

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
---	-----------------------

Appropriation/Budget Activity	R-1 Program Element (Number/Name)											
1319: <i>Research, Development, Test & Evaluation, Navy I BA 7: Operational Systems Development</i>	PE 0101226N I <i>Submarine Acoustic War Dev</i>											
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	38.057	4.658	9.329	12.053	-	12.053	9.330	9.430	13.583	13.856	Continuing	Continuing
1265: <i>Sub Defensive Warfare</i>	38.057	3.886	9.329	12.053	-	12.053	9.330	9.430	13.583	13.856	Continuing	Continuing
9999: <i>Congressional Adds</i>	0.000	0.772	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.772

A. Mission Description and Budget Item Justification

The Submarine Acoustic Warfare Development program element is comprised of the Submarine Defensive Warfare Program and a Congressional ADD for Compact Rapid Attack Weapon Program (CRAW). The objective is to maintain and improve the survivability of all U.S. submarine classes in response to torpedo attack. Efforts include the Next Generation Countermeasure (NGCM) program, the Torpedo Defense Working Group (TDWG), Technical Direction Agent (TDA) and In-Service Engineering Agent (ISEA) hardware and software development support for Acoustic Devices Countermeasures (ADCs), Countermeasures Set, Acoustic (CSA) systems and Acoustic Augmentation Support Systems (AASS) in the Acoustic Augmentation Support Program (AASP), including component level technical insertion. Also, this program transitions the research and development of new technologies and capabilities developed under the Future Naval Capabilities (FNC), Small Business and Innovative Research (SBIR), and other Research, Development, Test & Evaluation (RDT&E) initiatives.

Project 9999/Congressional Add for Compact Rapid Attack Weapon Program (CRAW) will identify the program requirements for a CRAW Program, to determine and justify a new start program based on employing the 6" diameter Countermeasure Anti-Torpedo (CAT) in the submarine force.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	4.700	9.329	12.100	-	12.100
Current President's Budget	4.658	9.329	12.053	-	12.053
Total Adjustments	-0.042	0.000	-0.047	-	-0.047
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.042	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.047	-	-0.047

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 9999: *Congressional Adds*

Congressional Add: *Combat Rapid Attach Weapon Program*

FY 2016	FY 2017
0.772	0.000

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy		Date: May 2017	
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0101226N I <i>Submarine Acoustic War Dev</i>	
Congressional Add Details (\$ in Millions, and Includes General Reductions)		FY 2016	FY 2017
Congressional Add Subtotals for Project: 9999		0.772	0.000
Congressional Add Totals for all Projects		0.772	0.000
Change Summary Explanation			
Schedule: The developmental efforts will include torpedo threat analysis and integration, Concept of Operations (CONOPS) for fleet tactics evaluation, Test and Evaluation Master Plan (TEMP) completion, Tactical Decision Aid (TacDA) development, and sabot development for External Countermeasure Launcher (ECL) capability. A single, new development contract resulting in fully functional EDM device variants will be awarded in FY18. The developmental contract will consist of a 4 year development effort and the 5th year will provide Low-Rate Initial Production (LRIP) units for accomplishing operational testing (OT) in FY22-23. Milestone C is notionally planned for FY22.			
Financial:			
FY 2016 \$0.042 million was decreased for SBIR adjustment.			
FY 2018 \$7.000 million to be awarded for the base year of a 5 year developmental contract.			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0101226N / Submarine Acoustic War Dev				Project (Number/Name) 1265 / Sub Defensive Warfare			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
1265: Sub Defensive Warfare	38.057	3.886	9.329	12.053	-	12.053	9.330	9.430	13.583	13.856	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
The increase in FY18 funding is primarily due to the efforts required during the base year of the development contract (1Q FY18 Award), which includes Non-Recurring Engineering (NRE) for the initial design development, feasibility analysis and the design of three Engineering Development Model (EDM) variants, that will be used to begin the government's Developmental Testing (DT). Hardware deliveries of the initial EDM variants will begin, and the Critical Design Review (CDR) will be accomplished in 2018. Governmental design of the Sabot will culminate in a Critical Design Review late in FY18.												
This project supports the Submarine Acoustic Warfare System (SAWS) program to maintain and improve the survivability of all U.S. submarine classes in response to torpedo attack. This program funds:												
1. The Next Generation Countermeasure (NGCM) program, (ACAT III) currently in Engineering and Manufacturing Development (E&MD). The ADC MK5 Device Developmental Contract will be awarded in FY18, through a full and open competition, Cost Plus Incentive Fee (CPIF) contract, and government development in SABOT and Tactical Decision Aid development. The key new capabilities NGCM brings are: adaptive countermeasure (ACM) technology with full duplex capability and mobility packaged in a three inch diameter body. Milestone C is nominally 2022.												
2. The Torpedo Defense Working Group (TDWG). A working group comprised of fleet, resource sponsor, and acquisition community representatives to assess countermeasure effectiveness against fleet threats, both known and projected, with associated studies, models, and simulations.												
3. The Technical Direction Agent (TDA) and In-Service Engineering Agent (ISEA) hardware and software development support for Acoustic Devices Countermeasure (ADC) (ADC MK 2, 3 & 4, NAE Beacon) as well as Countermeasures Set, Acoustic (CSA) MK 2, MK 3, MK 4 systems and Acoustic Augmentation Support Systems (AASS) in the Acoustic Augmentation Support Program (AASP), including component level technical insertion.												
4. Research and development of new technologies and capabilities developed under the Future Naval Capabilities (FNC), Small Business and Innovative Research (SBIR), and other Research, Development, Test & Evaluation (RDT&E) initiatives. New and emerging hardware and software are evaluated in representative acoustic environments, against projected threats through both digital and hardware-in-the-loop simulations, to determine their effectiveness and impact on improving submarine survivability. The technology is then incorporated into the appropriate countermeasure.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Sub Acoustic Warfare								3.886	9.329	12.053	0.000	12.053
Articles:								-	-	-	-	

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy				Date: May 2017		
Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name) PE 0101226N / Submarine Acoustic War Dev		Project (Number/Name) 1265 / Sub Defensive Warfare		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
FY 2016 Accomplishments: - Continue NGCM TEMP - Continue preparing for the NGCM developmental contract. - Continue M&S for known and projected torpedo threats - Continue development of required program documentation - Continue development of CONOPS and TacDA for fleet tactics - Continue sabot development for external launch - Conduct review TDWG and WAF with updated reliability assessments.						
FY 2017 Plans: - Complete NGCM TEMP - Continue M&S for known and projected torpedo threats - Continue development of required program documentation - Continue development of CONOPS and TacDA for fleet tactics - Continue sabot development for external launch - Continue assessment of threat by TDWG and WAF with updated vulnerability assessments						
FY 2018 Base Plans: - Begin NGCM Engineering and Manufacturing Development Phase under development contract. - Award NGCM Development Contract. - Begin first three EDM variant designs - NGCM Critical Design Reviews - Continue M&S for known and projected torpedo threats - Continue development of required program documentation - Continue development of CONOPS and TacDA for fleet tactics - Continue sabot development for external launch - Sabot Critical Design Review - Continue assessment of threat by TDWG and WAF with updated vulnerability assessments						
FY 2018 OCO Plans: N/A						
Accomplishments/Planned Programs Subtotals		3.886	9.329	12.053	0.000	12.053

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017	
Appropriation/Budget Activity 1319 / 7				R-1 Program Element (Number/Name) PE 0101226N / Submarine Acoustic War Dev				Project (Number/Name) 1265 / Sub Defensive Warfare			
C. Other Program Funding Summary (\$ in Millions)											
			<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Complete</u>	<u>Total Cost</u>
• OPN/2210: Submarine Acoustic Warfare System	19.718	21.291	21.449	-	21.449	24.090	26.218	26.738	27.272	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
Submarine Acoustic Warfare System (SAWS) develops Undersea Defensive Warfare technologies to improve the survivability of all U.S. Submarine classes. The integration of technology into the Next Generation Countermeasure (NGCM) and the NGCM-capable CSA MK 3/4 system will continue through FY23. The NGCM development contract will be awarded in FY 18, through a full and open competition, Cost Plus Incentive Fee (CPIF) contract. Engineering Development Model (EDM) variants, Technical Data Packages (TDP), and LRIP units for accomplishing Operational Testing, will be delivered to the Navy under this contract. NGCM contractor subsystem testing will occur in FY 18 through FY 22 and joint contractor/Navy Developmental Testing (DT) will be in FY 19 through FY 21, with Navy Operational Testing (OT) in FY 22 through FY 23. Milestone C is nominally in FY 22. Initial Operational Capability (IOC) is nominally FY 24 for both the Internal Countermeasure Launcher (ICL) and External Countermeasure Launcher (ECL) capability of NGCM. The production contract solicitation will be issued in FY23, after successfully completing OT and Full Rate Production decision review (FRP DR) approval, for an award in FY23, as a full and open competition, build to print approach with either a single producer or leader/follower production contract.											
E. Performance Metrics											
Progress Reviews											
Execution Reporting and Reviews											
Milestone Reviews											

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017			
Appropriation/Budget Activity 1319 / 7						R-1 Program Element (Number/Name) PE 0101226N / Submarine Acoustic War Dev				Project (Number/Name) 1265 / Sub Defensive Warfare					
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
WAF ANALYSIS TDWG	WR	NUWC : NEWPORT, RI	11.553	0.261	Dec 2015	0.700	Dec 2016	0.275	Dec 2017	-		0.275	Continuing	Continuing	Continuing
NGCM SYSYTEM ENGINEERING	WR	NUWC : NEWPORT, RI	9.340	0.600	Dec 2015	1.700	Dec 2016	0.666	Dec 2017	-		0.666	Continuing	Continuing	Continuing
NGCM New Development	C/CPIF	TBD : TBD	0.000	0.000		0.000		7.000	Dec 2017	-		7.000	Continuing	Continuing	Continuing
CSA MK5 SYSTEM ENGINEERING	WR	NUWC : KEYPORT, WA	1.495	0.500	Dec 2015	1.549	Dec 2016	0.700	Dec 2017	-		0.700	Continuing	Continuing	Continuing
Modeling And Simulation	WR	NUWC : NEWPORT, RI	1.437	1.225	Dec 2015	2.000	Dec 2016	1.132	Dec 2017	-		1.132	Continuing	Continuing	Continuing
Tactical Decision Aid	WR	NUWC : NEWPORT, RI	0.000	0.600	Dec 2015	1.800	Dec 2016	1.100	Dec 2017	-		1.100	Continuing	Continuing	Continuing
Sabot Development	WR	NUWC : NEWPORT, RI	0.479	0.400	Dec 2015	1.100	Dec 2016	0.700	Dec 2017	-		0.700	Continuing	Continuing	Continuing
NGCM DEVELOPMENT 1	C/CPAF	Argon ST : Fairfax, VA	5.757	0.000		0.000		0.000		-		0.000	0.000	5.757	-
NGCM DEVELOPMENT 2	C/CPAF	Ultra : Braintree, MA	5.484	0.000		0.000		0.000		-		0.000	0.000	5.484	-
AASP SBIR Phase 2.5	SS/CPFF	HAI : Cohasset, MA	0.435	0.000		0.000		0.000		-		0.000	0.000	0.435	-
Subtotal			35.980	3.586		8.849		11.573		-		11.573	-	-	-
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
TRAVEL	WR	NAVSEA : Washington, DC	0.572	0.040	Oct 2015	0.080	Oct 2016	0.080	Oct 2017	-		0.080	Continuing	Continuing	Continuing
PROGRAM MANAGEMENT SUPPORT	C/CPAF	TECH MARINE : Washington, DC	0.900	0.000		0.000		0.000		-		0.000	0.000	0.900	-
PROGRAM MANAGEMENT SUPPORT	C/CPAF	BOOZ ALLEN : Washington, DC	0.605	0.260	Dec 2015	0.400	Jun 2017	0.400	Dec 2017	-		0.400	Continuing	Continuing	Continuing

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017		
Appropriation/Budget Activity 1319 / 7						R-1 Program Element (Number/Name) PE 0101226N / <i>Submarine Acoustic War Dev</i>				Project (Number/Name) 1265 / <i>Sub Defensive Warfare</i>				

Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Subtotal			2.077	0.300		0.480		0.480		-		0.480	-	-	-

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	38.057	3.886	9.329	12.053	-	12.053	-	-	-

Remarks

UNCLASSIFIED

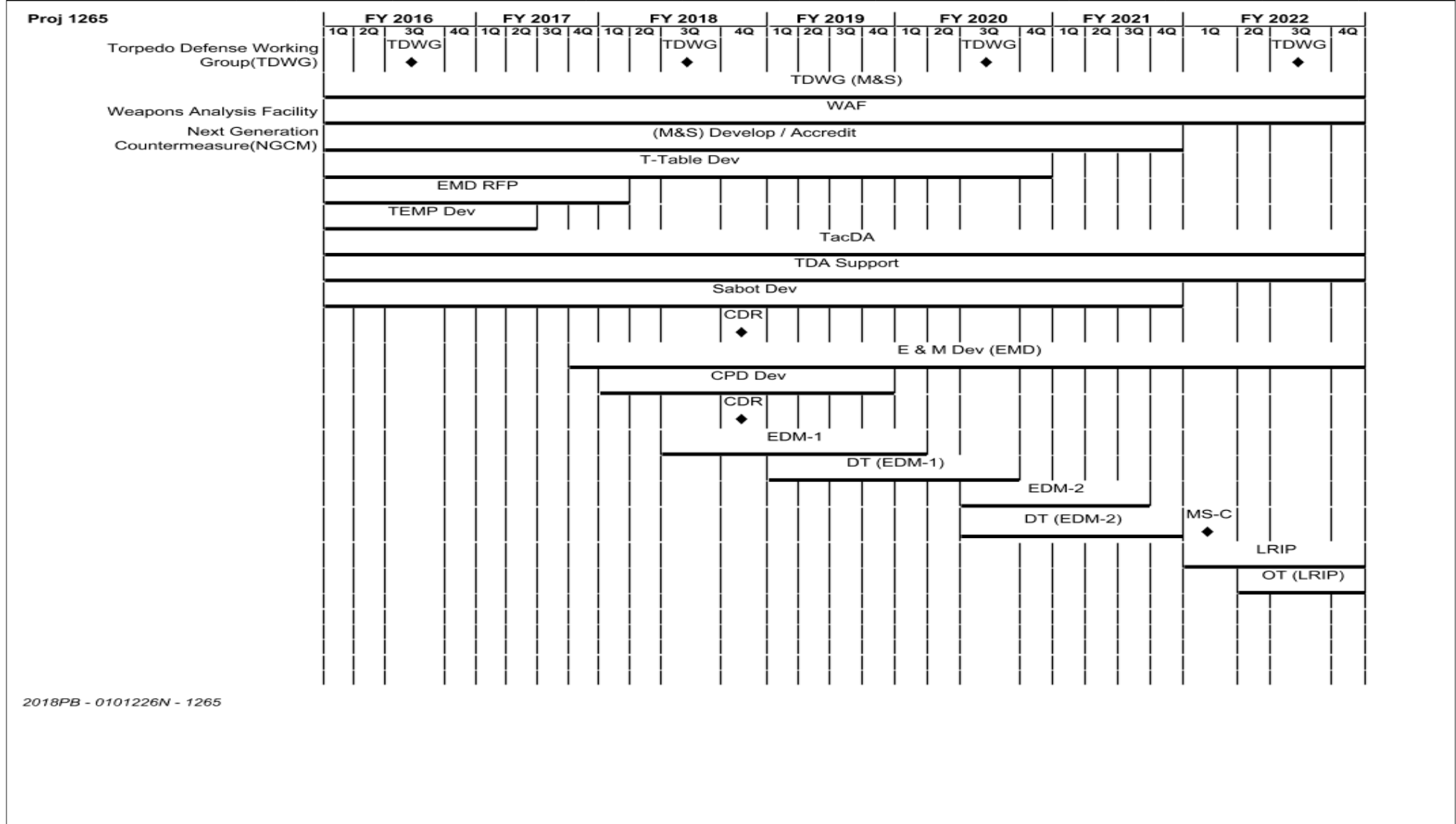
Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy

Date: May 2017

Appropriation/Budget Activity
1319 / 7

R-1 Program Element (Number/Name)
PE 0101226N / Submarine Acoustic War
Dev

Project (Number/Name)
1265 / Sub Defensive Warfare



UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101226N / <i>Submarine Acoustic War Dev</i>	Project (Number/Name) 1265 / <i>Sub Defensive Warfare</i>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 1265				
Torpedo Defense Working Group(TDWG): FY16 TDWG	3	2016	3	2016
Torpedo Defense Working Group(TDWG): FY18 TDWG	3	2018	3	2018
Torpedo Defense Working Group(TDWG): FY20 TDWG	3	2020	3	2020
Torpedo Defense Working Group(TDWG): FY22 TDWG	3	2022	3	2022
Torpedo Defense Working Group(TDWG): TDWG Modeling & Simulation (M&S)	1	2016	4	2022
Weapons Analysis Facility: COUNTERMEASURE (CM) EFFECTIVENESS/WEAPON ANALYSIS FACILITY (WAF) VULNERABILITY	1	2016	4	2022
Next Generation Countermeasure(NGCM): NGCM (M&S) Develop / Accredit	1	2016	4	2021
Next Generation Countermeasure(NGCM): NGCM T-Table Development	1	2016	4	2020
Next Generation Countermeasure(NGCM): EMD RFP	1	2016	1	2018
Next Generation Countermeasure(NGCM): NGCM TEMP Development	1	2016	2	2017
Next Generation Countermeasure(NGCM): Tactical Decision Aid (TacDA)	1	2016	4	2022
Next Generation Countermeasure(NGCM): Technical Direction Agent (TDA) Support	1	2016	4	2022
Next Generation Countermeasure(NGCM): Sabot Development	1	2016	4	2021
Next Generation Countermeasure(NGCM): Sabot CDR	4	2018	4	2018
Next Generation Countermeasure(NGCM): Engineering & Manufacturing Development (EMD)	4	2017	4	2022
Next Generation Countermeasure(NGCM): NGCM CPD Development	1	2018	4	2019
Next Generation Countermeasure(NGCM): NGCM Critical Design Review (CDR)	4	2018	4	2018
Next Generation Countermeasure(NGCM): EDM-1	3	2018	1	2020
Next Generation Countermeasure(NGCM): DT (EDM-1)	1	2019	3	2020
Next Generation Countermeasure(NGCM): EDM-2	3	2020	3	2021

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy			Date: May 2017		
Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name) PE 0101226N / Submarine Acoustic War Dev		Project (Number/Name) 1265 / Sub Defensive Warfare	
		Start		End	
Events by Sub Project		Quarter	Year	Quarter	Year
Next Generation Countermeasure(NGCM): DT (EDM-2)		3	2020	4	2021
Next Generation Countermeasure(NGCM): MS-C		1	2022	1	2022
Next Generation Countermeasure(NGCM): LRIP		1	2022	4	2022
Next Generation Countermeasure(NGCM): OT (LRIP)		2	2022	4	2022

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0101226N / <i>Submarine Acoustic War Dev</i>				Project (Number/Name) 9999 / <i>Congressional Adds</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
9999: <i>Congressional Adds</i>	0.000	0.772	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.772
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification
 Project 9999/Congressional Add for "Compact Rapid Attack Weapon Program" will identify the program requirements to determine and justify a new start program by employing the 6" diameter Countermeasure Anti-Torpedo (CAT) in the submarine force.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017
<i>Congressional Add:</i> Combat Rapid Attach Weapon Program	0.772	0.000
<i>FY 2016 Accomplishments:</i> This add will evaluate the technological readiness and engineering challenges associated with incorporating the CAT onto submarines as a defensive Anti-Torpedo Torpedo (ATT) to counter Non-Traditional Threat Torpedoes (NTTT). This study effort will involve subject matter experts from the Navy (primarily NUWC, Newport, to include torpedo, fire control, launcher, and systems integration expertise) and 6" CAT developers (at Applied Research Laboratory/Penn State University (ARL/PSU), as well as other warfare expertise such as from the Naval War College.		
<i>FY 2017 Plans:</i> N/A		
Congressional Adds Subtotals	0.772	0.000

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

Remarks

D. Acquisition Strategy
 N/A

E. Performance Metrics
 To be determined.