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Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy **Date:** March 2024

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>
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COST (\$ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	318.272	68.075	104.731	79.411	-	79.411	65.580	53.835	54.664	55.781	Continuing	Continuing
0267: <i>Mine Improvements</i>	263.410	29.250	45.234	15.312	-	15.312	12.749	9.483	9.516	9.711	Continuing	Continuing
2993: <i>Encapsulated Effector</i>	54.862	38.825	59.497	64.099	-	64.099	52.831	44.352	45.148	46.070	Continuing	Continuing

A. Mission Description and Budget Item Justification

Project 0267 funds the Quickstrike MOD 3, Quickstrike-Extended Range (ER), and Clandestine Delivered Mine (CDM) MK68 programs. Project 2993 adjustments are associated with sensor upgrades to allow the Hammerhead system to prosecute additional targets.

The Mines Improvement PE provides resources to develop naval mine systems used to establish and maintain control of essential sea areas. Naval mines are used to deny sea areas or inflict damage on adversary shipping to hinder, disrupt, and deny adversary operations. Naval mining is employed to reduce the adversary's threat to friendly forces and preserve access. Mining complements and performs an essential part of other warfare areas; particularly strike, anti-submarine, and anti-surface warfare. Resources are utilized for developing and deploying improvements to the portfolio of naval mines.

B. Program Change Summary (\$ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	60.793	104.731	119.530	-	119.530
Current President's Budget	68.075	104.731	79.411	-	79.411
Total Adjustments	7.282	0.000	-40.119	-	-40.119
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	8.500	0.000			
• SBIR/STTR Transfer	-1.218	0.000			
• Rate/Misc Adjustments	0.000	0.000	-40.119	-	-40.119

Change Summary Explanation

FY 2023: reflects an increase of \$8.5M due to reprogrammings and a decrease of \$1.218M due to SBIR assessments.

FY 2024: no adjustments.

FY 2025: reflects a \$55.41M decrease due to the removal of the LRADMM Program and miscellaneous adjustments and a \$15.3M increase to support CDM explosive fill and carriage development efforts.

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Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy										Date: March 2024		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>				Project (Number/Name) 0267 / <i>Mine Improvements</i>			
COST (\$ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
0267: <i>Mine Improvements</i>	263.410	29.250	45.234	15.312	-	15.312	12.749	9.483	9.516	9.711	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

FY 2025 decrease reflects the completion of QS-ER testing.

Naval mines are used to deter or control adversary movements, including surface ships and submarines. Funding supports the capability to maintain effectiveness of mines facing new threat targets with increasing emphasis on major regional conflicts and great power competition. The three major project areas are:

- 1) Quickstrike (QS) Mod 3: QS MOD 3 improves effectiveness of existing mines against modern threats by using a programmable Target Detection Device (TDD) MK-71. QS MOD 3 utilizes modeling and analysis to improve target detection and response by developing optimized mine settings and firing algorithms. Minefield planning improvements include new targeting algorithms , mine settings, and corresponding damage data for weapon /target pairs into existing minefield planning software.
- 2) QS-ER: QS-ER adds GPS-guidance and glide flight gear to the (QS) series to reduce risk to delivery aircraft by introducing precision placement and mid-range standoff. Aerial delivery development efforts address capabilities required by a Joint Emergent Operational Needs Statement (JEONS).
- 3) Clandestine Delivered Mine: Clandestine Delivered Mine MK68 (CDM MOD 0) provides a required capability by converting legacy mining systems for delivery by Extra Large Unmanned Undersea Vehicles (XLUUV) and/or surface platform in support of a JEONS. This capability allows access to contested environments and reduces risk by using unmanned platforms. Upgrades to CDM incorporate the programmable TDD MK-71, adds iterative command and control enhancements (MODs 1 and 2) through future upgrades for increased operational flexibility and safety for emplaced minefields. Additional efforts include transitioning an explosive section design into the CDM program that is in development under the Compact Encapsulated Effector (C- ENCAP) effort that is managed by the Office of Naval Research (ONR).

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

	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: Product Development	20.671	32.503	8.010	0.000	8.010
Articles:	-	-	-	-	-
FY 2024 Plans:					
QS Mod 3:					
- Planning software updates based on Fleet priority targets and available target signature data.					
- Deliver Air Cushioned Vehicle (ACV) detection algorithm					
Quickstrike-ER:					
- Complete Functional Wing Kit Test Articles					
- Award LRIP Option 1 and commence bomb and wing kit production					
- Complete Load Adapter Production					

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Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy **Date:** March 2024

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>	Project (Number/Name) 0267 / <i>Mine Improvements</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
<p>CDM: - Begin integration of explosive section for FNC effort to CDM (C-ENCAP) - Begin CDM MOD 1 Kit Assembly - WSESRB MOD 1 T&E Approval</p> <p>FY 2025 Base Plans: QS MOD 3 - Planning software updates based on Fleet priority targets and available target signature data. - Begin Electronic Safe and Arming Device (ESAD) development. - Award MK75 production contract.</p> <p>CDM: - Complete integration of explosive section for FNC effort to CDM (C-ENCAP) - Begin MOD 2 development - Weapons System Explosive Safety Review Board (WSESRB) for CDM MOD 1 fielding</p> <p>FY 2025 OCO Plans: N/A</p> <p>FY 2024 to FY 2025 Increase/Decrease Statement: Decrease due to completion of Quickstrike-ER and CDM MOD 1 development efforts.</p>					
<p>Title: Management</p> <p align="right">Articles:</p> <p>FY 2024 Plans: - Continue to provide programmatic and financial support for CDM, and QS programs.</p> <p>FY 2025 Base Plans: - Continue to provide programmatic and financial support for CDM and QS programs.</p> <p>FY 2025 OCO Plans: N/A</p> <p>FY 2024 to FY 2025 Increase/Decrease Statement: Decreased due to a reduced programmatic support requirements with removal of LRADMM Program.</p>	0.872	7.421	0.775	0.000	0.775
	-	-	-	-	-
<p>Title: Test and Evaluation</p>	7.707	5.310	6.527	0.000	6.527

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
	<p align="right"><i>Articles:</i></p> <p>FY 2024 Plans: Quickstrike-ER: - Complete QS-ER B-52 Flight certification test events - Conduct Quick Reaction Assessment (QRA)/Developmental Test (DT)</p> <p>CDM: - Begin CDM MOD 1 test and evaluation.</p> <p>FY 2025 Base Plans: Quickstrike Mod 3: - Conduct B-52 and B-1 Flight Certification.</p> <p>CDM: - Begin Test and Evaluation of FNC Explosive Design (C-ENCAP) - Begin MOD 2 Test and Evaluation - Complete CDM MOD 1 test and evaluation</p> <p>FY 2025 OCO Plans: N/A</p> <p>FY 2024 to FY 2025 Increase/Decrease Statement: Increase due to continued test and evaluation efforts for C-ENCAP and C2 security enhancements to support MOD1 completion.</p>	-	-	-	-
Accomplishments/Planned Programs Subtotals	29.250	45.234	15.312	0.000	15.312

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025 Base</u>	<u>FY 2025 OCO</u>	<u>FY 2025 Total</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>FY 2029</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• WPN 3231: <i>Maritime Mines</i>	9.281	58.800	100.065	-	100.065	117.250	103.282	105.972	108.126	0.000	698.245

Remarks

D. Acquisition Strategy
In order to meet accelerated timelines, the QS-ER wing kit is being developed under a sole source contract with Boeing. QS-ER leak resistant bomb bodies are being developed and procured through an active NAVAIR contract vehicle. QS MOD 3 and CDM mine kits, including target detecting devices, adapters, and other hardware

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Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
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components are procured via various small contract vehicles or developed internally by the Government. All QS and CDM software is developed and maintained by Government activities.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy												Date: March 2024			
Appropriation/Budget Activity 1319 / 5						R-1 Program Element (Number/Name) PE 0604601N / Mine Development				Project (Number/Name) 0267 / Mine Improvements					
Product Development (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
QS Mod 3: Ancillary Hardware Development	Various	Various : Various	10.141	2.139	Oct 2022	1.452	Oct 2023	0.000	Oct 2024	-		0.000	Continuing	Continuing	Continuing
QS Mod 3: Saftey Development	WR	NUWC NPT : Newport, RI	0.000	0.000		0.649	Oct 2023	0.670	Oct 2024	-		0.670	Continuing	Continuing	Continuing
QS Mod 3: Software Development	WR	NSWC PC : Panama City, FL	32.090	1.200	Oct 2022	3.480	Oct 2023	1.758	Oct 2024	-		1.758	Continuing	Continuing	Continuing
QS-ER: Hardware Development	WR	NSWC IH : Indian Head, MD	6.451	0.000		0.000		0.000		-		0.000	0.000	6.451	-
QS-ER: Hardware Development	WR	NSWC PC : Panama City, FL	8.825	0.000		0.000		0.000		-		0.000	0.000	8.825	-
QS-ER: Hardware Development	C/CPFF	Boeing : St. Charles, MO	9.780	6.149	Oct 2022	18.454	Oct 2023	0.000		-		0.000	Continuing	Continuing	Continuing
QS-ER: Hardware Development	WR	Eglin AFB : Okaloosa, FL	1.450	0.440	Oct 2022	0.000		0.000		-		0.000	0.000	1.890	-
QS-ER: Hardware Development	WR	NUWC NPT : Newport, RI	0.440	0.164	Oct 2022	0.000		0.000		-		0.000	0.000	0.604	-
QS-ER: Hardware Development	C/CPAF	NAVAIR : Pax River, MD	3.210	0.981	Oct 2022	0.000		0.000		-		0.000	0.000	4.191	-
QS-ER: Hardware Development	WR	China Lake : China Lake, CA	0.000	0.000		0.398	May 2024	0.000		-		0.000	0.000	0.398	-
CDM Primary Hardware Development	WR	NSWCPC : Panama City, FL	135.915	4.670	Oct 2022	3.870	Oct 2023	2.750	Oct 2024	-		2.750	Continuing	Continuing	Continuing
CDM: Primary Hardware Development	WR	NSWCIH : Indian Head, MD	16.798	4.328	Oct 2022	3.512	Oct 2023	2.381	Oct 2024	-		2.381	Continuing	Continuing	Continuing
CDM: Primary Hardware Development	C/CPFF	JHU/APL : Baltimore, MD	10.469	0.500	Nov 2022	0.388	Nov 2023	0.000		-		0.000	Continuing	Continuing	Continuing
CDM: System Safety	WR	NUWC NPT : Newport, RI	0.959	0.100	Oct 2022	0.300	Oct 2023	0.451	Oct 2024	-		0.451	0.000	1.810	-
Subtotal			236.528	20.671		32.503		8.010		-		8.010	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy												Date: March 2024			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 5				PE 0604601N / Mine Development				0267 / Mine Improvements							
Support (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
QS-ER: Engineering Support	C/CPFF	JHU/APL : Baltimore, MD	0.860	0.000		0.000		0.000		-		0.000	0.000	0.860	-
Subtotal			0.860	0.000		0.000		0.000		-		0.000	0.000	0.860	N/A
Test and Evaluation (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	NSWC IH-CDM : Indian Head, MD	5.778	1.900	Oct 2022	1.200	Oct 2023	3.533	Oct 2024	-		3.533	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	NSWC PC-QSM3 : Panama City, FL	12.161	1.700	Oct 2022	0.000	Oct 2023	2.994	Oct 2024	-		2.994	0.000	16.855	-
Developmental Test & Evaluation (DT&E)	WR	Eglin, AFB-QSER : Eglin AFB, FL	1.772	2.667	Oct 2022	1.309	Oct 2023	0.000		-		0.000	0.000	5.748	-
Developmental Test & Evaluation (DT&E)	WR	Tinker AFB-QSER : Oklahoma City, OK	2.428	1.440	Oct 2022	0.700	Oct 2023	0.000		-		0.000	0.000	4.568	-
Developmental Test & Evaluation (DT&E)	WR	Pacific Missile : Range Facility, HI	0.000	0.000		2.101	May 2024	0.000		-		0.000	0.000	2.101	-
Subtotal			22.139	7.707		5.310		6.527		-		6.527	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
QS-ER: Program Management Support	C/CPAF	Various : Various	0.538	0.231	Oct 2022	6.670	Oct 2023	0.150	Oct 2024	-		0.150	0.000	7.589	-
CDM: Program Management Support	C/CPAF	Various : Various	3.345	0.641	Oct 2022	0.751	Oct 2023	0.625	Oct 2024	-		0.625	0.000	5.362	-
Subtotal			3.883	0.872		7.421		0.775		-		0.775	0.000	12.951	N/A

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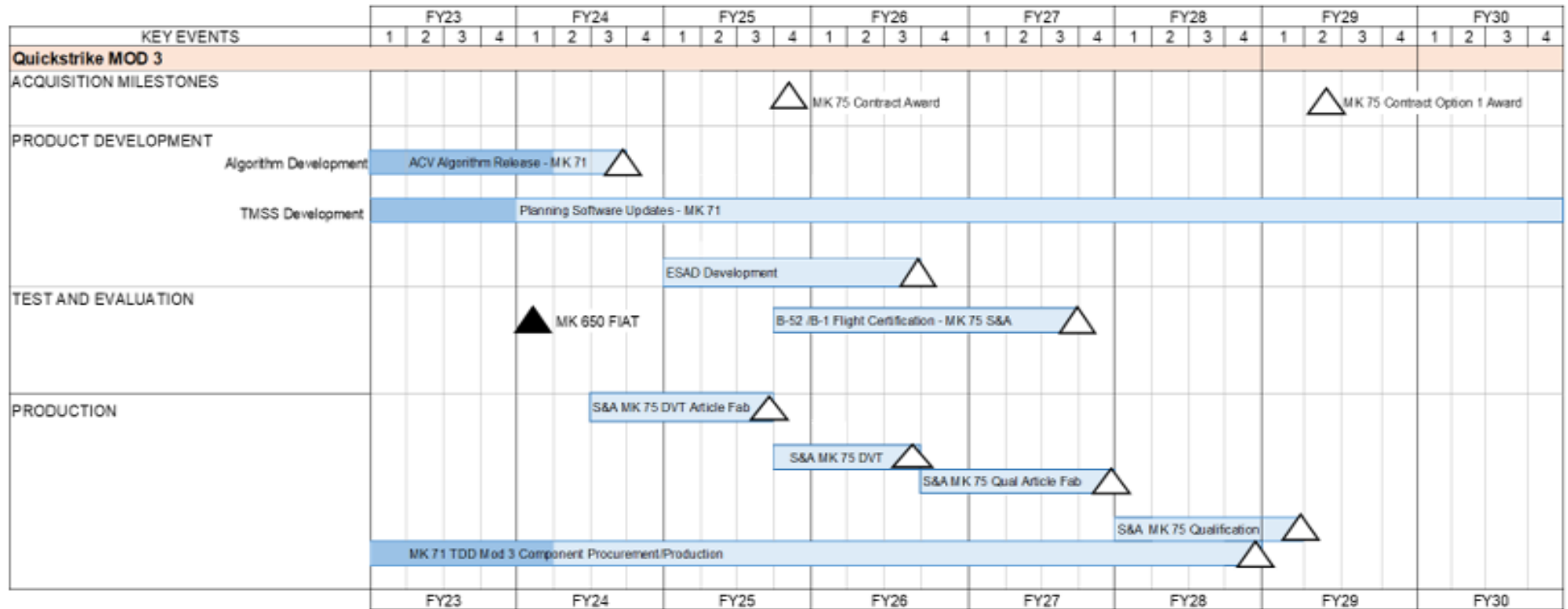
Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy

Date: March 2024

Appropriation/Budget Activity
1319 / 5

R-1 Program Element (Number/Name)
PE 0604601N / Mine Development

Project (Number/Name)
0267 / Mine Improvements



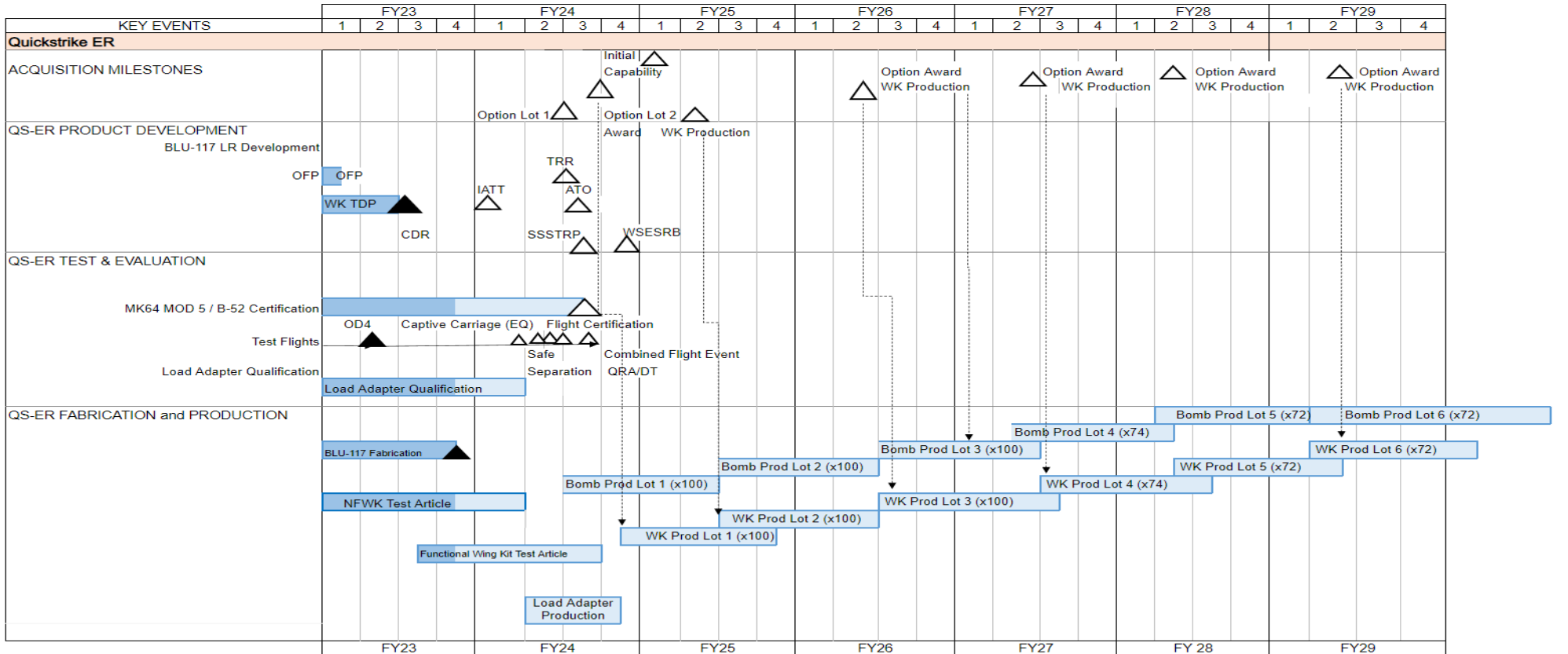
ACRONYMS

ACV	Air Cushion Vehicle	FIAT	Fleet Introduction Assistance Training
DVT	Design Verification Testing	IOC	Initial Operational Capability
ALG	Algorithm	Qual	Explosive Qualification
EOD	Explosive Ordnance Disposal	S&A	Safe and Arming
RST	Render Safe Test	TMSS	Total Mine Simulation Software
ESAD	Electrical Safe & Arming Device	TDD	Target Detection Device

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Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy **Date: March 2024**

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / Mine Development	Project (Number/Name) 0267 / Mine Improvements
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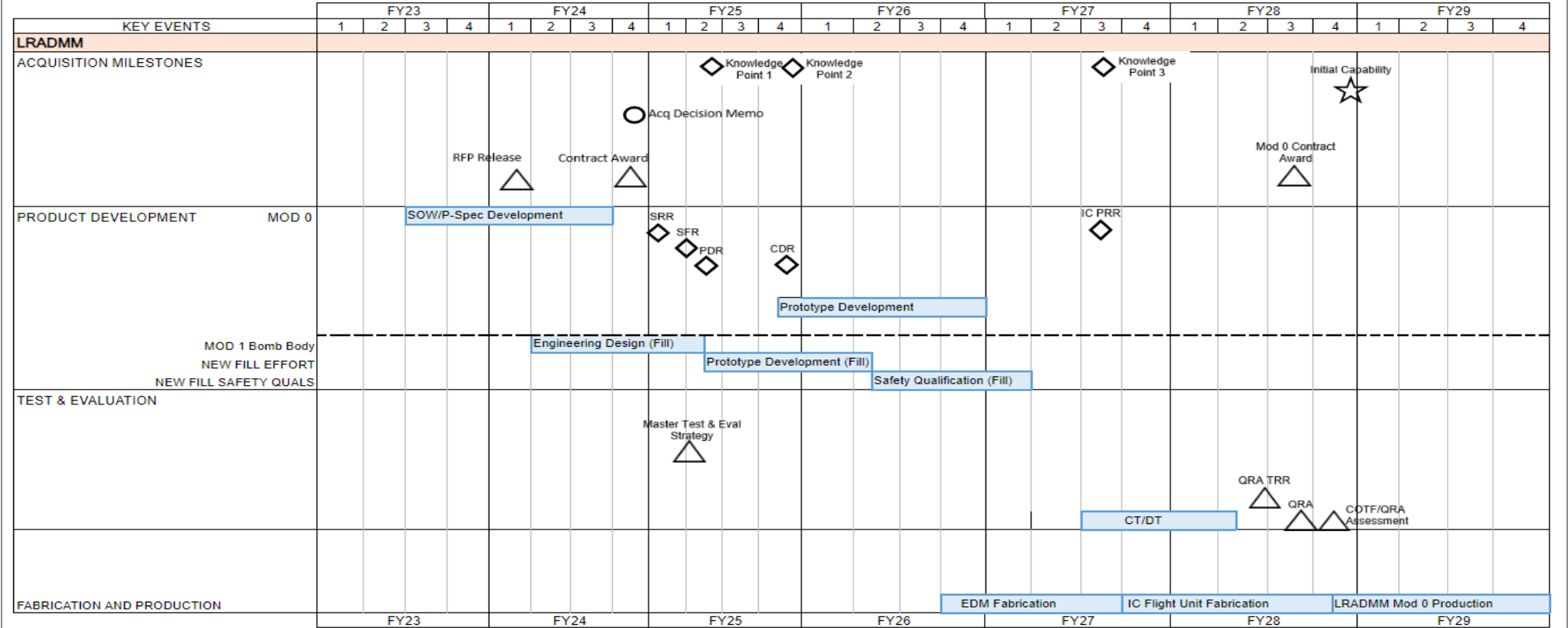


ACRONYMS					
WK	BSU-106 Wing Kit	OD	Ope	IATT	Interim Authority to Test
OPF	Operation Flight Profile	EQ	Envi	WSESRB	Weapon System Explosives Safety Review Board
NFWK	Non-Functional Wing Kit Test Article	CC	Cap	SSSTRP	Software System Safety Technical Review Panel
FWK	Functional Wing Kit Test Article	Safe Sep	Safe	ATO	Authority to Operate
SIL	Software Integration Lab Ground Test	QRA	Quic		

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Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy **Date:** March 2024

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / Mine Development	Project (Number/Name) 0267 / Mine Improvements
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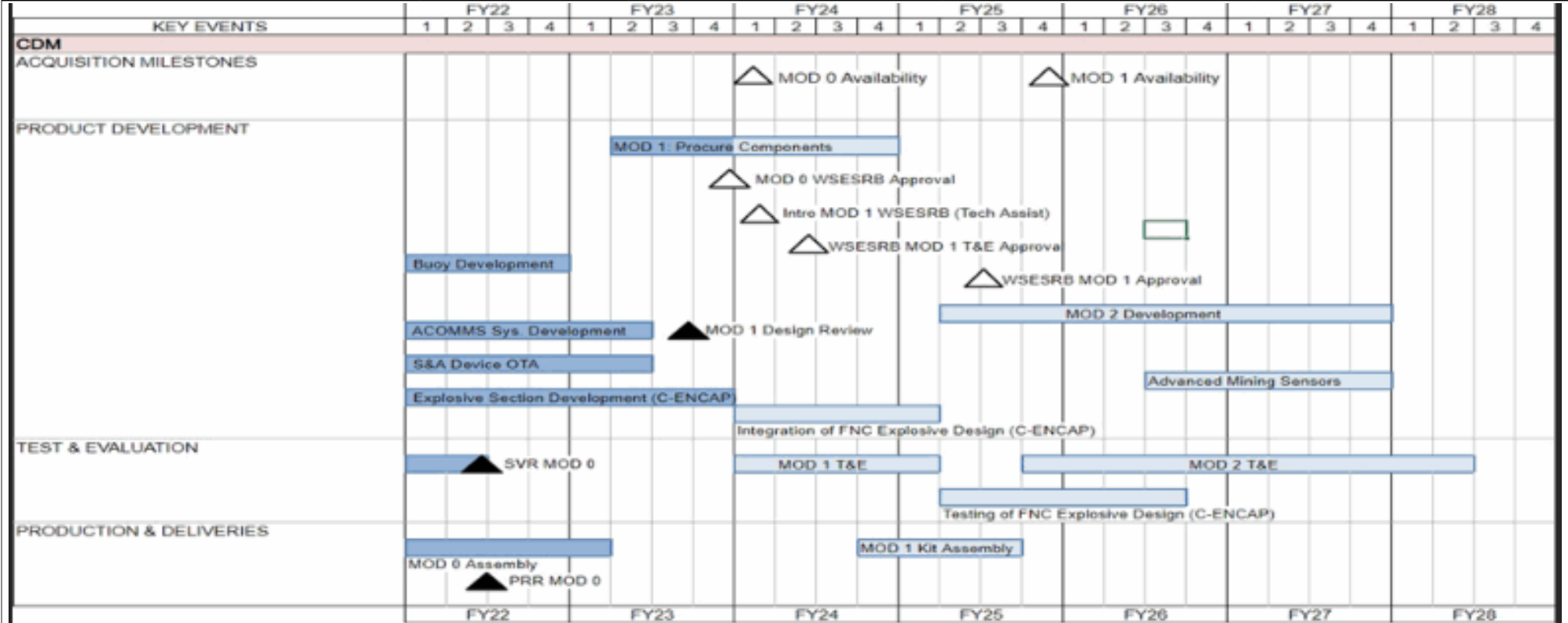


ACRONYMS					
SRR	System Requirements Review	CDD	Capability Development Docun	TRR	Test Readiness Review
SFR	System Functional Review	SOW	Statement of Work	COTF	Commander, Operational Test & Evaluation Force
RFP	Request for Proposal	P-SPEC	Performance Specification	CT	Contractor Testing
PDR	Product Design Review	PRR	Production Readiness Review	DT	Developmental Testing
CDR	Critical Design Review	QRA	Quick Reaction Assessment	EDM	Engineering Development Model
				IC	Initial Capability

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Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy Date: March 2024

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ACRONYMS			
CDR	Critical Design Review	S&A	Safe and Arming
FNC	Future Naval Capability	SVR	Systems Verification Review
ONR	Office of Naval Research	T&E	Testing & Evaluation
OTA	Other Transactions Authority	WSESRB	Weapons Systems Explosives
PRR	Production Readiness Review		Safety Review Board

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Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Quickstrike				
Acquisition Milestones: Quickstrike Mod 3: MK 75 Contract Award	4	2025	4	2025
Acquisition Milestones: Quickstrike Extended Range: Option Lot 1	3	2024	3	2024
Acquisition Milestones: Quickstrike Extended Range: Option Lot 2	2	2025	2	2025
Acquisition Milestones: Quickstrike Extended Range: Initial Capability	3	2024	3	2024
Acquisition Milestones: Quickstrike Extended Range: Incremental WK Production Lots	2	2025	2	2029
Product Development: Quickstrike Mod 3: Planning Software Updates	2	2023	4	2029
Product Development: Quickstrike Mod 3: ACV Alg Release	1	2023	3	2024
Product Development: Quickstrike Extended Range: QS-ER System Development Events	1	2023	2	2023
Product Development: Quickstrike Extended Range: WK CDR	3	2023	3	2023
Testing & Evaluation: Quickstrike Mod 3: B-52/B-1 Flight Certification	4	2025	4	2027
Testing & Evaluation: Quickstrike Extended Range: MK 64 Mod 5 / B-52 Certification	2	2023	3	2024
Testing & Evaluation: Quickstrike Extended Range: Incremental Test Flight Events	2	2024	3	2024
Testing & Evaluation: Quickstrike Extended Range: Load Adapter Qualification	1	2023	2	2024
Testing & Evaluation: Quickstrike Extended Range: Quick Reaction Assessment (QRA)	3	2024	3	2024
Fabrication & Production: Quickstrike Mod 3: S&A MK 75 DVT article fabrication	4	2024	3	2025
Fabrication & Production: Quickstrike Mod 3: S&A MK 75 DVT	4	2025	3	2026
Fabrication & Production: Quickstrike Mod 3: S&A MK 75 Qual article fabrication	3	2026	4	2027
Fabrication & Production: Quickstrike Mod 3: S&A MK 75 Qualification	1	2028	2	2029
Fabrication & Production: Quickstrike Mod 3: MK71 Mod 3 Component Procurement	1	2023	4	2028
Fabrication & Production: Quickstrike Extended Range: NFWK Test Article Fabrication	1	2023	2	2024

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Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy **Date:** March 2024

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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Fabrication & Production: Quickstrike Extended Range: Functional Wing Test Article	3	2023	3	2024
Fabrication & Production: Quickstrike Extended Range: BLU 117 Fabrication	1	2023	4	2023
Fabrication & Production: Quickstrike Extended Range: Load Adapter Production	2	2024	4	2024
Fabrication & Production: Quickstrike Extended Range: Bomb Production Lot	3	2024	2	2029
Fabrication & Production: Quickstrike Extended Range: Work Production Lot	4	2024	2	2029
<i>Clandestine Mining</i>				
Acquisition Milestones: Clandestine Mining: MOD 0 Availability	2	2024	2	2024
Acquisition Milestones: Clandestine Mining: MOD 1 Availability	1	2028	1	2028
Acquisition Milestones: Clandestine Mining: MOD 1 Contract Award	3	2025	3	2025
Acquisition Milestones: Clandestine Mining: MOD 2 Availability	1	2028	1	2028
Product Development: Procure Mod 1 Components	2	2023	4	2024
Product Development: MOD 0 WSESRB Approval	4	2023	4	2023
Product Development: WSESRB MOD 1 T&E Approval	1	2024	1	2024
Product Development: WSESRB MOD 1 Approval	2	2025	2	2025
Product Development: Formal MOD 1 Intro to WSESRB	3	2024	3	2024
Product Development: Mod 2 Development	2	2025	4	2027
Product Development: Integration of FNC Explosive Design (C-ENCAP)	1	2024	1	2025
Product Development: Advanced Mining Sensors	3	2026	4	2027
Testing & Evaluation: Clandestine Mining Testing MOD 1	1	2024	1	2025
Testing & Evaluation: Testing of FNC Explosive Design (C-ENCAP)	2	2025	4	2026
Testing & Evaluation: Production & Deliveries: Mod 1 Kit Assembly	4	2024	4	2025

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Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>				Project (Number/Name) 2993 / <i>Encapsulated Effector</i>			
COST (\$ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
2993: <i>Encapsulated Effector</i>	54.862	38.825	59.497	64.099	-	64.099	52.831	44.352	45.148	46.070	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Encapsulated Effector, aka Hammerhead, program complements existing shallow-water mines by providing maritime mining capability in deeper water depths. Based on the urgency of the requirement, the Hammerhead program utilizes Section 804 authority to streamline acquisition of an initial capability. The system uses existing kinetic payloads to engage enemy targets, and provides a wide area of coverage per each weapon. The program uses a self-contained, propelled weapon to engage the target when a target is detected. The system uses modern sensing and processing technology to enable accurate targeting at increased range and maintains minefield resilience even as weapons are expended against targets. The result is expanded operating areas to restrict or deny adversary access to the intended area while using fewer weapons than traditional mines. Additional efforts include transitioning an encapsulation system with different end effectors under the Compact Encapsulated Effector (C-ENCAP) future naval capability (FNC) that is managed by the Office of Naval Research (ONR).

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

	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: Product Development	34.419	46.386	54.579	0.000	54.579
Articles:	-	-	-	-	-
FY 2024 Plans:					
- Continue development of sensor upgrades and software updates to prosecute additional targets (MOD 1)					
- Begin development and integration of Future Naval Capability (FNC) End Effector and Encapsulation System (C-ENCAP) into MOD2					
- Conduct Test Readiness Review					
FY 2025 Base Plans:					
-Continue development and integration of Future Naval Capability (FNC) End Effector and Encapsulation System (C-ENCAP) into MOD 2					
-Complete development of MOD 1					
-Submit MOD 1 Engineering Change Proposal					
-Conduct Systems Verification Review/ Production Readiness Review					
-Enter Major Capability Acquisition pathway at Milestone C					
-Achieve Initial Capability					
-Initiate development of delivery carriage					
-Complete development of new explosive fill					
FY 2025 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy			Date: March 2024		
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>	Project (Number/Name) 2993 / <i>Encapsulated Effector</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
N/A					
FY 2024 to FY 2025 Increase/Decrease Statement: Increase associated with carriage and explosive fill efforts.					
Title: Support	0.100	0.580	1.677	0.000	1.677
Articles:	-	-	-	-	-
FY 2024 Plans: - Continue engineering support of Hammerhead mine design and development. - Begin engineering support of FNC End Effector and Encapsulation System (C-ENCAP) for MOD 2					
FY 2025 Base Plans: -Continue engineering support of Hammerhead mine design and development -Continue engineering support of FNC End Effector and Encapsulation System (C-ENCAP) for MOD 2					
FY 2025 OCO Plans: N/A					
FY 2024 to FY 2025 Increase/Decrease Statement: Increase associated with additional engineering support required for MOD 2, carriage and, explosive fill efforts.					
Title: Management	0.640	0.640	0.643	0.000	0.643
Articles:	-	-	-	-	-
FY 2024 Plans: - Continue to provide programmatic and financial support.					
FY 2025 Base Plans: -Continue to provide programmatic and financial support.					
FY 2025 OCO Plans: N/A					
FY 2024 to FY 2025 Increase/Decrease Statement: Increase associated with carriage and explosive fill efforts.					
Title: Test and Evaluation	3.666	11.891	7.200	0.000	7.200
Articles:	-	-	-	-	-
FY 2024 Plans: - Complete Contractor Testing					

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Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy	Date: March 2024
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Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>	Project (Number/Name) 2993 / <i>Encapsulated Effector</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
- Complete Developmental Testing					
<i>FY 2025 Base Plans:</i> -Complete Quick Reaction Assessment -Complete regression tests and MOD 1 T&E					
<i>FY 2025 OCO Plans:</i> N/A					
<i>FY 2024 to FY 2025 Increase/Decrease Statement:</i> Decrease associated with reduction in T&E effort.					
Accomplishments/Planned Programs Subtotals	38.825	59.497	64.099	0.000	64.099

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

N/A

Remarks

D. Acquisition Strategy

The Hammerhead program leveraged Navy warfare center expertise to perform requirements analysis and engineering architecture design to develop system requirements. The system requirements and interface requirements documents are used by the prime contractor to develop, test, integrate, and produce Hammerhead mines. The contractor is responsible for the final design to optimize producibility, manufacture engineering design models to be used during testing, and test planning and execution to gather the required data to support a production decision. Hammerhead will utilize existing lightweight torpedo inventory and incorporate modifications to enable underwater launch. The program follows an evolutionary acquisition approach by providing incremental performance updates to the system.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy **Date:** March 2024

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>	Project (Number/Name) 2993 / <i>Encapsulated Effector</i>
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Product Development (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 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 Hardware Development	WR	NSWC PC : Panama City, FL	12.410	4.292	Oct 2022	9.497	Oct 2023	6.500	Oct 2024	-		6.500	Continuing	Continuing	Continuing
Weapon Interfaces & Modifications	WR	NUWC NPT : Newport, RI	6.472	1.052	Oct 2022	7.800	Oct 2023	4.490	Oct 2024	-		4.490	Continuing	Continuing	Continuing
System Safety	WR	NUWC NPT : Newport, RI	0.823	0.097	Oct 2022	0.300	Oct 2023	0.300	Oct 2024	-		0.300	0.000	1.520	-
System Development & Integration	C/CPFF	GDMS : Various	27.735	28.728	Jan 2023	22.372	Nov 2023	21.686	Nov 2024	-		21.686	Continuing	Continuing	Continuing
Primary Hardware Development	Various	Various : Various	0.000	0.000		3.750	Jan 2024	0.000		-		0.000	0.000	3.750	-
Weapon Interfaces & Modifications	Reqn	PSU-ARL : PSU-ARL	0.000	0.000		2.250	Jan 2024	6.000	Nov 2024	-		6.000	0.000	8.250	-
Primary Hardware Development	Reqn	JHU-APL : JHU-APL	0.000	0.250	Jun 2023	0.417	Jan 2024	1.000	Jan 2025	-		1.000	0.000	1.667	-
Carriage Primary Hardware Development	WR	NSWC PC : Panama City, FL	0.000	0.000		0.000		9.503	Nov 2024	-		9.503	0.000	9.503	-
Primary Hardware Development	WR	NSWC-IH : Indian Head, MD	0.000	0.000		0.000		5.100	Nov 2024	-		5.100	0.000	5.100	-
Subtotal			47.440	34.419		46.386		54.579		-		54.579	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 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			
Systems Engineering Support	WR	NSWC/PC : Panama City, FL	0.270	0.100	Nov 2022	0.580	Nov 2023	0.580	Oct 2024	-		0.580	Continuing	Continuing	Continuing
Systems Engineering Support	Reqn	PSU-ARL : PSU-ARL	0.000	0.000		0.000		0.220	Nov 2024	-		0.220	0.000	0.220	-
Systems Engineering Support	Reqn	JHU-APL : JHU-APL	0.000	0.000		0.000		0.500	Jan 2025	-		0.500	0.000	0.500	-
Systems Engineering Support	WR	NSWC-PC : Panama City, FL	0.000	0.000		0.000		0.367	Nov 2024	-		0.367	0.000	0.367	-
Subtotal			0.270	0.100		0.580		1.667		-		1.667	Continuing	Continuing	N/A

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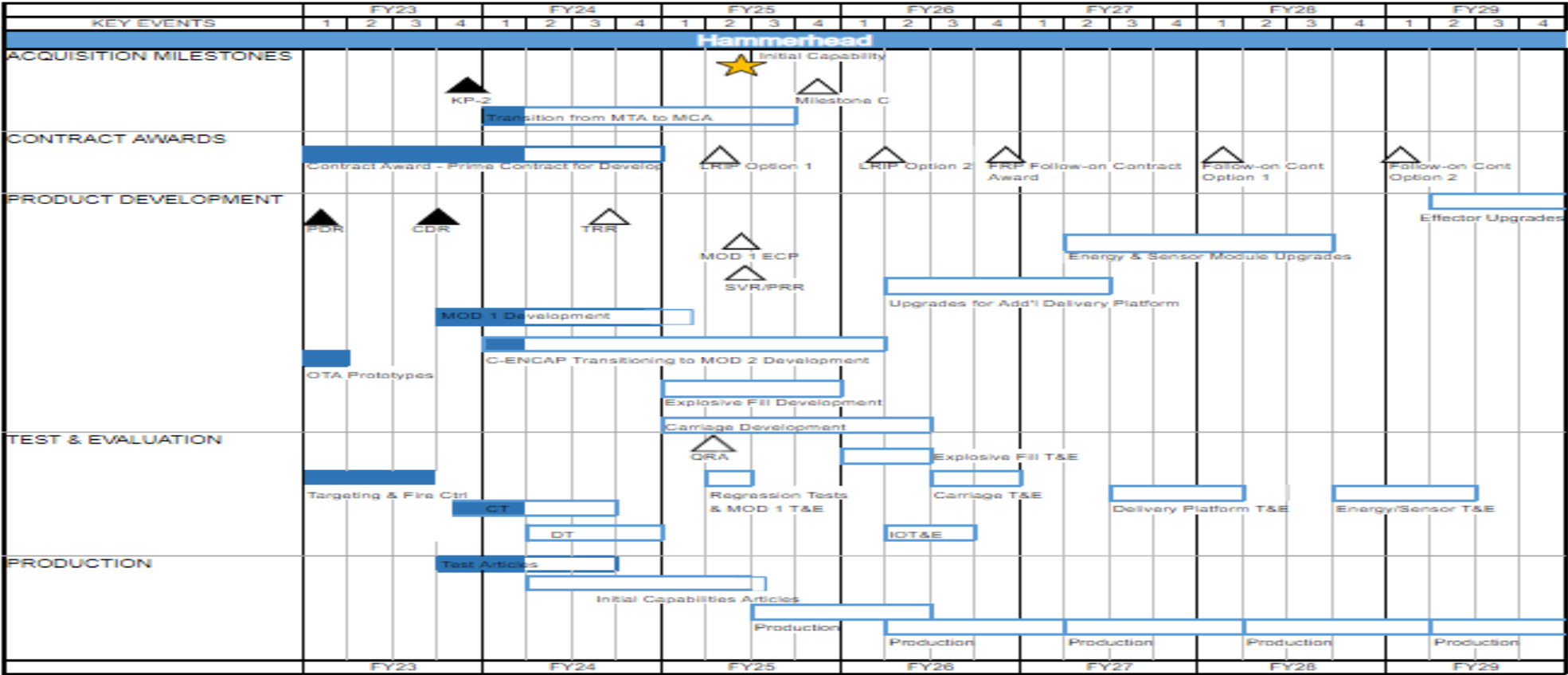
Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy

Date: March 2024

Appropriation/Budget Activity
1319 / 5

R-1 Program Element (Number/Name)
PE 0604601N / Mine Development

Project (Number/Name)
2993 / Encapsulated Effector



ACRONYMS					
C-ENCAP	Compact Encapsulated Effector	KP	Knowledge Point	PRR	Production Readiness Review
CDR	Critical Design Review	LRIP	Low Rate Initial Production	QRA	Quick Reaction Assessment
CT	Contractor Test	MCA	Major Capability Acquisition	SVR	System Verification Review
ECP	Engineering Change Proposal	MTA	Middle Tier Acquisition	T&E	Test and Evaluation
FRP	Full Rate Production	OTA	Other Transactions Authorities	TRR	Test Readiness Review
IOT&E	Initial Operational Test and Evaluation	PDR	Preliminary Design Review		

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Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>	Project (Number/Name) 2993 / <i>Encapsulated Effector</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Encapsulated Effector</i>				
Acquisition Milestones: Knowledge Point 2	4	2023	4	2023
Acquisition Milestones: Milestone C	4	2025	4	2025
Acquisition Milestones: Initial Capability	2	2025	2	2025
Acquisition Milestones: Transition from MTA to MCA	1	2024	3	2025
Contract Awards: Contract Award- Prime Contract for Development	1	2023	4	2024
Contract Awards: LRIP Option 1	2	2025	2	2025
Contract Awards: LRIP Option 2	2	2026	2	2026
Contract Awards: FRP Follow-on Contract Award	4	2026	4	2026
Contract Awards: Follow-on Contract Option 1	1	2028	1	2028
Contract Awards: Follow-on Contract Option 2	1	2029	1	2029
Product Development: Preliminary Design Review	1	2023	1	2023
Product Development: TRR	3	2024	3	2024
Product Development: SVR/PRR	2	2025	2	2025
Product Development: Critical Design Review	3	2023	3	2023
Product Development: C-ENCAP Transitioning to MOD 2 Development	1	2024	1	2026
Product Development: MOD 1 Development	4	2023	1	2025
Product Development: Energy & Sensor Module Upgrades	2	2027	3	2028
Product Development: Upgrades for Additional Delivery Platform	2	2026	2	2027
Product Development: Effector Upgrades	2	2029	4	2029
Product Development: CDM Carriage Development	1	2025	2	2026
Product Development: CDM Explosive Fill Development	1	2025	4	2025
Test and Evaluation: Targeting & Fire Control Algorithm Evaluation	1	2023	3	2023

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Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy **Date:** March 2024

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>	Project (Number/Name) 2993 / <i>Encapsulated Effector</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Test and Evaluation: Contractor Testing	4	2023	3	2024
Test and Evaluation: Development Testing	2	2024	4	2024
Test and Evaluation: Quick Reaction Assessment	2	2025	2	2025
Test and Evaluation: Regression Tests & MOD 1 T&E	2	2025	3	2025
Test and Evaluation: Energy/Sensor T&E	4	2028	2	2029
Test and Evaluation: Delivery Platform T&E	3	2027	1	2028
Fabrication: Test Articles	4	2023	3	2024
Fabrication: Initial Capability Articles (MOD 0)	2	2024	3	2025
Fabrication: Production	3	2025	4	2029