual cost per system for IRST is calculated by dividing the Total O&S Cost of \$1,358.9M CY2008 by 3,249 total IRST system years, resulting in \$0.418M CY2008 per system per year.

O&S Cost Variance		
Category	BY 2008 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2017 SAR	874.8	
Programmatic/Planning Factors	894.2	Naval Synchronization Toolset 18-01 data reflects additional system years and flight hours. Accelerated procurement of Block I to Block II retrofit systems.
Cost Estimating Methodology	-1144.1	Methodology change due to implementation of intermediate-level maintenance, partially offset by OSD CAPE ICE insertion where appropriate.

Cost Data Update	15.2 Updated inflation indices.
Labor Rate	0.0 No change from December 2017 SAR.
Energy Rate	0.0 No change from December 2017 SAR.
Technical Input	718.8 Reduced predicted reliability rates due to increased Block II system complexity / capability and additional support equipment maintenance, partially offset by updated supply rates data.
Other	0.0 No change from December 2017 SAR.
Total Changes	484.1
Current Estimate	1358.9

Disposal Estimate Details

Date of Estimate:	December 04, 2018
Source of Estimate:	POE
Disposal/Demilitarization Total Cost (BY 2008 \$M):	4.4

The TY\$ value is \$8.22M.