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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Army **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>
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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	-	8.861	3.438	-	-	-	-	-	-	-	-	-
582: <i>Synthetic Envir Core</i>	-	8.861	3.438	-	-	-	-	-	-	-	-	-

**Note**

The research and development effort for Project 582 - Synthetic Environment Core, has completed and the program will not request funding in FY 2022.

**A. Mission Description and Budget Item Justification**

The Combined Arms Tactical Trainers (CATT) represent a family of combined arms simulation systems designed to support the Army's simulation-based, Combined Arms Training Strategy. The CATT program portfolio directly supports the Army's Training Strategy and progressive training model by providing realistic training events and comprehensive After Action Reviews (AAR). CATT enables units, from crew to the battalion task force level, to conduct a wide variety of combat tasks on a realistic, interactive, synthetic battlefield. CATT's combination of manned simulators and staff officer workstations enables units to train as a combined arms team in a cost effective manner. The primary CATT system is the Close Combat Tactical Trainer (CCTT) which provides the underlying baseline architecture and AAR for CATT expansions, Pre-Planned Product Improvements (P3I) and system enhancements. The Reconfigurable Vehicle Simulator (RVS) supports combat convoy operations and Improvised Explosive Devices (IED) tasks. Synthetic Environment (SE) Core provides for the expansion of the synthetic environment baseline to include enhanced interoperability and the products and infrastructure to support current and future combat operations and mission rehearsal. The first synthetic environments expanded were in the Aviation Combined Arms Tactical Trainer (AVCATT) and the CCTT for both the Active and Reserve components. Gaming Technology provides an application to train and rehearse convoy-operations, platoon level, mounted infantry tactics, dismounted operations, rules-of-engagement training, cross-cultural communications training, IED defeat training, route clearance, ground-air coordination, Unmanned Aerial Vehicle (UAV) integration, and other small unit and individual training and mission rehearsal requirements. Soldiers can train in a common environment on geotypical or geospecific virtual terrain. It is also possible to link Gaming technology to actual communication, command, control, computer, and intelligence (C4I) systems and other CATT simulation systems to increase the utility and realism of the training. By practicing skills in CATT, units are able to effectively prepare for costly live fire and maneuver exercises, as well as training tasks deemed too hazardous to conduct in a live training environment. Fielded in both fixed site and mobile versions, CATT enables both Active and Reserve component units to prepare for real world contingency missions. By being able to use a wide array of training terrain databases and modify the behavior of the computer generated opposing forces, CATT offers an unlimited array of training options to support the Army's many regional combat missions. The combination of tough field and live fire training, and realistic simulation training in CATT, is the formula to prepare Soldiers and their Leaders for the uncertainties they face in combat operations.

The research and development effort for Project 582 - Synthetic Environment Core, has completed and the program will not request funding in FY 2022.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	9.241	3.568	2.753	-	2.753
Current President's Budget	8.861	3.438	0.000	-	0.000
Total Adjustments	-0.380	-0.130	-2.753	-	-2.753
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.380	-0.130			
• Adjustments to Budget Years	-	-	-2.753	-	-2.753

**Change Summary Explanation**

Fiscal Year 2022 (FY22) decrease is a result of Project 582 Synthetic Envir Core completing at the end of FY 2021.

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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / Combined Arms Tactical Trainer (CATT) Core	<b>Project (Number/Name)</b> 582 / Synthetic Envir Core
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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
582: Synthetic Envir Core	-	8.861	3.438	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

The research and development effort for Project 582 - Synthetic Environment Core, has completed and the program will not request funding in FY 2022.

**A. Mission Description and Budget Item Justification**

This project supports the Synthetic Environment Core (SE Core) Program. The SE Core Program is a foundational element and the only provider of correlated terrain for the Army's Live, Virtual, Constructive Integrated Training Environment (LVC ITE) that links Army training systems and simulators into an integrated and interoperable environment. SE Core's mission is to ensure that Army systems and simulators support U.S. Army Readiness by providing visual models (buildings and vehicles), terrain (over which the simulator moves), and entity behaviors (models performing realistic and appropriate actions such as movement and weapon effects) that are relevant and realistic in support of Multi-Domain Operations (MDO) 2028. As the exclusive provider of correlated terrain, SE Core ensures that all Army simulators/operators receive terrain that allows for a "Fair Fight" capability; that is, no one will have an inherent advantage over another because training did not occur on a "level playing field". Fair Fight allows air and ground forces to hold coordinated and integrated training events that accurately replicate combat operations for a train-as-we-fight capability.

A major component of the program is the SE Core-developed Standard Terrain Database Generation Capability (STDGC), the process used to build the terrain and models that the simulators and simulations employ. The Army Geospatial Center (AGC) gave SE Core its highest rating, the "Gold Standard", based on the quality of the STDGC process and the geospatial data generated by it. The program has been a certified, AGC co-producer of geospatial data since 2014. In addition to the correlated terrain databases and common visual models, SE Core components include Virtual One Semi-Automated Forces (Virtual OneSAF) (the computer generated force behaviors for virtual systems); the virtual systems architecture; and mission command development.

The research and development effort for Project 582 - Synthetic Environment Core, has completed and the program will not request funding in FY 2022.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Synthetic Environment Core (SE Core) program.	8.657	3.079	-
<b>Description:</b> Continue EMD phase contract activities for the SE Core program.			
<b>FY 2021 Plans:</b>			

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Continues to fulfill requirements of Increment 3. Efforts will refine the terrain generation capability (STDGC) to ensure it remains concurrent in meeting the demand for synthetic terrain for constructive simulations. In addition, funds are required to ensure the SE Core development environment remains compliant with Risk Management Framework mandates.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease for FY 2021 to FY 2022 is due to completion of the research and development effort associated with the program.				
<b>Title:</b> Government Program Management for the Synthetic Environment Core (SE Core) program.		0.204	0.359	-
<b>Description:</b> Government Program Management for the SE Core program.				
<b>FY 2021 Plans:</b> Will provide funding for the Subject Matter Experts providing technical input into the development of the SE Core terrain generation capability.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease for FY 2021 to FY 2022 is due to completion of the research and development effort associated with the program.				
<b>Accomplishments/Planned Programs Subtotals</b>		8.861	3.438	-
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
<p>The SE Core program is post Milestone B and will remain in the Engineering and Manufacturing Development phase for the remainder of its lifecycle. SE Core is a "software only" program that continuously develops terrain, virtual models and other software products for integration into existing training systems. It does not field products to the end user, therefore the program will not require a Milestone C decision or go into the Production phase. The SE Core program is developing the software tools and processes to develop the Army's common virtual environment to link simulation devices [to include: Close Combat Tactical Trainer (CCTT), Aviation Close Combat tactical Trainer (AVCATT) , Games for Training (GFT), Live, Virtual, Constructive Integrating Architecture (LVC-IA), Homestation Instrumentation Training System (HITS), Joint Land Component Constructive Training Capability (JLCCTC), Fires Simulation (FIRESIM), One Semi-Automated Forces (OneSAF)] into an interoperable environment and maintaining the synthetic terrain, models, and virtual OneSAF for the Army's Integrated Training Environment (ITE) concept.</p> <p>The government awarded Increment 2 as a single award, cost plus fixed fee (CPFF), indefinite delivery indefinite quantity (IDIQ) contract to Leidos in August 2011 with a period of performance start date of December 2011. Leidos was formerly known as Science Applications International Corporation (SAIC). This contract has a one-year base with four one-year options. The government exercised the first option in December 2012, the second option in December 2013, the third option in December 2014</p>				

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2040 / 5	PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	582 / <i>Synthetic Envir Core</i>

and the fourth option in December 2015. The government awarded a final delivery order in December 2016 that extended the period of performance of the Increment 2 contract into December 2017. The contract was extended an additional six months to June 2018 while the Increment 3 contract was competed.

In April 2018, in keeping with the original SE Core acquisition strategy of continuous development, the government awarded the Increment 3 contract as a single award, CPFF, IDIQ with a one year base and four one-year options and a target end date of FY 2023.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Tra</i> <i>iner (CATT) Core</i>	<b>Project (Number/Name)</b> 582 / <i>Synthetic Envir Core</i>
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<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	Various	Various : Various	3.622	-		-		-		-		-	0.000	3.622	3.622
Government Program Management Support	Various	PEO STRI : Orlando, FL	26.522	0.204	Oct 2019	0.359	Feb 2021	-		-		-	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	0.419		-		-		-		-	0.000	0.419	-
<b>Subtotal</b>			30.144	0.623		0.359		-		-		-	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Technology Development - Architecture and Integration	C/CPFF	SAIC : Orlando, FL	6.946	-		-		-		-		-	0.000	6.946	6.946
Technology Development -Architecture and Integration	C/CPFF	SAIC : Orlando, FL	50.785	-		-		-		-		-	0.000	50.785	50.785
Technology Development -Database Virtual Environment Development	C/CPFF	CAE, USA : Orlando, FL	56.179	-		-		-		-		-	0.000	56.179	56.179
Technology Development-Common Virtual Environment & Management	C/Various	Leidos : Orlando, FL	80.284	-		-		-		-		-	0.000	80.284	80.284
Technology Development-Common Virtual Environment & Management INC III	C/Various	Leidos, Inc. : Orlando, FL	10.525	-		-		-		-		-	0.000	10.525	Continuing
Technology Development-Common Virtual Environment & Management INC III	Option/ Various	Leidos : Orlando, FL	4.940	8.238	Nov 2019	3.079	Nov 2020	-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			209.659	8.238		3.079		-		-		-	Continuing	Continuing	N/A

**UNCLASSIFIED**

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

**Remarks**  
FY 2020 award in Nov 2019 of \$8.238 million funds remaining option year 1 period and awards option year 2 period. FY 2021 award of \$3.079 million in Nov 2020 fully funds option year 2 period and awards option year 3 period.

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Technology Development - Test Support	Various	Test Community : Various	0.125	-		-		-		-		-	0.000	0.125	0.125
<b>Subtotal</b>			0.125	-		-		-		-		-	0.000	0.125	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
<b>Project Cost Totals</b>			239.928	8.861		3.438		-		-		-	Continuing	Continuing	N/A

**Remarks**



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Army		<b>Date:</b> May 2021
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Increment 2 (Development and Integration)	4	2013	3	2018
Increment 3 (Development and Integration)	3	2018	3	2023