Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603216N *I Aviation Survivability*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	201.414	11.742	13.342	16.815	-	16.815	-	-	-	-	-	-
0584: *Acft Protective Clothing*	108.733	4.021	6.121	5.836	-	5.836	-	-	-	-	-	-
0591: *Acft Survivability, Vulnerability & Safety*	49.400	1.408	1.462	5.450	-	5.450	-	-	-	-	-	-
0592: *Acft & Ordnance Safety*	38.487	5.732	5.158	4.928	-	4.928	-	-	-	-	-	-
1819: *CV Acft Fire Suppress System*	4.794	0.581	0.601	0.601	-	0.601	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Aviation Survivability addresses the issues of aircrew and platform survivability, focusing on enhancing overall opportunity for aircrew and platform protection and enhanced performance. The capabilities addressed under this program element counter emerging threats of next generation operational weapons systems and enhance combat effectiveness in future operational mission scenarios.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	11.919	13.428	13.018	-	13.018
Current President's Budget	11.742	13.342	16.815	-	16.815
Total Adjustments	-0.177	-0.086	3.797	-	3.797
• Congressional General Reductions	-	-0.086			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.177	0.000			
• Program Adjustments	0.000	0.000	4.000	-	4.000
• Rate/Misc Adjustments	0.000	0.000	-0.203	-	-0.203

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603216N *I Aviation Survivability*

Change Summary Explanation

Funding: FY 2022 increase of $4.0M due to realignment of funding from APN-5 to RDT&E for the Multilayered Obstructed Brokered (MOB) HUB software integration package. Reductions of $0.203M since the previous President's Budget submission due to support and working capital fund rate changes.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / *Aviation Survivability*	Project (Number/Name) 0584 / *Acft Protective Clothing*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
0584: *Acft Protective Clothing*	108.733	4.021	6.121	5.836	-	5.836	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 0584 develops, demonstrates, and validates technologies designed to enhance warfighter performance, protection, injury prevention, mission effectiveness, and survivability. The project addresses aircrew readiness, life support equipment, physiological episodes, hearing protection and communication intelligibility, advanced helmet vision systems, laser eye protection and supporting technologies, escape and crashworthy systems, active/passive restraint systems; survival and evasion, aircrew/injury modeling, crew centered cockpit design control stations, and aircraft maintainer protection. Fully protected and mission ready Aircrew are a critical component of Ready Basic Aircraft. The goal is to ensure they are able to perform their mission effectively on time, safely, every time. Project 0584 responds to a number of operational requirements documents, including OR# 210-05-88 for Chemical and Biological protection, OR# 099-05-087 for Laser Eye Protection, Aircrew Laser Eye Protection (ALEP) joint operation requirements document JORD #513-88-99, and Capabilities Program Document (CPD) Night Vision Cueing and Display (NVCD).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Advanced Technology Crew Station	4.021	6.121	5.836	0.000	5.836
Articles:	-	-	-	-	-

FY 2021 Plans:

Continue to advance the development of the baseline Physiological Monitor Warning System. The objective is to mature the system by refining the algorithms, improving the technology gaps in the subsystems/sensor components and expanding the monitoring to other physiological episode contributors (e.g., hydration, cognitive state) from the baseline Physiological Monitor. Mature the system from warning to a system that can enact steps to mitigate. Conduct verification and validation testing to prove component and subsystem maturity.

Integrate the biofidelic model of the spinal column based on actual human data and responses to stressors into the suite of tools used to design and develop head mounted systems (e.g., helmet mounted displays, helmets, visors, oxygen masks, etc.). Redesign head borne prototype systems to increase functionality while reducing/optimizing loading on the head, neck, and spine to reduce strain and possible injury. Begin definition, integration, and support of Incapacitation Prediction for Readiness in Expeditionary Domains - an Integrated Computational Tool (I-PREDICT). Initiate foundational discussions to shift from a mannequin to a cadaver-based paradigm to improve the design and development of advanced personal protective equipment (PPE) to address chronic and acute pain/injury. The ultimate goal is to predict and prevent incidents that increase the level of back pain and long-term disabilities. Begin new anthropometric technique to assess head, neck, spine

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0584 / *Acft Protective Clothing*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
vertebral alignment/position to mature a digital human modeling capability for the design of PPE and seating systems. Continue the development and testing of the vibration damping systems, which recently transitioned into the Gunners Seat (H-60 platform). Testing will investigate the capability of MR based damping systems to withstand harsh environments found onboard air, ground, and surface ship military platforms where excessive impact and vibration is causing debilitating neck/spine injuries. Subject prototype-seating systems to longer periods of exposure to extremely harsh conditions that are more representative of the expected field conditions. Continue the development of High Resolution Digital Night Vision Goggle. Begin integration of digital night sensors and displays into both goggle and helmet mounted display formats to include the study of a new wide field of view (FOV) goggle (initially 68 deg. FOV). Study the effect of motion blur on resolution. Address windowing and increased frame rate to reduce/eliminate the negative effects of motion blur. Investigate the possibility of extending the wavelength band/sensitivity of the silicon wafer used in the digital sensor to include Short Wave InfraRed (SWIR) with Near InfraRed. Sensitivity in the SWIR region will improve resolution at extremely low light levels and in degraded visual environments. Address the ballistic test protocol for polycarbonate visors and goggles. Current accepted method has differences in test methodologies that have shown new assets failing upon receipt. Adjudicate the test protocol and investigate redesign of substrates as needed. Continue the development of the solar dots (indicates number of hours of solar exposure) to have either a series of dots or one dot that gradually degrades with exposure time to match the degradation profile seen in polycarbonate visors/goggles. Assess dielectric deposition uniformity and thickness with a goal of increasing optical density. Test environmental stability over time of the enhanced dielectric protective coating from the new on shore supplier. ***FY 2022 Base Plans:*** Improve and refine subsystems and components of the baseline Physiological Monitor and algorithms. Mature the warning elements of the Physiological Monitor to include the capability to enact steps to mitigate physiologic episodes in real time. The objective is to refine the algorithms, reduce the technology gaps in the subsystems/ sensor components, and expand monitoring to other episode contributors such as, hydration and cognitive state. Verification and validation testing will continue to refine component and subsystem capability. Continue development, and begin integration and support of "Incapacitation Prediction for Readiness in Expeditionary Domains - an Integrated Computational Tool (I-PREDICT)". Integrate I-PREDICT into Human System's laboratories to move to a model based system to improve the design and development of advanced					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0584 / *Acft Protective Clothing*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
personal protective equipment (PPE - e.g., helmet mounted displays, night vision devices, helmets, visors, oxygen masks, etc.) to predict and prevent incidents that increase the level of back pain and long-term disabilities. Expand digital human modeling to be able to assess head, neck, spine vertebral alignment/position for the design of PPE and seating systems. Continue the development and testing of active vibration damping systems to include magneto rheological (MR) technologies. Evaluate the ability of MR and other adaptive damping systems to address the full anthropometric range of male/female aviators while withstanding the harsh environments found on military platforms to reduce the excessive impact and vibration causing debilitating neck/spine injuries. Other Basic and Applied Research mission endurance development efforts will be assessed, and the most mature / promising will be developed further and readied for qualification to meet fleet endurance requirements. Continue integration of Intevac's digital high resolution sensor and eMagin's display into the High Resolution Digital Goggle (HRDG). Complete effort to develop and test a wide field of view (FOV) goggle (initially 68 deg. FOV). Complete the study of motion blur on resolution to define minimum acceptable refresh / frame rates to prevent blurring. Investigate the possibility of extending the wavelength band/sensitivity of the silicon wafer in the digital sensor to include Short Wave InfraRed (SWIR). SWIR is expected to improve resolution at extremely low light levels and in degraded visual environments. Adjudicate the differences found in ballistic test procedures used by DoD and suppliers. Determine the effect of variability in testing and whether redesign of substrates is needed. Refine the action spetra of the solar dots recently developed to be indicative of a graded solar exposure. Continue to refine and evaluate thicker dielectric coatings to provide progressively higher optical densities in the long wavelength visible and near infrared portion of the electromagnetic spectrum. Assess dielectric deposition profile (square vs. sinusoidal), uniformity, and thickness with a goal of increasing optical density. Compare and contrast vapor vs. magnetron sputtering deposition approaches. Continue advanced research and technology maturation activity for hearing protection and speech intelligibility improvement. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Certain aspects of the Physiological Monitor Warning System have been completed, thereby reducing project cost.					
Accomplishments/Planned Programs Subtotals	4.021	6.121	5.836	0.000	5.836

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0584 / *Acft Protective Clothing*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN 4268: *Aviation Support Equipment*	62.871	57.174	70.665	-	70.665	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Primary Hardware Development for the Navy Advanced Technology Crew Station efforts will be performed under a Cost Plus Fixed Fee Indefinite Delivery Indefinite Quantity contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0584 / *Acft Protective Clothing*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCAD : Pax River MD	36.264	0.663	Dec 2019	0.602	Oct 2020	0.616	Oct 2021	-		0.616	-	-	-
Primary Hardware Development	C/CPFF	Intevac : San Jose CA	7.182	0.909	Jun 2020	1.250	Dec 2020	1.500	Dec 2021	-		1.500	-	-	-
Primary Hardware Development	MIPR	US Army CERDEC : Ft. Belvoir VA	3.540	0.050	Jun 2020	0.050	Dec 2020	0.087	Dec 2021	-		0.087	-	-	-
Primary Hardware Development	C/CPFF	Innovital : Calverton MD	0.633	0.150	Dec 2019	0.150	Dec 2020	0.000		-		0.000	-	-	-
Physiological Monitoring	C/CPFF	TBD : TBD	0.000	1.000	Mar 2020	1.230	Mar 2021	0.510	Dec 2021	-		0.510	-	-	-
I-PREDICT	C/CPFF	TBD : TBD	0.000	0.000		1.000	Jun 2021	1.500	Dec 2021	-		1.500	-	-	-
Laser Eye Protection	C/CPFF	TBD : TBD	0.000	0.000		0.350	Jun 2021	0.089	Dec 2021	-		0.089	-	-	-
Prior Year Prod Dev no Longer Funded in Budget Year or Outyears	Various	Various : Various	23.380	0.000		0.000		0.000		-		0.000	-	-	-
Enhanced Visual	C/CPFF	SA Photonics, LLC : TBD	0.700	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	71.699	2.772		4.632		4.302		-		4.302	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Configuration Management	WR	NAWCAD : Pax River MD	3.841	0.400	Dec 2019	0.400	Oct 2020	0.511	Oct 2021	-		0.511	-	-	-
Prior Year Support no Longer Funded in Budget Year or Outyears	Various	Various : Various	3.232	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	7.073	0.400		0.400		0.511		-		0.511	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / *Aviation Survivability*	Project (Number/Name) 0584 / *Acft Protective Clothing*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NAWCAD : Pax River MD	6.539	0.559	Dec 2019	0.705	Oct 2020	0.698	Oct 2021	-		0.698	-	-	-
Prior Year T&E no Longer Funded in Budget Year or Outyears	Various	Various : Various	18.240	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	24.779	0.559		0.705		0.698		-		0.698	-	-	N/A

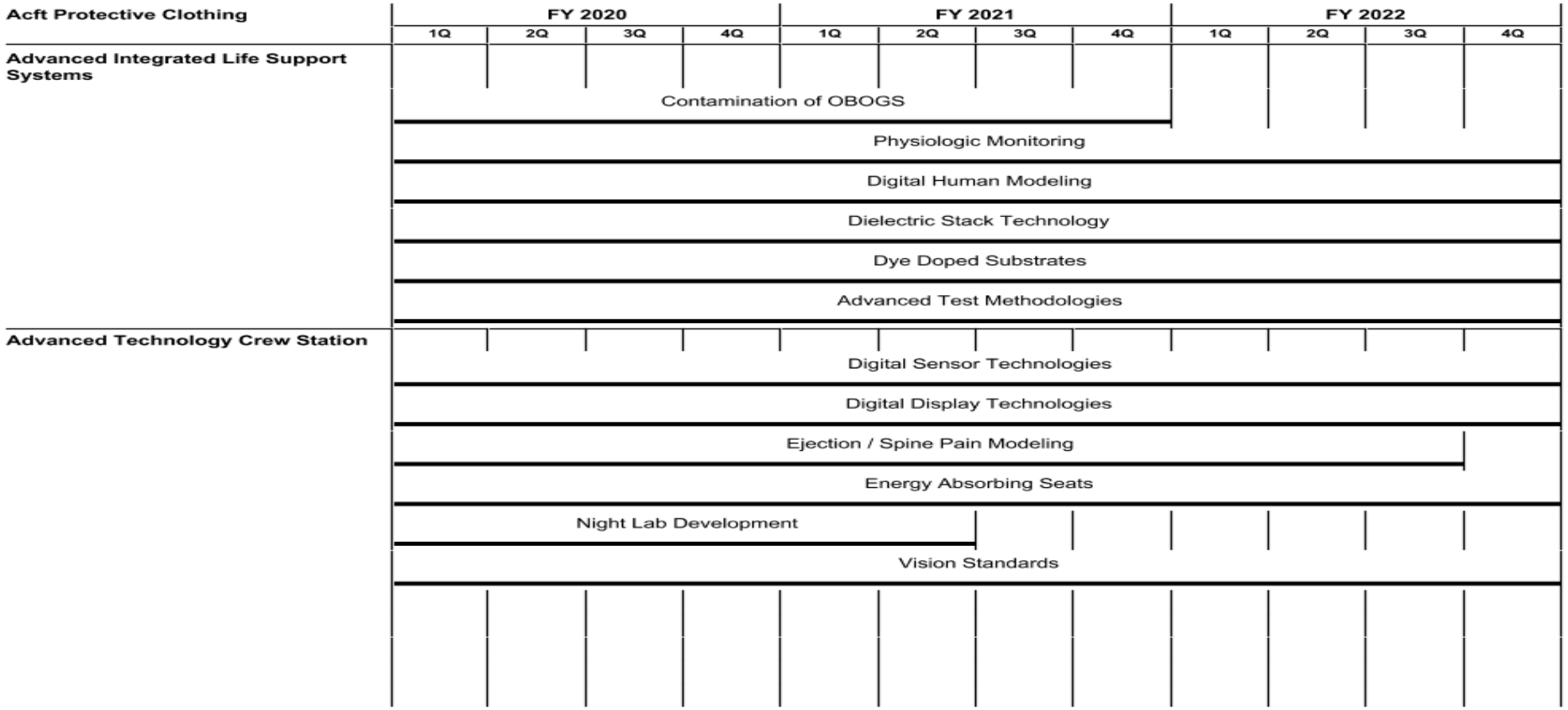
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NAWCAD : Pax River MD	4.661	0.275	Dec 2019	0.369	Oct 2020	0.320	Oct 2021	-		0.320	-	-	-
Travel	PO	NAVAIR : Pax River MD	0.511	0.015	Oct 2019	0.015	Oct 2020	0.005	Oct 2021	-		0.005	-	-	-
Prior Year Mgmt Svcs no Longer Funded in Budget Year or Outyears	Various	Various : Various	0.010	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	5.182	0.290		0.384		0.325		-		0.325	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	108.733	4.021		6.121		5.836		-		5.836	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0584 / *Acft Protective Clothing*



2022PB - 0603216N - 0584

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0584 / *Acft Protective Clothing*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Acft Protective Clothing				
Advanced Integrated Life Support Systems: Contamination of OBOGS	1	2020	4	2021
Advanced Integrated Life Support Systems: Physiologic Monitoring	1	2020	4	2022
Advanced Integrated Life Support Systems: Digital Human Modeling	1	2020	4	2022
Advanced Integrated Life Support Systems: Dielectric Stack Technology	1	2020	4	2022
Advanced Integrated Life Support Systems: Dye Doped Substrates	1	2020	4	2022
Advanced Integrated Life Support Systems: Advanced Test Methodologies	1	2020	4	2022
Advanced Technology Crew Station: Digital Sensor Technologies	1	2020	4	2022
Advanced Technology Crew Station: Digital Display Technologies	1	2020	4	2022
Advanced Technology Crew Station: Ejection / Spine Pain Modeling	1	2020	3	2022
Advanced Technology Crew Station: Energy Absorbing Seats	1	2020	4	2022
Advanced Technology Crew Station: Night Lab Development	1	2020	2	2021
Advanced Technology Crew Station: Vision Standards	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / *Aviation Survivability*	Project (Number/Name) 0591 / *Acft Survivability, Vulnerability & Safety*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
0591: *Acft Survivability, Vulnerability & Safety*	49.400	1.408	1.462	5.450	-	5.450	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Aircraft Survivability, Vulnerability and Safety. This project evaluates and develops prototype hardware and software solutions to improve the survivability of Navy and Marine Corps aircraft. This project addresses the likelihood of an aircraft being hit (susceptibility) and the probability of a kill if the aircraft is hit (vulnerability). Types of programs funded under this project include signature reduction efforts, subsystem and component hardening and development of Integrated Aviation Survivability Equipment (iASE) architectures for simulation and training systems. This project also provides an engineering level modeling and simulation capability to assess electronic warfare capabilities and to support future electronic warfare investment strategies. Further, this effort expands upon existing high fidelity Hardware In The Loop (HITL) capability and this expanded capability will enable the assessment of Electronic Warfare (EW) concepts versus future (i.e. not fully defined) threat systems. This project will include the development of new or modification of existing modules which are high fidelity representations of the EW and threat system's components and will support iASE hardware and software research and future technological survivability concepts as they become available.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Technology Requirements	0.040	0.045	0.045	0.000	0.045
Articles:	-	-	-	-	-
FY 2021 Plans: Planned trade studies include: expansion of threats assessments to include new and/or evolved threats. Update modeling and simulation capabilities to better reflect the evolving threat environment.					
FY 2022 Base Plans: Continue to update and expand threats assessments to include new and/or evolved threats. Update modeling and simulation capabilities to better reflect the evolving threat environment.					
FY 2022 OCO Plans: N/A					
Title: Technology Design & Development	1.168	1.317	3.400	0.000	3.400
Articles:	-	-	-	-	-
FY 2021 Plans: Conduct asymmetric threats modeling and analyses based on expansion of the OpNav Aircraft Survivability Integration Study (OASIS) project to include additional aircraft platforms. Continue integration efforts for the					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0591 / *Acft Survivability, Vulnerability & Safety*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
iASE architecture within the USN/USMC simulation and training system environment. Model results of combat situational awareness analyses to evaluate effectiveness of proposed solutions. ***FY 2022 Base Plans:*** Conduct initial Navy Future Vertical Lift (FVL) assessment to inform the Request for Proposals and then update annually to provide a feedback loop to the Model Based Systems Engineering effort. Evaluate design of proposed Miniaturized Self Defense Missile (MSDM) system and determine integration properties for each candidate aircraft platform. Support the Multilayered Obstructed Brokered (MOB) HUB software integration package efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase due to realignment of funding from APN-5 to RDT&E for the Multilayered Obstructed Brokered (MOB) HUB software integration package.					
Title: Technology Test & Evaluation	0.200	0.100	2.005	0.000	2.005
Articles:	-	-	-	-	-
FY 2021 Plans: Continue prototype hardware testing in support of the iASE architecture development and in support of countermeasures simulation hardware. Continue testing combat situational awareness capability in a simulated environment. ***FY 2022 Base Plans:*** Continue prototype hardware testing in support of the iASE architecture development and in support of countermeasures simulation hardware. Continue testing combat situational awareness capability in a simulated environment. Test newly developed or modified modules to validate accuracy of representations of the EW and threat system's components. Perform a continuum of assessments from early M&S through Hardware-in-the-Loop as the EW system matures. Support the Multilayered Obstructed Brokered (MOB) HUB software integration package efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0591 / *Acft Survivability, Vulnerability & Safety*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Increase due to realignment of funding from APN-5 to RDT&E for the Multilayered Obstructed Brokered (MOB) HUB software integration package.					
Accomplishments/Planned Programs Subtotals	1.408	1.462	5.450	0.000	5.450

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Primary Hardware Development will be performed under either a Cost Plus Fixed Fee or a Firm Fixed Price contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0591 / *Acft Survivability, Vulnerability & Safety*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCAD : Pax River, MD	13.386	0.276	Oct 2019	0.255	Oct 2020	1.376	Oct 2021	-		1.376	-	-	-
Systems Engineering	WR	NAWCWD : China Lake, CA	0.442	0.150	Oct 2019	0.087	Jan 2021	0.731	Jan 2022	-		0.731	-	-	-
Systems Engineering	MIPR	DTIC : Ft. Belvoir, VA	1.794	0.642	Jan 2020	0.875	Nov 2020	0.820	Nov 2021	-		0.820	-	-	-
System Engineering	C/CPFF	TEKLA : Dumfries, VA	0.000	0.100	Dec 2019	0.100	Apr 2021	0.000		-		0.000	-	-	-
System Engineering	WR	NAWCWD : Pt Mugu, CA	0.000	0.000		0.000		0.060	Jan 2022	-		0.060	-	-	-
System Engineering	C/CPFF	Mantech : Fairfax,VA	0.000	0.000		0.000		0.300	Jan 2022	-		0.300	-	-	-
System Engineering	WR	NSWC : Crane, IN	0.000	0.000		0.000		0.095	Jan 2022	-		0.095	-	-	-
Prior Year Prod Dev cost no longer funded in FYDP	Various	Various : Various	21.268	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	36.890	1.168		1.317		3.382		-		3.382	-	-	N/A

Remarks

All prior year lines have been consolidated

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Support cost no longer funded in FYDP	Various	Various : Various	4.569	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	4.569	0.000		0.000		0.000		-		0.000	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0591 / *Acft Survivability, Vulnerability & Safety*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NAWCAD : Patuxent River, MD	2.453	0.100	Oct 2019	0.050	Apr 2021	0.000		-		0.000	-	-	-
Developmental Test & Evaluation	WR	NAWCWD : China Lake, CA	0.000	0.000		0.050	May 2021	2.023	Oct 2021	-		2.023	-	-	-
Developmental Test & Evaluation	C/CPFF	GTRI : Atlanta, GA	0.000	0.100	Jan 2020	0.000		0.000		-		0.000	-	-	-
Prior Year T&E cost no longer funded in FYDP	Various	Various : Various	2.995	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	5.448	0.200		0.100		2.023		-		2.023	-	-	N/A

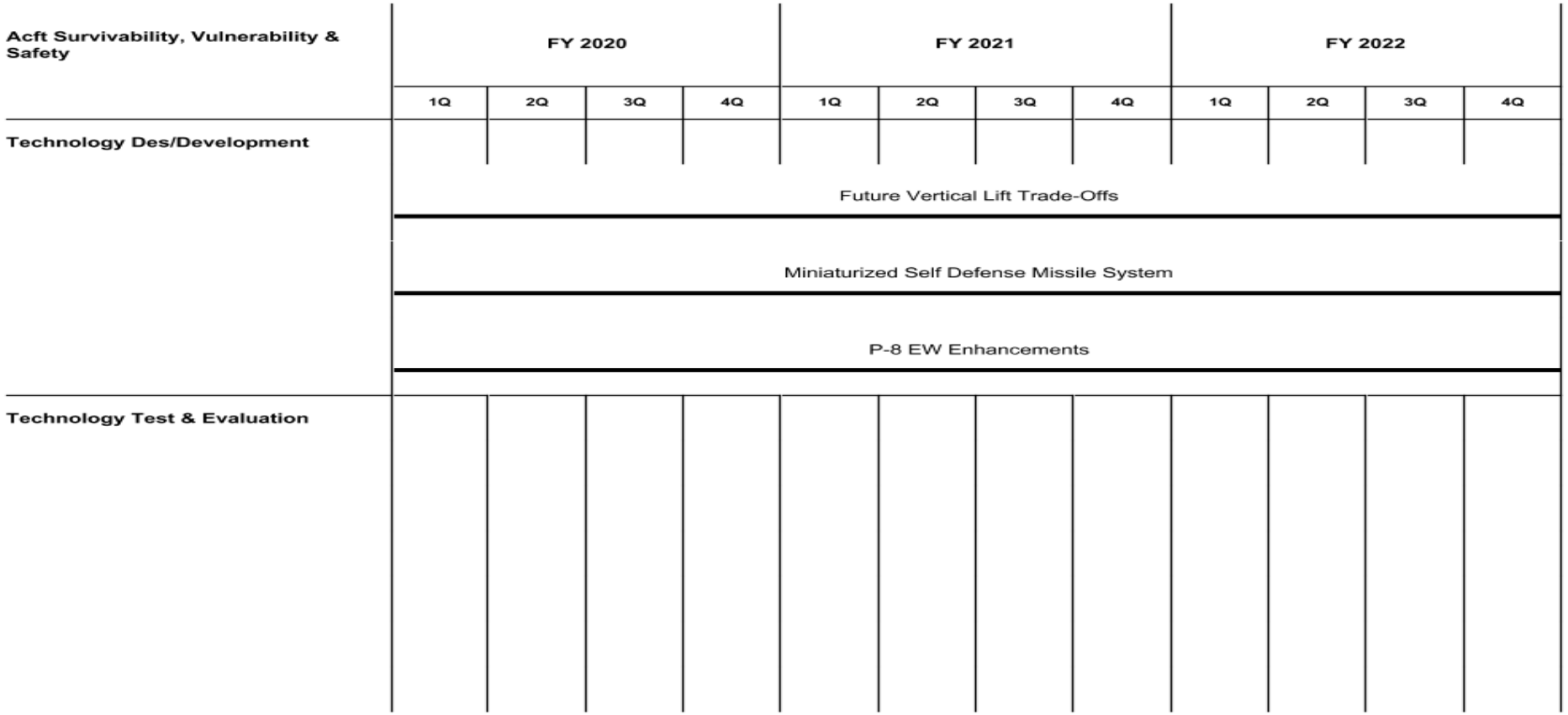
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NAWCAD : Pax River, MD	1.768	0.040	Oct 2019	0.045	Oct 2020	0.045	Oct 2021	-		0.045	-	-	-
Prior Year Mgmt cost no longer funded in FYDP	Various	Various : Various	0.725	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	2.493	0.040		0.045		0.045		-		0.045	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	49.400	1.408		1.462		5.450		-		5.450	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0591 / *Acft Survivability, Vulnerability & Safety*



2022PB - 0603216N - 0591

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0591 / *Acft Survivability, Vulnerability & Safety*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Acft Survivability, Vulnerability & Safety				
Technology Des/Development: Future Vertical Lift Trade-Offs	1	2020	4	2022
Technology Des/Development: Miniaturized Self Defense Missile System	1	2020	4	2022
Technology Des/Development: P-8 EW Enhancements	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / *Aviation Survivability*				Project (Number/Name) 0592 / *Acft & Ordnance Safety*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
0592: *Acft & Ordnance Safety*	38.487	5.732	5.158	4.928	-	4.928	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Aircraft and Ordnance Safety Program transitions innovative munitions safety technology to Navy and Marine Corps air weapons, to comply with the Chief of Naval Operations direction that all munitions carried aboard Navy ships be insensitive to unplanned stimuli (thermal, impact, and shock events). The Aircraft and Ordnance Safety Program also ensures the safety and protection of personnel, aircraft, ships, and operational facilities, through improved precision targeting, fail-safe ordnance, selective effects munitions and shock/blast force protection technologies.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Insensitive Munitions (IM)	5.732	5.158	4.928	0.000	4.928
Articles:	-	-	-	-	-
FY 2021 Plans: Air-to-Air Demonstration: Improved liner system for use in bombs, specifically Mark 80 Series, which will optimize the minimum 8-minute protection during Fast Cook-off. Insensitive Munitions (IM) benefits of integrating Rocket Solid Fuel RamJet Technology with traditional solid rocket motor propellant in IM testing scenario including Fast Cook-off, bullet impact, fragment impact, and shape charge jet. Improved Air-Launched Weapons: Develop a Polymer-bonded Explosive 109 use loaded variant of IM vented Bomb Live Unit 117 for the Navy. Investigate the use of Precision-controlled Additive Manufactured fragments to improve IM response as well as increase lethality over multiple target sets. Perform initial testing to improve warhead initiation system to increase warhead performance. Advanced Containment/Case Warhead Materials: Continue working the Metal Matrix Composite case for continued improved IM responses. Integrate a remote RF sensor into an Evolved Seasparrow Missile, Block III type system capable of igniting the motor prior to cook-off upon generating a signal indicating thermal runaway is imminent. Shock/Blast Barrier Protection Modeling, Demo & Testing: High Impulse Booster - improving performance by supporting a more robust firetrain under hard impacts as it can transfer the shock over large distances that could be encountered due to explosive fill compression. Improve the reaction of the Block 2 RAM rocket motors to the Fast Cook-off and Slow Cook-off tests through the application of a mature Thermally Initiation Venting System					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0592 / *Acft & Ordnance Safety*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
technology. Determine the feasibility of shock sensitizing a large failure diameter Polymer-bonded Explosive fill. Single-use fragment projector for reduced cost and improved flexibility. Using Large Scale Gap Test to improve analysis of shock initiation of energetics using energy per unit area technique. ***FY 2022 Base Plans:*** Air-to-Air Demonstration: Sidewinder Rocket Motor IM improvements and demonstrations will be conducted during FY22. The 21-inch High Loaded Grain (HLG) motor will be demonstrated. This motor will provide insight into increasing range and propulsion technology. Exploring technology to decrease explosions in rocket motor demonstrated by using thermite as means of igniting prior to a major explosion during slow cook-off and/or fast cook-off Improved Air-Launched Weapons: Bomb Live Unit 111 tested with a different explosive fill, while maintaining its lethality. Advanced Anti-Radiation Guidance Missile upgrades for distance and lethality. Improvements in fuzes will see systems changing to the new version, Fuze Munitions Unit 139 (FMU-139). Continued testing on the impulse motor as well as upgrades on the Long Range Anti-Ship Missile. Advanced Containment/Case/Warhead Material: Developing several new techniques for warhead initiation. Insertion of new warhead for the TOMAHAWK missile system. Shock/Blast Barrier Protection/Modeling and Simulation: Modeling of the FMU-139 to be used for future assessment of the units. Continued development of remote sensing for slow cook-off, which will be advantageous for ships carrying weapons. Using Large Scale Gap Test to improve analysis of shock initiation of energetics using energy per unit area technique. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Slight decrease in FY22 due to the completion of several projects, projects will be doing final documentation/ presentations/closeout during FY 2022.					
Accomplishments/Planned Programs Subtotals	5.732	5.158	4.928	0.000	4.928

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

All planned programs are accomplished via civilian labor and use of government testing facilities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / *Aviation Survivability*	Project (Number/Name) 0592 / *Acft & Ordnance Safety*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCWD : China Lake, CA	38.479	5.732	Oct 2019	5.158	Oct 2020	4.928	Oct 2021	-		4.928	-	-	-
		Subtotal	38.479	5.732		5.158		4.928		-		4.928	-	-	N/A

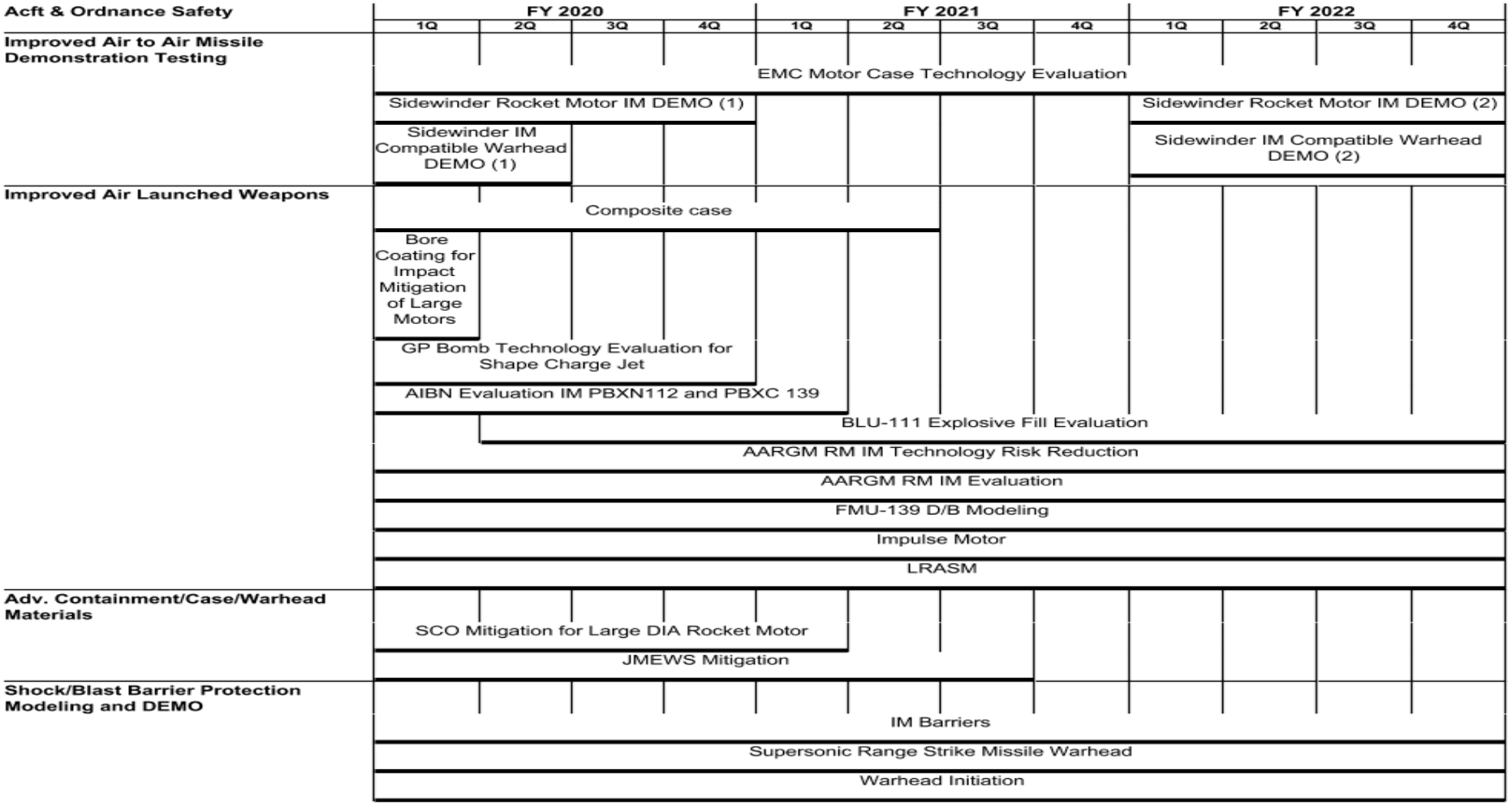
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Mgmt no longer funded in FYDP	Various	Various : Various	0.008	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	0.008	0.000		0.000		0.000		-		0.000	-	-	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	38.487	5.732		5.158		4.928		-		4.928	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0592 / *Acft & Ordnance Safety*



Warhead Liner
Remote Sensing of SCO Events
PAM Fragments

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0592 / *Acft & Ordnance Safety*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Acft & Ordnance Safety				
Improved Air to Air Missile Demonstration Testing: Electromagnetic Compatibility (EMC) Motor Case Technology Evaluation	1	2020	4	2022
Improved Air to Air Missile Demonstration Testing: Sidewinder Rocket Motor insensitive munitions (IM) DEMO (1)	1	2020	4	2020
Improved Air to Air Missile Demonstration Testing: Sidewinder Rocket Motor IM DEMO (2)	1	2022	4	2022
Improved Air to Air Missile Demonstration Testing: Sidewinder IM Compatible Warhead DEMO (1)	1	2020	2	2020
Improved Air to Air Missile Demonstration Testing: Sidewinder IM Compatible Warhead DEMO (2)	1	2022	4	2022
Improved Air Launched Weapons: Advance 5 in Composite case	1	2020	2	2021
Improved Air Launched Weapons: Bore Coating for Impact Mitigation of Large Motors	1	2020	1	2020
Improved Air Launched Weapons: General Purpose (GP) Bomb Technology Evaluation for Shape Charge Jet	1	2020	4	2020
Improved Air Launched Weapons: Azobis-Isobutyronitrile (AIBN) Evaluation IM PBXN112 and PBXC 139	1	2020	1	2021
Improved Air Launched Weapons: BLU-111 Explosive Fill Evaluation	2	2020	4	2022
Improved Air Launched Weapons: Advanced Anti-Radiation Guided missile (AARGM RM) IM Technology Risk Reduction	1	2020	4	2022
Improved Air Launched Weapons: AARGM RM IM Evaluation	1	2020	4	2022
Improved Air Launched Weapons: Fuze Munitions (FMU)-139 D/B Modeling	1	2020	4	2022
Improved Air Launched Weapons: Impulse Motor	1	2020	4	2022
Improved Air Launched Weapons: Long Range Anti-Ship Missile (LRASM)	1	2020	4	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 0592 / *Acft & Ordnance Safety*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Adv. Containment/Case/Warhead Materials: Slow Cook-off (SCO) Mitigation for Large DIA Rocket Motor	1	2020	1	2021
Adv. Containment/Case/Warhead Materials: Joint Multi-Effects Warhead System (JMEWS) Mitigation	1	2020	3	2021
Shock/Blast Barrier Protection Modeling and DEMO: IM Barriers	1	2020	4	2022
Shock/Blast Barrier Protection Modeling and DEMO: Supersonic Range Strike Missile Warhead	1	2020	4	2022
Shock/Blast Barrier Protection Modeling and DEMO: Warhead Initiation	1	2020	4	2022
Shock/Blast Barrier Protection Modeling and DEMO: Warhead Liner	1	2020	4	2022
Shock/Blast Barrier Protection Modeling and DEMO: Remote Sensing of SCO Events	1	2020	4	2022
Shock/Blast Barrier Protection Modeling and DEMO: Precision controlled additive manufacturing (PAM) Fragments	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / *Aviation Survivability*				Project (Number/Name) 1819 / *CV Acft Fire Suppress System*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
1819: *CV Acft Fire Suppress System*	4.794	0.581	0.601	0.601	-	0.601	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops improved fire-fighting systems and fire protective measures for aircraft-related fires on aircraft carriers, including assessment of fire properties, definition of fire threats, improvements to fire-fighting agents and delivery systems, fire detection and suppression system performance evaluations, and fire-fighter training improvements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Fire-Fighting	0.581	0.601	0.601	0.000	0.601
Articles:	-	-	-	-	-

FY 2021 Plans:

Continue support for Naval Air Training and Operating Procedures Standardization improvements for aircraft fire prediction and protection. Continue monitoring aqueous film forming foam developments and other clean agents. Continue to monitor new equipment improvements for saws, spreaders, and other improvements to reduce or discontinue the use of Motor Gasoline on ships. Continue evaluations for flash-hood, crash-fire-rescue face shield and firefighter personnel floatation device improvements. Continue to monitor and recommend Electromagnetic Aircraft Launch Systems fire doctrine, Carrier Fixed Wing Aircraft Nuclear hangar bay conflagration management system operations, and unmanned carrier launched airborne surveillance and strike firefighting operations impacts. Continue project looking at firefighter issues related to composites, weapons and fuels and develop procedures to be used aboard ship to rapidly and safely extinguished deep-seated smoldering fires with composite materials. Continue to evaluate training and certification requirements and equipment to bring the ship up to aviation boatswains mate capabilities and readiness for Air Capable Ships, ships that rely on the ships damage control team and limited resources to fight aircraft related fires. Continue improved weapons cooling scenario testing. Continue project looking at options for firefighter equipment storage on CVN's and LHA/D ships.

FY 2022 Base Plans:

Continue support for Naval Air Training and Operating Procedures Standardization improvements for aircraft fire prediction and protection. Continue monitoring aqueous film forming foam developments and other clean agents. Continue to monitor new equipment improvements for saws, spreaders, and other improvements to reduce or discontinue the use of Motor Gasoline on ships. Continue evaluations for flash-hood, crash-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 1819 / *CV Acft Fire Suppress System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
fire-rescue face shield and firefighter personnel floatation device improvements. Continue to monitor and recommend Electromagnetic Aircraft Launch Systems fire doctrine, Carrier Fixed Wing Aircraft Nuclear hangar bay conflagration management system operations, and unmanned carrier launched airborne surveillance and strike firefighting operations impacts. Continue project looking at firefighter issues related to composites, weapons and fuels and develop procedures to be used aboard ship to rapidly and safely extinguished deep-seated smoldering fires with composite materials. Continue to evaluate training and certification requirements and equipment to bring the ship up to aviation boatswains mate capabilities and readiness for Air Capable Ships, ships that rely on the ships damage control team and limited resources to fight aircraft related fires. Continue improved weapons cooling scenario testing. Continue project looking at options for firefighter equipment storage on Carrier Fixed-Wing Aircraft Nuclear's(CVN)and Landing Helicopter Assault/Dock (LHA/D) ships. ***FY 2022 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	0.581	0.601	0.601	0.000	0.601

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This is a non-ACAT program. Procurement strategy is determined by market survey and cooperative opportunities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / *Aviation Survivability*	Project (Number/Name) 1819 / *CV Acft Fire Suppress System*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCWD : China Lake, CA	0.242	0.062	Oct 2019	0.075	Oct 2020	0.072	Oct 2021	-		0.072	-	-	-
Prior Yr Prod Dev no longer funded in the FYDP	Various	Various : Various	0.335	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	0.577	0.062		0.075		0.072		-		0.072	-	-	N/A

Remarks

All prior year lines have been consolidated.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	C/CPFF	ICI : Virginia Beach, VA	0.105	0.030	Nov 2019	0.000		0.000		-		0.000	-	-	-
Engineering Support	WR	NAWCWD : China Lake, CA	0.607	0.159	Oct 2019	0.186	Oct 2020	0.181	Oct 2021	-		0.181	-	-	-
Engineering Support	C/CPFF	Hughes Associates : Baltimore, MD	0.132	0.030	Nov 2019	0.010	Nov 2020	0.010	Nov 2021	-		0.010	-	-	-
Engineering Support	C/CPFF	AVW : Chesapeake, VA	0.149	0.000		0.000		0.000		-		0.000	-	-	-
Engineering Support	WR	NRL : Washington, DC	0.029	0.010	May 2020	0.010	May 2021	0.010	May 2022	-		0.010	-	-	-
		Subtotal	1.022	0.229		0.206		0.201		-		0.201	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Test & Evaluation	WR	NAWCWD : China Lake, CA	1.846	0.180	Oct 2019	0.210	Oct 2020	0.208	Oct 2021	-		0.208	-	-	-
Technology Test & Evaluation	C/FFP	Hughes Associates : Baltimore, MD	0.608	0.050	Nov 2019	0.060	Nov 2020	0.060	Nov 2021	-		0.060	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / *Aviation Survivability*	Project (Number/Name) 1819 / *CV Acft Fire Suppress System*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior yr T&E no longer funded in the FYDP	Various	Various : Various	0.329	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	2.783	0.230		0.270		0.268		-		0.268	-	-	N/A

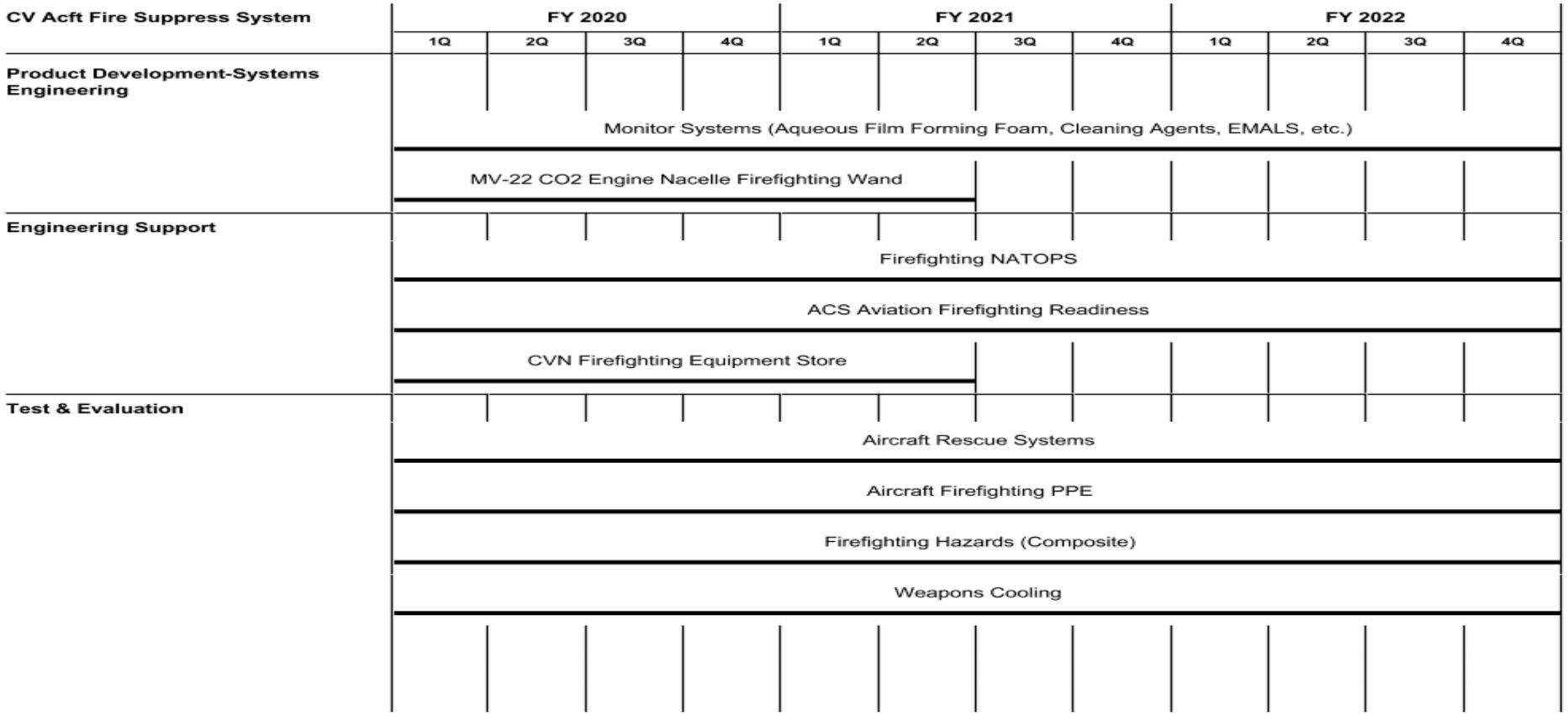
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	WR	NAWCWD : China Lake, CA	0.412	0.060	Oct 2019	0.050	Oct 2020	0.060	Oct 2021	-		0.060	-	-	-
		Subtotal	0.412	0.060		0.050		0.060		-		0.060	-	-	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.794	0.581		0.601		0.601		-		0.601	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 1819 / *CV Acft Fire Suppress System*



2022PB - 0603216N - 1819

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603216N / *Aviation Survivability*	**Project (Number/Name)** 1819 / *CV Acft Fire Suppress System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CV Acft Fire Suppress System				
Product Development-Systems Engineering: Monitor Systems (Aqueous Film Forming Foam, Cleaning Agents, Electro Magnetic Aircraft Launch System (EMALS), etc.)	1	2020	4	2022
Product Development-Systems Engineering: MV-22 CO2 Engine Nacelle Firefighting Wand	1	2020	2	2021
Engineering Support: Firefighting NATOPS	1	2020	4	2022
Engineering Support: Air Capable Ship (ACS) Aviation Firefighting Readiness	1	2020	4	2022
Engineering Support: Carrier Aviation Nuclear (CVN) Firefighting Equipment Store	1	2020	2	2021
Test & Evaluation: Aircraft Rescue Systems	1	2020	4	2022
Test & Evaluation: Aircraft Firefighting Personal Protective Equipment (PPE)	1	2020	4	2022
Test & Evaluation: Firefighting Hazards (Composite)	1	2020	4	2022
Test & Evaluation: Weapons Cooling	1	2020	4	2022