Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Office of the Secretary Of Defense	Date: February 2018
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	58.676	7.254	3.967	3.781	-	3.781	3.796	3.868	3.927	4.000	Continuing	Continuing
440: *UAS Airspace Integration*	32.688	4.932	0.980	0.980	-	0.980	1.100	1.200	1.250	1.300	Continuing	Continuing
442: *Interoperability*	24.693	1.972	2.747	2.471	-	2.471	2.446	2.318	2.427	2.350	Continuing	Continuing
443: *Unmanned Systems Roadmap*	1.295	0.350	0.240	0.330	-	0.330	0.250	0.350	0.250	0.350	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) Unmanned Systems (UxS) Common Development program is a joint effort to develop and demonstrate common standards, architectures, and technologies that address unmanned systems' issues across all Military Services. The intent is to increase interoperability and effectiveness by promoting cooperative development of solutions that are applicable across all unmanned systems. This effort initially focused on addressing DoD unmanned aircraft systems (UAS), to include integration into the National Airspace System (NAS) and a common, interoperable ground station architecture and associated interface standards. While UAS initially were the primary focus, interoperability among all unmanned and manned systems is the long-term goal.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	3.320	3.967	3.806	-	3.806
Current President's Budget	7.254	3.967	3.781	-	3.781
Total Adjustments	3.934	0.000	-0.025	-	-0.025
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	4.000	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• FFRDC Reduction	-0.008	-	-	-	-
• Leadership Adjustments	-0.058	-	-0.025	-	-0.025

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2017	FY 2018
Project: 440: *UAS Airspace Integration*		
Congressional Add: *Airspace Integration*	4.000	-
Congressional Add Subtotals for Project: 440	4.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Office of the Secretary Of Defense	Date: February 2018
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604400D8Z *I Department of Defense (DoD) Unmanned Systems Common Development*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2017	FY 2018
Congressional Add Totals for all Projects	4.000	-

Change Summary Explanation

A $4.0M FY2017 Congressional Add was provided on June 22, 2017.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense			Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	Project (Number/Name) 440 / *UAS Airspace Integration*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
440: *UAS Airspace Integration*	32.688	4.932	0.980	0.980	-	0.980	1.100	1.200	1.250	1.300	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Airborne Sense-and-Avoid (ABSAA) and Ground Based Sense-and-Avoid (GBSAA) technology development transitioned to UAS programs of record during FY2013.

A. Mission Description and Budget Item Justification

Global Hawk and Triton, as well as other Group 3-5 UAS, need a sense-and-avoid (SAA) capability as an alternate means of compliance to Title 14 Code of Federal Regulations, Part 91.111 and Part 91.113, requirement to see-and-avoid other aircraft. The Air Force is leading the effort to develop an ABSAA system that is suitable to support operations within US and foreign national airspace. The RQ-4 Global Hawk, MQ-4C Triton, MQ-1B Predator, MQ-1C Gray Eagle, and MQ-9 Reaper all have a requirement for SAA capability and will leverage the technology being developed by the Air Force. The Army is leading the development of a GBSAA system to provide a solution for improved airspace access in terminal operations as well as operations/training within the GBSAA system's coverage area (e.g., Gray Eagle at Fort Hood, Shadow operations at Cherry Point). This system will provide a near-term solution and is an integral part of the long-term permanent solution. Long term GBSAA systems and Unmanned Traffic Management (UTM) architectures, operating concepts, standards and technology are being developed to allow DoD, commercial and private manned and Group 1-5 Unmanned Aircraft to operate safely and effectively in the national Airspace.

This joint funding also supports development of common operating concepts, policy, standards, modeling and simulation, and technology to enable DoD UAS to routinely access the national and international airspace systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Unmanned Aircraft System Airspace Integration Initiatives	0.932	0.980	0.980
Description: Starting in FY 2010 the Department's sense-and-avoid (SAA) developmental efforts are enhanced by this defense-wide program element. This program has provided joint funding to accelerate the development of SAA technology and standards to enable UAS to routinely access the national and international airspace systems. This program also supports development of UAS airspace integration policy and standards, as well as the modeling, simulation, and operational analysis needed to validate the standards. In FY 2013 ABSAA and GBSAA efforts transitioned to the Services. ***FY 2018 Plans:*** Evaluate and validate identified best-candidate solutions for low size, weight, power and cost technology supporting military sUAS operations in national, international and foreign national airspace. Develop future Policy and architectures that support the operation of DoD, Commercial, and Private Group 1-5 UAS systems in the national Airspace safely by developing an Unmanned Traffic Management (UTM) system Develop quantitative safety assessment approaches that support unique UAS operations to			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 440 / *UAS Airspace Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
support emerging DoD needs and inform future rulemaking. Make formal recommendations for separation minima that enable low-altitude military UAS to remain well clear of other aircraft. Continue to engage the FAA to advance DoD UAS airspace integration. Investigate and draft Cyber security concept of operations for Manned and Unmanned Aircraft Systems operating in the National Airspace. ***FY 2019 Plans:*** Develop future Policy and architectures that support the operation of DoD, Commercial, and Private Group 1-5 UAS systems in the national Airspace safely by developing an Unmanned Traffic Management (UTM) system. Investigate and draft Cyber security concept of operations for Manned and Unmanned Aircraft Systems operating in the National Airspace with a focus on Groups 1-2 UAS. Evaluate and validate identified best-candidate solutions for low size, weight, power and cost technology supporting military sUAS operations in national, international and foreign national airspace. Develop quantitative safety assessment approaches that support unique UAS operations to support emerging DoD needs and inform future rulemaking. Make formal recommendations for separation minima that enable low-altitude military UAS to remain well clear of other aircraft. Continue to engage the FAA to advance DoD UAS airspace integration. Investigate and draft Cyber security concept of operations for Manned and Unmanned Aircraft Systems operating in the National Airspace. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY19 budget reduction was offset by the congressional add in FY17			
Accomplishments/Planned Programs Subtotals	0.932	0.980	0.980

	FY 2017	FY 2018
Congressional Add: Airspace Integration	4.000	-
FY 2017 Accomplishments: Investigated and developed the technology requirements, policies and architectures required to integrate DoD Unmanned systems safely into the national Airspace.		
Congressional Adds Subtotals	4.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 440 / *UAS Airspace Integration*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Office of the Secretary Of Defense			Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 440 / *UAS Airspace Integration*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBSAA	MIPR	USAF A3 AFLCMC/ HBAG (VOLPE/ MITRE) : AFLCMC/ HBAG	32.028	1.644	Dec 2017	0.340	Jul 2018	0.340	Jul 2019	0.000		0.340	Continuing	Continuing	-
DoD UTM	MIPR	NASA : Ames Research California	0.000	0.985	Dec 2017	0.000	Oct 2018	0.000		0.000		0.000	Continuing	Continuing	-
National Guard GBSAA	MIPR	Army PM UAS : Army Redstone, Alabama	0.000	1.643	Mar 2018	0.000		0.000		0.000		0.000	Continuing	Continuing	-
		Subtotal	32.028	4.272		0.340		0.340		0.000		0.340	Continuing	Continuing	N/A

Remarks

NA

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USAF - A3 PBFA Support	Option/ LH	USAF A3 AFLCMC/ HBAG : AFLCMC/ HBAG	0.660	0.660	Feb 2018	0.640	Mar 2018	0.640	Mar 2019	-		0.640	Continuing	Continuing	-
		Subtotal	0.660	0.660		0.640		0.640		-		0.640	Continuing	Continuing	N/A

Remarks

NA

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	32.688	4.932		0.980		0.980		0.000		0.980	Continuing	Continuing	N/A

Remarks

NA

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 440 / *UAS Airspace Integration*

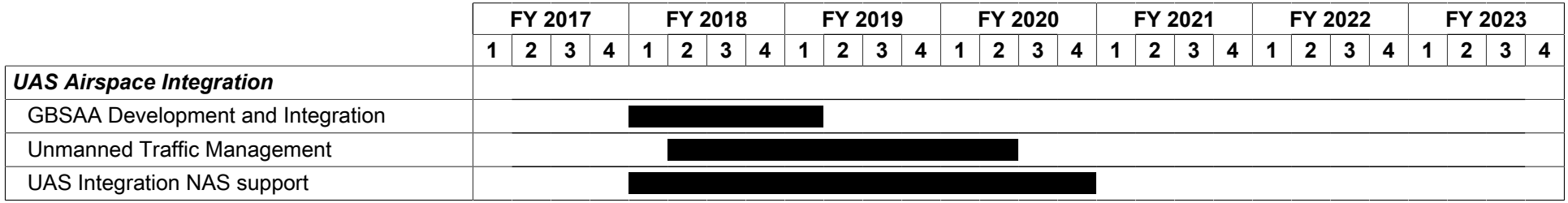

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 440 / *UAS Airspace Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
UAS Airspace Integration				
GBSAA Development and Integration	1	2018	1	2019
Unmanned Traffic Management	2	2018	2	2020
UAS Integration NAS support	1	2018	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense			Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 442 / *Interoperability*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
442: *Interoperability*	24.693	1.972	2.747	2.471	-	2.471	2.446	2.318	2.427	2.350	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Interoperability project will develop and demonstrate an interoperable, standards-based, open architecture solution for cross-domain (air, ground, maritime) unmanned systems. The intent is to improve joint and coalition interoperability and to promote competition through the implementation of open standards and open architectures.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Interoperability	1.972	2.747	2.471
Description: Develop and demonstrate an interoperable, standards-based, open ground station architecture for cross-domain (air, ground, maritime) unmanned systems; improve joint and coalition interoperability; and promote competition through the implementation of open standards and open architectures.			
FY 2018 Plans: Continue SAE working group support for UAS Control Segment Architecture (UCS) interfaces and Joint Architecture Unmanned System (JAUS). Continue JCAUS compliant prototypes to validate and further mature the architecture. Continue support for Unmanned Systems Interoperability and Integration workshop/technical exchange meeting. Continue support to DoD Interoperability IPT.			
FY 2019 Plans: Support the continued development and implementation of the SAE working group for UAS Control Segment Architecture (UCS) interfaces and Joint Architecture Unmanned System (JAUS). Develop a Joint Communications Architecture for Unmanned systems (JCAUS) and demonstrate a JCAUS compliant prototypes to validate and further mature the architecture. Develop Safety standards and policy for Unmanned and Autonomous systems that will allow for the incorporation of Artificial Intelligence (AI). Continue support for Unmanned Systems Interoperability and Integration workshop/technical exchange meeting. Develop and Unmanned system autonomous test and Evaluation standards and architectures using modeling and simulation. Investigate a Cyber secure solution for integrating Artificial Intelligent systems into Unmanned Systems			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 442 / *Interoperability*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Continue support to DoD Interoperability IPT. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The development of a Joint Communications Architecture for Unmanned Systems to support bandwidth requirements for multiple program of records based on the DoD's reduction of Spectrum allocation.			
Accomplishments/Planned Programs Subtotals	1.972	2.747	2.471

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

n/a

E. Performance Metrics

n/a

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Office of the Secretary Of Defense			Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	Project (Number/Name) 442 / *Interoperability*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
UxS Interoperability and Architecture Development	MIPR	Labs, Warfare Centers, and DoD components and support : DoD Labs, Warefare Center, DoD and support service	24.693	1.972	Sep 2017	2.747	Sep 2018	2.471	Sep 2019	0.000		2.471	Continuing	Continuing	-
		Subtotal	24.693	1.972		2.747		2.471		0.000		2.471	Continuing	Continuing	N/A

Remarks

NA

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	24.693	1.972		2.747		2.471		0.000		2.471	Continuing	Continuing	N/A

Remarks

NA

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 442 / *Interoperability*

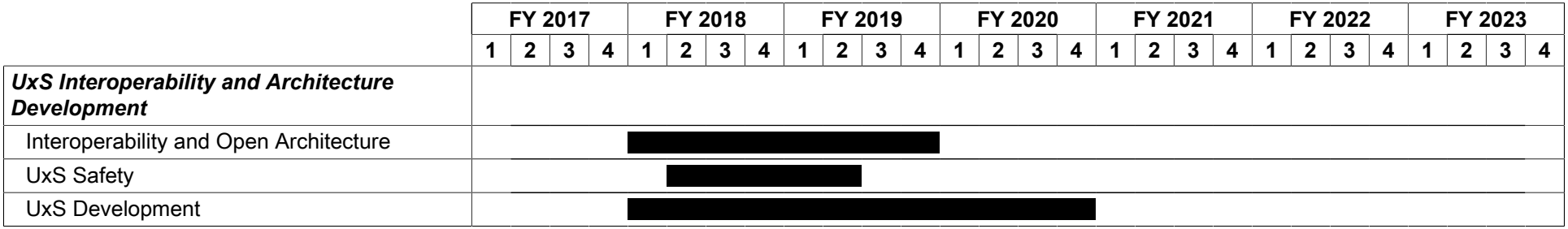

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 442 / *Interoperability*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
UxS Interoperability and Architecture Development				
Interoperability and Open Architecture	1	2018	4	2019
UxS Safety	2	2018	2	2019
UxS Development	1	2018	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense			Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	Project (Number/Name) 443 / *Unmanned Systems Roadmap*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
443: *Unmanned Systems Roadmap*	1.295	0.350	0.240	0.330	-	0.330	0.250	0.350	0.250	0.350	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This effort supports the Department's Unmanned Systems Integrated Roadmap and updates. The roadmap provides a DoD vision for the continuing development, fielding and employment of unmanned systems technologies; establishes the current state of unmanned systems in today's force; and outlines a strategy to address common challenges to achieve the shared vision across all unmanned domains (air, ground, and maritime).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Unmanned Systems Roadmap	0.350	0.240	0.330
Description: Develops, Drafts, and Produces the Department's Unmanned Systems Integrated Roadmap. ***FY 2018 Plans:*** Update the Department's Unmanned Systems Integrated Roadmap and perform related studies supporting the Department's vision for unmanned systems. Integrate feedback, responses and new technology into the FY19 Roadmap. Investigate changes to concept of operations with guidance provided by Department's vision for unmanned systems. ***FY 2019 Plans:*** Release the FY19 Unmanned Systems Integrated Roadmap Update the Department's Unmanned Systems Integrated Roadmap and perform related studies supporting the Department's vision for unmanned systems. Integrate feedback, responses and new technology into the FY19 Roadmap. Investigate changes to concept of operations with guidance provided by Department's vision for unmanned systems. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The Unmanned systems roadmap is Developed and published every other year to provide the Department's vision for unmanned systems based on the rapid change in technology			
Accomplishments/Planned Programs Subtotals	0.350	0.240	0.330

Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 443 / *Unmanned Systems Roadmap*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Provide up-to-date Unmanned Systems Roadmap providing a DoD vision for the continuing development, fielding and employment of unmanned systems technologies.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Office of the Secretary Of Defense			Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	Project (Number/Name) 443 / *Unmanned Systems Roadmap*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Unmanned Systems Roadmap	C/LH	Army TARDEC Unmanned System Support services : Army TARDEC	1.295	0.350	Aug 2017	0.240	Aug 2018	0.330	Aug 2019	0.000		0.330	Continuing	Continuing	-
		Subtotal	1.295	0.350		0.240		0.330		0.000		0.330	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.295	0.350		0.240		0.330		0.000		0.330	Continuing	Continuing	N/A

Remarks

NA

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 443 / *Unmanned Systems Roadmap*

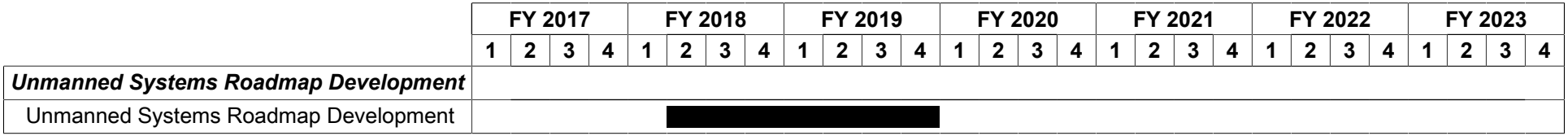

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Office of the Secretary Of Defense		Date: February 2018
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** 443 / *Unmanned Systems Roadmap*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Unmanned Systems Roadmap Development				
Unmanned Systems Roadmap Development	2	2018	4	2019