Exhibit R-2, RDT&E Budget Iten	n Justificat	i on: PB 202	20 Navy						Date: March 2019			
Appropriation/Budget Activity 1319: Research, Development, Te Systems Development	R-1 Program Element (Number/Name) PE 0204571N / Consolidated Trng Sys Dev											
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	441.349	64.585	104.903	129.873	-	129.873	64.931	46.068	28.351	25.673	Continuing	Continuing
0604: Training Range & Instr Dev	151.767	0.003	4.238	5.574	-	5.574	3.554	3.632	3.697	3.769	Continuing	Continuing
1427: Surface Tactical Team Trainer (STTT)	119.025	15.081	42.046	67.790	-	67.790	51.628	37.067	19.183	16.325	Continuing	Continuing
2124: Air Warfare Training	49.516	1.558	1.709	1.700	-	1.700	1.614	1.647	1.679	1.712	Continuing	Continuing
3093: TACTS/LATR Replacement	93.570	46.780	56.154	51.245	-	51.245	6.669	3.722	3.792	3.867	Continuing	Continuing
3356: High Fidelity Surface Trainers	27.471	1.163	0.756	3.564	-	3.564	1.466	0.000	0.000	0.000	0.000	34.420

A. Mission Description and Budget Item Justification

0604 - Training Range and Instrumentation Development project develops specialized instrumentations for fleet readiness training while minimizing life cycle costs. Tasks include development of the following: Large Area Tracking Range (LATR) improvements, technology improvements for fixed and portable Anti-Submarine Warfare training ranges, and Tactical Training Range (TTR) infrastructure improvements to include: Joint Display Subsystem, Radar Acquisition Display Subsystem, Electronic Warfare server, Link 16 interface, TTR Rotary Wing Tracking System technology improvements, Radiant Mercury Cross Domain Solution and Smart Antenna technology for automated frequency deconfliction.

1427 - Surface Tactical Team Trainer (STTT) develops modifications during sustainment of Battle Force Tactical Training (BFTT) system and modernization into the Advanced Training Domain (ATD). Both BFTT and ATD are the core system that is used to integrate the weapon system elements, and combat system components to create the Total Ship Training Capability (TSTC). BFTT and ATD continue to integrate and update, as new tactical capabilities are being introduced, to enable crew operator proficiency training for basic and sustainment level training events, through distributed strike group certification fleet synthetic training (FST) events and including COMPTUEX FST at Sea integration into Live, Virtual and Constructive (LVC) environment. Continued Development is required to integrate new capabilities and interfaces to provide training for AEGIS and SSDS combat system capability upgrades, and to address the Fleet's Live, Virtual and Constructive (LVC) Fleet Training Wholeness initiative. Additionally, modernization is needed to support the DoD Training Transformation Plan, the Chief of Naval Operations Fleet Response Plan.

2124 - Air Warfare Training Development (AWTD) provides for risk mitigation and next generation platform, Unmanned Aerial Systems (UAS), Live Virtual Constructive (LVC) and associated visualization component development for distributed mission training, and for stand-alone and small footprint deployable devices. Supports the Navy Aviation Simulation Master Plan (NASMP) upgrade efforts and Type/Model/Series programs with advanced visual system display configurations requirements. Provides for Open Architecture (OA), and common systems interface applications. Assesses trainee cognitive requirements and the development and incorporation of next generation LVC, UAS constructive and associated visualization component technologies. Additionally, AWTD provides for advanced virtual component fidelity

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity	R-1 Program Element (Number/Name)
1319: Research, Development, Test & Evaluation, Navy I BA 7: Operational	PE 0204571N / Consolidated Trng Sys Dev
Systems Development	
improvements for LVC capability which includes the "Mobility" Part-Task Traine LVC technologies will facilitate advanced, cost effective weapons and tactics tr Integrated Fire Control-Counter Air capabilities development. AWTD investigat Reality (VR), and Mixed Reality (MR) Head Mounted Displays (HMD), haptic fe technology).	ers and the Multiplex Data Bus Controller Translator Transmitter enabling technologies. aining and emerging capability requirements in the Air-Sea Battle Space and Naval es training applications of emerging technologies such as Augmented Reality (AR), Virtual edback devices, and cross domain solutions/ cybersecurity solutions (e.g., Blockchain
3093 - The Tactical Combat Training System (TCTS) Increment II will provide a ground data link, and will provide rangeless operation capability to Forward De threat environment, as well as airborne participant instrumentation for multiple be developed in FY19 and FY20 and will support Engineering and Development following areas: Environmental Qualification, Software, High Accelerated Lifecy Shipboard Ground Station, Internal Mount and Rack Mounted Subsystem (Internal	an improved environment for air combat training utilizing a secure air-to-air and air-to- ployed Naval Forces (FDNF). TCTS Increment II will provide encryption and an enhanced fixed and rotary wing platforms. Engineering Development Model (EDM) units will ntal Testing events thru FY21. The EDMs will be specifically utilized for testing in the vcle, Ground System Integration, Airborne Subsystem Air Worthiness and Performance, rnal Mount) Airworthiness and Performance and JSF Airworthiness and Performance.
3356- Funds high fidelity Aegis Integrated Air and Missile Defense (IAMD) india and below Aegis baselines. This line also provides funds for the research and of to Certify (T2C) requirements for the Vertical Takeoff Unmanned Aerial Vehicle Integrated Tactical Trainers. This line also provides funds for research and der of instruction. This line supports Surface Training Advanced Virtual Environment immersive and interactive learning environment and support both CNO High Ve Synthetic Training requirements previously captured within PE 0204571N / Pro [(Mine Warfare Planning and Analysis)].	vidual, instructor, strike group and team trainers for all Advanced Capability Build (ACB) development of enabling technologies required to meet Train to Qualify (T2Q) and Train e (VTUAV) and testing towards the integration with the Littoral Combat Ships (LCS) velopment of updates to the Surface Navigation Maintenance Technician Training course nt (STAVE) methodology by researching and developing trainers that will create an elocity Learning and Ready Relevant Learning intent. NOTE: In FY18, Mine Warfare ject 3356 [(High Fidelity Surface Trainer)] were realigned to PE 0603502N / Project 1235

JUSTIFICATON FOR BUDGET ACTIVITY:

This program is funded under Operational Systems Development because it includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate funding in the current or subsequent fiscal year.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 N		Date:	March 2019		
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy I BA Systems Development	7: Operational	R-1 Program El PE 0204571N / (e ment (Number/Name) Consolidated Trng Sys L	Dev	
B. Program Change Summary (\$ in Millions)	<u>FY 2018</u>	<u>FY 2019</u>	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	66.518	104.903	101.388	-	101.388
Current President's Budget	64.585	104.903	129.873	-	129.873
Total Adjustments	-1.933	0.000	28.485	-	28.485
 Congressional General Reductions 	-	-			
 Congressional Directed Reductions 	-	-			
 Congressional Rescissions 	-	-			
 Congressional Adds 	-	-			
 Congressional Directed Transfers 	-	-			
 Reprogrammings 	-	-			
 SBIR/STTR Transfer 	-1.933	0.000			
 Program Adjustments 	0.000	0.000	28.486	-	28.486
 Rate/Misc Adjustments 	0.000	0.000	-0.001	-	-0.001

Change Summary Explanation

2124:

Human Systems Integration: Updated title of Augmented Reality OFT Demo to AR/VR/MR Sim Demo and extended end date from 4Q19 to 4Q21. Updated Crew Enabled Role Player start date from 1Q19 to 1Q18 and end date from 4Q23 to 4Q24. Updated T-45 ARVS PTT end date from 2Q19 to 3Q19. Updated Augmented Reality OFT Demo milestone name to AR/VR/MR Sim Demo I. Added AR/VR/MR Sim Demo 2 milestone in 4Q2020. Added AR/VR/MR Sim Demo 3 milestone in 4Q21. Added Crew Enabled Role Player - Phase IV milestone in 4Q24. Added T-45 ARVS PTT 2 milestone in 2Q19. Added T-45 ARVS PTT 3 milestone in 3Q19.

Sensors and Environment: Updated Common/Platform Sensors and Environment (Models/Tools) end date from 4Q19 to 4Q20. Updated Collaborative Database Rapid Terrain Generation end date from 4Q23 to 4Q24. Updated Near Eye Display Metrology System end date from 4Q19 to 4Q20. Updated VR and Haptic for Flight Deck Crew Demo end date from 4Q20 to 4Q22. Added Fused Sensors USA/Tier 5 milestone in 4Q20. Added Collaborative Database Rapid Generation Phase IV milestone in 4Q24. Updated Near Eye Display Metrology System milestone from 4Q19 to 4Q20. Added VR and Haptic for Flight Deck Crew Demo II milestone in 4Q21. Added VR and Haptic for Flight Deck Crew Demo III milestone in 4Q22.

Live/Virtual/Constructive: Added Embedded NGTS for TCTS Participant Subsystem starting 1Q19 and ending 4Q19. Added NIFC-CA Virtual Adaptive Training Technology starting 1Q18 ending 4Q20. Updated Flight Deck Trainer Expansion pack start date from 1Q19 to 1Q18 and end date from 4Q23 to 4Q24. Added Fleet Adaptive Multi-Level Measurement for LVD starting 4Q18 ending 4Q23. Deleted Virtual/Constructive Mission Rehearsal milestone 4Q18. Deleted LVC Persistent Capability Demo milestone 4Q18. Added Embedded NGTS for TCTS PS milestone 1Q19. Added Embedded NGTS for TCTS PS 2 milestone 3Q19. Added NIFC-CA Adaptive Training Tech I milestone 4Q19. Added NIFC-CA Adaptive Training Tech II milestone 4Q20. Added Fleet Adaptive Multi-Level Measurement for LVC Phase 1 milestone 3Q19. Added Fleet Adaptive Multi-Level Measurement for LVC Phase 2 milestone 3Q20. Added Fleet Adaptive Multi-

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	
1319: Research, Development, Test & Evaluation, Navy I BA 7: Operational Systems Development	PE 0204571N / Consolidated Trng Sys Dev	
Level Measurement for LVC Phase 3 milestone 3Q21. Added Fleet Ad	aptive Multi-Level Measurement for LVC Phase 4 milestor	ne 3Q22. Added Fleet Adaptive
Multi-Level Measurement for LVC Phase 5 milestone 4Q23.		
3093: TACTS/LATR Replacement: Post Preliminary Design Review (PDR) A Assessment moved from 1QTR 2019 to 2QTR 2019. Encryption Miles Ground Subsystem, Remote Range Unit, Portable Support Equipment for the Internal Mounts moved from 1QTR 2021 to 1QTR 2022 with the running through 2QTR 2023. Initial operational capability (IOC) for Airt Equipment Subsystem moved from 2QTR 2021 to 2QTR 2022 and IOC from 1QTR 2023 to 2QTR 2023. Authority to Operate (ATO) moved fro Functional Configuration Audit moved from 2QTR 2019 to 1QTR 2020 1QTR 2020 and will run through 4 QTR 2021. Developmental Test C v Security Agency (NSA) certification events will now run through 2QTR	Assessment moved from 2QTR 2018 to 4QTR 2018. Post tone C moved from 1QTR 2020 to 2QTR 2021. LRIP for Subsystem will now run from 2QTR 2021 through 2QTR 2 e Low rate initial production (LRIP) for the Internal Mounts borne Subsystem (POD), Ground Subsystem, Remote Ra C for the Internal Mounts will occur in 2QTR 2023. Full-Ra om 3QTR 2019 to 3QTR 2020. Test Readiness Review / and will run through 1QTR 2022. Developmental Test-B was moved from 1QTR 2020 to 2QTR 2022 and will now r 2021.	Critical Design Review (CDR) Airborne Subsystem (POD), 2022. The Production Decision beginning in 1QTR 2022 and nge Unit, and Portable Support ate Production (FRP) was moved Flight Readiness Review / was moved from 2QTR 2019 to un through 2QTR 2023. National

Exhibit R-2A, RDT&E Project Ju	nibit R-2A, RDT&E Project Justification: PB 2020 Navy											
Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name)Project (NPE 0204571N / Consolidated Trng Sys Dev0604 / Trail						lumber/Name) ining Range & Instr Dev				
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
0604: Training Range & Instr Dev	151.767	0.003	4.238	5.574	-	5.574	3.554	3.632	3.697	3.769	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Training Range and Instrumentation Development project develops specialized instrumentations for fleet readiness training while minimizing life cycle costs. Tasks include development of the following: Large Area Tracking Range (LATR) improvements, technology improvements for fixed and portable Anti-Submarine Warfare training ranges, and Tactical Training Range (TTR) infrastructure improvements to include: Joint Display Subsystem, Radar Acquisition Display Subsystem, Electronic Warfare server, Link 16 interface, TTR Rotary Wing Tracking System technology improvements, Radiant Mercury Cross Domain Solution and Smart Antenna technology for automated frequency deconfliction. FY19 to FY20 funding increase represents support to planned LATR, TTR and Ocean System development programs. It also includes increased funding of \$1.135M for Smart Antenna development.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2020	FY 2020	FY 2020
	FY 2018	FY 2019	Base	000	Total
Title: LATR	0.003	2.416	2.877	0.000	2.877
Articles:	-	-	-	-	-
 Description: Design, integrate and test modules to eliminate obsolete components in the Large Area Tracking Range (LATR) Pod. Design, integrate and test LATR software baseline upgrades. Design, integrate and test Participant Instrumentation Packages (PIP) modules to address obsolescence, high failure components and to improve operability and performance. Conduct and complete installation of the Ground System Rehosts. Conduct and complete security testing and assessment for LATR system certification and accreditation for Ground System Rehosts. Develop, test and integrate software and hardware modifications to system test sets. Develop, test and integrate LATR data translators. Conduct studies to identify sub-projects required through FY24. Complete ground system and PIP refresh sub-projects, in conjunction with, semi-annual system block upgrades. Conduct LATR Operational Security (OPSEC) Posture Improvements Sub-Project, Shipboard and Rotary Wing Technology Wing Upgrade (LSRTU) and LATR Navigation Technology Refresh (LNTR). FY 2019 Plans: Develop and test Large Area Tracking Range (LATR) ground software 6.4 changes to incorporate Live Virtual Constructive (LVC) Technology. Continue to develop operational system improvements and solutions to eliminate LATR obsolescence issues. FY 2020 Base Plans: 					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: Marc	h 2019		
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/ PE 0204571N / Consolidated Trng	Name) g Sys Dev	Project (Number/Name) 0604 / Training Range & Instr Dev			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	<u>i Each)</u>	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Develop and test Large Area Tracking Range (LATR) ground software 6.5 chan Constructive (LVC) Technology. Continue to develop operational system impro LATR obsolescence issues.						
FY 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement: The increase of \$.461 from FY 2019 to FY 2020 represents funds required to de improvements and solutions to reduce LATR obsolescence issues as the system life.						
Title: TTR	Articles:	0.000	1.232 -	2.034 -	0.000 -	2.034 -
Description: Develop and test upgrades to the Joint Display Subsystem (JDS), Subsystem (RADS), and Electronic Warfare (EW) server. Develop and test upg JDS, RADS, and EW server. Develop and test Smart Antenna technology for an Disruptions and limitations in the Live-to-Virtual (LV) tactical radio communication Continuous Training Environment (NCTE) network have interfered with the goal Synthetic Training (FST) events. The Smart Antenna improves utilization of the relay tower by performing calculations to predict RF interference and then avoid interfering frequency pairs to antenna pairs with greater isolation, thereby decor	Radar Acquisition Display grades to the Link-16 Interface, utomated frequency deconfliction. on segment of the Navy s and objectives of Fleet frequency spectrum in the I RF interference by assigning offlicting frequencies.					
<i>FY 2019 Plans:</i> Develop and test 2019.1 upgrades to the Joint Display Subsystem (JDS), Rada (RADS), and Electronic Warfare (EW) server to remain in concert with evolving requirements. Develop operational systems improvements to the Rotary Wing test Tactical Training Ranges (TTR) ground software changes to incorporate Liv (LVC) technology. Develop detailed Smart Antenna architecture including intersoftware code to test architecture.	r Acquisition Display Subsystem threat and tactical training Tracking System. Develop and ve, Virtual and Constructive faces. Develop exploratory					
<i>FY 2020 Base Plans:</i> Develop and test 2020.1 upgrades to the Joint Display Subsystem (JDS), Rada (RADS), and Electronic Warfare (EW) server to remain in concert with evolving requirements. Develop operational systems improvements to the Rotary Wing test Tactical Training Ranges (TTR) ground software changes to incorporate Live	r Acquisition Display Subsystem threat and tactical training Tracking System. Develop and /e, Virtual and Constructive					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: Marc	ch 2019		
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/ PE 0204571N / Consolidated Trng	Name) g Sys Dev	n e) & Instr Dev			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	<u>n Each)</u>	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
(LVC) technology. Integrate, test & deliver Smart Antenna deconfliction softwar Demonstrate Smart Antenna technology during a LVC event.						
FY 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement: The increase of \$.802 from FY 2019 to FY 2020 represents the additional fundi deliver Smart Antenna deconfliction software and Technical Data Package.	ng required to integrate, test &					
<i>Title:</i> Ocean Systems	Articles:	0.000	0.590 -	0.663 -	0.000	0.663 -
Description: Research, develop, and test technology improvements for fixed a Warfare (ASW) training ranges.	nd portable Anti-Submarine					
FY 2019 Plans: Complete a gap analysis between Sea Raven Display and Control Subsystem (Document the requirements identified by the gaps and develop a Product Line a Develop a plan for sun-setting Naval Gunfire Scoring System (NGSS) and Navy (NTADs).	DCS) and other DCS systems. approach for Sea Raven. / Tracking and Display Software					
FY 2020 Base Plans: To complete and deliver Phase 4 of the Next Generation Technology Developm Warfare (ASW) training ranges.	nent at various Anti-Submarine					
FY 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement: Increase of \$.073 from FY 2019 to FY 2020 due to requirements for Phase 4 of Training Range Technology Development.	the Next Generation ASW					
Accomplishmen	ts/Planned Programs Subtotals	0.003	4.238	5.574	0.000	5.574
		1	1		1	

Exhibit R-2A, RDT&E Project Just	ification: PB	2020 Navy						Date: Ma	rch 2019		
Appropriation/Budget Activity 1319 / 7	R-1 P I PE 02	r ogram Elen 04571N / Co	n ent (Numb Insolidated 7	umber/Name) ining Range & Instr Dev							
C. Other Program Funding Summa	ary (\$ in Milli	ons <u>)</u>									
			FY 2020	FY 2020	<u>FY 2020</u>					Cost To	
Line Item	FY 2018	<u>FY 2019</u>	Base	000	<u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	FY 2023	FY 2024	Complete	Total Cost
 OPN/4204: Weapons Range 	66.941	93.864	101.843	-	101.843	84.035	110.979	112.426	115.771	Continuing	Continuing
Support Equipment (WRSE)/											
LSRTU/Ocean Systems											
Barra and a											

<u>Remarks</u>

FY20 increase in OPN 4204 for replacement of Barking Sands Tactical Undersea Range (BARSTUR) fixed anti-submarine warfare (ASW) range instrumentation.

D. Acquisition Strategy

The Training Range and Instrumentation Development (TRID) program is a non-ACAT program. The integrated program teams that develop new TRID capabilities include government and contractor engineering personnel.

E. Performance Metrics

Metric/Description:

Naval Air Warfare Center-Aircraft Division (NAWC-AD): Completion of one Large Area Tracking Range (LATR) upgrade per year. Successful application of system engineering processes. Site acceptance of product improvements.

Jacobs Eng: Site acceptance of LATR product improvements. Successful design, development and testing of product improvements and new capabilities.

Naval Air Warfare Center Weapons Division(NAWC-WD): Completion of one Tactical Training Range (TTR) upgrade per year. Successful application of system engineering processes. Site acceptance of product improvements.

Jacobs Eng: Site acceptance of TTR product improvements. Successful design, development, and testing of product improvements and new capabilities.

Exhibit R-3, RDT&E	Project Co	ost Analysis: PB 2	2020 Navy									Date:	March 20)19	
Appropriation/Budge	et Activity	,				R-1 Pro PE 020	o gram Ele 4571N / C	e <mark>ment (N</mark> Consolida	umber/Na ted Trng S	ame) Sys Dev	Project (Number/Name) 0604 <i>I Training Range & Instr Dev</i>				
Product Developme	nt (\$ in Mi	illions)		FY 2018		FY 2019		FY 2 Ba	2020 Ise	FY 2 OC	020 :O	FY 2020 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
Hardware Development	C/CPFF	JACOBS ENG : RIDGECREST, CA	13.159	0.000		0.620	Jan 2019	2.047	Nov 2019	-		2.047	0.000	15.826	15.826
Hardware Development	WR	NUWC : NEWPORT, RI	0.455	0.000		0.568	Nov 2018	0.383	Nov 2019	-		0.383	Continuing	Continuing	Continuing
Hardware Development	WR	NAWCTSD : ORLANDO, FL	0.000	0.000		0.565	Nov 2018	1.135	Nov 2019	-		1.135	Continuing	Continuing	Continuing
Software Development	C/CPFF	JACOBS ENG : RIDGECREST, CA	5.439	0.000		0.180	Jan 2019	0.181	Nov 2019	-		0.181	0.000	5.800	5.800
Software Development	WR	NAWC-AD : PAX RIVER, MD	9.035	0.000		0.578	Nov 2018	0.455	Nov 2019	-		0.455	Continuing	Continuing	Continuing
Software Development	WR	NAWC-WD : CHINA LAKE, CA	0.000	0.000		0.677	Nov 2018	0.350	Nov 2019	-		0.350	Continuing	Continuing	Continuing
Prior Year Prod Dev No _onger Funded in the FYDP	Various	Various : Various	100.665	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal 128.753 0.000						3.188		4.551		-		4.551	Continuing	Continuing	N/A

Remarks

Increase in Jacobs Engineering Hardware contract and associated software development from FY2019 to FY2020 represents funding required to design, develop and test product improvement for the LATR Fixed Wing (FW) Component Replacement (CR) Pod and the Rotary Wing Tracking Systems (RTS) Ground Systems. The increase in NAWCTSD Hardware development represents the funding required to integrate, test & deliver Smart Antenna deconfliction software and Technical Data Package. Funding to NAWC-WD China Lake provides software upgrades to Simulation Display (SIMDIS).

Support (\$ in Million		FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Systems Engineering	WR	NAWC-AD : PAX RIVER, MD	1.739	0.003	Nov 2017	0.747	Nov 2018	0.567	Nov 2019	-		0.567	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWC-WD : CHINA LAKE, CA	0.626	0.000		0.089	Nov 2018	0.085	Nov 2019	-		0.085	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : CORONA, CA	0.985	0.000		0.119	Nov 2018	0.121	Nov 2019	-		0.121	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	020 Navy	,								Date:	March 20)19	
Appropriation/Budge	et Activity	/				R-1 Pro PE 020	o gram Ele 4571N / C	e <mark>ment (N</mark> Consolida	lumber/Na ated Trng S	ame) Sys Dev	Project (Number/Name) 0604 <i>I Training Range & Instr Dev</i>				
Support (\$ in Million	s)			FY 2	2018	FY 2019		FY 2 Ba	2020 ase	FY 2 OC	.020 FY 2020 CO 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
Systems Engineering	WR	NAWC-WD : POINT MUGU, CA	0.050	0.000		0.024	Nov 2018	0.025	Nov 2019	-		0.025	Continuing	Continuing	Continuing
Prior Year Support No Longer Funded in the FYDP	Various	Various : Various	10.576	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	13.976	0.003		0.979		0.798		-		0.798	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)			FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Prior Year T&E No Longer Funded in the FYDP	Various	Various : Various	5.299	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	5.299	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A
Management Service	es (\$ in M	illions)		FY 2	2018	FY 2	2019	FY 2020 Base		FY 2020 OCO		FY 2020 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
Prog Mngt Sup	WR	NAWC-AD : PAX RIVER, MD	0.077	0.000		0.071	Nov 2018	0.225	Nov 2019	-		0.225	Continuing	Continuing	Continuing
Prior Year Support No Longer Funded in the FYDP	Various	Various : Various	3.662	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal 3.739						0.071		0.225		-		0.225	Continuing	Continuing	N/A

Remarks

Increase in Government Program Management Support from FY2019 to FY2020 represents the increased level of effort required to Integrate, test & deliver Smart Antenna technology. Increase also includes support required for Smart Antenna technology demonstration during a Live, Virtual and Constructive (LVC) event.

Exhibit R-3, RDT&E Project Cost Analysis: PB	2020 Nav	у							Date:	March 20)19	
Appropriation/Budget Activity 1319 / 7			R-1 Pro PE 020	ogram El 4571N / (ement (N Consolida	umber/N ted Trng	ame) Sys Dev	Project 0604 / 7	(Number	r/ Name) ange & In	str Dev	
	Prior Years	FY 2018	FY 2	2019	FY 2 Ba	2020 se	FY 2 OC	020 :O	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	151.767	0.003	4.238		5.574		-		5.574	Continuing	Continuing	N/A

Remarks

Appropriation/Budget Activity 319 / 7										R-1 PE	020	ogi 045	ran 71	n Element N / Consoli	(Nu date	mb ed 7	er/l Trng	Name) Sys De	v	Pro 060	oje 04	ect (Numb I Training	ər/l Ra	Nar nge	me e &	e) & Instr Dev
Training Range & Instr Dev - Large Area Tracking Range	F	Y 20	018		F	Y 2019			FY	2020			FY	2021		F	Y 20	022		F	FY	2023		ı	FY	2024
	10	203	3040	Q1Q	2030	a 4a	1	Q 2Q	3Q	4Q	10	20	30	4Q	102	2030	2	4Q	10	203	30	4Q	10	203	30	4Q
Acquisition Milestones																										
System Development																										
				-	UP	TR - 6.4 PGRADE	+	U	ATI IPG	R - 6.5 RADE	+	L		R - 6.6 GRADE		UP	GR	- 6.7 ADE		U	AT PG	R - 6.8 GRADE		U		R - 6.9 GRADE
Test & Evaluation	ĺ	\square											$\left \right $		\square								Π			
Production Milestones Deliveries						LATR - 6 UPGRAE	.4 E			_ATR - 6. JPGRAD ▼	5 E			LATR - 6.6 UPGRADE ▼			LA	TR - 6.7 PGRADE ▼				LATR - 6.8 UPGRADE ▼				LATR - 6.9 UPGRADE ▼
2020DON - 0204571N - 0604																										

Exhibit R-4, RDT&E Schedule Prof	file:	PB	; 20)20	Na	vy																C	Date	: M	arc	h 2019	
Appropriation/Budget Activity 1319 / 7											R-1 PE	020	ogr 045	am 71N	Element	t (N lida	uml ted	beı Trr	r/ Name) ng Sys Dev	,	Proj 0604	ect (Nu 4 / Traini	mbe ing F	er/N Ran	am ge	e) & Instr De	ev
Training Range & Instr Dev - Tactical Training Ranges	F	r 20	018			FY	2019		F	Y 202	0			FY	2021		F	= Y :	2022		F	2023		102	F	r 2024	
Acquisition Milestones		2013					402		2013		40	4	4204		40	1-	2013	4-	402 1	1	-434					4 <u>≁</u> ⊄	
System Development					11 T	R - PG	2019.1 RADE																				
							DEVEL			R - 202 GRAI	20.1 DE			IR -	2021.1 RADE			R - PGF	2022.1 RADE			- 2023.1 GRADE	·	 т		- 2023.1 GRADE	
Test & Evaluation	\Box				\Box			\Box]	
Production Milestones							TTR - 2019.1 JPGRADE			TT 20 UPG SM	TR - I20.1 GRAD	E			TTR - 2021.1 JPGRADE	E			TTR - 2022.1 JPGRADE			TTR - 2023. UPGRA	- 1 DE			TTR - 2024.1 UPGRAI	DE
2020DON - 0204571N - 0604																											

ppropriation/Budget Activity 319 / 7												R-1 Pr PE 020	ogr)457	am 71N	Elei / Co	ment (onsolia	Nun lateo	nbe d Tri	r/Na ng S	ame) Sys Dev	/ F	Proj 0604	ect 4 / 7	(Numt Training	er/N Rar	lam nge	e) & In	str De
Ocean Systems		FY :	201	в		FY	201	19		F١	r 20	20		FY	20	21		FY	20	22		F	Y 20	23		F١	Y 20	24
	10	20	3Q	4Q	1Q	2Q	3Q	4Q	10	2Q	3Q	4Q	1Q	20	зQ	4Q	10	2Q	3Q	4Q	1Q	20	30	4Q	10	20	30	4Q
Acquisition Milestones																												
System Development											 	ĺ										ĺ	Ì		1	ĺ	ĺ	
					D	Ne: Tecl eve Ph	xt G hnol lopn ase	en gy nent 3		Ne Tec)eve Pł	ext G hnol elopr nase	en ogy nent 4		Ne Tect Deve Ph	xt G Innol Iopr iase	en ogy nent 5		Ne Tecł Ph	xt G nnol lopr nase	en ogy nent 6		Ne Tec Deve Pł	ext G hno elopi hase	Sen logy ment e 7		Ne Tec Deve Pł	ext G hnol elopr nase	ien ogy nent 8
Test & Evaluation		1																										
Production Milestones																												
Deliveries								Phase 3 ▼				Phase 4 ▼				Phase 5 ▼				Phase 6 ▼				Phase 7 ▼				Phase 8 ▼
2020DON - 0204571N - 0604																												

nibit R-4A, RDT&E Schedule Details: PB 2020 Navy			Date: Marc	h 2019
propriation/Budget Activity 9 / 7	R-1 Program Element (Numbe PE 0204571N / Consolidated Tri	r/Name) ng Sys Dev	Project (Number/Nam 0604 / Training Range	ı e) & Instr Dev
S	Schedule Details			
	St	art	Er	ıd
Events by Sub Project	Quarter	Year	Quarter	Year
Training Range & Instr Dev - Large Area Tracking Range				
System Development: LATR - 6.4 UPGRADE	1	2019	4	2019
System Development: LATR - 6.5 UPGRADE	1	2020	4	2020
System Development: LATR - 6.6 UPGRADE	1	2021	4	2021
System Development: LATR - 6.7 UPGRADE	1	2022	4	2022
System Development: LATR - 6.8 UPGRADE	1	2023	4	2023
System Development: LATR - 6.9 UPGRADE	1	2024	4	2024
Production Milestones: Deliveries: LATR - 6.4 UPGRADE	4	2019	4	2019
Production Milestones: Deliveries: LATR - 6.5 UPGRADE	4	2020	4	2020
Production Milestones: Deliveries: LATR - 6.6 UPGRADE	4	2021	4	2021
Production Milestones: Deliveries: LATR - 6.7 UPGRADE	4	2022	4	2022
Production Milestones: Deliveries: LATR - 6.8 UPGRADE	4	2023	4	2023
Production Milestones: Deliveries: LATR - 6.9 UPGRADE	4	2024	4	2024
Training Range & Instr Dev - Tactical Training Ranges				
System Development: TTR - 2019.1 UPGRADE	1	2019	4	2019
System Development: TTR - SMART ANTENNA DEVELOPMENT	1	2019	4	2020
System Development: TTR - 2020.1 UPGRADE	1	2020	4	2020
System Development: TTR - 2021.1 UPGRADE	1	2021	4	2021
System Development: TTR - 2022.1 UPGRADE	1	2022	4	2022
System Development: TTR - 2023.1 UPGRADE	1	2023	4	2023
System Development: TTR - 2024.1 UPGRADE	1	2024	4	2024
Production Milestones: Deliveries: TTR - 2019.1 UPGRADE	4	2019	4	2019
Production Milestones: Deliveries: TTR - 2020.1 UPGRADE	4	2020	4	2020

020 Navy	Date: March 2019	
R-1 Program Element (Number PE 0204571N / Consolidated Tr	r/Name) Project (Number/Name) ng Sys Dev 0604 I Training Range & Instr Dev	
Si	art End	
Sub Project Quarter	Year Quarter Year	
SMART ANTENNA 4	2020 4 2020	
2021.1 UPGRADE 4	2021 4 2021	
2022.1 UPGRADE 4	2022 4 2022	
2023.1 UPGRADE 4	2023 4 2023	
2024.1 UPGRADE 4	2024 4 2024	
gy Development Phase 3 1	2019 4 2019	
gy Development Phase 4 1	2020 4 2020	
gy Development Phase 5 1	2021 4 2021	
gy Development Phase 6 1	2022 4 2022	
gy Development Phase 7 1	2023 4 2023	
gy Development Phase 8 1	2024 4 2024	
3 4	2019 4 2019	
4 4	2020 4 2020	
5 4	2021 4 2021	
6 4	2022 4 2022	
7 4	2023 4 2023	
8 4	2024 4 2024	
Indext Phase 4IIngy Development Phase 51Ingy Development Phase 61Ingy Development Phase 71Ingy Development Phase 81Ingy Development Phase 91Ingy Develop	202042020202142021202242022202342023202442024201942019202042020202142021202242022202342023202442023202342023202442024	

Exhibit R-2A, RDT&E Project Ju	stification:	PB 2020 N	lavy							Date: Marc	ch 2019	
Appropriation/Budget Activity 1319 / 7		R-1 Progra PE 020457	am Element 1N / Conso	t (Number / lidated Trng	Name) g Sys Dev	Project (N 1427 / Suri	umber/Nan face Tactica	ne) al Team Trair	ner (STTT)			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
1427: Surface Tactical Team Trainer (STTT)	119.025	15.081	42.046	67.790	-	67.790	51.628	37.067	19.183	16.325	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Department's submission reflects the results of a deep dive into Fleet Training Wholeness (FTW) and how to provide a means for Strike Group Training in a contested environment, in accordance with Chief of Naval Operations guidance and Fleet Training Wholeness 2025 objectives. The analysis determined the most cost effective means to provide this training is via a combination of Live Virtual Constructive (LVC) capabilities. The department of the Navy has identified 21 LVC Capabilities that began in FY19 leveraging combat system product line architecture components, contract vehicles, warfare center subject matter experts, and engineering practices for iterative development. The deep dive identified that there is no other cost effective way train in a contested environment. The foundation for LVC has already been established. FY20 continues the iterative investment strategy to provide initial at sea LVC capability to train a Strike Groups in the environment they expected to fight in. The development, integration and testing of LVC's, along with ensuring interoperability with surface and air communities, will be accomplished across Integrated Warfare Systems (IWS), Navy Continuous Training Environment (NCTE), and the Navy's Tactical Training Network.

Surface Tactical Team Trainer (STTT) develops modifications during sustainment of Battle Force Tactical Training (BFTT) system and modernization into the Advanced Training Domain (ATD). Both BFTT and ATD are the core system that is used to integrate the weapon system elements, and combat system components to create the Total Ship Training Capability (TSTC). BFTT and ATD continue to integrate and update, as new tactical capabilities are being introduced, to enable crew operator proficiency training for basic and sustainment level training events, through distributed strike group certification fleet synthetic training (FST) events and including Composite Training Unit Exercise (COMPTUEX) FST

at Sea integration into LVC environment. Continued Development is required to integrate new capabilities and interfaces to provide training for AEGIS and Ships Self Defense System (SSDS) combat system capability upgrades, and to address the Fleet's LVC FTW initiative. Additionally, modernization is needed to support the Department of Defense (DoD) Training Transformation Plan, the Chief of Naval Operations Fleet Response Plan and Commander United States Fleet Forces Command Fleet Readiness Training Plan.

The Advanced Training Domain (ATD) is being developed to combine BFTT and the AEGIS Combat Training System (ACTS) into a common system that integrates with AEGIS Base Line (BL) 9.2.2 And Follow, and Ships Self Defense System (SSDS) BL 11.xAF. ATD is being hosted along with the AEGIS and SSDS combat system on Technical Insertion (TI)-16 common processing and display hardware. ATD is being designed to be the core of the Total Ship Training Capability, and is projected to be more reliable, simpler to use, and architected to be extensible to meet interoperability and capability enhancement challenges in the future.

The BFTT is being updated to maintain integration and capability enhancements developed for the Cooperative Engagement Capability (CEC), Surface Electronic Warfare Improvement Program (SEWIP), and the Carrier Tactical Support Center (CV-TSC), and SSDS Fire Control Loop Improvement Program.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	h 2019	
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/ PE 0204571N / Consolidated Trng	Name) g Sys Dev	Project (N 1427 / Surf	umber/Nam ^f ace Tactica	ie) I Team Trail	ner (STTT)
TSTC provides realistic joint warfare training across the spectrum of armed con missions to support IAMD). TSTC provides ships' Commanding Officers and Ba stress, combat system level team training as an integral part of the Afloat Traini	flict, realistic unit level team trainir attle Group/Battle Force Command ng Organization, the Tactical Train	ng in all war lers with the ning Groups	fare areas (ability to co and C2F/C	e.g. NIFC-C onduct coor C3F FST/LV	CA and BMI dinated rea C events.) listic, high
Develop and integrate MH-60R simulator to enable single ship basic and sustai	nment training, and distributed mu	ılti-ship pier	-side Fleet	Synthetic Tr	aining (FST) events.
Develop and Integrate Cooperative Engagement Capability (CEC) Enhanced To ship pier-side FST events. CET also provide enable proficiency training of Nava	raining (CET) to enable single ship al Integrated Fire Control - Counter	o basic and r Air (NIFC-	sustainmen CA) capabil	it training, a ity.	nd distribute	ed multi-
Develop CEC Interim Training (CIT) capability to enable multi-ship pier-side FS	T events.					
Develop and integrate upgrades to Battleforce Electronic Warfare Trainer (BEW	/T) to support soft kill training with	NULKA De	coys.			
Develop Identification Friend or Foe (IFF) simulator to enable training of Modes and SSDS IFF MODE 4/5 Integration program will address training Mode 4 Inor	1, 2, 3A, 4, C, 5 and S on both AE culation, and allow training of Mod	EGIS and S es 5 and S	SDS ships. IFF.	Capability	will support	AEGIS
Develop and integrate commensurate training improvements to Ships Self Defe (EW) tactical improvements.	nse System in support of Enhance	ed Sea Spa	rrow Missile	e (ESSM) ar	nd Electroni	c Warfare
Integrate Navy Continuous Training Environment (NCTE) networking and cyber	security upgrades.					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<i>Title:</i> Surface Tactical Team Trainer (STTT)	Articles:	15.081 -	14.598 -	15.350 -	0.000 -	15.350 -
<i>FY 2019 Plans:</i> ATD 1.0: Delivered Advanced Training Domain (ATD) 1.0 system and software Baseline (BL) 9.2.2 and SSDS BL 11.x	to support training on Aegis					
ATD 1.1: Conducted integration testing of ATD 1.1 with Aegis Baseline (BL) 10.1 In Weapons Systems (CIWS) simulator and develop and integrate Gun Weapon meet Aegis BL 10.X requirements.	x. Develop and integrate Close- System Training Capability to					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	h 2019	
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/ PE 0204571N / Consolidated Trng	Name) g Sys Dev	Project (Nu 1427 / Surf	u mber/Nan ace Tactica	ie) I Team Trail	ner (STTT)
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	<u>ı Each)</u>	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
BFTT 5.1.2: Delivered Battle Force Tactical Training (BFTT) Software updates a Improvement Program (FCLIP) on Ships Self Defense System (SSDS), to inclu- leveraged from Aegis BL 10 development.	to support Fire Control Loop de integration at CIWS Simulator					
 FY 2020 Base Plans: Continue development, integration, and testing of Advanced Training Domain BL 11. Develop changes to BFTT to incorporate ATD Human Machine Interface (HMI without TI-16 computing and display infrastructure. Complete testing and integration of CIWS Simulator with BFTT and ATD. 	(ATD) on Aegis BL 10 and SSDS) to modernize BFTT in ships					
FY 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement: The increase of \$.752M is for the development of the Close-In Weapon System Integration into both BFTT and ATD with expected completion in FY20. This wi Fire Control Loop Improvement Project (FCLIP) enhancements, and AEGIS Ba capability.	(CIWS) Simulator and Il support training with SSDS se Line 10.x CIWS Integration					
<i>Title:</i> Fleet Training Wholeness	Articles:	0.000	17.835 -	38.820 -	0.000	38.820
Description: Increase in PB20 required to provide a means for Strike Group Tr Training Wholeness (FTW) in a contested environment.	aining to implement Fleet					
FY 2019 Plans: Developed, tested and integrated Engineering Change Proposals (ECP) to implicit simulated contacts into live shipboard air-search radars, for augmenting live expreducing the need for live training assets. This is key to providing the ability to a constructive capabilities needed for fleet synthetic training underway. Failure to prevent ability to augment live underway exercises with synthetic contacts.	lement ability to inject and tag ercises with simulation, thereby train using live, virtual and o update the radar systems, will					
Developed, tested and integrated changes to allow simulated contacts to be over AEGIS and Ships Self Defense System (SSDS) combat systems, which is a crit live, virtual, constructive capabilities in support of fleet synthetic training underw systems will prevent the ability to safely participate in live exercises that are aug	erlaid with tactical contacts, on tical enabler for implementing vay. Failure to update combat gmented with simulation.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	ch 2019	
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/ PE 0204571N / Consolidated Trng	Name) g Sys Dev	Project (N 1427 / Suri	u mber/Nan ace Tactica	n e) Il Team Trai	ner (STTT)
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities i	n Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Developed, tested and Integrated a Gun Weapon System (GWS) simulations a System (EOSS) simulations to provide a means of conducting surface warfare reduce dependence on live fire training. Failure to implement GWS/EOSS train inability to conduct effective surface warfare training.	and Electronic Optical Sensor training capability on AEGIS, and ing capability will result in the					
Developed changes to implement capability to conduct Strike Group Cooperation underway to enable distribution of training data over the live CEC data links to tactical capabilities during fleet synthetic training exercises. Failure to update to AEGIS and SSDS Combat Systems capability advancements and is a critical	ve Engagement Capability (CEC) support training of advanced CEC will prevent fleet from training al capability for FTW.					
Assessed safety issues related to navigation distribution and develop Courses concerns and potential hazards with conducting shipboard synthetic training ur the assessment could adversely impact the ability to safely conduct underway constructive environment.	Of Action (COA) to mitigate nderway. Failure to conduct training in a live, virtual and					
Developed, tested and Integrated combat system data collection and after-acti provide an effective means for instructors to assess operator, and crew perforr Failure to develop assessment tools will impact ability to quantitatively assess during training exercises.	on review capability that will nance during training events. operator and crew performance					
Developed, Tested, and Integrated shipboard synthetic tactical radios that comexercise coordination between ships and shore sites for fleet synthetic events. tactical radios will impact ability to coordinate training exercises without the new communication devices.	municate over NCTE to enable Failure to develop synthetic ed of temporarily installed					
Modified weapon systems modifications to integrate Live, Virtual, and Construct safety. Initiate Battle Force Tactical Training (BFTT) and Advanced Training Domain (integrate	ctive (LVC) functionality and ATD) development efforts to					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	ch 2019	
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/ PE 0204571N / Consolidated Trag	Name) g Sys Dev	Project (N 1427 / Suri	umber/Nan face Tactica	n e) Il Team Trai	ner (STTT)
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities i	in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
LVC capabilities. Failure of not modifying weapons systems will impact the all from participating in underway training events in a live, virtual and constructive ability to adequately conduct strike group certification training events.	bility for AEGIS and SSDS ships e environment, ultimately impacting					
FY 2020 Base Plans: Continue developing changes to implement capability to conduct Strike Group Capability (CEC) underway to enable distribution of training data over the live of advanced tactical capabilities during fleet synthetic training exercises. Failu from training to AEGIS and SSDS Combat Systems capability advancements a	Cooperative Engagement CEC data links to support training the to update CEC will prevent fleet and is a critical capability for FTW.					
Deliver and integrate Radar Sensor Live over Sim capability for Aegis and SSIS	DS.					
Conduct systems enginee3ring activities to embed the Combined Integrated A Anti-Submarine Warfare (ASW) Trainer (CIAT) on Aegis BL 10.	ir and Missile Defense (IAMD) and					
FY 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement: The increase of \$20.985M is in support of Fleet Training Wholeness (FTW) Init wholeness efforts include modifications shipboard sensors to inject simulation integration of MK-34 Gun Weapon System training capability to enable surface events, Modifications of Cooperative Engagement Capability to distribute training integrate synthetic radios, and funds for AEGIS and SSDS weapon systems to during underway fleet training exercises. Also as part of FTW is to the begin the integrate the Combined Integrated Air and Missile Defense (IAMD) and Anti-St onto the next generation AEGIS Destroyer.	tiatives. The fleet training on top of live sensor returns, e warfare into integrated training ing data while ships are underway, o process Simulation over Live he systems engineering activity to ubmarine Warfare (ASW) Trainer					
Title: DDG 1000 Wholeness/Surface Strike	Articles:	0.000	9.613 -	13.620 -	0.000	13.620 -
Description: Increase in PB20 required to provide a means for Strike Group T DDG 1000.	raining to implement training into					
FY 2019 Plans:						

Exhibit R-2A, RDT&E Project Just	ification: PB	2020 Navy							Date: Mar	ch 2019	
Appropriation/Budget Activity 1319 / 7				R-1 Pr PE 020	ogram Elei 04571N / Co	ment (Numbe onsolidated Tri	r/Name) ng Sys Dev	Project (N 1427 / Suri	umber/Na face Tactic	me) al Team Trai	iner (STTT)
B. Accomplishments/Planned Pro	<u>grams (\$ in N</u>	<u>/lillions, Art</u>	icle Quantit	ies in Each)	<u>)</u>		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Developed, tested and installed emb and multi-ship distributed combat sy Support Plan (NTSP). Capability will Training (FST) events. FST events deployment certification. Failure to other services and coalition partners	bedded shipbo stems training allow DDG 1 are used for a execute plans in FST event	pard training prequiremen 000 class sh dvance war , will preven ts.	capability to nts as outline nips to partici fare training, t DDG 1000	support org ed in the DDC ipate in distri , and work up to participate	anic within t G 1000 Nav ibuted Fleet os to strike g e, with the c	he lifelines y Training Synthetic group ther ships,					
DDG 1000 On-Board Trainer develo shipboard configuration, testing will Support Plan (NTSP), and to ensure Copies of the system will then be de	pment began be conducted interoperabil veloped and i	FY19, Shor to ensure re ity with Navy nstalled on I	e Training fa equirement a / Continuous board DDG ´	cility will be is outlined in Training En 1000 Class S	upgraded to DDG 1000 wironment (Ships.	e represent Navy training NCTE).					
<i>FY 2020 Base Plans:</i> Continue development and begin int	egration testi	ng of DDG 1	000 Shipboa	ard Training (Capability.						
Continue development and integrati shipboard Data Center to ensure red Conduct testing to ensure interopera pier-side multi-ship fleet synthetic tra	on of the DDG quirements of ability with the aining exercise	6 1000 On-B DDG 1000 I Navy Conti es.	oard Trainer Navy Trainin nuous Traini	⁻ (OBT) within g Support PI ng Environm	n the DDG an (NTSP) ent (NCTE)	1000 are achieved. to support					
FY 2020 OCO Plans: N/A											
FY 2019 to FY 2020 Increase/Decr The increase of \$4.007M is required Board Training (OBT) capability, as	ease Stateme to complete to outlined in the	e nt: he developr DDG 1000	nent, integra Navy Trainir	ition and test ng Support P	ing of the D Plan (NTSP)	DG-1000 On-					
			Accomplish	nments/Plan	nned Progra	ams Subtotal	s 15.081	42.046	67.790	0.000	67.790
C. Other Program Funding Summ	ary (\$ in Milli	ons <u>)</u>									
			FY 2020	FY 2020	FY 2020					Cost To	Tatal Oast
LINE Item • RDTE/0604307N/3357: Aegis Training Improvement Program	<u>FY 2018</u> 7.717	<u>FY 2019</u> 6.946	<u>вазе</u> 10.078	<u>000</u> -	<u>Iotal</u> 10.078	<u>FY 2021</u> 8.898	<u>FY 2022</u> 7.968	<u>FY 2023</u> 6.139	<u>FY 2024</u> 5.348	Complete Continuing	Continuing
RDTE/0604755N/3358: SSDS Training Improvement Program	7.347	7.831	8.532	-	8.532	12.575	11.729	10.299	9.280	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justi	fication: PB										
Appropriation/Budget Activity 1319 / 7	R-1 Pr PE 020	R-1 Program Element (Number/Name)Project (Number/Name)PE 0204571N / Consolidated Trng Sys Dev1427 / Surface Tactical Team									
C. Other Program Funding Summa	ry (\$ in Milli	ons <u>)</u>									
			<u>FY 2020</u>	FY 2020	FY 2020					Cost To	
Line Item	<u>FY 2018</u>	<u>FY 2019</u>	Base	000	Total	FY 2021	FY 2022	FY 2023	FY 2024	Complete	Total Cost
 OPN/5664/TBD: Other Training 	23.722	29.057	57.364	-	57.364	55.300	53.789	35.988	36.534	Continuing	Continuing
Equipment (Surface BFTT/TSTC											-
portion only) New BLI FY17											
<u>Remarks</u>											

D. Acquisition Strategy

The BFTT acquisition strategy for system development utilizes the Advanced Capability Build (ACB) development model, as mandated by OPNAV. Incremental acquisition and fielding, utilizing commercial off-the-shelf technology to the extent possible, is in accordance with OPNAV LTR Ser N86/9U179029 dtd 31 Jul 09.

E. Performance Metrics

TSTC BFTT Core component will be developed to meet the following developmental milestones. These milestones are in close alignment with AEGIS BL9.C2 and SSDS MK 2 development milestones and integration events. (see R-4)

Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	020 Navy	/								Date:	March 20)19	
Appropriation/Budge	et Activity	1				R-1 Pro PE 020	R-1 Program Element (Number/Name)Project (Number/Name)PE 0204571N / Consolidated Trng Sys Dev1427 / Surface Tactical Team Trainer (STT)								
Product Developmer	nt (\$ in M	illions)		FY	2018	FY 2019			FY 2020 FY 202 Base OCC		2020 CO)20 FY 2020 O 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
Hardware Development	C/FFP	GTS : Virginia Beach, VA	15.457	0.571	Dec 2017	0.580	Dec 2018	0.620	Dec 2019	-		0.620	Continuing	Continuing	Continuing
Systems Engineering	WR	SEA02/NSWC Dam Neck/NSWC Dahlgren : NAVSEA/ Dam Neck/NSWC Dahlgren	29.901	5.370	Dec 2017	15.849	Dec 2018	26.053	Dec 2019	-		26.053	Continuing	Continuing	Continuing
		Subtotal	45.358	5.941		16.429		26.673		-		26.673	Continuing	Continuing	N/A
Remarks Systems Engineering Incre begin engineering solutions On-Board Trainer (OBT) w	ases for devise to embed to the ship	veloping the engineering he Combined IAMD and as data centers.	change to i ASW Train	implement ler on the n	the ability fo ext AEGIS E	r the comba Baseline, ar	at systems a nd to develop	nd sensors o the engine	to augment eering chang	live exercis ges to incor	ses with sin porate the	nulation, DDG 1000			
Support (\$ in Million	s)			FY	2018	FY 2	2019	FY 2 Ba	2020 Ise	FY 2 O(2020 CO	FY 2020 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
Software Development	WR	NSWC Dam Neck/ SEA 02 : WR/REQN	46.792	5.217	Dec 2017	17.977	Dec 2018	33.332	Dec 2019	-		33.332	Continuing	Continuing	Continuing

Remarks

Software Development increases for developing combat system and sensor software changes to implement the capability to augment live exercises with simulation; develop the CIWS Simulation for integration on to SSDS and AEGIS; and develop the software modifications to integrate DDG 1000 On-board Trainer.

5.217

Subtotal

46.792

Test and Evaluation	(\$ in Milli	ons)		FY	2018	FY 2	2019	FY 2 Ba	2020 se	FY 2 OC	2020 CO	FY 2020 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	WR	NSWC Dam Neck/ SEA 02 : WR/REQN	15.610	1.767	Dec 2017	6.125	Dec 2018	6.164	Dec 2019	-		6.164	Continuing	Continuing	Continuing
		Subtotal	15.610	1.767		6.125		6.164		-		6.164	Continuing	Continuing	N/A

17.977

33.332

33.332 Continuing Continuing

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy									Date:	Date: March 2019							
Appropriation/Budge	t Activity	,				R-1 Pro PE 020	o gram Ele 4571N / C	e <mark>ment (N</mark> Consolida	umber/Na ted Trng S	ame) Sys Dev	Project 1427 / S	(Number Surface Ta	r/ Name) actical Tea	nm Traine	r (STTT)		
Management Service	s (\$ in M	illions)	ſ	FY 2	2018	FY 2	2019	FY 2 Ba	2020 Ise	FY 2 OC	2020 CO	FY 2020 Total	Y 2020 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		
Government Engineering Support	WR	NSWC Dam Neck/ SEA02 : WR/REQN	11.265	2.156	Dec 2017	1.515	Dec 2018	1.621	Dec 2019	-		1.621	Continuing	Continuing	Continuing		
		Subtotal	11.265	2.156		1.515		1.621		-		1.621	Continuing	Continuing	N/A		
			Prior Years	FY 2	2018	FY 2	2019	FY 2 Ba	2020 Ise	FY 2 OC	2020 CO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals 119.025 15.081						42.046 67.790 -				67.790	Continuing	Continuing	N/A				

Remarks



Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019							
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Nu PE 0204571N / Consolidate	mber/Name) ed Trng Sys Dev	Project (Number/Na 1427 / Surface Tactio	m e) cal Team Trainer (STTT,					
	Schedule Details								
		Start		End					
Events by Sub Project	Quarter	Year	Quarter	Year					
Proj 1427									
BFTT 5.1A Element Cert for AWS 9.A2.0	1	2018	1	2018					
BFTT 5.1A Element Cert AWS 9.C2.0	4	2018	4	2018					
CSCP Element Cert AWS BL 9A2A	4	2018	4	2018					
BFTT BUILD 5.1.1 TRR	2	2018	2	2018					
BFTT BUILD 5.1.2 IPR	1	2018	1	2018					
BFTT BUILD 5.1.2 IPR2	4	2018	4	2018					
ATD 1.0 CDR	2	2018	2	2018					
ATD 1.1 SFR	1	2018	1	2018					
ATD 1.1 PDR	4	2018	4	2018					
BEWT II 1.4.0 TRR	1	2018	1	2018					
BEWT II 1.4.0 Element Cert	3	2018	3	2018					
BFTT Build 5.1.1 Element Cert AWS 9.2.1	2	2019	2	2019					
BFTT Build 5.1.2 TRR	1	2019	1	2019					
BFTT Build 5.1.2 Element Cert for LSD 46	2	2019	2	2019					
ATD 1.0 IPR	1	2019	1	2019					
ATD 1.0 TRR	2	2019	2	2019					
ATD 1.1 CDR	3	2019	3	2019					
BEWT II 1.4.0 Element Cert CSCP	2	2019	2	2019					
BFTT 5.1.1 Element Cert CSCP for AWS 9.2.1	1	2020	1	2020					
BFTT BUILD 5.1.2 Element Cert for LHD 6	1	2020	1	2020					
ATD 1.0 TRR for TSTC Graduation Test	2	2020	2	2020					
ATD 1.1 TRR	2	2020	2	2020					
			<u>.</u>						

Exh	ibit R-4A, RDT&E Schedule Details: PB 2020 Navy					Date: Marc	ch 2019	
App	ropriation/Budget Activity	R-1 Program	1 Program Element (Number/Name) Project (Number/Name)					
1319	<i>317</i>	PE 02045/1N	T Consolidated Tri	ng Sys Dev	1427 I Sui	al Team Trainer (S	<u>III)</u>	
			Sta	art		E	nd	
	Events by Sub Project		Quarter	Year	(Quarter	Year	
	ATD 1.0 Element Cert for SSDS (est.)		3	2021		3	2021	
	ATD 1.0 Element Cert CSCP AWS BL 9.2.2		1	2021		1	2021	
	ATD 1.1 TRR for TSTC Graduation test (est.)		3	2023		3	2023	

Exhibit R-2A, RDT&E Project Ju	chibit R-2A, RDT&E Project Justification: PB 2020 Navy											
Appropriation/Budget Activity 1319 / 7	R-1 Progra PE 020457	R-1 Program Element (Number/Name)Project (Number/Name)PE 0204571N / Consolidated Trng Sys Dev2124 / Air Warfare Training										
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2124: Air Warfare Training	49.516	1.558	1.709	1.700	-	1.700	1.614	1.647	1.679	1.712	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project transitions new training and range system technologies for use in Naval Aviation training. Products from this effort are directly tied to the Navy Aviation Simulation Master Plan (NASMP), MH-60R/S master plan, Unmanned Aerial Systems (UAS) master plan, the PMA-205 Strategic Plan, the Live Virtual Constructive (LVC) program, component technologies, including the Multiplex Data Bus Controller Translator Transmitter, F/A-18C-F Requirements Procurement Plan (RPP), open architecture implementation, multiple technology refresh efforts and the Multi-Mission Maritime Aircraft/P-8 programs. These efforts will support training optimization of future naval aviation training/preview/mission rehearsal systems (fixed, deployed, and unmanned). Tasks include: specification development to provide for common, modular, High Level Architecture compliant, high fidelity Distributed Mission Training and mission rehearsal capabilities ashore and afloat. Technologies to be developed and integrated include: intelligent semi-automated forces (SAF) technologies, automated performance measurement technology, advanced net-ready weapons simulation, Air to Air/Air to Ground, visual/sensor enhancement, common post mission assessment technologies, tablet mission preview technology, advanced visual-sensor technology, high resolution helmet mounted, and/or flat panel displays, 20-20 visual acuity image generation, Augmented Reality (AR), Virtual Reality (VR) and Mixed Reality (MR) technology, NAVAIR Portable Source Initiative improvements, common correlated data set technologies and heterogeneous data fusion, common link, common software/database reuse technologies, advanced environmental effects modeling, fused radar/infra-red/electro-optic and acoustic sensor simulations, aerodynamic modeling, physics-based infra-red simulations, spatial disorientation and simulator sickness research, communications degradation modeling, and final Test and Evaluation (T&E) within the Aviation Training Technology Integration Facility (ATTIF), Naval Air Warfare Center-Aircraft Division. This Manned-Flight Simulator (MFS) ATTIF capability provides a window to fleet aviators for critical comment, evaluation and fine tuning of new, interoperable, and innovative technologies such as LVC before final transition to the fleet. Naval Aviation Distributed Training Center, debrief/After Action Review (AAR), and intelligent training tools for the virtual environment are focused on human performance and trend analysis enhancements for fleet readiness and distributed mission training at all levels.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2020	FY 2020	FY 2020
	FY 2018	FY 2019	Base	000	Total
Title: HUMAN/INSTRUCTIONAL SYSTEMS INTEGRATION	0.732	0.959	0.960	0.000	0.960
Articles:	-	-	-	-	-
Description: Develop common After Action Review (AAR) and platform-unique post mission assessment, Intelligent Tactical SAF, and high fidelity simulator component technologies to include AR/VR/MR HMD technologies. After Action Review (AAR), and high fidelity components such as Intelligent SAF designs lower Navy Aviation Simulation Master Plan (NASMP) upgrade and simulator life-cycle costs. Integrate Voice-Capable semi-automated forces (SAF) component technologies, improve open common instructor interface effectiveness and provide for multi-SAF exercise utilization. Analyze, develop, and integrate common architecture components for F/A-18C-F, EA-18G, MH-60R/S, Unmanned Aerial Systems (UAS) platforms, E-2C/D & United States Marine Corps mission areas, intelligent instructor operator components, automated					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	h 2019	
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/ PE 0204571N / Consolidated Trng	' Name) g Sys Dev	Project (N 2124 / Air	umber/Nan Narfare Tra	1e) ining	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	<u>n Each)</u>	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
performance measurement technologies, Tactical Aircraft/ Multi-Mission Maritir Breathing Device-Spatial Disorientation technologies/devices common graphic common threat system formats, Next Generation Threat System (NGTS) techn Automated Forces (JSAF) compatibility, cross platform post mission performan Reconfigurable Maintenance Training Systems, (MRTS) and after action review maximizing return on investment for instructional systems technology investme	ne Aircraft/ Reduced Oxygen user interface initiatives, ology transitions, Joint Semi- ce measurement, Multi-purpose v/debrief innovations, thereby nts.					
<i>FY 2019 Plans:</i> Continue fidelity improvements for synthetic entity systems (e.g. NGTS, JSAF), wingman capability and speech recognition control. Continue test and evaluation training device. Continue T-45 Augmented Reality Visual System (ARVS) trained Develop automated scoring and debrief technology for use in multi-team, distribution constructive (LVC) training environments. Continue development of the Post M Training (PMATT) for rotary wing and multiplatform environments. Perform train low footprint, AR/VR/MR based training devices/simulators. Develop technolog from disparate, heterogenous databases to support currency and training required tabase).	including virtual crewman and on of alternate mask-on hypoxia er development and evaluation. buted, and Live, Virtual and lission Assessment for Tactical ning effectiveness experiments on ies to fuse and leverage metrics rements analysis (e.g., CVN LSO					
FY 2020 Base Plans: Continue fidelity improvements for synthetic entity systems (e.g. NGTS, JSAF), wingman capability and speech recognition control. Develop heterogenous data intelligent, semi-automated performance measurement and debrief capability in Constructive (LVC) training environments. Continue development of the Post M Training (PMATT) for rotary wing and multiplatform environments. Perform train on low footprint, AR/VR/MR based training devices / sims. Develop technologie from disparate, heterogenous databases to support currency and training required database).	including virtual crewman and a fusion capability to support a support of Live, Virtual and lission Assessment for Tactical ning effectiveness experiments as to fuse and leverage metrics rements analysis (e.g., CVN LSO					
FY 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement:						

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	h 2019	
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/I PE 0204571N / Consolidated Trng	Name) y Sys Dev	Project (N 2124 / Air	umber/Nan Warfare Tra	ne) ining	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	<u>n Each)</u>	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Minimal increase of one thousand dollars in order to continue fidelity improvem heterogenous data fusion, performance measurement and debrief, and AR/VR/ the base FY20 plans.	ents for synthetic entity systems, MR technologies as described in					
Title: SENSORS AND ENVIRONMENT	Articles:	0.525	0.250	0.240	0.000 -	0.240 -
Description: Develop common and platform unique sensor, visual, and enviror or acoustics) into fidelity upgrades with Commercial Off The Shelf and/or Gover Software. Perform risk reduction, advanced displays innovation, test and evaluat of Common Sensor Model, High Fidelity Active-Acoustics Sensor Operator Trais Submarine Warfare (ASW) acoustic fidelity assessments, 3D weather effects, 3 new Reduced Oxygen Breathing Device (ROBD)& Spatial Disorientation (SD), Demonstrate GOTS capability for cost-effective database materialization, Mater library, associated NAVAIR Portable Source Initiative specifications and process Distributed Mission Training, deployed trainers, legacy, and new visual system Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR). In suppor Master Plan (NASMP) upgrade efforts, develop texture storage, sensor-enviror Source Initiative material reference processes/standards, automated technolog publishing, shadows, cultural lighting, combat, and weather effects and very high technologies, to include tablet-based mission preview for tactical aircrew.	nmental simulation (atmospherics roment Off the Shelf (GOTS) ation, integration, and production ning, 3D Ocean effects, Anti- BD Ocean acoustic modeling, and legacy device technologies. rial Properties Reference Dataset ses for implementation on upgrade programs to include ort of Navy Aviation Simulation imental effects, NAVAIR Portable y applications for real time th resolution visualization					
<i>FY 2019 Plans:</i> Continue investigation of collaborative environmental database for time-critical mission rehearsal trainers. Develop AR/VR/MR Head Mounted Display (HMD) acuity. Develop haptic feedback capability to support AR/VR/MR interaction. De Metrology system for verifying the performance of Virtual and Augmented Realitest metrics and procedures for equating the performance of virtual and augmented legacy Navy Aviation Simulation Master Plan (NASMP) display systems. Develop performance and utility of Mixed Reality training devices (i.e., HMD that integrates and procedures for the performance of the performance of the performance of the performance of the performance and utility of Mixed Reality training devices (i.e., HMD that integrates and performance of the performance of	terrain updates for deployable to provide near human visual evelop Near Eye Display (NED) ity goggle displays. Develop and nted reality display systems to op tests and metrics to evaluate tes virtual world with real world).					
<i>FY 2020 Base Plans:</i> Continue investigation of collaborative environmental database for time-critical mission rehearsal trainers. Develop AR/VR/MR Head Mounted Display (HMD) acuity. Develop haptic feedback capability to support AR/VR/MR interaction. De Metrology system for verifying the performance of Virtual and Augmented Real	terrain updates for deployable to provide near human visual evelop Near Eye Display (NED) ty goggle displays. Develop and					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	h 2019			
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/ PE 0204571N / Consolidated Trag	Name) g Sys Dev	Project (N 2124 / Air V	Date: March 2019 Sect (Number/Name) I Air Warfare Training FY 2020 FY 2020 FY 2020 FY 2020 2019 Base OCO 1 2019 0.500 0.500 0.000 - - - -				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	<u>ı Each)</u>	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total		
test metrics and procedures for equating the performance of virtual and augme legacy Navy Aviation Simulation Master Plan (NASMP) display systems. Contir metrics to evaluate performance and utility of Mixed Reality training devices (i.e world with real world).	nted reality display systems to ue development of tests and ., HMD that integrates virtual							
FY 2020 OCO Plans: N/A								
FY 2019 to FY 2020 Increase/Decrease Statement: Decrease of ten thousand dollars due to reduction in contract service support.								
Title: LIVE VIRTUAL CONSTRUCTIVE (LVC), AND VISUALS	Articles:	0.301	0.500 -	0.500 -	0.000	0.500		
Description: Air Warfare Training Development provides for risk mitigation and Unmanned Aerial Systems, Live Virtual Constructive (LVC) and associated visu development for Navy aviation distributed mission training, and distributed train for stand-alone and small footprint deployable devices. Provided integrated cap Experimentation products, and Training. Support the NASMP upgrade efforts a with advanced visual system display configurations requirements. Assess trained development and incorporation of next generation Live Virtual Constructive (LV (UAS) constructive and associated debrief/After Action Review (AAR) visualiza Additionally, Air Warfare Training Development (AWTD) provides for advanced improvements for Live Virtual Constructive capability (such as "Mobility" Part-T Data Bus Controller Translator Transmitter (MDBCTT)). LVC technologies will f weapons and tactics training and emerging capability requirements in the Air-S Integrated Fire Control-Counter Air (NIFC-CA) capabilities development. FY 2019 Plans: Continue analytical and developmental support for emergent programs of recorr (LVC), integrated warfare, acoustic simulation environments, warfighter perform enhancements, and sensor/visualization modeling. Develop and integrate addi Landing Aid System(MOVLAS) capability into Landing Signal Officer (LSO) Sta deck crew trainer. Develop and test prototype Embedded Next Generation Three	next generation platform, nalization component ing centers (NADTC), as well as ability assessment for Ranges, nd Type/Model/Series programs ee cognitive requirements and the C), Unmanned Aerial Systems ion component technologies. virtual component fidelity ask Trainers and the Multiplex acilitate advanced, cost effective ea battlespace and Naval d in Live, Virtual and Constructive nance assessment, threat system tional Manually Operated Visual tion for the expandable flight eat System (NGTS) for TCTS Inc							

Exhibit R-2A, RDT&E Project Justif				Date: Mar	ch 2019						
Appropriation/Budget Activity 1319 / 7				R-1 Pr PE 020	ogram Elen 04571N / Co	n ent (Numbe Insolidated Tri	r/Name) ng Sys Dev	Project (N 2124 / Air	umber/Nai Warfare Tra	ne) aining	
B. Accomplishments/Planned Prog	rams (\$ in N	<u>lillions, Arti</u>	icle Quantit	<u>ies in Each)</u>	1		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
II Participant Subsystem. Develop cromission training. Develop metrics for the second	Participant Subsystem. Develop cross domain solutions to support LVC, integrated warfare, and distributed ssion training. Develop metrics for cross-platform NIFC-CA and integrated warfighting capability.										
FY 2020 Base Plans: N/A											
FY 2020 OCO Plans: Continue analytical and developmenta (LVC), integrated warfare, acoustic si enhancements, and sensor/visualizar based on Commercial Off the Shelf (C reality Landing Signal Officer (LSO) S solutions to support LVC, integrated w NIFC-CA and integrated warfighting c	al support fo mulation env tion modelin COTS) virtua tation for the varfare, and apability.	r emergent p rironments, v g. Develop ir l and augme e expandable distributed n	programs of warfighter pentegrated ex ented reality e flight deck nission traini	record in Liv erformance a pandable flig technology. crew trainer. ing. Develop	e, Virtual an issessment, ght deck crea Develop pro Develop crea metrics for	d Constructive threat system w trainer totype virtual oss domain cross platform					
			Accomplis	hments/Plar	nned Progra	ims Subtotal	s 1.558	1.709	1.700	0.000	1.700
C. Other Program Funding Summar	y (\$ in Milli	ons)								_	
Line Item • APN/0705:: COMMON GROUND EQUIPMENT - TRAINING <u>Remarks</u>	<u>FY 2018</u> 181.145	<u>FY 2019</u> 179.674	<u>FY 2020</u> <u>Base</u> 292.015	<u>FY 2020</u> <u>OCO</u> -	FY 2020 Total 292.015	<u>FY 2021</u> 252.165	<u>FY 2022</u> 218.093	<u>FY 2023</u> 239.165	<u>FY 2024</u> 231.018	Cost To Complete Continuing	<u>Total Cost</u> Continuing

D. Acquisition Strategy

Air Warfare Training Development (AWTD) is a BA 07 RDT&E joint technology transition program tied to the PMA-205 Strategic Plan, Navy Aviation Simulation Master Plan (NASMP), United States Marine Corps upgrades and the various platform simulation master plans with the purpose of transitioning advanced training and mission preview/rehearsal technologies. AWTD provides risk mitigation, test and evaluation, and prototype development for stand-alone, manned, un-manned, distributed, open systems and deployed training systems for the warfighter utilizing an Integrated Product Team approach and a combination of reimbursable and direct cite/cost-plus time and material (T&M) contracts.

E. Performance Metrics

Naval Air Warfare Center-Training Systems Division (NAWC-TSD): # of transitions to Fleet Platforms. For each transition, successful Technical Readiness Level (TRL) testing and device Ready for Training (RFT) to Fleet platforms. Seminal transition events are either RFT or tech-refresh Authority to Operate.

NAWC-Aircraft Division (AD): Complete TRL & compliance testing for Navy Aviation Simulation Master Plan (NASMP) and Information Assurance directives.

Exhibit R-3, RDT&E F	Project Co	ost Analysis: PB 2	020 Navy	/								Date:	March 20	019	
Appropriation/Budge	et Activity	,				R-1 Pro PE 020	o gram Ele 4571N / C	e <mark>ment (N</mark> Consolida	umber/Na ited Trng S	ame) Sys Dev	Project 2124 / A	(Number Air Warfar	r/ Name) e Training	1	
Product Developmer	nt (\$ in Mi	illions)		FY 2	2018	FY 2	2019	FY 2 Ba	2020 Ise	FY 2 OC	2020 CO	FY 2020 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
Software Development	C/CPFF	Bohemia Interactive : ORLANDO, FL	0.324	0.448	Jan 2018	0.277	Mar 2019	0.277	Mar 2020	-		0.277	0.000	1.326	1.326
Software Development	C/CPFF	Soar Technology, Inc. : ORLANDO, FL	0.000	0.070	Dec 2018	0.000		0.000		-		0.000	0.000	0.070	0.070
Software Development	C/CPFF	Aptima : WOBURN, MA	0.424	0.000		0.232	Mar 2019	0.232	Mar 2020	-		0.232	0.000	0.888	0.888
Software Development	WR	NAWCTSD : ORLANDO, FL	24.179	0.729	Nov 2017	0.549	Nov 2018	0.550	Nov 2019	-		0.550	Continuing	Continuing	Continuing
Prior Year Prod Dev No Longer Funded in the Budget or Out Years	or Year Prod Dev No nger Funded in the dget or Out Years Various Various : Various 10.0 Subtotal 35.0					0.000		0.000		-		0.000	Continuing	Continuing	Continuing
	Subtotal 35.549 1.247							1.059		-		1.059	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2	2018	FY 2	2019	FY 2 Ba	2020 Ise	FY 2 OC	2020 CO	FY 2020 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
Logistics	WR	NAWCAD : PATUXENT RIVER, MD	0.051	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Logistics	WR	NAWCTSD : ORLANDO, FL	0.000	0.020	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCAD : PATUXENT RIVER, MD	0.033	0.035	Nov 2017	0.120	Nov 2018	0.120	Nov 2019	-		0.120	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCTSD : ORLANDO, FL	0.000	0.020	Nov 2017	0.150	Nov 2018	0.150	Nov 2019	-		0.150	Continuing	Continuing	Continuing
Prior Year Support No Longer Funded in the Budget or Out Years	Various	Various : Various	3.803	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	3.887	0.075		0.270		0.270		-		0.270	Continuing	Continuing	N/A

Appropriation/Budget Activity 1319 / 7 Proper Ilement (Number/Name) PE 0204571N / Consolidated Trg Sys Dev Project (Number/Name) 2124 / Air Warfare Training Second 2124 / Air Warfare Training Test and Evaluation (\$ in Millions) FY 2018 FY 2019 FY 2020 Base FY 2020 Cot FY 2020 Total F	Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	020 Navy	/								Date:	March 20	19	
Test and Evaluation U U F F F C F C F C F C F C F C F C F C F C F C F C F C F C F C F C F C F C <	Appropriation/Budge	et Activity	/				R-1 Pro PE 020	gram Ele 4571N / C	e <mark>ment (N</mark> Consolida	lumber/Na ated Trng S	ame) Sys Dev	Project 2124 / A	(Numbe i Air Warfar	r/ Name) e <i>Trainin</i> g		
Cost Category Item Contract & Type Performing Activity & Location Prior Value Cost Award Date Cost Cost </th <th>Test and Evaluation</th> <th>(\$ in Milli</th> <th>ions)</th> <th></th> <th>FY</th> <th>2018</th> <th>FY 2</th> <th>2019</th> <th>FY 2 Ba</th> <th>2020 ase</th> <th>FY 2 OC</th> <th>2020 CO</th> <th>FY 2020 Total</th> <th></th> <th></th> <th></th>	Test and Evaluation	(\$ in Milli	ions)		FY	2018	FY 2	2019	FY 2 Ba	2020 ase	FY 2 OC	2020 CO	FY 2020 Total			
Developmental Test & Evaluation WR NAWC AD : PAX RIVER, MD 7.588 0.000 0.000 Nov 2018 0.060 Nov 2019 - 0.060 Continuing Continuing Continuing Continuing Continuing Continuing Continuing Continuing Continuing Continuing Continuing Continuing Continuing Continuing NA Management Services (\$ in Willions) Fry 2019	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
$ \begin to the term of term of the term of term $	Developmental Test & Evaluation	WR	NAWC AD : PAX RIVER, MD	7.588	0.000		0.060	Nov 2018	0.060	Nov 2019	-		0.060	Continuing	Continuing	Continuing
Management Services (\$ in Millions)FY 2018FY 2019FY 2020 BaseFY 2020 OCOFY 2020 TotalContract Method & TypeContract Method & TypePrior Activity & Location YearsPrior CostCost DateAward DateCost CostAward DateCostAward DateAward CostAward DateAward CostAward DateCost CostAward DateAward CostAward DateCostAward DateAward CostAward DateCostAward DateCostAward DateCostAward DateAward CostAward DateCostAward DateCostAward DateCostAward DateCostAward DateCostAward DateCostAward DateCostAward DateCostAward DateCostTotal Cost<			Subtotal	7.588	0.000		0.060		0.060		-		0.060	Continuing	Continuing	N/A
Cost Category ItemContract & TypePerforming Activity & LocationPrior YearsCostAward DateAward CostAward DateAward CostAward DateAward CostAward DateAward CostAward DateAward CostAward DateCostTarget Value of ContractProgram Management SupportC/CPFFPrecise : LEXINGTON PARK, MD0.3980.149Feb 20180.134Feb 20190.124Feb 20200.1240.0000.0000.8050.805Program Management SupportWRNAWC AD : PAX RIVER, MD0.0000.075Nov 20170.0000.0	Management Service	lanagement Services (\$ in Millions)			FY	2018	FY 2	2019	FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Program Management Support C/CPFF Precise : LEXINGTON PARK, MD 0.398 0.149 Feb 2018 0.134 Feb 2019 0.124 Feb 2020 0.124 0.000 0.805 0.805 0.805 Program Management Support WR NAWCAD : PAX RIVER, MD 0.000 0.075 Nov 2017 0.000 0.000 0.000 Continuing Continuing Travel Allot NAVCRD : PAX RIVER, MD 0.543 0.012 Nov 2017 0.010 Nov 2018 0.010 Nov 2019 0.010 Continuing Continuing Continuing Continuing Program Management Support WR NAVAIR : PAX RIVER, MD 0.543 0.012 Nov 2017 Nov 2018 0.010 Nov 2019 0.010 Continuing Continuing Continuing Continuing Program Management Support WR NAWCTSD : ORLANDO, FL 0.089 0.000 0.177 Nov 2019 0.177 Continuing Continuing Continuing Continuing Continuing	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
Program Management SupportWRNAWC AD : PAX RIVER, MD0.0000.075Nov 20170.0000.0000.0000.0000.000ContinuingCont	Program Management Support	C/CPFF	Precise : LEXINGTON PARK, MD	0.398	0.149	Feb 2018	0.134	Feb 2019	0.124	Feb 2020	-		0.124	0.000	0.805	0.805
TavelAllotNAVAIR : PAX RIVER, MD 0.543 0.012 Nov 2017 0.010 Nov 2018 0.010 Nov 2019 $ 0.010$ 0.010 <th< td=""><td>Program Management Support</td><td>WR</td><td>NAWC AD : PAX RIVER, MD</td><td>0.000</td><td>0.075</td><td>Nov 2017</td><td>0.000</td><td></td><td>0.000</td><td></td><td>-</td><td></td><td>0.000</td><td>Continuing</td><td>Continuing</td><td>Continuing</td></th<>	Program Management Support	WR	NAWC AD : PAX RIVER, MD	0.000	0.075	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Management Support WR NAWCTSD : ORLANDO, FL 0.089 0.000 0.177 Nov 2018 0.177 Nov 2019 - 0 0.177 Continuing	Travel	Allot	NAVAIR : PAX RIVER, MD	0.543	0.012	Nov 2017	0.010	Nov 2018	0.010	Nov 2019	-		0.010	Continuing	Continuing	Continuing
Prior year Mgmt Sup no longer funded in the FYDP Various Various 1.462 0.000 0.000 0.000 0.000 - 0.000 Continuing	Program Management Support	WR	NAWCTSD : ORLANDO, FL	0.089	0.000		0.177	Nov 2018	0.177	Nov 2019	-		0.177	Continuing	Continuing	Continuing
Subtotal 2.492 0.236 0.321 0.311 - 0.311 Continuing Continuing N/A Prior Prior FY 2018 FY 2019 FY 2020 FY 2020 FY 2020 Cost To Continuing Total Value of Project Cost Totals 49.516 1.558 1.709 1.700 - - 1.700 Continuing Continuing N/A	Prior year Mgmt Sup no longer funded in the FYDP	Various	Various : Various	1.462	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Prior Years FY 2018 FY 2019 FY 2020 Base FY 2020 OCO FY 2020 Total Cost To Complete Total Cost Target Value of Contract Project Cost Totals 49.516 1.558 1.709 1.700 - 1.700 Continuing Continuing N/A			Subtotal	2.492	0.236		0.321		0.311		-		0.311	Continuing	Continuing	N/A
Project Cost Totals 49.516 1.558 1.709 1.700 - 1.700 Continuing Continuing N/A	Prior Years		Prior Years	FY	2018	FY 2	2019	FY 2 Ba	2020 1se	FY 2 OC	2020 CO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract	
		_	Project Cost Totals	49.516	1.558		1.709		1.700		-		1.700	Continuing	Continuing	N/A

Remarks



Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy Date: March 2019 Appropriation/Budget Activity R-1 Program Element (Number/Name) Project (Number/Name) PE 0204571N / Consolidated Trng Sys Dev 2124 / Air Warfare Training 1319/7 FY 2021 FY 2024 FY 2023 Sensors and Environment FY 2018 FY 2019 FY 2020 FY 2022 10/20/30 40 40 40 Acquistion Milestones Systems Development Common/Platform Sensors and Environment (Models/Tools) collaborative Database Rapid Terrain Generation Near Eye Display Metrology System VR and Haptic for Flight Deck Crew Demo Test & Evaluation Production Milestones FUSED SENSORS UAS/Tier 3 FUSED SENSORS UAS/Tier 4 FUSED SENSORS UAS/Tier Near Eye Display Metrology System VR and VR and VR and Haptic for Haptic for Flight Deck Haptic for Flight Deck Flight Deck Crew Demo Crew Demo Crew 2 3 Demo --T Collaborative Collaborative Collaborative Collaborative Database Database Database Database Rapid Rapid Rapid Rapid Terrain Terrain Terrain Terrain Generation Generation Generation Generation Phase I Phase II Phase III Phase IV Ŧ T • -

2020DON - 0204571N - 2124

Exhibit R-4, RDT&E Sched	ule	Prof	ile: PB 2	2020 N	avy													Da	te:	March 201	19	
Appropriation/Budget Activ 1319 / 7	9 / 7 9 / 7 Ve Virtual Constructive (LVC), FY 2018 FY 2019								R-1 Program Element (Number/Name)ProjectPE 0204571N / Consolidated Trng Sys Dev2124 / A						ject (N 4 <i>I Air</i>	(Number/Name) Air Warfare Training						
Live Virtual Constructive (LVC), and Visuals	FY	2018	l	FY	2019			FY 2	020		FY 2	2021			FY	2022			F	Y 2023	F	Y 2024
	1012	93949	10	29	3Q	40	192	ସ ଓ ସ	40		Q 2Q	130	4Q	1020	3Q		4Q	102	q3q	4Q	19293	Q 4Q
Acquistion Milestones	44					<u> </u>	44				ļ	44						44	44		\square	
Systems Development			Emb NIF	edded N C-CA Vir	GTS for	 TCTS ptive Train	ing T	echnology														
									FI	light D	eck Trainer Ex	qan	sion Pack			'						'
	\square							Flee	et Adaptive	e Multi	-Level Measur	reme	ent for LVC									
Test & Evaluation												רר										
			Embedded NGTS for TCTS	Em NG NG Ac Mul Mea: for	bedded STS for CTS 2 Fleet laptive ti-Level surement LVC 1 V	NIFC-CA Adaptive Training Tech 1 Flight Deck Training Expansor Pack - Phase 1		Fleet Adaptive Multi-Leve Measurem for LVC 2	NIFC- Adap Train Tect Peop Pace Phas	CA tive 12 ht:kg sion k- e 2	Fleet Adaptive Multi-Level Measuremer for LVC 3	nt	Flight Deck Training Expansion Pack - Phase 3 ▼		Fleet Adaptiv Multi-Le Measurer for LVC ▼	re - vel E : 4 I	Flight Deck Training xpansior Pack - Phase 4 ▼		8	Flight Deck Training Expansion Pack - Phase 5 ▼ Fleet Adaptive Multi-Level Multi-Level Measurement for LVC 5		Flight Deck Training Expansion Pack - Phase 6 ▼

2020DON - 0204571N - 2124

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204571N / Consolidated Trng Sys Dev	Project (N 2124 / Air I	umber/Name) Warfare Training

Schedule Details

	Sta	art	Er	d
Events by Sub Project	Quarter	Year	Quarter	Year
Human/Instructional Systems Integration	·			
Systems Development: Common Instruction Systems/SAF and Unmanned Aerial Systems Interface Selection and Training Tech Dev	1	2018	4	2019
Systems Development: Augmented Reality/ Virtual Reality/ Mixed Reality Sim Demo	1	2019	4	2021
Systems Development: NGTS Analysis and Reporting	1	2019	4	2022
Systems Development: Crew Enabled Role Player	1	2018	4	2024
Systems Development: T-45 Augmented Reality Visual System (ARVS) Part Task Trainer (PTT)	2	2018	3	2019
Production Milestones: AR/VR/MR Sim Demo 1	4	2019	4	2019
Production Milestones: AR/VR/MR Sim Demo 2	4	2020	4	2020
Production Milestones: AR/VR/MR Sim Demo 3	4	2021	4	2021
Production Milestones: UAS INSTR. SYS Tier I/II 2	4	2018	4	2018
Production Milestones: UAS INSTR. SYS. Tier I/II 3	4	2019	4	2019
Production Milestones: NGTS Analysis and Reporting - Phase I	4	2019	4	2019
Production Milestones: Crew Enabled Role Player - Synthetic Crew Member	4	2020	4	2020
Production Milestones: NGTS Analysis and Reporting - Phase 2	4	2020	4	2020
Production Milestones: Crew Enabled Role Player - Virtual Wingman	4	2021	4	2021
Production Milestones: NGTS Analysis and Reporting - Phase 3	4	2021	4	2021
Production Milestones: NGTS Analysis and Reporting - Phase 4	4	2022	4	2022
Production Milestones: Crew Enabled Role Player - Speech Enabled Synthetic Role Player	4	2023	4	2023
Production Milestones: T-45 Augmented Reality Visual System (ARVS) Part Task Trainer (PTT) 1	2	2019	2	2019

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy				Date: Mar	ch 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program I PE 0204571N	Element (Number I Consolidated Trn	r/ Name) Ig Sys Dev 2	Project (Number/Nar 2124 / Air Warfare Tra	ne) iining
		Sta	rt	E	nd
Events by Sub Project		Quarter	Year	Quarter	Year
Production Milestones: T-45 Augmented Reality Visual System (ARVS) Trainer (PTT) 2	Part Task	2	2019	2	2019
Production Milestones: T-45 Augmented Reality Visual System (ARVS) Trainer (PTT) 3	Part Task	3	2019	3	2019
Production Milestones: Crew Enabled Role Player - Phase IV		4	2024	4	2024
Sensors and Environment		L. L			
Systems Development: Common/Platform Sensors and Environment (M	/lodels/Tools)	1	2018	4	2020
Systems Development: Collaborative Database Rapid Terrain Generation	on	1	2019	4	2024
Systems Development: Near Eye Display Metrology System		1	2019	4	2020
Systems Development: VR and Haptic for Flight Deck Crew Demo		1	2020	4	2022
Production Milestones: FUSED SENSORS UAS/Tier 3		4	2018	4	2018
Production Milestones: FUSED SENSORS UAS/Tier 4		4	2019	4	2019
Production Milestones: FUSED SENSORS UAS/Tier 5		4	2020	4	2020
Production Milestones: Near Eye Display Metrology System		4	2020	4	2020
Production Milestones: VR and Haptic for Flight Deck Crew Demo		4	2020	4	2020
Production Milestones: VR and Haptic for Flight Deck Crew Demo 2		4	2021	4	2021
Production Milestones: VR and Haptic for Flight Deck Crew Demo 3		4	2022	4	2022
Production Milestones: Collaborative Database Rapid Terrain Generatic	on Phase I	4	2021	4	2021
Production Milestones: Collaborative Database Rapid Terrain Generatic	on Phase II	4	2022	4	2022
Production Milestones: Collaborative Database Rapid Terrain Generation	on Phase III	4	2023	4	2023
Production Milestones: Collaborative Database Rapid Terrain Generation	on Phase IV	4	2024	4	2024
Live Virtual Constructive (LVC), and Visuals					
Systems Development: Embedded NGTS for TCTS Participant Susbyst	tem	1	2019	4	2019
Systems Development: NIFC-CA Virtual Adaptive Training Technology		1	2018	4	2020
Systems Development: Flight Deck Trainer Expansion Pack		1	2018	4	2024
Systems Development: Fleet Adaptive Multi-Level Measurement for LV	С	4	2018	4	2023
Production Milestones: Embedded NGTS for TCTS Participant Subsyste	em	1	2019	1	2019

Exh	nibit R-4A, RDT&E Schedule Details: PB 2020 Navy					Date: Marc	ch 2019
Ap 131	oropriation/Budget Activity 9 / 7	R-1 Program PE 0204571N	Element (Number I Consolidated Tr	e r/Name) mg Sys Dev	Project 2124 / /	ne) ining	
			St	tart		E	nd
	Events by Sub Project		Quarter	Year		Quarter	Year
	Production Milestones: Embedded NGTS for TCTS Participant Subsyste	em 2	3	2019		3	2019
	Production Milestones: NIFC-CA Adaptive Training Tech 1		4	2019		4	2019
	Production Milestones: NIFC-CA Adaptive Training Tech 2		4	2020		4	2020
	Production Milestones: Flight Deck Training Expansion Pack - Phase 1		4	2019		4	2019
	Production Milestones: Flight Deck Training Expansion Pack - Phase 2	4	2020		4	2020	
	Production Milestones: Flight Deck Training Expansion Pack - Phase 3		4	2021		4	2021
	Production Milestones: Flight Deck Training Expansion Pack - Phase 4		4	2022		4	2022
	Production Milestones: Flight Deck Training Expansion Pack - Phase 5		4	2023		4	2023
	Production Milestones: Flight Deck Training Expansion Pack - Phase 6		4	2024		4	2024
	Production Milestones: Fleet Adaptive Multi-Level Measurement for LVC	1	3	2019		3	2019
	Production Milestones: Fleet Adaptive Multi-Level Measurement for LVC	2	3	2020		3	2020
	Production Milestones: Fleet Adaptive Multi-Level Measurement for LVC	3	2	2021		2	2021
	Production Milestones: Fleet Adaptive Multi-Level Measurement for LVC	4	3	2022		3	2022
	Production Milestones: Fleet Adaptive Multi-Level Measurement for LVC	5	4	2023		4	2023
							<u>i</u>

Exhibit R-2A, RDT&E Project Ju	stification:	PB 2020 N	lavy							Date: Marc	h 2019		
Appropriation/Budget Activity 1319 / 7		R-1 Progra PE 020457	am Elemen '1N / Conso	t (Number /l lidated Trng	Name) g Sys Dev	Project (No 3093 / TAC	umber/Nan TS/LATR F	n e) Replacemen	t				
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 FY 2020 FY 2021 FY 2022 FY 2023 OCO Total FY 2021 FY 2022 FY 2023					Cost ToFY 2024Complete		
3093: TACTS/LATR Replacement	93.570	46.780	56.154	51.245	-	51.245	6.669	3.722	3.792	3.867	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-						

A. Mission Description and Budget Item Justification

The Tactical Combat Training System (TCTS) Increment II will provide an improved environment for air combat training utilizing a secure air-to-air and air-to-ground data link, and will provide rangeless operation capability to Forward Deployed Naval Forces (FDNF). TCTS Increment II will provide encryption and an enhanced threat environment, as well as airborne participant instrumentation for multiple fixed and rotary wing platforms. Engineering Development Model (EDM) units will be developed in FY19 and FY20 and will support Engineering and Developmental Testing events thru FY21. The EDMs will be specifically utilized for testing in the following areas: Environmental Qualification, Software, High Accelerated Lifecycle, Ground System Integration, Airborne Subsystem Air Worthiness and Performance, Shipboard Ground Station, Internal Mount and Rack Mounted Subsystem (Internal Mount) Airworthiness and Performance and JSF Airworthiness and Performance.

Increase in FY20 from previous submission reflects transfer of funding from APN 0725, OPN 4204 for EDM development and test, to include Cross Domain Solution (CDS) and Advanced Weapons Laboratory testing.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: TACTS/LATR REPLACEMENT Articles:	46.780	56.154 41	51.245 16	0.000	51.245 16
Description: TCTS: Qualify and complete the On-Range and Rangeless Pod system fielding for all USN Tactical Training Ranges and Carrier Air Wing Five (CVW-5) CVN installation, including the complete Integrated Logistics products and training. Define Test & Training Enabling Architecture (TENA) compliant interface between TCTS and an Advanced Display System (ADS). Develop a Rack- Mounted subsystem for use on rotary wing and transport aircraft. Continue development of the encrypted data link. Develop related training range integration.					
FY 2019 Plans: FY19 includes the completion of Critical Design Review (CDR) and Post Critical Design Review (CDR) assessment for the Airborne Subsystem (POD), Ground Subsystem, Remote Range Unit, and Portable Support Equipment Subsystems. Engineering Development Model (EDM) fabrication of both participant subsystems and ground stations occurs in FY19 to support Developmental Testing (DT) beginning in FY20. FY19 continues steps toward completion of the National Security Agency (NSA) Certification. FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Just	ification: PB	2020 Navy							Date: Mar	ch 2019	
Appropriation/Budget Activity 1319 / 7				R-1 Pr PE 020	ogram Elen 04571N / Co	n ent (Numbe i Insolidated Trr	r/ Name) ng Sys Dev	Project (N 3093 / <i>TAC</i>	umber/Na CTS/LATR	me) Replacemer	nt
B. Accomplishments/Planned Pro	grams (\$ in I	<u>/lillions, Art</u>	icle Quantit	ies in Each)			FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY20 will include Test Readiness Re ensure readiness to start contractor Test-B). FY20 will continue steps to include the completion of System Au	eview (TRR) a system testin ward complet uthority to Ope										
FY 2020 OCO Plans: N/A											
FY 2019 to FY 2020 Increase/Decr The decrease of \$4.909 from FY201 Review (CDR) and moving into Dev	ease Statem 9 to FY2020 elopmental Te										
			Accomplish	nments/Plar	nned Progra	ms Subtotals	4 6.780	56.154	51.245	0.000	51.245
C. Other Program Funding Summa	ary (\$ in Milli	ons <u>)</u>									
			<u>FY 2020</u>	<u>FY 2020</u>	FY 2020					Cost To	
Line Item • OPN/4204: Weapons Range Support Equipment (WRSE)	<u>FY 2018</u> 66.941	<u>FY 2019</u> 93.864	<u>Base</u> 101.843	<u>000</u> -	<u>Iotal</u> 101.843	<u>FY 2021</u> 84.035	<u>FY 2022</u> 110.979	<u>FY 2023</u> 112.426	<u>FY 2024</u> 115.771	Complete Continuing	Total Cost Continuing
APN/0725: Other Production Charges/Tactical Combat Training System (TCTS)	1.463	1.444	0.000	-	0.000	21.184	21.607	22.060	22.502	Continuing	Continuing
<u>Remarks</u>											
D. Acquisition Strategy Tactical Combat Training System w	ill employ an	evolutionary	incremental	acquisition s	strategy. Th	is strategy will	provide for	the develop	ment of a s	system that	meets the

Operational Requirements Document.

E. Performance Metrics

Rockwell Collins, Inc.: National Security Agency (NSA) approved encrypted Data Link Transceiver (DLT). Successful Engineering Development Model testing of encrypted DLT requirements with NSA.

Exhibit R-3, RDT&E I	Project C	ost Analysis: PB 2	2020 Navy	/								Date:	March 20)19	
Appropriation/Budge	et Activity	/				R-1 Pro PE 020	o gram Ele 4571N / C	e <mark>ment (N</mark> Consolida	umber/N ted Trng :	ame) Sys Dev	Project 3093 / 7	(Number ACTS/LA	r/ Name) ATR Repla	cement	
Product Developme	nt (\$ in M	illions)		FY 2	2018	FY 2	2019	FY 2 Ba	2020 se	FY 2	2020 CO	FY 2020 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
Hardware Development	C/CPIF	ROCKWELL COLLINS, INC : CEDAR RAPIDS, IA	17.462	42.852	Oct 2017	47.333	Oct 2018	41.269	Oct 2019	-		41.269	9.490	158.406	158.406
Prior Year Prod Dev No Longer Funded in the Budget or Out Years	Various	Various : Various	10.901	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	28.363	42.852		47.333		41.269		-		41.269	Continuing	Continuing	N/A
Remarks Increase in FY20 from prev Support (\$ in Million	vious submis S)	ssion reflects transfer of	funding fron	n APN 072	5, OPN 4204 2018	4 for EDM o	development 2019	FY 2 Ba	2020 se	FY	2020 CO	FY 2020 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
Systems Engineering	WR	NAWC-WD : CHINA LAKE, CA	0.961	0.030	Jan 2018	0.000		0.000		-		0.000	0.000	0.991	0.991
Systems Engineering	WR	NAWC-AD : PAX RIVER, MD	9.498	1.535	Jan 2018	3.310	Nov 2018	3.376	Nov 2019	-		3.376	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	JACOBS ENG : Ridgecrest, CA	0.000	0.000		0.700	Dec 2018	0.000		-		0.000	0.000	0.700	0.700
Systems Engineering	WR	SPAWAR : NORTH CHARLESTON, SC	0.000	0.113	Jun 2018	0.406	Nov 2018	0.000		-		0.000	0.000	0.519	0.519
Systems Engineering	C/CPFF	Calvert Engineering Inc. : Prince Frederick, MD	0.000	0.040	Sep 2018	0.000		0.000		-		0.000	0.000	0.040	0.040
Systems Engineering	C/CPFF	Precise : LEXINGTON PARK, MD	0.000	0.239	Mar 2018	0.087	Nov 2018	0.089	Nov 2019	-		0.089	0.000	0.415	0.415
Logistics	WR	NAWC-AD : PAX RIVER, MD	0.714	0.290	Jan 2018	0.956	Nov 2018	0.975	Nov 2019	-		0.975	Continuing	Continuing	Continuing
Logistics Sup	C/CPFF	Synectic Solutions, Inc. : LEXINGTON PARK, MD	0.164	0.168	Aug 2018	0.173	Aug 2019	0.176	Aug 2020	-		0.176	0.000	0.681	0.681

Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	2020 Navy	/								Date:	March 20)19	
Appropriation/Budge	et Activity	ý				R-1 Pro PE 020	o gram Ele 4571N / C	e <mark>ment (N</mark> Consolida	umber/Nated Trng S	ame) Sys Dev	Project 3093 / 7	(Number TACTS/LA	r/ Name) ATR Repla	acement	
Support (\$ in Million	s)		ſ	FY	2018	FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Prior Year Support No Longer Funded in the Budget or Out Years	Various	Various : Various	28.115	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	39.452	2.415		5.632		4.616		-		4.616	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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	WR	NAWC-AD : PAX RIVER, MD	1.938	0.272	Jan 2018	0.892	Nov 2018	0.910	Nov 2019	-		0.910	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	AMRDEC : REDSTONE ARSENAL, AL	0.000	0.002	Oct 2018	0.008	Nov 2018	0.008	Nov 2019	-		0.008	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	GSA : Atlanta, GA	0.000	0.048	Nov 2018	0.258	Jan 2019	0.263	Nov 2019	-		0.263	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NAWC-WD : China Lake, MD	0.000	0.000		0.000		1.108	Nov 2019	-		1.108	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSA : Fort Meade, MD	0.000	0.000		0.000		1.000	Nov 2019	-		1.000	Continuing	Continuing	Continuing
Prior Year T&E No Longer Funded in the Budget or Out Years	Various	Various : Various	3.425	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	5.363	0.322		1.158		3.289		-		3.289	Continuing	Continuing	N/A

Remarks

Increase in Government Developmental Test & Evaluation support from FY2019 to FY2020 to support the Developmental Testing (DT) that will begin in FY2020. This includes funding to NSA for Cross Domain Solution (CDS) testing and funding to NAWCWD for Advanced Weapons Laboratory testing.

Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	020 Navy	/								Date:	March 20	19	
Appropriation/Budge	et Activity	1			R-1 Program Element (Number/Name)Project (Number/Name)PE 0204571N / Consolidated Trng Sys Dev3093 / TACTS/LATR Replace										
Management Service	es (\$ in M	illions)		FY 2	2018	FY 2	2019	FY 2 Ba	2020 Ise	FY 2	2020 CO	FY 2020 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
Prog Mgnt Sup	WR	NAWC-AD : PAX RIVER, MD	4.151	1.057	Jan 2018	1.784	Nov 2018	1.820	Nov 2019	-		1.820	Continuing	Continuing	Continuing
Travel	Allot	NAVAIR : PAX RIVER, MD	0.103	0.006	Jan 2018	0.030	Nov 2018	0.030	Nov 2019	-		0.030	Continuing	Continuing	Continuing
Prog Mgnt Sup	C/CPFF	Precise : LEXINGTON PARK, MD	0.079	0.128	Jun 2018	0.217	Feb 2019	0.221	Feb 2020	-		0.221	0.000	0.645	0.645
Prior Year Mgmt No ₋onger Funded in the Budget or Out Years	Various	Various : Various	16.059	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	20.392	1.191		2.031		2.071		-		2.071	Continuing	Continuing	N/A
			Prior Years	FY 2	2018	FY 2	2019	FY 2 Ba	2020 Ise	FY 2	2020 CO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
		Project Cost Totals	93.570	46.780		56.154		51.245		-		51.245	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Pi	rofile	: PB	202	20 Nav	у																		D	ate	∋: №	larc	ch 2	019
Appropriation/Budget Activity 1319 / 7										R- PE	1 Pr 5 020	og 045	ram I 571N	Elen / Cc	nen onsc	t (N	Num ated	ber/ Trng	' Na i g Sj	me) vs L) Dev	P I 30	oject (Nu 93 / <i>T</i> ACT	nb S/L	er/I .AT	Nan R R	ne) Repl	acement
TACTS/LATR Replacement	10	FY	20	18		FY 201	9 3014	401	FY	<u>202</u>	0	10	FY 20	021	40	F	=Y 20	022	401	101	20	FY 2	2023 4Q		0120	FY 130	20:	24
Acquisition Milestones and Knowledge Points				Post PDR Assess ▼		Post CDR Assess ▼							POD MS C		F	νD Ι Μ												
Program Management/Cyber Security																İ				Ì	_							
Contracts													L	RIP		5/G	S L	RIP	, IМ				F					
Engineering								- - 1		 /FRR	/FC/	⊢ ^	- Multi	ple l	Eve	nts		 		- - 								
Logistics																	PCA POD			F	PCA IM							
Test & Evaluation									D.	¦ т-в	- Mu	Itipl	le Eve	ents		İ	DT	-C - Ev	- Mi ents	ultip s	ble						1	
NSA Certification	R	j AP 1/	İ 'RA	P 2/IAT	İ Т/РС/	A/RAP 3	3/Fir	hal C	 Cert] Mu	ltiple) ∋ Ev	vents			Ï									Ì	1	1	
Systems Development																				ј Те	Next chno F	t Ge olog Phas	neration y Upgrade se 1	Te	 Ne echi	nolo Ph	Gene ogy l iase	eration Jpgrade 2
Production Milestones																							Next Generation Technology Upgrade Phase 1	r			Ge Te U P	Next neration chnology pgrade hase 2

2020PB - 0204571N - 3093

ibit R-4A, RDT&E Schedule Details: PB 2020 Navy			Da	te: March 2019
propriation/Budget ActivityR-19 / 7PE	Program Element 0204571N / Consol	(Number/Name) idated Trng Sys De	V 3093 / TACTS	ɔer/Name) /LATR Replacement
Schedu	lle Details			
		Start		End
Events by Sub Project	Qua	rter Yea	ır Quar	ter Year
TACTS/LATR Replacement				
Acquisition Milestones and Knowledge Points: Post PDR Assessment	4	4 201	8 4	2018
Acquisition Milestones and Knowledge Points: Post CDR Assessment	2	2 201	9 2	2019
Acquisition Milestones and Knowledge Points: POD MS C		2 202	1 2	2021
Acquisition Milestones and Knowledge Points: POD IOC		2 202	2 2	2022
Acquisition Milestones and Knowledge Points: Production Decision Internal M	ount	1 202	2 1	2022
Acquisition Milestones and Knowledge Points: Internal Mount IOC	2	2 202	3 2	2023
Acquisition Milestones and Knowledge Points: FRP	2	2 202	3 2	2023
Program Management/Cyber Security: Authority to Operate	3	3 202	0 3	2020
Contracts: LRIP Airborne Subsystem (POD), Ground Subsystem, Remote Ra Portable Support Equipment Subsystem	nge Unit,	2 202	1 2	2022
Contracts: LRIP Rack-Mounted Internal Mount, JSF Internal Mount		1 202	2 2	2023
Contracts: Full Rate Production	2	2 202	3 4	2024
Engineering: Preliminary Design Review		2 201	8 2	2018
Engineering: Critical Design Review		1 201	9 1	2019
Engineering: Test Readiness Review / Flight Readiness Review / Functional Configuration Audit		1 202	0 1	2022
Logistics: Physical Configuration Audit POD	2	2 202	2 2	2022
Logistics: Physical Configuration Audit IM	2	2 202	3 2	2023
Test & Evaluation: Developmental Test B - Multiple Events		1 202	0 4	2021
Test & Evaluation: Developmental Test C - Multiple Events	2	2 202	2 2	2023
NSA Certification: RAP 1/RAP 2/IATT/PCA/RAP 3/Final Cert		1 201	8 2	2021

Systems Development: Next Generation Technology Upgrade Phase 1

2023

1

2023

4

Exh	ibit R-4A, RDT&E Schedule Details: PB 2020 Navy					Date: Mar	ch 2019	
App 1319	ropriation/Budget Activity 97	R-1 Program PE 0204571N	Element (Numbe / Consolidated Tri	r/Name) ng Sys Dev	Project (3093 / <i>TA</i>	Number/Nar ACTS/LATR F	ne) Replacement	
			St	art		E	nd	
ſ	Events by Sub Project		Quarter	Year		Quarter	Year	
ſ	Systems Development: Next Generation Technology Upgrade Phase 2		1	2024		4	2024	7
	Production Milestones: Next Generation Technology Upgrade Phase 1		4	2023		4	2023	1
	Production Milestones: Next Generation Technology Upgrade Phase 2		4	2024		4	2024	1

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy												Date: March 2019				
Appropriation/Budget Activity 1319 / 7					R-1 Progra PE 020457	am Element 1N / Conso	: (Number /l lidated Trng	Project (N 3356 / Higi	Number/Name) igh Fidelity Surface Trainers							
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2023	FY 2024	Cost To Complete	Total Cost					
3356: High Fidelity Surface Trainers	27.471	1.163	0.756	3.564	-	3.564	1.466	0.000	0.000	0.000	0.000	34.420				
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-						

A. Mission Description and Budget Item Justification

This line funds high fidelity Aegis Integrated Air and Missile Defense (IAMD) individual, instructor, strike group and team trainers to support all Advanced Capability Build (ACB) and below Aegis baselines. This line provides funds for development of a High Fidelity Aegis Combined Integrated Air and Missile Defense (IAMD) and Anti-Submarine Warfare (ASW) Trainer (CIAT) to enable advanced warfare training (AWT) Phase II objectives to be accomplished ashore and to support Active and Passive Sonar Operations, Target Motion Analysis, Sonobuoy Localization, Command and Control, and execution of ASW Kill chain. Funds are provided for advanced component technology development, prototype evaluation, and technology readiness level assessment. Development of these trainers is in response to CNO Wholeness Review and Department of the Navy requirements. This line also provides funds for the research and development of enabling technologies required to meet Train to Qualify (T2Q) and Train to Certify (T2C) requirements for the Vertical Takeoff Unmanned Aerial Vehicle (VTUAV) and testing towards the integration with the Littoral Combat Ships (LCS) Integrated Tactical Trainers. This line also provides funds for research and development of updates to the Surface Navigation Maintenance Technician Training course of instruction. This line supports Surface Training Advanced Virtual Environment (STAVE) methodology by researching and developing trainers that will create an immersive and interactive learning environment and support both CNO High Velocity Learning and Ready Relevant Learning intent.

NOTE: In FY18, Mine Warfare Synthetic Training requirements previously captured within PE 0204571N / Proj 3356 (High Fidelity Surface Trainer) were realigned to PE 0603502N Surface & Shallow Water MCM / Proj 1235 (Mine Warfare Planning and Analysis).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Combined IAMD ASW Trainer (CIAT) Articles:	0.607 -	0.156 -	0.200 -	0.000	0.200 -
FY 2019 Plans: Test and integrate developed models prior to system installation. Research and develop models to integrate into the system which would keep pace with emergent tactical capabilities in the Fleet such as Electronic Warfare and NIFC-CA enhancements.					
FY 2020 Base Plans: Complete research and development for supporting Aegis BL 9.2 within CIAT architecture. Evaluate computing equipment alternatives for CIAT V2 configuration. Evaluate Operating Environment (OE) network configuration					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	h 2019		
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/I PE 0204571N / Consolidated Trng	Name) g Sys Dev	Project (N 3356 / High	(Number/Name) ligh Fidelity Surface Trainers			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	
updates required for CIAT V2 configuration. Perform critical experiments as new appropriate Subsystem Requirements Documents for CIAT V2.	eded for CIAT V2. Update						
FY 2020 OCO Plans: N/A							
FY 2019 to FY 2020 Increase/Decrease Statement: FY20 funding increase of \$.044 supports Resource Sponsor direction to perform development and validation, preliminary design and prototyping of advanced and the Advanced Capability Build (ACB) 15 / Advanced Capability Build (ACB) 16 Combined Integrated Air Missile Defense/Anti Surface Warfare Trainer (CIAT)	n requirements analysis, d enabling technologies for Phase 0 and Phase 1 into the /2 trainer.						
Title: LCS Navy Training System Plan (NTSP) Execution	Articles:	0.000	0.000 -	1.200 -	0.000 -	1.200 -	
FY 2019 Plans: N/A							
FY 2020 Base Plans: Resources will be used perform research required for the development of enab Train to Qualify (T2Q) and Train to Certify (T2C) requirements for the Vertical T (VTUAV) and testing towards the integration with the Littoral Combat Ships (LC	ing technologies required to meet akeoff Unmanned Aerial Vehicle S) Integrated Tactical Trainers.						
FY 2020 OCO Plans: N/A							
FY 2019 to FY 2020 Increase/Decrease Statement: FY20 increase in this funding line is required to meet Train to Qualify (T2Q) and for the Vertical Takeoff Unmanned Aerial Vehicle (VTUAV) and testing towards Combat Ships (LCS) Integrated Tactical Trainers. This unique training capabilit future fleet operational commitments and missions.	I Train to Certify (T2C) objectives the integration with the Littoral y is needed to satisfy current and						
Title: Air Defense Strike Group Facility	Articles:	0.556 -	0.600 -	1.764 -	0.000 -	1.764 -	
FY 2019 Plans: Research and develop VACSSim simulators and CEC Engagement Processor within the Integrated Training Facility (ITF) Engineering Development Model (El to VACSSim will be researched and developed to include additional AEGIS Bas	(CEP) Simulators to integrate DM). Additional functionality selines and submodes. These						

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	h 2019	
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/ PE 0204571N / Consolidated Trng	Name) g Sys Dev	Project (N 3356 / High	umber/Nam n Fidelity Su	ne) Irface Train	ers
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	<u>i Each)</u>	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
simulators will integrate with NAVAIR simulators (E2D, F35) to create an overar that will be the only way to train Carrier Strike Groups on high-end threats and o Integrated Fire Control Counter Air (NIFC-CA). The ITF capabilities are a requi Steering Committee and part of the CNO-directed Fleet Training Wholeness eff	ching simulation environment capabilities related to Naval rement of the NIFC-CA Flag ort.					
FY 2020 Base Plans: Continue to research and develop VACSSim simulators and CEP Simulators to include Baseline 7.1 and Ballistic Missile Defense 4.0 Development. The ITF cathe Naval Integrated Fire Control Counter Air (NIFC-CA) Flag Steering Committed Fleet Training Wholeness effort.	integrate within the ITF. This will apabilities are a requirement of ee and part of the CNO-directed					
FY 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement: FY20 funding increase supports the continued research and development requi enabling technologies for upgrades to the Virtual AEGIS Combat System Simul the Joint Integrated and Air Missile Defense (JIAMD) Mission. Efforts include ex- introduction of a Cooperative Engagement Capability (CEC) simulation capability and is aligned to the CNO directed Live, Virtual and Constructive (LVC) training	red to deliver advanced and ator (VACSSim) in support of tensive system testing and the ty for integrated warfare training initiative.					
Title: Navigation Systems Technician (NAVSYSTECH) Capacity	Articles:	0.000	0.000	0.400	0.000	0.400
FY 2019 Plans: N/A						
FY 2020 Base Plans: Research and develop updates to the Surface Navigation Maintenance Technic The Navigation System Maintenance Trainer supports system level operations CSCS Unit Dam Neck, VA. Develop Navigation Systems Technician (NAVSYS changes to the system for modernized course performance objectives. Design a that include GPS-Based Positioning, Navigation and Timing Service (GPNTS) re	tian Training course of instruction. and maintenance level training at TECH) simulator to integrate field and develop training solutions nodernization.					
FY 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement:						

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: Marc	h 2019	
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/I PE 0204571N / Consolidated Trng	Name) y Sys Dev	Project (Nu 3356 / High	umber/Nam Fidelity Su	ie) Irface Traine	ers
3. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Millions) and the second s	<u>n Each)</u>	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY20 funding increase supports surface navigation operator and maintainer tra Navy Training System Plans for Global Positioning System (GPS) - Based Posi Service (GPNTS) AN/SSN-9(V) and Surface Navigation System. Funds are pr analysis, development and validation, critical investigations, preliminary design enabling technologies for the purpose of introducing GPNTS training systems of an upgrade. GPNTS provides modernized pervasive, robust, secure, integrate net-centric PNT capabilities. The upgraded surface navigation system of system fully aligns to the Surface Training community's investments in high fidelity integrate and the CNO directed Live, Virtual and Constructive (LVC) training initiative.	ining requirement delineated in tioning, Navigation and Timing rovided to perform requirements and prototyping of advanced and of systems navigation training as d, and shipboard interoperable ns training solution architecture grated navigation systems trainer					
Accomplishmer	ts/Planned Programs Subtotals	1.163	0.756	3.564	0.000	3.564

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

N/A

<u>Remarks</u>

D. Acquisition Strategy

The software development and advanced technology upgrades for High Fidelity Surface Trainers are accounted for in this RDT&E line. These upgrades will provide an enabling technology to an existing training system.

E. Performance Metrics

Naval Surface Warfare Center Dahlgren: Approved Combined IAMD and ASW Trainer (CIAT). Successful engineering development model (EDM) introducing advanced technologies necessary to simulate/stimulate the AEGIS Combat System elements required for operators stated in AEGIS Ashore Baseline 9 Weapons Specification (WS) 21200 series.

Naval Surface Warfare Center Dahlgren: Incorporation of approved legacy Aegis baselines (7.2, 6.3) into the Virtual Aegis Combat System Simulator (VACSSim). Incorporation of additional sub-modes into the VACSSim. Successful integration of VACSSim and CEP Workstation into the Integrated Training Facility simulation architecture.

Naval Surface Warfare Center Carderock: Approved Combined IAMD & ASW Trainer (CIAT). Successful engineering development model introducing advanced technologies necessary to 1) simulate performance of AN/SQQ-89A(V)15 sonar system in alignment with fielding plan for initial Sonar software versions with capability to receive AN/SQQ-89A(V)15 coordinated routine modernizations and 2) replicate Combat Information Center (CIC) configuration and functionalities representative of AEGIS Baseline 9.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204571N / Consolidated Trng Sys Dev	Project (Number/Name) 3356 I High Fidelity Surface Trainers
Naval Undersea Warfare Center Newport: Approved Combined IAMD & ASW Technology Requirements Model (TRM) simulation of own ship and threat torport NAWCTSD: Completed development of enabling technologies required to meet successful integration with the LCS Integrated Tactical Trainers. Completed up	Trainer (CIAT). Develop ASW components to edoes, and emulations of sonar devices. et T2Q and T2C requirements for the VTUAV odates to the Surface Navigation Maintenance	be integrated in the CIAT system for and Technician Training course of instruction.

Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	020 Navy									Date:	March 20	19	
Appropriation/Budge	et Activity	1				R-1 Pro PE 020	o gram Ele 4571N / C	e <mark>ment (N</mark> Consolida	umber/Nated Trng S	ame) Sys Dev	Project 3356 / F	(Number ligh Fidel	/ Name) ity Surface	e Trainers	s
Product Developme	nt (\$ in Mi	illions)		FY 2	2018	FY	2019	FY 2 Ba	2020 Ise	FY 2 OC	2020 CO	FY 2020 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
SYSTEMS ENG	WR	NSWC DAHLGREN : DAHLGREN,VA	17.239	0.895	Nov 2017	0.756	Dec 2018	0.400	Nov 2019	-		0.400	0.200	19.490	Continuing
SYSTEMS ENG	WR	NSWC CARDEROCK : CARDEROCK, MD	6.052	0.268	Nov 2017	0.000		0.000		-		0.000	0.000	6.320	-
SYSTEMS ENG	WR	NUWC NEWPORT : NEWPORT, RI	2.076	0.000		0.000		0.000		-		0.000	0.000	2.076	-
SYSTEMS ENG	MIPR	U.S. ARMY SMDC : HUNTSVILLE, AL	0.147	0.000		0.000		0.000		-		0.000	0.000	0.147	-
SYSTEMS ENG	WR	NAWCTSD : ORLANDO, FL	1.957	0.000		0.000		1.600	Nov 2019	-		1.600	0.000	3.557	-
SYSTEMS ENG	TBD	LOCKHEED MARTIN : TBD	0.000	0.000		0.000		1.564	Nov 2019	-		1.564	1.258	2.822	Continuing
		Subtotal	27.471	1.163		0.756		3.564		-		3.564	1.458	34.412	N/A

Remarks

FY20 funding increase supports the following:

1) Resource Sponsor direction to perform requirements analysis, development and validation, preliminary design and prototyping of advanced and enabling technologies for the Advanced Capability Build (ACB) 15 / Advanced Capability Build (ACB) 16 Phase 0 and Phase 1 into the Combined Integrated Air Missile Defense/Anti Surface Warfare Trainer (CIAT) V2 trainer.

2) Continued research and development required to deliver advanced and enabling technologies for upgrades to the Virtual AEGIS Combat System Simulator (VACSSim) in support of the Joint Integrated and Air Missile Defense (JIAMD) Mission. Efforts include extensive system testing and the introduction of a Cooperative Engagement Capability (CEC) simulation capability for integrated warfare training and is aligned to the CNO directed Live, Virtual and Constructive (LVC) training initiative.

3) Funding required to meet Train to Qualify (T2Q) and Train to Certify (T2C) objectives for the Vertical Takeoff Unmanned Aerial Vehicle (VTUAV) and testing towards the integration with the Littoral Combat Ships (LCS) Integrated Tactical Trainers. This unique training capability is needed to satisfy current and future fleet operational commitments and missions.

4) Surface navigation operator and maintainer training requirement delineated in Navy Training System Plans for Global Positioning System (GPS) - Based Positioning, Navigation and Timing Service (GPNTS) AN/SSN-9(V) and Surface Navigation System. Funds are provided to perform requirements analysis, development and validation, critical investigations, preliminary design and prototyping of advanced and enabling technologies for the purpose of introducing GPNTS training systems of systems navigation training as an upgrade. GPNTS provides modernized pervasive, robust, secure, integrated, and shipboard interoperable net-centric PNT capabilities. The upgraded surface navigation system of systems training solution architecture fully aligns to the Surface Training community's investments in high fidelity integrated navigation systems trainer and the CNO directed Live, Virtual and Constructive (LVC) training initiative.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2	2020 Navy	/								Date:	March 20	19	
Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name)ProjectPE 0204571N / Consolidated Trng Sys Dev3356 / H							/ Name) ity Surface	e Trainers	5		
	Prior Years	FY 2	2018	FY 2	019	FY 2 Ba	2020 Ise	FY 2 OC	020 :O	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	27.471	1.163		0.756		3.564		-		3.564	1.458	34.412	N/A

Remarks

xhibit R-4, RDT&E Schedule Profile: PB 2020 N	Navy	,																				Dat	e: M	arch	201	9		
Appropriation/Budget Activity 319 / 7								R-1 I PE 0	Prog 204	gran 571	n El N / (eme Cons	ent soli	(Nur date	nber d Trr	r/Na ng S	me) ys E)ev	Pro 33	ojec 56 /	t (N High	umb 1 Fid	er/N lelity	l ame Suri	e) face	Traii	ners	3
		FY	2018	}		FY	2019	•		FY 2	2020)		FY	2021			FY	2022	2		FY	2023	3		FY 2	024	•
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 3356									· · · · · ·																			
Software Development - Combined IAMD & ASW Trainer (CIAT)																												
Software Development - Air Defense Strike Group Facility																												
LCS Navy Training System Plan (NTSP) Execution																	I											
Navigation Systems Technician (NAVSYSTECH) Capacity								l																				

hibit R-4A, RDT&E Schedule Details: PB 2020 Navy				Date	March 2019			
propriation/Budget Activity 19 / 7	R-1 Program PE 0204571N	Element (Number I Consolidated Ti	Project (Numbe 3356 / High Fide	umber/Name) h Fidelity Surface Trainers				
	Schedule Details	6						
		S	art		End			
Events by Sub Project		Quarter	Year	Quarte	r Year			
Proj 3356								
Software Development - Combined IAMD & ASW Trainer (CIAT)		1	2018	4	2019			
Software Development - Air Defense Strike Group Facility		1	2018	4	2021			
LCS Navy Training System Plan (NTSP) Execution		1	2020	4	2021			