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Exhibit P-40, Budget Line Item Justification: PB 2020 Navy **Date:** March 2019

Appropriation / Budget Activity / Budget Sub Activity: 1507N: Weapons Procurement, Navy / BA 02: Other Missiles / BSA 1: Strategic Missiles	P-1 Line Item Number / Title: 2101 / Tomahawk
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ID Code (A=Service Ready, B=Not Service Ready): A	Program Elements for Code B Items: N/A	Other Related Program Elements: N/A
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Line Item MDAP/MAIS Code: 289

Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Procurement Quantity (<i>Units in Each</i>)	8,529	100	-	-	90	90	90	-	-	-	-	8,809
Gross/Weapon System Cost (<i>\$ in Millions</i>)	13,452.125	187.354	98.570	0.000	386.730	386.730	373.963	220.141	317.815	280.825	3,630.706	18,948.229
Less PY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Net Procurement (P-1) (<i>\$ in Millions</i>)	13,452.125	187.354	98.570	0.000	386.730	386.730	373.963	220.141	317.815	280.825	3,630.706	18,948.229
Plus CY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Total Obligation Authority (<i>\$ in Millions</i>)	13,452.125	187.354	98.570	0.000	386.730	386.730	373.963	220.141	317.815	280.825	3,630.706	18,948.229

(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)

Initial Spares (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Flyaway Unit Cost (<i>\$ in Thousands</i>)	1,188.144	1,432.700	-	-	1,901.722	1,901.722	1,951.344	-	-	-	-	1,206.009
Gross/Weapon System Unit Cost (<i>\$ in Thousands</i>)	-	-	-	-	-	-	-	-	-	-	-	-

Description:

FY 2020 funding totals include \$0.0M for Base and \$386.73M for Overseas Contingency Operations (OCO); of which \$386.73M and 90 quantity is realigned as part of the OCO for Base Requirements. FY 2020 OCO for Base Requirements is OCO funding for base budget requirements in support of the National Defense Strategy. The Budget requests these funds in OCO to comply with the base budget defense caps included in the Budget Control Act of 2011.

The Block V is a modernized TACTOM missile which includes Navigation Communications (NAV/COMMs) upgrade.

Tomahawk provides an attack capability against fixed and mobile/moving targets, and can be launched from both surface ships (RGM) and submarines (UGM). Tomahawk consists of the following variants: (1) RGM/UGM-109C, Land Attack Conventional; (2) RGM/UGM-109D, Land Attack Submunition Dispenser; (3) RGM/UGM-109E, Tactical Tomahawk.

The Block IV/V Tactical Tomahawk (TACTOM RGM/UGM-109E) preserves Tomahawk's long-range precision-strike capability while significantly increasing responsiveness and flexibility. TACTOM is capable of in-flight retargeting, the ability to loiter over the battlefield, in-flight missile health and status monitoring, and battle damage indication. Other Tomahawk Weapon System functionality includes rapid mission planning and execution via Global Positioning System (GPS) onboard the launch platform and improved anti-jam GPS.

Characteristics and dimensions (approximate):

Weight (with booster and capsule) (UGM-109): 4,300 pounds

Weight (with booster and canister) (RGM-109): 4,300 pounds

Length (with booster): 20.5 feet

Wing Span: 8.6 feet

Cruise Speed: High Subsonic

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Exhibit P-40, Budget Line Item Justification: PB 2020 Navy **Date:** March 2019

Appropriation / Budget Activity / Budget Sub Activity: 1507N: Weapons Procurement, Navy / BA 02: Other Missiles / BSA 1: Strategic Missiles **P-1 Line Item Number / Title:** 2101 / Tomahawk

ID Code (A=Service Ready, B=Not Service Ready): A **Program Elements for Code B Items:** N/A **Other Related Program Elements:** N/A

Line Item MDAP/MAIS Code: 289

Exhibits Schedule					Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Exhibit Type	Title*	Subexhibits	ID CD	MDAP/MAIS Code	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)
P-5	1 / Tomahawk	P-5a, P-21			8,529 / 13,452.125	100 / 157.311	- / 20.164	- / 0.000	90 / 204.716	90 / 204.716
P-3a	1 / TACTOM NAV/COMMs Modernization and Recertification Kits (Increase Capability and Maintain Reliability)				- / 0.000	- / 30.043	- / 78.406	- / 0.000	- / 182.014	- / 182.014
P-40	Total Gross/Weapon System Cost				8,529 / 13,452.125	100 / 187.354	- / 98.570	- / 0.000	90 / 386.730	90 / 386.730

Exhibits Schedule					FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Exhibit Type	Title*	Subexhibits	ID CD	MDAP/MAIS Code	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)
P-5	1 / Tomahawk	P-5a, P-21			- / -	- / -	- / -	- / -	- / -	- / -
P-3a	1 / TACTOM NAV/COMMs Modernization and Recertification Kits (Increase Capability and Maintain Reliability)				- / 166.130	- / 212.062	- / 305.055	- / 257.751	- / 3,270.533	- / 4,501.994
P-40	Total Gross/Weapon System Cost				90 / 373.963	- / 220.141	- / 317.815	- / 280.825	- / 3,630.706	8,809 / 18,948.229

*Title represents 1) the Number / Title for Items; 2) the Number / Title [DODIC] for Ammunition; and/or 3) the Number / Title (Modification Type) for Modifications.

Note: Totals in this Exhibit P-40 set may not be exact or sum exactly due to rounding.

Justification:
 FY 2020 funding supports the procurement of 90 new BLOCK V TACTOM and the start of the Recertification phase of the program with the induction of Block IV assets for modification into the Block V configuration with the installation of 112 NAVIGATION/COMMUNICATIONS (NAV/COMMs) Kits, formerly known as Anti-Access Area Denial (A2AD) modernization kits. Funding also supports the increased procurement of TACTOM NAV/COMMs modernization kits, from 112 in FY 2019 to 156 in FY 2020, support equipment and associated support.
 FY 2020 includes the procurement of Maritime Strike Tomahawk (MST) as a rapid deployment capability which includes seeker kit hardware, assemblies/subassemblies, packaging and storage.
 The Next Generation Land Attack Weapon (NGLAW) Analysis of Alternatives (AoA) findings have prompted the Navy to restart the TACTOM Production line in FY 2020. This strategy change necessitates the need to leverage budgeted Production Shutdown funds for the purpose of Production Transition, enabling the transformation of the TACTOM line, tooling, test equipment, and System Integration Labs for concurrent production of TACTOM missiles and TACTOM missile re-certifications. The Navy will conduct further analysis to determine if TACTOM production will continue beyond FY 2021.

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Exhibit P-5, Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Item Number / Title [DODIC]: 1 / Tomahawk

ID Code (A=Service Ready, B=Not Service Ready) :				MDAP/MAIS Code:			
Resource Summary		Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Procurement Quantity (<i>Units in Each</i>)		8,529	100	-	-	90	90
Gross/Weapon System Cost (<i>\$ in Millions</i>)		13,452.125	157.311	20.164	0.000	204.716	204.716
Less PY Advance Procurement (<i>\$ in Millions</i>)		-	-	-	-	-	-
Net Procurement (P-1) (<i>\$ in Millions</i>)		13,452.125	157.311	20.164	0.000	204.716	204.716
Plus CY Advance Procurement (<i>\$ in Millions</i>)		-	-	-	-	-	-
Total Obligation Authority (<i>\$ in Millions</i>)		13,452.125	157.311	20.164	0.000	204.716	204.716
<i>(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)</i>							
Initial Spares (<i>\$ in Millions</i>)		-	-	-	-	-	-
Gross/Weapon System Unit Cost (<i>\$ in Thousands</i>)		1,577.222	1,573.110	-	-	2,274.622	2,274.622

Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.

Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)
Flyaway - TOTAL HARDWARE - MISSILE Cost																		
Recurring Cost																		
1.1.1) TACTICAL TOMAHAWK (VLS) ^(†) (1)	912.611	3,186	2,907.579	1,432.696	100	143.270	-	-	0.000	-	-	0.000	1,901.722	90	171.155	1,901.722	90	171.155
1.1.2) TACTICAL TOMAHAWK (CLS)	883.216	1,078	952.107	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
1.1.3) TACTICAL TOMAHAWK (TTL)	1,088.385	65	70.745	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
1.1.4) REMANUFACTURE (BLOCK III)	-	-	592.217	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
1.1.5) PREVIOUS TOMAHAWK PRODUCTION	1,335.961	4,200	5,611.035	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
<i>Subtotal: Recurring Cost</i>	-	-	10,133.683	-	-	143.270	-	-	0.000	-	-	0.000	-	-	171.155	-	-	171.155
<i>Subtotal: Flyaway - TOTAL HARDWARE - MISSILE Cost</i>	-	-	10,133.683	-	-	143.270	-	-	0.000	-	-	0.000	-	-	171.155	-	-	171.155
Hardware - TOTAL HARDWARE - MISSILE - OTHER COSTS Cost																		
Recurring Cost																		
2.1.1) CCLS CAPSULE RETRO KIT	-	-	26.300	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000

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Exhibit P-5, Cost Analysis: PB 2020 Navy													Date: March 2019					
Appropriation / Budget Activity / Budget Sub Activity:						P-1 Line Item Number / Title:						Item Number / Title [DODIC]:						
1507N / O2 / 1						2101 / Tomahawk						1 / Tomahawk						
ID Code (A=Service Ready, B=Not Service Ready) :									MDAP/MAIS Code:									
Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.																		
Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)
2.1.2) CCLS SUBMARINE CAPSULES	352.786	1,078	380.303	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
2.1.3) MK 14 CANISTERS ^{(1) (2)}	77.809	3,186	247.901	32.955	100	3.295	-	-	0.000	-	-	0.000	137.089	90	12.338	137.089	90	12.338
2.1.4) OBSOLESCENCE ⁽³⁾	-	-	59.743	-	-	0.000	-	-	0.000	-	-	0.000	-	-	2.460	-	-	2.460
2.1.6) PRODUCTION LINE TRANSITION ⁽⁴⁾	-	-	0.000	-	-	0.000	-	-	20.164	-	-	0.000	-	-	0.000	-	-	0.000
<i>Subtotal: Recurring Cost</i>	-	-	714.247	-	-	3.295	-	-	20.164	-	-	0.000	-	-	14.798	-	-	14.798
<i>Subtotal: Hardware - TOTAL HARDWARE - MISSILE - OTHER COSTS Cost</i>	-	-	714.247	-	-	3.295	-	-	20.164	-	-	0.000	-	-	14.798	-	-	14.798
Support - TOTAL PROCUREMENT SUPPORT - MISSILE Cost																		
3.1) PRODUCT IMPROVEMENT	-	-	435.331	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
3.2) PRODUCTION ENGINEERING SUPPORT ⁽⁵⁾	-	-	786.761	-	-	3.867	-	-	0.000	-	-	0.000	-	-	8.415	-	-	8.415
3.3) SPECIAL TOOLING & TEST EQUIPMENT (ST & TE)	-	-	38.090	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
3.4) SYSTEMS ENGINEERING ⁽⁶⁾	-	-	425.241	-	-	3.503	-	-	0.000	-	-	0.000	-	-	6.885	-	-	6.885
<i>Subtotal: Support - TOTAL PROCUREMENT SUPPORT - MISSILE Cost</i>	-	-	1,685.423	-	-	7.370	-	-	0.000	-	-	0.000	-	-	15.300	-	-	15.300
Support - TOTAL FLEET SUPPORT - MISSILE Cost																		
4.1) DOCUMENTATION	-	-	32.257	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
4.2) SUPPORT EQUIPMENT ⁽⁷⁾	-	-	230.000	-	-	3.376	-	-	0.000	-	-	0.000	-	-	3.463	-	-	3.463
4.3) THEATER MISSION PLANNING CENTER	-	-	255.044	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
4.4) TRAINING EQUIPMENT	-	-	87.953	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
5.1) EOQ	-	-	50.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
5.2) EOQ Credit	-	-	-50.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
<i>Subtotal: Support - TOTAL FLEET SUPPORT - MISSILE Cost</i>	-	-	605.254	-	-	3.376	-	-	0.000	-	-	0.000	-	-	3.463	-	-	3.463

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Exhibit P-5, Cost Analysis: PB 2020 Navy												Date: March 2019					
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1						P-1 Line Item Number / Title: 2101 / Tomahawk						Item Number / Title [DODIC]: 1 / Tomahawk					
ID Code (A=Service Ready, B=Not Service Ready) :												MDAP/MAIS Code:					

Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.

Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ K)	Qty (Each)	Total Cost (\$ M)
Support - TOTAL SPARES & REPAIR PARTS Cost																		
6.1) TOMAHAWK INITIAL SPARES	-	-	313.518	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
<i>Subtotal: Support - TOTAL SPARES & REPAIR PARTS Cost</i>	-	-	313.518	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
Gross/Weapon System Cost	1,577.222	8,529	13,452.125	1,573.110	100	157.311	-	-	20.164	-	-	0.000	2,274.622	90	204.716	2,274.622	90	204.716

(t) indicates the presence of a P-5a

Footnotes:

- (1) FY 2018 funding and quantity reflect the Enacted amounts. Unit Cost increase from FY 2018 to FY 2020 due to capability upgrades associated with Block V configuration.
- (2) FY 2018 funding and quantity reflect the Enacted amounts. Unit cost increase from FY 2018 to FY 2020 due to buying canisters directly from the Vendor in FY 2020. FY 2018 canisters were refurbished from expended canisters and purchased parts from qualified supplier.
- (3) Funding reflects required Production obsolescence mitigation including avionics, electrical, and structures bill of material development, and obsolescence ECP forecasting in order to support the extended end of service date.
- (4) Production Line Shutdown cost element has been renamed to Production Line Transition. Name change is due to The Next Generation Land Attack Weapon (NGLAW) Analysis of Alternatives (AoA) findings that have prompted the Navy to restart the TACTOM Production line starting in FY 2020. This strategy change necessitates the need to leverage budgeted Production Shutdown funds for the purpose of Production Transition, enabling the transformation of the TACTOM production line, tooling, test equipment, and System Integration Labs for concurrent production of TACTOM missiles and TACTOM missile re-certifications starting in FY 2020 and continuing in FY 2021. Production Line Transition costs totaling \$20.164M in FY 2019 is required for the transitioning of the Tactical Tomahawk from the production to the recertification line. It will include disposition of tooling at Raytheon Missile Systems, and multiple vendors including primary vendors integral to the recertification of the TACTOM. Capital improvements transitioning the System Integration Lab (SIL) and Production Floor for concurrent Production/Recertification starting in FY 2020.
- (5) Production Engineering Support is required in FY 2020 to support the delivery of missiles across the funded delivery period as well as additional support required for Block V related capabilities. Efforts include warhead energetics, airframe engineering competencies, Production Acceptance Testing integrated logistics support.
- (6) Systems Engineering Support is required in FY 2020 to support the delivery of missiles across the funded delivery period as well as additional support required for Block V related capabilities. Efforts include warhead energetics, airframe engineering competencies, Production Acceptance Testing integrated logistics support.
- (7) Support Equipment in FY 2020 is for the procurement of Mid-Body Range Safety System (MRSS) required to conduct TACTOM BLK IV/V flight testing, and associated test equipment obsolescence and cyber security upgrades necessary for software development, MRSS kit production and TACTOM BLK IV/V missile conversion into a flight test missile. Increases in FY 2020 are due to the requirement to maintain Flight Test tempo that is supportive of capability development, missile inventory surveillance, fleet proficiency, and tactics development.

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Exhibit P-5a, Procurement History and Planning: PB 2020 Navy **Date:** March 2019

Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Item Number / Title [DODIC]: 1 / Tomahawk
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Cost Elements	O C O	FY	Contractor and Location	Method/Type or Funding Vehicle	Location of PCO	Award Date	Date of First Delivery	Qty <i>(Each)</i>	Unit Cost <i>(\$ K)</i>	Specs Avail Now?	Date Revision Available	RFP Issue Date
1.1.1) TACTICAL TOMAHAWK (VLS) ^(†)		2016	Raytheon Missile System / Tucson AZ	SS / FP	NAVAIR	Dec 2016	Dec 2017	149	1,093.617	Y		Jul 2015
1.1.1) TACTICAL TOMAHAWK (VLS) ^(†)		2017	Raytheon Missile System / Tucson AZ	SS / FP	NAVAIR	Sep 2017	Sep 2018	196	1,141.403	Y		Jul 2016
1.1.1) TACTICAL TOMAHAWK (VLS) ^(†)		2018	Raytheon Missile System / Tucson AZ	SS / FP	NAVAIR	Apr 2018	Jun 2019	44	1,432.696	Y		Jul 2017
1.1.1) TACTICAL TOMAHAWK (VLS) ^(†)	✓	2018	Raytheon Missile System / Tucson AZ	SS / FP	NAVAIR	Apr 2018	Jun 2019	56	1,432.696	Y		Jul 2017
1.1.1) TACTICAL TOMAHAWK (VLS) ^(†)	✓	2020	Raytheon Missile System / Tucson AZ	SS / FP	NAVAIR	Jun 2020	Dec 2021	90	1,901.722	Y		Mar 2019
2.1.3) MK 14 CANISTERS ^(†)		2016	BAE / MINNEAPOLIS, MN	C / FP	NAVSEA	Mar 2016	Sep 2017	149	79.127	Y		Jun 2012
2.1.3) MK 14 CANISTERS ^(†)		2017	Naval Munitions Command Weapons Station / Various	WR	N/A	Mar 2017	Sep 2018	196	21.128	Y		Jul 2016
2.1.3) MK 14 CANISTERS ^(†)		2018	Naval Munitions Command Weapons Station / Various	WR	N/A	Aug 2018	Mar 2019	44	32.955	Y		Mar 2018
2.1.3) MK 14 CANISTERS ^(†)	✓	2018	Naval Munitions Command Weapons Station / Various	WR	N/A	Aug 2018	Mar 2019	56	32.955	Y		Mar 2018
2.1.3) MK 14 CANISTERS ^(†)	✓	2020	BAE / MINNEAPOLIS, MN	C / FP	NAVSEA	Sep 2020	Nov 2021	90	137.089	Y		Aug 2018

^(†) indicates the presence of a P-21

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Exhibit P-21, Production Schedule: PB 2020 Navy **Date:** March 2019

Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Item Number / Title [DODIC]: 1 / Tomahawk
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Cost Elements <i>(Units in Each)</i>						Fiscal Year 2016												Fiscal Year 2017												BALANCE	
O C C #	M F R #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2015	BAL DUE AS OF 1 OCT	Calendar Year 2016												Calendar Year 2017												
							O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G		S E P
1.1.1) TACTICAL TOMAHAWK (VLS) ⁽¹⁾																															
Prior Years Deliveries: 2841																															
	1	2016	NAVY	149	0	149																							149		
	1	2017	NAVY	196	0	196																							196		
	1	2018	NAVY	44	0	44																							44		
✓	1	2018	NAVY	56	0	56																							56		
✓	1	2020	NAVY	90	0	90																							90		
2.1.3) MK 14 CANISTERS ⁽²⁾																															
Prior Years Deliveries: 2841																															
	3	2016	NAVY	149	0	149																							149		
	2	2017	NAVY	196 ^(b)	0	196																							196		
	2	2018	NAVY	44	0	44																							44		
✓	2	2018	NAVY	56	0	56																							56		
✓	3	2020	NAVY	90	0	90																							90		

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Exhibit P-21, Production Schedule: PB 2020 Navy **Date:** March 2019

Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Item Number / Title [DODIC]: 1 / Tomahawk
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Cost Elements <i>(Units in Each)</i>						Fiscal Year 2018													Fiscal Year 2019													BALANCE	
O C C #	M F R #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2017	BAL DUE AS OF 1 OCT	Calendar Year 2018													Calendar Year 2019													
							O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P			
1.1.1) TACTICAL TOMAHAWK (VLS) ⁽¹⁾																																	
Prior Years Deliveries: 2841																																	
	1	2016	NAVY	149	0	149	-	-	2	14	14	14	14	13	13	13	13	13	13	13										0			
	1	2017	NAVY	196	0	196	-	-	-	-	-	-	-	-	-	-	16	16	16	17	17	16	16	16	17	17	15	17		0			
	1	2018	NAVY	44	0	44																				2	2	2	3	35			
✓	1	2018	NAVY	56	0	56																					5	5	5	5	36		
✓	1	2020	NAVY	90	0	90																								90			
2.1.3) MK 14 CANISTERS ⁽²⁾																																	
Prior Years Deliveries: 2841																																	
	3	2016	NAVY	149	2	147	14	14	14	14	13	13	13	13	13	13														0			
	2	2017	NAVY	196 ⁽⁸⁾	0	196	-	-	-	-	-	-	-	-	-	-	16	16	16	16	16	17	16	17	16	17	16	17		0			
	2	2018	NAVY	44	0	44																	3	3	3	3	3	3	3	23			
✓	2	2018	NAVY	56	0	56																								22			
✓	3	2020	NAVY	90	0	90																								90			
							O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P			

UNCLASSIFIED

Exhibit P-21, Production Schedule: PB 2020 Navy **Date:** March 2019

Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1 **P-1 Line Item Number / Title:** 2101 / Tomahawk **Item Number / Title [DODIC]:** 1 / Tomahawk

Cost Elements <i>(Units in Each)</i>							Fiscal Year 2020														Fiscal Year 2021														BALANCE
O C C #	M F R #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2019	BAL DUE AS OF 1 OCT	Calendar Year 2020														Calendar Year 2021														
							O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P					
1.1.1) TACTICAL TOMAHAWK (VLS) ⁽¹⁾																																			
Prior Years Deliveries: 2841																																			
	1	2016	NAVY	149	149	0																							0						
	1	2017	NAVY	196	196	0																							0						
	1	2018	NAVY	44	9	35	3	3	2	2	2	2	2	2	-	-	1	1	1	2	2	2	2	2	2	2	2	2	0						
✓	1	2018	NAVY	56	20	36	5	5	5	5	4	4	4	4															0						
✓	1	2020	NAVY	90	0	90									A	-	-	-	-	-	-	-	-	-	-	-	-	-	90						
2.1.3) MK 14 CANISTERS ⁽²⁾																																			
Prior Years Deliveries: 2841																																			
	3	2016	NAVY	149	149	0																							0						
	2	2017	NAVY	196 ^(b)	196	0																							0						
	2	2018	NAVY	44	21	23	3	3	3	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	0							
✓	2	2018	NAVY	56	34	22	4	4	4	5	5																	0							
✓	3	2020	NAVY	90	0	90																							90						
							O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P					

UNCLASSIFIED

Exhibit P-21, Production Schedule: PB 2020 Navy															Date: March 2019									
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1										P-1 Line Item Number / Title: 2101 / Tomahawk										Item Number / Title [DODIC]: 1 / Tomahawk				

Cost Elements <i>(Units in Each)</i>						Fiscal Year 2022												Fiscal Year 2023												BALANCE	
O C C #	M F R #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2021	BAL DUE AS OF 1 OCT	Calendar Year 2022												Calendar Year 2023												
							O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G		S E P
1.1.1) TACTICAL TOMAHAWK (VLS) ⁽¹⁾																															
Prior Years Deliveries: 2841																															
	1	2016	NAVY	149	149	0																							0		
	1	2017	NAVY	196	196	0																							0		
	1	2018	NAVY	44	44	0																							0		
✓	1	2018	NAVY	56	56	0																							0		
✓	1	2020	NAVY	90	0	90	-	-	7	7	7	8	8	7	8	8	7	8	8	7									0		
2.1.3) MK 14 CANISTERS ⁽²⁾																															
Prior Years Deliveries: 2841																															
	3	2016	NAVY	149	149	0																							0		
	2	2017	NAVY	196 ^(b)	196	0																							0		
	2	2018	NAVY	44	44	0																							0		
✓	2	2018	NAVY	56	56	0																							0		
✓	3	2020	NAVY	90	0	90		7	7	7	8	8	7	8	8	7	8	8	7										0		
							O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	

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Exhibit P-21, Production Schedule: PB 2020 Navy **Date:** March 2019

Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Item Number / Title [DODIC]: 1 / Tomahawk
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MFR Ref #	Manufacturer Name - Location	Production Rates (Each / Year)			Procurement Leadtime (Months)								
		MSR For 2020	1-8-5 For 2020	MAX For 2020	Initial				Reorder				
					ALT Prior to Oct 1	ALT After Oct 1	Manufacturing PLT	Total After Oct 1	ALT Prior to Oct 1	ALT After Oct 1	Manufacturing PLT	Total After Oct 1	
1	Raytheon Missile System - Tucson AZ	90	360	456	0	0	0	0	0	0	8	14	22
2	Naval Munitions Command Weapons Station - Various	90	360	456	0	0	0	0	0	0	10	15	25
3	BAE - MINNEAPOLIS, MN	90	360	360	0	0	0	0	0	0	6	10	16

"A" in the Delivery Schedule indicates the Contract Award Date.

Note: Due to space limitations, quantities in the Exhibit P-21 delivery calendar are truncated and rounded based on the maximum quantity in the calendar as follows. If the maximum quantity is less than or equal to than 9,999, all quantities are shown as each. If the maximum quantity is between 10,000 and 999,999 all quantities are shown in thousands. If the maximum quantity is between 1,000,000 and 999,999,999 all quantities are shown in millions (rounded to the nearest thousand). If the maximum quantity is equal or greater than 1,000,000,000 all quantities are shown in billions (rounded to the nearest million).

Footnotes:

⁽⁸⁾ MSR/MAX production rates are based on canister contract constraints. Multiple canister configurations are manufactured at BAE in Aberdeen, South Dakota for multiple customers in the same facility. The family includes MK7, MK8, MK13, MK15, MK21 and MK236. As a result of the broad number of customers, the demand level is sufficient for the industrial base. There is no specific MSR/MAX for the MK14 TACTOM canister. MSR/MAX would be a factor of the entire family of canisters. MSR for TACTOM missiles is 90 when executing concurrently with the Recertification Program.

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Exhibit P-3a, Individual Modification: PB 2020 Navy		Date: March 2019
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Modification Number / Title: 1 / TACTOM NAV/COMMs Modernization and Recertification Kits

ID Code (A=Service Ready, B=Not Service Ready) :	MDAP/MAIS Code:
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Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Procurement Quantity (<i>Units in Each</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Cost (<i>\$ in Millions</i>)	0.000	30.043	78.406	0.000	182.014	182.014	166.130	212.062	305.055	257.751	3,270.533	4,501.994
Less PY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Net Procurement (P-1) (<i>\$ in Millions</i>)	0.000	30.043	78.406	0.000	182.014	182.014	166.130	212.062	305.055	257.751	3,270.533	4,501.994
Plus CY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Total Obligation Authority (<i>\$ in Millions</i>)	0.000	30.043	78.406	0.000	182.014	182.014	166.130	212.062	305.055	257.751	3,270.533	4,501.994

(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)

Initial Spares (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Unit Cost (<i>\$ in Thousands</i>)	-	-	-	-	-	-	-	-	-	-	-	-

Description:

The Tactical Tomahawk (TACTOM) Navigation Communication Modernization kits (NAV/COMMs) formerly known as Anti-Access Area Denial (A2AD) Modernization kits consist of the Integrated Single Box Solution (ISBS) radio, two new antennas and associated cabling, a new mid-body cover, and changes to the aft-body structure and aft-body cover. The ISBS radio is replacing the existing Satellite Data Link Terminal (SDLT); and the new Ultra High Frequency (UHF) antenna is replacing the existing UHF antenna. A second antenna is being added to the missile to accommodate a second frequency band. The changes to the missile are driven by the obsolescence of the SDLT hardware and the obsolescence of the UHF Demand Assigned Multiple Access (DAMA) communications infrastructure that is being phased out of service. Tomahawk Weapon System Baseline IV, Operational Requirements Document (SN 641-76-04), Revision 3, 11 August 2004.

As part of the Recertification (ACAT II) program, all Block IV TACTOMs will be updated to the modernized Block V configuration with the incorporation of NAV/COMMs kits starting in FY 2020. Recertification inventory objective is 3992.

The TACTOM service life for RGM109E and UGM109E Block IV/V Tomahawk cruise missiles is 30 years with a 15 year deployment and recertification cycle. The TACTOM Recertification program includes FY 2019 funding associated with the non-recurring engineering across the prime contractor and sub-tiered vendor base required for the Stand-up/Support Equipment upgrades of the Tactical Tomahawk recertification line. Stand-up/Support Equipment upgrades are inclusive of updating, refurbishing, and replacing existing Tooling and Test Equipment and Systems Integration Labs (SILs) which have been in existence from the early 1980s (Tomahawk Block II/III Depot and Production lines) along with the unique Block IV Tactical Tomahawk Tooling and Test Equipment procured in FY 2003/2004. All of these activities need to be completed to verify and validate the recertification line, in preparation for recertification inductions starting in FY 2020; and serve as an enabler for executing Recertification and Block V Production concurrently in FY 2020. In FY 2019 five TACTOM missiles will go through the end-to-end recertification process, formally 'Proving-In' recertification work instructions, the Raytheon line and sub-vendor recertification activities..

The yearly recertification profile will limit missile backlog within the Fleet due to the expiration of life limiting components. This activity includes the costs associated with the Raytheon labor, vendor recertification of specific components (i.e. mechanical and electrical components), recertification of the MK 45 submarine capsule, missile consumables, fuze recertification and fuel. Recertification is planned to occur concurrently with installation of NAV/COMMs Modernization Kits, which will replace the existing SDLT radio and antenna.

Maritime Strike Tomahawk (MST) is a Rapid Deployment Capability which includes seeker kit hardware, assemblies/subassemblies, packaging and storage. Seeker kit hardware procurement includes the sensors, nosecone, ULTRA processor, cooling pump and plumbing, bulkhead, power and signal harnesses, power supply, plumbing and electrical chase insulators, telemetry unit, wiring, magnet generator, and alternator voltage control converter. Includes modifying existing missile infrastructure to accept/install seeker kit components and assemblies into a modernized Block V missile.

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Exhibit P-3a, Individual Modification: PB 2020 Navy											Date: March 2019			
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1				P-1 Line Item Number / Title: 2101 / Tomahawk							Modification Number / Title: 1 / TACTOM NAV/COMMs Modernization and Recertification Kits			
ID Code (A=Service Ready, B=Not Service Ready) :							MDAP/MAIS Code:							
Models of Systems Affected: TACTOM				Modification Type: Increase Capability and Maintain Reliability				Related RDT&E PEs: 0204229N						
Financial Plan	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total		
	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)		
Procurement														
Modification Item 1 of 3: Recertification														
A Kits														
Recurring														
1.1.1) Recertification kits - NonOrganic ⁽⁹⁾	- / -	- / -	5 / 6.290	- / 0.000	112 / 30.951	112 / 30.951	156 / 36.160	156 / 32.580	348 / 51.120	274 / 39.420	2,941 / 963.957	3,992 / 1,160.478		
<i>Subtotal: Recurring</i>	- / 0.000	- / -	- / 6.290	- / 0.000	- / 30.951	- / 30.951	- / 36.160	- / 32.580	- / 51.120	- / 39.420	- / 963.957	- / 1,160.478		
<i>Subtotal: Recertification</i>	- / -	- / -	5 / 6.290	- / 0.000	112 / 30.951	112 / 30.951	156 / 36.160	156 / 32.580	348 / 51.120	274 / 39.420	2,941 / 963.957	3,992 / 1,160.478		
Modification Item 2 of 3: NAV/COMMs														
A Kits														
Recurring														
2.1.1) NAV/COMMs - NonOrganic ⁽¹⁰⁾	- / -	5 / 2.270	112 / 29.679	- / 0.000	156 / 38.407	156 / 38.407	156 / 38.185	348 / 72.740	274 / 58.200	255 / 56.100	2,686 / 593.134	3,992 / 888.715		
<i>Subtotal: Recurring</i>	- / 0.000	- / 2.270	- / 29.679	- / 0.000	- / 38.407	- / 38.407	- / 38.185	- / 72.740	- / 58.200	- / 56.100	- / 593.134	- / 888.715		
<i>Subtotal: NAV/COMMs</i>	- / -	5 / 2.270	112 / 29.679	- / 0.000	156 / 38.407	156 / 38.407	156 / 38.185	348 / 72.740	274 / 58.200	255 / 56.100	2,686 / 593.134	3,992 / 888.715		
Modification Item 3 of 3: MST														
A Kits														
Recurring														
3.1.1) MST Recurring - NonOrganic ⁽¹¹⁾	- / -	- / -	- / -	- / 0.000	20 / 16.963	20 / 16.963	44 / 35.539	65 / 49.653	142 / 108.532	104 / 66.869	947 / 706.699	1,322 / 984.255		
<i>Subtotal: Recurring</i>	- / 0.000	- / -	- / -	- / 0.000	- / 16.963	- / 16.963	- / 35.539	- / 49.653	- / 108.532	- / 66.869	- / 706.699	- / 984.255		
<i>Subtotal: MST</i>	- / -	- / -	- / -	- / 0.000	20 / 16.963	20 / 16.963	44 / 35.539	65 / 49.653	142 / 108.532	104 / 66.869	947 / 706.699	1,322 / 984.255		
<i>Subtotal: Procurement, All Modification Items</i>	- / 0.000	- / 2.270	- / 35.969	- / 0.000	- / 86.321	- / 86.321	- / 109.884	- / 154.973	- / 217.852	- / 162.389	- / 2,263.790	- / 3,033.448		
Support (All Modification Items)														
4.1) Other Production Support- NAV/COMMs Modifications ⁽¹²⁾	- / 0.000	- / 4.725	- / 1.461	- / 0.000	- / 0.182	- / 0.182	- / 0.183	- / 0.187	- / 0.184	- / 0.187	- / 2.138	- / 19.247		
4.2) Support Equipment- NAV/COMMs Modification ⁽¹³⁾	- / 0.000	- / 0.000	- / 1.934	- / 0.000	- / 0.038	- / 0.038	- / 0.035	- / 0.035	- / 0.035	- / 0.310	- / 0.369	- / 2.756		
4.3) Integrated Logistics Support- NAV/COMMs Modification ⁽¹⁴⁾	- / 0.000	- / 2.252	- / 1.706	- / 0.000	- / 0.027	- / 0.027	- / 0.024	- / 0.024	- / 0.024	- / 0.063	- / 0.211	- / 4.331		
4.4) Other Production Support- Recertification ⁽¹⁵⁾	- / 0.000	- / 0.000	- / 4.899	- / 0.000	- / 1.225	- / 1.225	- / 1.227	- / 1.157	- / 1.076	- / 1.228	- / 32.067	- / 42.879		
4.5) Support Equipment- Recertification ⁽¹⁶⁾	- / 0.000	- / 0.000	- / 13.644	- / 0.000	- / 56.290	- / 56.290	- / 0.269	- / 0.275	- / 0.280	- / 0.285	- / 6.928	- / 77.971		
4.6) Integrated Logistics Support- Recertification ⁽¹⁷⁾	- / 0.000	- / 0.000	- / 0.895	- / 0.000	- / 0.176	- / 0.176	- / 0.197	- / 0.183	- / 0.187	- / 0.193	- / 4.618	- / 16.449		

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Exhibit P-3a, Individual Modification: PB 2020 Navy		Date: March 2019
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Modification Number / Title: 1 / TACTOM NAV/COMMs Modernization and Recertification Kits

ID Code (A=Service Ready, B=Not Service Ready) :	MDAP/MAIS Code:
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Models of Systems Affected: TACTOM	Modification Type: Increase Capability and Maintain Reliability	Related RDT&E PEs: 0204229N
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Financial Plan	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)
4.7) MK-45 Support- Recertification ⁽¹⁸⁾	- / 0.000	- / 2.046	- / 9.300	- / 0.000	- / 2.171	- / 2.171	- / 3.815	- / 2.903	- / 2.157	- / 2.196	- / 94.570	- / 119.158
4.8) Recertification Line Stand-Up ⁽¹⁹⁾	- / 0.000	- / 18.750	- / 3.039	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / -	- / 21.789
4.9) Other Production Support- MST	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / 0.173	- / 0.173	- / 0.439	- / 0.862	- / 3.449	- / 0.425	- / 2.257	- / 7.605
4.10) Support Equipment- MST ⁽²⁰⁾	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / 0.158	- / 0.158	- / 0.135	- / 0.497	- / 2.469	- / 0.121	- / 0.641	- / 4.021
4.11) Integrated Logistics Support-MST	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / 0.105	- / 0.105	- / 0.090	- / 0.330	- / 2.309	- / 0.083	- / 0.440	- / 3.357
<i>Subtotal: Support</i>	- / 0.000	- / 27.773	- / 36.878	- / 0.000	- / 60.545	- / 60.545	- / 6.414	- / 6.453	- / 12.170	- / 5.091	- / 144.239	- / 299.563
Installation												
<i>Modification Item 1 of 3:</i> Recertification	- / 0.000	- / 0.000	- / 4.485	- / 0.000	- / 31.046	- / 31.046	- / 40.683	- / 37.615	- / 52.523	- / 53.804	- / 574.034	- / 794.190
<i>Modification Item 2 of 3:</i> NAV/COMMs	- / 0.000	- / 0.000	- / 1.074	- / 0.000	- / 4.102	- / 4.102	- / 5.452	- / 5.082	- / 11.110	- / 9.520	- / 94.087	- / 130.427
<i>Modification Item 3 of 3:</i> MST	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / 0.000	- / 3.697	- / 7.939	- / 11.400	- / 26.947	- / 194.383	- / 244.366
<i>Subtotal: Installation</i>	- / 0.000	- / -	- / 5.559	- / 0.000	- / 35.148	- / 35.148	- / 49.832	- / 50.636	- / 75.033	- / 90.271	- / 862.504	- / 1,168.983
Total												
Total Cost (Procurement + Support + Installation)	0.000	30.043	78.406	0.000	182.014	182.014	166.130	212.062	305.055	257.751	3,270.533	4,501.994

UNCLASSIFIED

Exhibit P-3a, Individual Modification: PB 2020 Navy		Date: March 2019
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Modification Number / Title: 1 / TACTOM NAV/COMMs Modernization and Recertification Kits

ID Code (A=Service Ready, B=Not Service Ready) :	MDAP/MAIS Code:
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Modification Item 1 of 3: Recertification

Manufacturer Information

Manufacturer Name: RAYTHEON Company	Manufacturer Location: TUCSON, AZ
Administrative Leadtime (in Months): 1	Production Leadtime (in Months): 2

Dates	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Contract Dates		Apr 2019	Oct 2019	Oct 2020	Oct 2021	Oct 2022	Oct 2023
Delivery Dates		May 2019	Dec 2019	Dec 2020	Dec 2021	Dec 2022	Dec 2023

Installation Information

Method of Implementation: Contractor:: Installation Name: Recertification kits

Installation Cost	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)
Prior Years	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
FY 2018	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
FY 2019	- / -	- / -	5 / 4.485	- / -	- / -	- / -	- / -	- / -	- / -	- / -	0 / 0.000	5 / 4.485
FY 2020	- / -	- / -	- / -	0 / 0.000	112 / 31.046	112 / 31.046	- / -	- / -	- / -	- / -	0 / 0.000	112 / 31.046
FY 2021	- / -	- / -	- / -	- / -	- / -	- / -	156 / 40.683	- / -	- / -	- / -	0 / 0.000	156 / 40.683
FY 2022	- / -	- / -	- / -	- / -	- / -	- / -	- / -	156 / 37.615	- / -	- / -	0 / 0.000	156 / 37.615
FY 2023	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	348 / 52.523	- / -	0 / 0.000	348 / 52.523
FY 2024	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	274 / 53.804	0 / 0.000	274 / 53.804
To Complete	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	2,941 / 574.034	2,941 / 574.034
Total	- / -	- / -	5 / 4.485	0 / 0.000	112 / 31.046	112 / 31.046	156 / 40.683	156 / 37.615	348 / 52.523	274 / 53.804	2,941 / 574.034	3,992 / 794.190

Installation Schedule

	PYS	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				TC	Tot
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
In	-	-	-	-	-	-	-	5	-	28	28	28	28	39	39	39	39	39	39	39	39	87	87	87	87	69	69	68	68	2,941	3,992
Out	-	-	-	-	-	-	-	-	5	-	28	28	28	28	39	39	39	39	39	39	39	39	87	87	87	87	69	69	68	3,009	3,992

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Exhibit P-3a, Individual Modification: PB 2020 Navy		Date: March 2019
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Modification Number / Title: 1 / TACTOM NAV/COMMs Modernization and Recertification Kits

ID Code (A=Service Ready, B=Not Service Ready) :	MDAP/MAIS Code:
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Modification Item 2 of 3: NAV/COMMs

Manufacturer Information

Manufacturer Name: RAYTHEON Company	Manufacturer Location: TUCSON, AZ
Administrative Leadtime (in Months): 2	Production Leadtime (in Months): 12

Dates	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Contract Dates		Mar 2019	Nov 2019	Nov 2020	Nov 2021	Nov 2022	Nov 2023
Delivery Dates		Mar 2020	Nov 2020	Nov 2021	Nov 2022	Nov 2023	Nov 2024

Installation Information

Method of Implementation: Contractor:: Installation Name: NAV/COMMs

Installation Cost	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)
Prior Years	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
FY 2018	- / -	- / -	5 / 1.074	- / -	- / -	- / -	- / -	- / -	- / -	- / -	0 / 0.000	5 / 1.074
FY 2019	- / -	- / -	- / -	0 / 0.000	112 / 4.102	112 / 4.102	- / -	- / -	- / -	- / -	0 / 0.000	112 / 4.102
FY 2020	- / -	- / -	- / -	- / -	- / -	- / -	156 / 5.452	- / -	- / -	- / -	0 / 0.000	156 / 5.452
FY 2021	- / -	- / -	- / -	- / -	- / -	- / -	- / -	156 / 5.082	- / -	- / -	0 / 0.000	156 / 5.082
FY 2022	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	348 / 11.110	- / -	0 / 0.000	348 / 11.110
FY 2023	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	274 / 9.520	0 / 0.000	274 / 9.520
FY 2024	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	255 / 0.000	255 / -
To Complete	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	2,686 / 94.087	2,686 / 94.087
Total	- / -	- / -	5 / 1.074	0 / 0.000	112 / 4.102	112 / 4.102	156 / 5.452	156 / 5.082	348 / 11.110	274 / 9.520	2,941 / 94.087	3,992 / 130.427

Installation Schedule

	PYS	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				TC	Tot
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
In	-	-	-	-	-	1	1	2	1	28	28	28	28	39	39	39	39	39	39	39	39	88	88	86	86	69	69	68	68	2,941	3,992
Out	-	-	-	-	-	1	1	2	1	28	28	28	28	39	39	39	39	39	39	39	39	88	88	86	86	69	69	68	68	2,941	3,992

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Exhibit P-3a, Individual Modification: PB 2020 Navy		Date: March 2019
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Modification Number / Title: 1 / TACTOM NAV/COMMs Modernization and Recertification Kits

ID Code (A=Service Ready, B=Not Service Ready) :	MDAP/MAIS Code:
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Modification Item 3 of 3: MST

Manufacturer Information

Manufacturer Name: RAYTHEON Company	Manufacturer Location: TUCSON, AZ
Administrative Leadtime (in Months): 2	Production Leadtime (in Months): 13

Dates	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Contract Dates			Nov 2019	Nov 2020	Nov 2021	Nov 2022	Nov 2023
Delivery Dates			Dec 2020	Dec 2021	Dec 2022	Dec 2023	Dec 2024

Installation Information

Method of Implementation: Contractor:: Installation Name: MST Recurring

Installation Cost	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)	Qty (Each) / Total Cost (\$ M)
Prior Years	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
FY 2018	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
FY 2019	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
FY 2020	- / -	- / -	- / -	- / -	- / -	- / -	20 / 3.697	- / -	- / -	- / -	0 / 0.000	20 / 3.697
FY 2021	- / -	- / -	- / -	- / -	- / -	- / -	- / -	44 / 7.939	- / -	- / -	0 / 0.000	44 / 7.939
FY 2022	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	65 / 11.400	- / -	0 / 0.000	65 / 11.400
FY 2023	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	142 / 26.947	0 / 0.000	142 / 26.947
FY 2024	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	104 / 0.000	104 / -
To Complete	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	947 / 194.383	947 / 194.383
Total	- / -	- / -	- / -	- / -	- / -	- / -	20 / 3.697	44 / 7.939	65 / 11.400	142 / 26.947	1,051 / 194.383	1,322 / 244.366

Installation Schedule

	PYS	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				TC	Tot
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
In	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	5	5	11	11	11	11	17	16	16	16	36	36	35	35	1,051	1,322
Out	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	5	5	11	11	11	11	17	16	16	16	36	36	35	35	1,051	1,322

Footnotes:
⁽⁹⁾ Learning curve, quantity variations affecting economy of scale, and escalation rates account for the variation in Recertification kit costs across the FYDP. FY 2019 will be the initial Recertification lot procurement.
⁽¹⁰⁾ FY 2018 funding and quantity reflect Enacted amounts. Only five NAV/COMMs kits were procured in FY 2018, in support of Recertification 'prove-in', which slipped to FY 2019.

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Exhibit P-3a, Individual Modification: PB 2020 Navy		Date: March 2019
Appropriation / Budget Activity / Budget Sub Activity: 1507N / 02 / 1	P-1 Line Item Number / Title: 2101 / Tomahawk	Modification Number / Title: 1 / TACTOM NAV/COMMs Modernization and Recertification Kits
ID Code (A=Service Ready, B=Not Service Ready) :		MDAP/MAIS Code:
<p>(11) Learning curve, quantity variations affecting economy of scale, and escalation rates account for the variation in MST kit costs across the FYDP. FY 2020 will be the initial year for MST kit procurements.</p> <p>(12) FY 2020 funding required for post production qualification radio and crypto support. Funding reflects required obsolescence mitigation including avionic, electrical, and structures bill of material development, and obsolescence Engineering Change Proposal forecasting in order to support the extended end of service date.</p> <p>(13) Includes unique support and test equipment required to support the integration of the NAV/COMMs, Modernization Kits during recertification. This would include planning, resourcing and implementing management actions to acquire and support the equipment required to sustain and validate the NAV/COMMs capability/functionality ensuring that the TACTOM is available to the warfighter when it is needed.</p> <p>(14) Includes costs for support equipment management, computer resources support, training and training support, ILS program management, and packaging, handling, storage and transportation as associated with the NAV/COMMs Modernization Kit.</p> <p>(15) Unique government and contractor production support and recurring fixed costs that is required per lot of recertification kit. Funding reflects required obsolescence mitigation including avionic, electrical, and structures bill of material development, and obsolescence Engineering Change Proposal forecasting in order to support the extended end of service date.</p> <p>(16) Increase in FY 2020 is associated with the increased demand on unique support and test equipment associated with the concurrent production of Block V TACTOM starting in FY 2020. Funding in FY 2019 and FY 2020 includes modifications/procurement of unique support and test equipment required to enable/support the integration and test of the recertification kit. This encompasses System Integration Lab (SIL), Hardware Integration Lab (HWIL), Air Vehicle System Integration Lab (AVSIL), Guidance Test Sets (GTSs) and Mid-body Range Safety Subsystem (MRSS) Kits. Funding also includes the planning, resourcing, and implementing management actions to acquire and support the equipment required to sustain and validate the capability/functionality ensuring that the TACTOM is available to the warfighter when needed.</p> <p>(17) Costs include support equipment management, computer resources support, training and training support, ILS program management, and packaging, handling, storage and transportation as associated with the recertification kit.</p> <p>(18) FY 2020-FY 2024 funding is required to recertify and extend the service life of the Composite Capsule Launching System (CCLS) barrels through procurement of rotatable pool Capsule Launching System (CLS) capsules, design and qualification of CLS missile CCA seals to support the life cycle of recertification efforts, and procurement of the hydro dynamic test fixture required for Capsule Closure Assembly (CCA) seal certification.</p> <p>(19) Recertification Line Stand-up funding is required for the prove in of the end-to-end recertification processes. The process takes five Block IV missiles through the entire recertification process. This is essential to qualifying test and tooling equipment, refining recertification processes and exercising quality/inspection procedures. All of which ensures that the end-to-end recertification line is ready for induction of missiles in FY 2020. Funding in FY 2019 includes modifications/procurement of unique support and test equipment required to enable/support the integration and test of the recertification kit. This encompasses System Integration Lab (SIL), Hardware Integration Lab (HWIL), Air Vehicle System Integration Lab (AVSIL), Guidance Test Sets (GTSs) and Mid-body Range Safety Subsystem (MRSS) Kits. Funding also includes the planning, resourcing, and implementing management actions to acquire and support the equipment required to sustain and validate the capability/functionality ensuring that the TACTOM is available to the warfighter when needed.</p> <p>(20) Support Equipment increases from FY 2022 to FY 2023 due to the increase in quantities.</p>		