Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army											Date: February 2018	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603645A *I Armored Systems Modernization Adv Dev*							
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	-	0.000	32.739	119.395	-	119.395	64.986	85.724	86.964	32.603	0.000	422.411
EV7: *Combat Vehicle Prototyping*	-	0.000	32.739	119.395	-	119.395	64.986	85.724	86.964	32.603	0.000	422.411

A. Mission Description and Budget Item Justification

Next Generation Combat Vehicle (NGCV) prototyping provides focused investment for development of the combat vehicles in future battlefields. The purpose of this funding is to integrate the next generation of technology enabled capabilities developed in the Science and Technology (S&T) portfolio to demonstrate new capabilities to meet emerging military needs, provide hardware for Soldier operational evaluation/feedback, to determine integration potential across the current Army portfolio of ground vehicles and to develop platform level prototypes

Prototyping allows for aggressive innovation (provides a bridge from S&T investment to vehicle integration and operational use), informs requirements through User Evaluations, ensures requirements are met, mitigates capability gaps and reduces integration risks.

Additional funding in FY 2019 will support working with Industry (via Other Transaction Agreement (OTAs)) on concept development, trade studies, technology maturation/testing, technical/operational/affordability analyses and prototyping and demonstration of combat vehicles (both manned and autonomous) to assess future concepts and designs that integrate emerging S&T advancements to include integration and fusion of data from different sensors and subsystems within the platform and how it will be displayed to the crewman and/or autonomous vehicle operator on the battlefield to improve crew reaction time and platform fightability. Funding will also support acceleration of the TARDEC NGCV 1.0 Prototype.

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	0.000	32.739	32.743	-	32.743
Current President's Budget	0.000	32.739	119.395	-	119.395
Total Adjustments	0.000	0.000	86.652	-	86.652
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	86.652	-	86.652

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army	Date: February 2018
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603645A *I Armored Systems Modernization Adv Dev*

Change Summary Explanation

Funding increase of $86.652M in support of Combat Vehicle modernization priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army			Date: February 2018
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603645A / *Armored Systems Modernization Adv Dev*	Project (Number/Name) EV7 / *Combat Vehicle Prototyping*	

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
EV7: *Combat Vehicle Prototyping*	-	0.000	32.739	119.395	-	119.395	64.986	85.724	86.964	32.603	0.000	422.411
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Next Generation Combat Vehicle Prototyping (CVP) provides focused investment for the development of the next of generation combat vehicles. The purpose of this funding is to integrate advanced technology enabled capabilities developed in the S&T portfolio, demonstrate their ability to meet emerging military needs, develop sub-system and system level prototypes, provide hardware for Soldier operational evaluation/feedback, and determine their integration potential across the current Army portfolio of ground vehicles.

Prototyping allows for aggressive innovation (provides a bridge from Science and Technology (S&T) investment to vehicle integration and operational use), informs requirements through User Evaluations, ensures requirements are met, mitigates capability gaps and reduces integration risks.

Additional funding in FY 2019 will support working with Industry (via OTAs) on concept development, trade studies, technology maturation/testing, technical/operational/ affordability analyses, and prototyping and demonstration of combat vehicles (both manned and autonomous) to assess future concepts and designs that integrate emerging Science and Technology advancements to include integration and fusion of data from different sensors and subsystems within the platform and how it will be displayed to the crewman and/or Autonomous vehicle operator on the battlefield to improve crew reaction time and platform fight ability. Funding will also support acceleration of the TARDEC NGCV 1.0 Prototype.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Project Management	-	14.854	19.220
Description: This effort conducts system level ground vehicle advanced concepting, prototyping and demonstration. This effort will partner government organic capabilities and Industry for an iterative process to develop combat vehicle concepts and prototypes in order to inform and stabilize future capability requirements, performance characteristics, and affordability, evaluate and update operational concepts, and reduce future acquisition risk. Activity will include the integration and demonstration of a series of subsystem demonstrators building off of previous investment in ground combat acquisition and science and technology programs along with advanced technologies from Industry and Academia.			
FY 2018 Plans: Will build off of previous and current investments in Science and Technology and Acquisition efforts (PE?s 0605625, 0604115, 0603005) to further concept development and system level risk reduction for the next generation of combat vehicles. The next generation combat vehicle team (PEO GCS in coordination with RDECOM) will oversee a continued public private partnership			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603645A / *Armored Systems Modernization Adv Dev*	**Project (Number/Name)** EV7 / *Combat Vehicle Prototyping*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
between organic government and private industry, monitoring and tracking technical progress related to the development concepts and designs for the next generation of combat vehicles. It will mature system level concepts and designs to integrate S&T developed advanced ground vehicle subsystem technologies such as active protection, powertrains, armors, and situational awareness suites into a system level experimental prototype. It will conduct experimental demonstration of a closed hatch Infantry Fighting Vehicle and split-squad operations. It will leverage organic early synthetic prototyping capability to conduct soldier-in-the-loop virtual simulations of future combat vehicle concepts to assess next generation capabilities and conduct system level performance trades. The team will conduct analysis based on all the data currently available from the Future Fighting Vehicle and Squad Centric Mounted Maneuver (SCMM) efforts to inform investments in FY19 and beyond. ***FY 2019 Plans:*** Analyze results of completed experimental demonstrations in support of next generation combat vehicles (both manned and autonomous) to include the Mission Enabling Technologies - Demonstrator (MET-D) demonstration of closed hatch Infantry Fighting Vehicle (IFV) and split-squad operations and apply lessons learned to mature the system level concepts and designs for integration of the S&T developed advanced ground vehicle subsystem technologies into a system level experimental prototype. Will continue to conduct soldier-in-the-loop virtual simulations of future combat vehicle concepts to assess next generation capabilities and conduct system level performance trades. Will analyze system concepts and designs to identify long-lead hardware in preparation for procurement prior to system build and physical integration. Current prototype build by TARDEC will be accelerated for delivery by FY 2020. Will initiate work on data fusion technology based on multiple sensor inputs for use in target identification and tracking, surveillance, and autonomous control. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase to FY 2019 is for additional Program Management support.			
Title: Test & Evaluation ***FY 2018 Plans:*** Test & Evaluation includes but not limited to safety, integration, and demonstration. ***FY 2019 Plans:*** Test & Evaluation includes but not limited to safety, integration, and demonstration. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Test & Evaluation increases in FY 2019 for safety, integration, and demonstration.	-	7.981	8.000
Title: Other ***Description:*** Funding provided support software development, integration and support services, hardware, and vehicle electronics architecture subsystems.	-	6.904	-

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603645A / *Armored Systems Modernization Adv Dev*	**Project (Number/Name)** EV7 / *Combat Vehicle Prototyping*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: Other efforts include software integration library (SIL), crew station SIL, power and data architecture, powerpack components, software support and development. The efforts also include integration and support services for the Squad Centric Mounted Maneuver (SCMM) project; ground movement target indicator radar, unmanned aerial system sensor, hardware for the head mount display subsystem, fabricates remaining hardware in support of SCMM vehicle integration, and hardware and support for the SCMM autonomy subsystem and vehicle electronics architecture subsystem. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Other decreases to zero in FY 2019 however it is included in the Prototyping Acceleration.			
Title: Modeling & Simulation ***Description:*** The modeling and simulation effort is to assess operational needs and operational employment by using the Maneuver Battle lab at Fort Benning and One Semi-Automated Forces (OneSAF) modeling. Results provide the analytical underpinnings to support development of requirements. ***FY 2018 Plans:*** The modeling and simulation effort is to assess operational needs and operational employment by using the Maneuver Battle lab at Fort Benning and One Semi-Automated Forces (OneSAF) modeling. Results provide the analytical underpinnings to support development of requirements. ***FY 2019 Plans:*** Will continue to assess operational needs and operational employment through modeling and simulation by using the Maneuver Battle lab at Fort Benning and One Semi-Automated Forces (OneSAF) modeling. Modeling and simulation results will continue to support the development of requirements for future systems. The modeling and simulation outcomes coupled with planned technology proto-type demonstrations and user evaluations will provide the combat developer an analytical base to support the development and refinement of requirements. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Modeling & Simulation increase in FY 2019 due to the increase in demonstrations.	-	3.000	6.000
Title: Prototyping Acceleration ***Description:*** Accelerate prototyping (both organic and from Industry) for combat vehicles and internal fusion of data from different sensors and how it will be displayed and used by manned and autonomous systems. Demonstrations from the prototypes will help to inform requirements for the NGCV platform(s) and how they will operate. ***FY 2019 Plans:***	-	-	86.175

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
TARDEC will take their existing contract using the OTA and accelerate the IFV build in order to deliver a first prototype by 1Q FY2021. The prototype will utilize latest off-the shelf technologies and have the capability to upgrade to the Combat Vehicle Prototyping (CVP) technologies as they become available. Acceleration of the contract will require modification of the current contract. NGCV Cross Functional Team (CFT)/PM will use the OTA to submit a call for white papers to Industry for concepts that will show technologies that will improve a combat vehicle (IFV or Tank) in the areas of mobility, survivability, lethality, situational awareness, sensor fusion and demonstrate a path to autonomy. The white papers will be used to award 1 to 2 contracts to build a prototype which will be delivered by 1Q FY2021. Information from the prototypes (both organic and from Industry), along with the parallel modeling and simulation will inform the development of the NGCV requirements. Demonstrate Sensor Fusion/Crew Station requirements for manned and unmanned systems. Will continue to provide integration support and technology procurement for the software system integration laboratory (SIL). Provide integration support and user evaluation for the crew station SIL. These SILs will allow the integration team to simulate integrated system functionality prior to the actual physical integration of the system. Work performed in these SILs will be critical to the successful mitigation of risk for the integrated systems demonstration by identifying any system integration-related errors as early as possible. Identifying errors early in the integration process will allow the team to develop solutions in a timely and effective manner. Will continue to mature the system level integration of the powerpack (engine, transmission, integrated starter generator, exhaust, air inlet, and thermal management system) along with working new projects in the areas of sensor fusion, which may include, but not limited to, data inputs from Global Positioning System (GPS), Light Detection and Raging (LIDAR), SOund Navigation And Ranging (SONAR), RAdio Detection And Ranging (RADAR), optical Infrared, UltraViolet (UV), etc. Will procure specialty tooling and long-lead items, and will continue to provide software support that is needed for system integration, for the accelerated demonstration. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Prototyping Acceleration increases in FY 2019 to include Next Generation Combat Vehicle, Prototype with Industry and Sensor Fuse/Crew/SIL.			
Accomplishments/Planned Programs Subtotals	-	32.739	119.395

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• 0604115A: *PE 0604115A*	14.423	-	0.000	-	0.000	-	-	-	-	0.000	14.423

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603645A / *Armored Systems Modernization Adv Dev*	**Project (Number/Name)** EV7 / *Combat Vehicle Prototyping*

D. Acquisition Strategy

Competitive contracts will be awarded. This project will continue to exercise competitively awarded contracts using best value source selection procedures.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army			Date: February 2018
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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
NGCV Contract(s)	C/TBD	TBD : TBD	-	-		5.671	Oct 2017	30.000	Mar 2019	-		30.000	Continuing	Continuing	Continuing
SCMM Phase 1 Contracts	C/TBD	TBD : TBD	-	-		1.233	Oct 2017	-		-		-	Continuing	Continuing	Continuing
Prototyping with Industry	C/TBD	TBD : TBD	-	-		-		30.000	Jul 2019	-		30.000	Continuing	Continuing	Continuing
Sensor Fuse/Crew/SIL	C/TBD	TBD : TBD	-	-		-		26.175	Jul 2019	-		26.175	0.000	26.175	-
		Subtotal	-	-		6.904		86.175		-		86.175	Continuing	Continuing	N/A

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
PMO/PEO Support	MIPR	PM/PEO : Warren, MI	-	-		14.854	Dec 2017	19.220	Dec 2018	-		19.220	0.000	34.074	-
		Subtotal	-	-		14.854		19.220		-		19.220	0.000	34.074	N/A

Test and Evaluation ($ 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
SCMM User Evaluation	C/TBD	TBD : TBD	-	-		7.981	Oct 2017	-		-		-	Continuing	Continuing	Continuing
Modeling & Simulation	C/TBD	TBD : TBD	-	-		3.000	Jan 2018	6.000	Mar 2019	-		6.000	Continuing	Continuing	Continuing
Developmental testing	C/TBD	TBD : TBD	-	-		-		8.000	Jul 2019	-		8.000	Continuing	Continuing	Continuing
		Subtotal	-	-		10.981		14.000		-		14.000	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	-	-		32.739		119.395		-		119.395	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603645A / *Armored Systems Modernization Adv Dev*	**Project (Number/Name)** EV7 / *Combat Vehicle Prototyping*

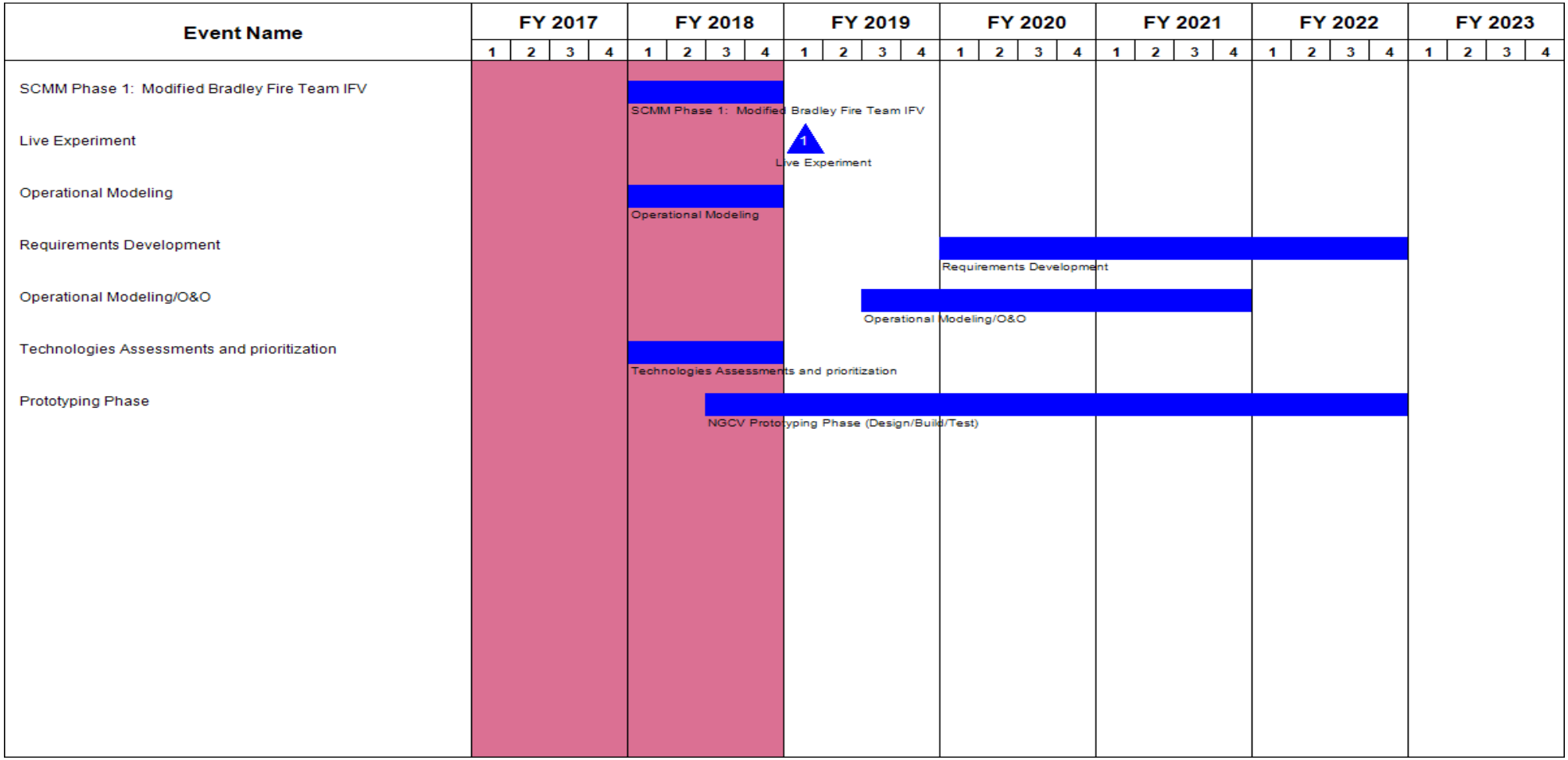

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603645A / *Armored Systems Modernization Adv Dev*	**Project (Number/Name)** EV7 / *Combat Vehicle Prototyping*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SCMM Phase 1: Modified Bradley Fire Team IFV	1	2018	4	2018
Live Experiment	1	2019	1	2019
Operational Modeling	1	2018	4	2018
Requirements Development	1	2020	4	2022
Operational Modeling/O&O	3	2019	4	2021
Technologies Assessments and prioritization	1	2018	4	2018
Prototyping Phase	3	2018	4	2022