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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603790A / NATO Research and Development
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	-	4.589	3.777	3.805	-	3.805	3.875	3.926	3.980	4.056	0.000	28.008
691: <i>NATO Rsch & Devel</i>	-	4.589	3.777	3.805	-	3.805	3.875	3.926	3.980	4.056	0.000	28.008

A. Mission Description and Budget Item Justification

This Project implements the provisions of Title 10 United States (U.S.) Code, Section 2350a, Cooperative Research and Development (R&D) Projects: Allied Countries. The objective is to improve, through the application of emerging technologies, the conventional defense capabilities of the U.S. and our cooperative partners, including the North Atlantic Treaty Organization (NATO), U.S. major non-NATO allies and Friendly Foreign countries through technology sharing and joint equipment development, thereby reducing U.S. acquisition costs. Cooperative efforts also improve multinational force compatibility with potential coalition partners through the development and use of similar equipment and improved interfaces. The Project focuses specifically on international cooperative technology demonstration, validation, and interoperability of Army weapon and command, control, communications and information (C3I) systems, including the NATO Defense Against Terrorism initiatives. Activities are implemented through international agreements with foreign partners that define scope, cost and work sharing arrangements, management, contracting, security, data protection and third party transfers. Funds are used to pay for only the U.S. work share that occurs in the United States at U.S. Government and U.S. contractor facilities.

B. Program Change Summary (\$ in Millions)	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>
Previous President's Budget	4.589	3.777	0.000	-	0.000
Current President's Budget	4.589	3.777	3.805	-	3.805
Total Adjustments	0.000	0.000	3.805	-	3.805
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	3.805	-	3.805

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

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Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603790A / NATO Research and Development				Project (Number/Name) 691 / NATO Rsch & Devel			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
691: NATO Rsch & Devel	-	4.589	3.777	3.805	-	3.805	3.875	3.926	3.980	4.056	0.000	28.008
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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

	FY 2021	FY 2022	FY 2023
Title: Armaments Cooperation Enterprise Support	3.436	2.486	2.834
Description: Armaments Cooperation Enterprise Support/ International Online (IOL) Development and Implementation NATO/ International Cooperative R&D (AR 70-41) and International Acquisition (AR 70-1, AR 70-3).			
The goal of this activity is to expand worldwide allied standardization and interoperability through cooperative Research and Development (R&D) and technology sharing per SECDEF guidance and especially in support of the U.S. Army. The execution AR 70-41 responsibilities requires DASA (DE&C) to conduct engagement with key strategy foreign partners in all regions of the world through the SNR(A) program, international agreement negotiations, and other bilateral and multilateral forums involving DASA (DE&C) personnel. This program will fund the travel costs and administrative support (studies, analysis, interpretation, equipment, etc.) required to participate internationally, such as the NATO Army Armaments Group (NAAG), Defense Against Terrorism (DAT) and to pursue new cooperative R&D initiatives and international cooperative agreements such as memoranda of understanding.			
FY 2022 Plans:			
Promotes more equitable sharing of International Cooperative conventional R&D costs through cooperative projects. Provides funds to conduct cooperative R&D projects, under international cooperative research, development and acquisition (ICRDA) agreements (MOU or Project Agreement/Arrangement [PA]), on defense equipment and munitions with NATO, NATO			

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603790A / NATO Research and Development	Project (Number/Name) 691 / NATO Rsch & Devel		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>organizations, major non-NATO allies, and other friendly foreign countries with senior representatives. Supports 9 CMEs with Armaments Cooperation Support with munitions, weapons, aviation and armaments.</p> <p>FY 2023 Plans: Supports 9 CMEs with Armaments Cooperation Support with munitions, weapons, aviation and armaments.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase is based on increased requirements and inflation.</p>				
<p>Title: Communications Interoperability, and Electronics Technologies</p> <p>Description: The goal of this activity is to develop technologies that enable interoperability among partner countries' command, control, communications, sensors, and information systems. Efforts include development of a single solution standard avoiding development of multiple unique solutions and leverage existing interoperability standards developed by NATO. Such standards include common doctrine, technical and procedural specifications to make better use of existing information, shared data, leveraged national operating picture capabilities and enable the development of interoperability of data, databases, applications, security domains and national networks architectures. Includes efforts from areas formerly titled Multi-National Network Enabled Capabilities, Low Level Air Defense Interoperability, JTRS, Combat Identification, and Multilateral Interoperability Program.</p> <p>FY 2022 Plans: Include efforts from areas formerly titled Multi-National Network Enabled Capabilities, Low Level Air Defense Interoperability, JTRS, Combat Identification, and Multilateral Interoperability Program.</p> <p>FY 2023 Plans: Include efforts from areas formerly titled Multi-National Network Enabled Capabilities, Low Level Air Defense Interoperability, JTRS, Combat Identification, and Multilateral Interoperability Program.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase is based on increased requirements and inflation.</p>		0.266	0.266	0.273
<p>Title: Senior National Representatives (Army) (SNR-(A))</p> <p>Description: Senior National Representatives (Army) (SNR-(A)) Projects (Partners: France, Germany, United Kingdom and Italy): Supports harmonization of programs at various levels: exchanging information, identifying knowledge gaps and conducting feasibility studies to further promote cooperative development; standardizing, fielding and road-mapping various processes; distributing the workload among the different nations. Technology Demonstrations hosted by the U.S. reps to Land Group 6, NATO Army Armaments Group (NAAG), will provide an opportunity to observe and demonstrate the current and future capability</p>		0.028	0.028	0.028

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603790A / NATO Research and Development	Project (Number/Name) 691 / NATO Rsch & Devel		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
of participating NATO nations with a view to assisting future operational and materiel interoperability. Army support of NAAG studies, analysis and technology demonstrations.				
<p>FY 2022 Plans: Funds will be used to pursue cooperative initiatives that were postponed, cancelled or not pursued due to funding reductions in previous years such as forums and engagement with long-standing foreign partners to identify interoperability gaps and develop necessary standardization programs.</p> <p>FY 2023 Plans: Funds will be used to pursue cooperative initiatives that were postponed, cancelled or not pursued due to funding reductions in previous years such as forums and engagement with long-standing foreign partners to identify interoperability gaps and develop necessary standardization programs.</p>				
<p>Title: Weapons and Munitions Technologies</p> <p>Description: The goal of this activity is to cooperate with partner countries to increase interoperability and develop jointly technologies to improve range, payloads, speed, survivability and lethality to maintain U.S. technical superiority and combat overmatch for Army weapons systems and associated munitions. Areas of cooperation include fuzing and warhead systems, guidance systems, counter improvised explosive device neutralization, directed energy, and fire control systems. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p>FY 2022 Plans: Weapons and munitions technologies (Partners: France, Germany, Italy, UK): The Participants in this program will develop an automated software interface between their national field artillery command and control systems. The nations will be able to receive and provide mutual fire support (i.e. cannon and rocket fire) in combined operations more rapidly and with minimal errors.</p> <p>FY 2023 Plans: The nations will be able to receive and provide mutual fire support (i.e. cannon and rocket fire) in combined operations more rapidly and with minimal errors</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase is based on increased requirements and inflation</p>		0.214	0.214	0.219
<p>Title: Ground Systems Technologies</p> <p>Description: The goal of this activity is to cooperate with partner countries to increase interoperability and develop jointly technologies to improve survivability, weapons, ground platforms (manned and unmanned), and mobility and counter-mobility</p>		0.214	0.214	0.120

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>to provide soldiers with unmatched offensive and defensive capabilities in weapons and military vehicles. Areas of cooperation include ground systems design, propulsion, structures, robotics, alternative fuels and lubricants, systems integration, electronics, and power management. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p>FY 2022 Plans: FY 2022 funding will be used to fund the continuation of cooperative projects in armored vehicle underbody blast protection and unmanned ground vehicles such as Hybrid Electric Project Agreement between US and Japan.</p> <p>FY 2023 Plans: funding will be used to fund the continuation of cooperative projects in armored vehicle underbody blast protection and unmanned ground vehicles such as Hybrid Electric Project Agreement between US and Japan.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Decrease is based on a projected slight decline in requirements.</p>				
<p>Title: Aviation Systems Technologies</p> <p>Description: The goal of this activity is to cooperate with partner countries to increase interoperability and develop jointly improved aerodynamics, aeromechanics, avionics, weapons and sensor integration, propulsion, and aviation autonomy technologies that improve range, payloads, speed, survivability and lethality to maintain U.S. technical superiority and combat overmatch for vertical lift aviation systems. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p>FY 2022 Plans: FY 2022 funding will be used to pursue cooperative projects (i.e., the development of advance rotorcraft technologies and improve systems that aid pilots and aircrew in degraded visual environments).</p> <p>FY 2023 Plans: funding will be used to pursue cooperative projects (i.e., the development of advance rotorcraft technologies and improve systems that aid pilots and aircrew in degraded visual environments).</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Decrease is based on a projected slight decline in requirements.</p>		0.431	0.431	0.331
<p>Title: FY22 SBIR/STTR Transfer</p>		-	0.138	-

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603790A / NATO Research and Development	Project (Number/Name) 691 / NATO Rsch & Devel		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
Description: Funding transferred in accordance with Title 15 USC ?638				
FY 2022 Plans: \$121K = SBIR Title 15 USC ?638(f)(1) \$17K = STTR Title 15 USC ?638(n)(1)(A)				
FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638				
Accomplishments/Planned Programs Subtotals		4.589	3.777	3.805
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
Acquisition Strategy: The goal of this program is to expand worldwide allied standardization interoperability through cooperative research and development (R&D) and technology sharing per SECDEF guidance and especially in support of the of the U.S. Army. All projects are test or technical demonstrations to feed into potential new requirements in support of Army Transformation to the Future Force or as product improvements to the Current Force.				
List of the programs curently in place: Communications, Interoperability, and Electronics Technologies The goal of this project is to develop technologies that enable interoperability among partner countries' command, control, communications, sensors, and information systems. Efforts under this project include development of a single solution standard avoiding development of multiple unique solutions and leverage existing interoperability standards developed by NATO. Such standards include common doctrine, technical and procedural specifications to make better use of existing information, shared data, leverage national operating picture capabilities and enable the development of interoperability of data, databases, applications, security domains and national networks architectures. Includes projects formerly titled Multi-National Network Enabled Capabilities, Low Level Air Defense Interoperability, JTRS, Combat Identification, and Multilateral Interoperability Program.				
Aviation Systems Technologies The goal of this project is to cooperate with partner countries to increase interoperability and develop jointly improved aerodynamics, aeromechanics, avionics, weapons and sensor integration, propulsion, and aviation autonomy technologies that improve range, payloads, speed, survivability and lethality to maintain U.S. technical				

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<p>superiority and combat overmatch for vertical lift aviation systems. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p>Ground Systems Technologies The goal of this project is to cooperate with partner countries to increase interoperability and develop jointly technologies to improve survivability, weapons, ground platforms (manned and unmanned), and mobility and counter-mobility to provide soldiers with unmatched offensive and defensive capabilities in weapons and military vehicles. Areas of cooperation include ground systems design, propulsion, structures, robotics, alternative fuels and lubricants, systems integration, electronics, and power management. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p>Weapons and Munitions Technologies The goal of this project is to cooperate with partner countries to increase interoperability and develop jointly technologies to improve range, payloads, speed, survivability and lethality to maintain U.S. technical superiority and combat overmatch for Army weapons systems and associated munitions. Areas of cooperation include fuzing and warhead systems, guidance systems, counter improvised explosive device neutralization, directed energy, and fire control systems. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p>Armaments Cooperation Enterprise Support The goal of this program is to expand worldwide allied standardization and interoperability through cooperative research and development (R&D) and technology sharing per SECDEF guidance and especially in support of the U.S. Army. This program will fund the travel costs and administrative support (studies, analysis, interpretation, equipment, etc.) required to participate internationally, such as the North Atlantic Treaty Organization (NATO) Army Armaments Group (NAAG), Defense Against Terrorism (DAT) and to pursue new cooperative R&D initiatives and international cooperative agreements such as memoranda of understanding. This program will also include: the United States' share of costs of the NATO Civil Budget, Chapter IX, which funds the NATO Industrial Advisory Group (NIAG) and the Special Fund for Cooperative Planning (U. S. Army is Executive Agent for this NATO bill); the Technical Cooperation Program, and Army armaments cooperation working groups with many nations.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603790A / NATO Research and Development	Project (Number/Name) 691 / NATO Rsch & Development
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Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Armaments Cooperation Enterprise Support	MIPR	DASA DEC HQDA : Ft Belvoir, VA	0.010	-		-		-		-		-	0.000	0.010	-
Weapons and Munitions	TBD	CECOM : Aberdeen Proving Ground, MD	0.008	-		-		-		-		-	0.000	0.008	-
Communications Interoperability and Electronic Technologies Interoperability	MIPR	SPAWAR : Various	0.010	-		-		-		-		-	0.000	0.010	-
Ground Systems Technologies	MIPR	TARDEC : Warren, MI	0.010	-		-		-		-		-	0.000	0.010	-
Chemical and Biological Technologies	MIPR	Aberdeen Proving Ground : MD	0.010	-		-		-		-		-	0.000	0.010	-
FY22 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.138		-		-		-	0.000	0.138	-
Subtotal			0.048	-		0.138		-		-		-	0.000	0.186	N/A

Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Missiles and Rocket Technologies	MIPR	APG, Redstone Arsenal : MD, AL	0.100	-		-		-		-		-	0.000	0.100	-
Communications, Interoperability, and Electronics Technologies	MIPR	CECOM, JTRS, COALWNW, JTNC, SPAWAR : San Diego, CA, various	0.529	-		-		-		-		-	0.000	0.529	-
Weapons and Munitions	Various	ARDEC, PEO AMMO, PM-CAS : VARIOUS	0.752	-		-		-		-		-	0.000	0.752	-
Aviation Systems Technologies	Various	AMRDEC : REDSTONE, VARIOUS	0.175	-		-		-		-		-	0.000	0.175	-
Ground Systems Technology	FFRDC	Various : Various	0.125	-		-		-		-		-	0.000	0.125	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army												Date: April 2022			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0603790A / NATO Research and Development				691 / NATO Rsch & Development							
Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SNR(A)	C/TBD	ARDEC: Arlington, VA : Various	9.012	-		-		-		-		-	Continuing	Continuing	Continuing
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	0.118	-		-		-		-		-	0.000	0.118	-
Subtotal			10.811	-		-		-		-		-	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Armaments Cooperation Enterprise Support	C/FFP	LSS/GDIT : Fairfax, VA	11.033	2.357		2.486		2.834		-		2.834	Continuing	Continuing	Continuing
Missiles and Rocket Technologies	MIPR	APG, Redstone Arsenal : MD, AL	1.595	0.785		-		-		-		-	0.000	2.380	-
Communications, Interoperability, and Electronics Technologies	MIPR	Joint Tactical Radio (JTRS), JTNC, COALWNW, SPAWAR, CERDEC, ARDEC W1DF : San Diego, CA, Red Stone Arsenal	1.707	0.395		0.266		0.273		-		0.273	Continuing	Continuing	Continuing
Aviation Systems Technologies	MIPR	RDECOM/ AMRDEC : Red Stone Arsenal	1.558	0.395		0.431		0.331		-		0.331	Continuing	Continuing	Continuing
Ground Systems Technology	MIPR	TARDEC : Various	0.478	-		0.214		0.120		-		0.120	Continuing	Continuing	Continuing
Weapons and Munitions	Various	CECOM, ARDEC, AMMO, PEO C3T : Aberdeen Proving Ground, Various	2.284	0.657		0.214		0.219		-		0.219	Continuing	Continuing	Continuing
Soldier Technologies	TBD	Various : Various	0.346	-		-		-		-		-	0.000	0.346	-

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Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0603790A / NATO Research and Development				691 / NATO Rsch & Development							
Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SNR(A)	C/TBD	ARL, HQDA, JCGISR: Army : Various	2.318	-		0.028		0.028		-		0.028	Continuing	Continuing	Continuing
Chemical & Biological Defense Technologies	MIPR	ECBC : Edgewood, Aberdeen, MD	0.270	-		-		-		-		-	0.000	0.270	-
Subtotal			21.589	4.589		3.639		3.805		-		3.805	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Communications, Interoperability, and Electronics Technologies	Various	JTRN, JTNC, COALWNW, CERDEC, NIGHT VISION : SPAWAR	0.444	-		-		-		-		-	0.000	0.444	-
Weapons and Munitions	TBD	ARDEC, PEO AMMO, ASCA : Various	0.200	-		-		-		-		-	0.000	0.200	-
Aviation Systems Technologies	TBD	RDECOM, AMRDEC : RED STONE	0.080	-		-		-		-		-	0.000	0.080	-
Ground Systems Technologies	MIPR	TARDEC : Various	0.050	-		-		-		-		-	0.000	0.050	-
Subtotal			0.774	-		-		-		-		-	0.000	0.774	N/A
Project Cost Totals			33.222	4.589		3.777		3.805		-		3.805	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army							Date: April 2022						
Appropriation/Budget Activity 2040 / 4				R-1 Program Element (Number/Name) PE 0603790A / NATO Research and Development				Project (Number/Name) 691 / NATO Rsch & Devel					

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
N/A	[REDACTED]																											

	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
N/A																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
N/A	1	2017	4	2017