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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	R-1 Program Element (Number/Name) PE 0303032A / TROJAN - RH12
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.983	5.022	4.273	-	4.273	4.284	4.386	4.452	4.494	Continuing	Continuing
RH5: TROJAN - RH12 - MIP	-	0.983	5.022	4.273	-	4.273	4.284	4.386	4.452	4.494	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project is a Military Intelligence Program (MIP). TROJAN research and development supports TROJAN Next Generation (TROJAN NexGEN), formerly TROJAN Classic XXI (TCXXI), future capabilities to fulfill the Army's need for worldwide, deployable, remobile, intelligence, surveillance and reconnaissance support that can dynamically execute operations from sanctuary-based to deployed assets in theater. In support of Army Modernization and Army Force Generation, TROJAN NexGEN will provide soldiers with a real-world, hands-on, live and near-real time SIGINT training environment sustaining, maintaining and enhancing their military occupational specialty proficiencies and specific target expertise. This operational readiness training will fulfill the Army's larger intelligence training requirement via a secure, collaborative architecture.

A key factor for future force success is the ability to collect, process, and use information about an adversary while preventing similar information from being disclosed. TROJAN NexGEN is a combined operational and readiness mission system which uses advanced networking technology to provide seamless rapid radio relay, secure communications to include voice, data, and electronic reconnaissance support to U.S. forces throughout the world. TROJAN NexGEN operations may be easily tailored to fit military intelligence unit training schedules and surged during specific events to involve every aspect of the tactical intelligence collection, processing, analysis and reporting systems. Engineers test and evaluate new digital intelligence collection, processing and dissemination technology using the fielded TROJAN NexGEN systems prior to the acquisition of those technologies. As part of the objective intelligence architecture, these capabilities will enable processing and dissemination of real-time intelligence data from various sources to form the intelligence needed to issue orders inside the threat decision cycle. To that end, it is imperative that TROJAN NexGEN keeps pace with digitization initiatives in order to respond aggressively to the emerging intelligence communication threat.

B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.983	5.022	4.473	-	4.473
Current President's Budget	0.983	5.022	4.273	-	4.273
Total Adjustments	0.000	0.000	-0.200	-	-0.200
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-0.200	-	-0.200

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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RH5: TROJAN - RH12 - MIP	-	0.983	5.022	4.273	-	4.273	4.284	4.386	4.452	4.494	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

	FY 2015	FY 2016	FY 2017
Title: Integrate Direction Finding and geo-location	0.225	1.263	1.118
Description: Integrate Direction Finding (DF) and geolocation (GL) technologies into TROJAN Remote Receiving Groups.			
FY 2015 Accomplishments: Continued to explore an effort to integrate Direction Finding (DF) and geolocation technologies into TROJAN Remote Receiving Groups.			
FY 2016 Plans: Continue efforts to integrate Direction Finding (DF) and geolocation technologies into TROJAN Remote Receiving Groups.			
FY 2017 Plans:			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
Will continue efforts to integrate Direction Finding (DF) and geolocation technologies into TROJAN Remote Receiving Groups in accordance with Joint Interface Control Document (JICD) 4.2. Will utilize field based risk reduction exercises to test and evaluate integrated technologies of the overall TROJAN Intelligence, Surveillance, and Reconnaissance (ISR) Enterprise.				
<p>Title: Improve security of the TROJAN Network architecture (formerly Improve bandwidth utilization to maximize efficiency).</p> <p>Description: Acquire and apply multi-bandwidth compression algorithm technology to maximize TROJAN intelligence network throughput.</p> <p>FY 2015 Accomplishments: Examined increasing efficiency and maximizing throughput via hardware consolidation and virtualization.</p> <p>FY 2016 Plans: Improve bandwidth utilization and network architecture to maximize TROJAN intelligence network throughput.</p> <p>FY 2017 Plans: Will utilize Government off the shelf (GOTS)/ Commercial of the shelf (COTS) solutions to secure data-at-rest / data-in-transit to extend the TROJAN intelligence network architecture to the edge.</p>		0.089	0.960	1.186
<p>Title: Integrate and test specialized hardware/software</p> <p>Description: Integrate and test specialized hardware/software for classified pre-processing of new signals of interest utilizing enhanced signal processing algorithms. Resource development of GL Application Interface for Virtual Environments (GLAIVE) software (SW). Integrated several new National Security Agency (NSA) SW packages.</p> <p>FY 2015 Accomplishments: Integrated and tested a scaled back suite of specialized hardware/software for classified pre-processing of new signals of interest utilizing enhanced signal processing algorithms and resourced development of GLAIVE software. Conducted limited effort to develop TROJAN Intelligence Surveillance Reconnaissance enterprise.</p> <p>FY 2016 Plans: Integrate and test specialized hardware/software for classified pre-processing of new signals of interest utilizing enhanced signal processing algorithms. Resource development of GLAIVE software. Continue efforts to develop TROJAN Intelligence Surveillance Reconnaissance enterprise. Continue efforts to integrate the REDHAWK architecture and JICD 4.2 across all platforms.</p> <p>FY 2017 Plans: Will continue integration and testing of specialized hardware/software for classified pre-processing of new signals of interest utilizing enhanced signal processing algorithms. Will continue resource development of GLAIVE software. Will continue efforts</p>		0.203	0.900	0.505

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
to develop TROJAN Intelligence Surveillance Reconnaissance enterprise. Will continue efforts to integrate the REDHAWK architecture and JICD 4.2 across all platforms.				
<p>Title: Research and testing of receivers</p> <p>Description: Research and testing of receiver packages for fixed and transportable TROJAN systems to acquire non-standard modulations using Digital System Processing (DSP) and Field Programmable Gate Arrays (FPGAs) technologies.</p> <p>FY 2015 Accomplishments: Conducted a limited effort relating to the development of receiver packages for fixed and transportable TROJAN systems to acquire non-standard modulations using DSP and FPGAs.</p> <p>FY 2016 Plans: Continue research and testing of receiver packages for fixed and transportable TROJAN systems to acquire non-standard modulations using DSP and FPGAs.</p> <p>FY 2017 Plans: Will continue research and testing of receiver packages for fixed and transportable TROJAN systems to acquire non-standard modulations using DSP and FPGAs.</p>		0.071	0.330	0.295
<p>Title: Development of Satellite Communication (SATCOM) dishes and transceivers</p> <p>Description: Development of smaller more mobile Satellite Communication (SATCOM) dishes and transceivers. Development of more efficient use of bandwidth, communications on the move and man-packable intelligence collection systems.</p> <p>FY 2015 Accomplishments: Continued development of smaller more mobile SATCOM dishes.</p> <p>FY 2016 Plans: Continue development of smaller more mobile SATCOM dishes.</p> <p>FY 2017 Plans: Will continue development of smaller tactical SATCOM dishes and transceivers to support beyond line of sight capabilities.</p>		0.101	0.744	0.371
<p>Title: Develop specialized software enhancements to the TROJAN streaming subsystems</p> <p>Description: Develop specialized software enhancements to the TROJAN audio streaming subsystems to improve system redundancy and throughput capacity and system management capabilities; Investigate compression/processing technologies to reduce communications bandwidth requirements for remoted TROJAN systems, including streaming audio technologies.</p> <p>FY 2015 Accomplishments:</p>		0.071	0.050	0.023

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017
Continued development of specialized software enhancements to the TROJAN audio streaming subsystems to improve system redundancy and throughput capacity. FY 2016 Plans: Develop specialized software enhancements to the TROJAN audio streaming subsystems to improve system redundancy and throughput capacity. FY 2017 Plans: Will research specialized software enhancements to improve system redundancy and throughput capacity to enable support for full motion video (FMV) streaming.			
Title: Labor cost software (SW) engineers Description: Labor for two software (SW) engineers in support of GLAIVE and other above applicable efforts. Labor for one Material Developer (MAT DEV) technologist, one MAT DEV software and one MAT DEV Hardware (HW) engineer. FY 2015 Accomplishments: Resourced labor for one part-time SW engineer in support of GLAIVE and other above applicable efforts. Resourced labor for one part-time MAT DEV software and one part-time MAT DEV HW engineer. FY 2016 Plans: Resource labor for two SW engineers in support of GLAIVE and other above applicable efforts. Resource labor for one MAT DEV technologist, one MAT DEV software and one MAT DEV HW engineer. FY 2017 Plans: Will resource labor for one MAT DEV technologist, two MAT DEV software engineers and two MAT DEV HW engineers.	0.223	0.775	0.775
Accomplishments/Planned Programs Subtotals	0.983	5.022	4.273

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u> <u>Base</u>	<u>FY 2017</u> <u>OCO</u>	<u>FY 2017</u> <u>Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BA0326: TROJAN (MIP) (OPA SSN BA0326)	15.214	20.471	20.760	-	20.760	13.202	13.956	14.403	14.591	Continuing	Continuing
Remarks											

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D. Acquisition Strategy

The Acquisition Strategy for the TROJAN NexGEN Systems supported by TROJAN RDT&E is to adapt and leverage from Commercial Off the Shelf (COTS) and Government Off the Shelf (GOTS) products. Additionally leverage off of development by DoD and other Government agencies to the greatest extent possible. TROJAN RDT&E is used to fund the development of enhancing these technologies to meet specific user requirements.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army **Date:** February 2016

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Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Labor Costs MAT DEV HW/SW Engineers	Various	CERDEC I2WD, APG, MD : MD	2.564	0.223	Oct 2014	0.775	Oct 2015	0.775	Oct 2016	-		0.775	0	4.337	0
Subtotal			2.564	0.223		0.775		0.775		-		0.775	0.000	4.337	0.000

Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Integrate Direction Finding and geo-location	Various	APG : MD	1.412	0.225	Oct 2014	1.263	Oct 2015	1.118	Oct 2016	-		1.118	Continuing	Continuing	0
Improve security of the TROJAN Network architecture	Various	APG : MD	1.040	0.089	Oct 2014	0.960	Oct 2015	1.186	Oct 2016	-		1.186	Continuing	Continuing	0
Research and testing of Receivers	Various	APG : MD	0.945	0.071	Oct 2014	0.330	Oct 2015	0.295	Oct 2016	-		0.295	Continuing	Continuing	0
Develop Satellite Communications (SATCOM) Dishes and transceivers	Various	APG : MD	2.053	0.101	Oct 2014	0.744	Oct 2015	0.371	Oct 2016	-		0.371	Continuing	Continuing	0
Specialized Software Enhancements	Various	APG : MD	0.831	0.071	Oct 2014	0.050	Oct 2015	0.023	Oct 2016	-		0.023	Continuing	Continuing	0
Develop Hardware/ Software Interface	Various	APG : MD	0.445	-		-		-		-		-	0	0.445	0
Subtotal			6.726	0.557		3.347		2.993		-		2.993	-	-	0.000

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Integration and Testing of Hardware/Software	Various	APG : MD	1.979	0.203	Oct 2014	0.900	Oct 2015	0.505	Oct 2016	-		0.505	0	3.587	0
Subtotal			1.979	0.203		0.900		0.505		-		0.505	0.000	3.587	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
Hardware, Software and Systems Development																												
Follow on Hardware, Software and Systems Development																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0303032A / TROJAN - RH12	Project (Number/Name) RH5 / TROJAN - RH12 - MIP
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Hardware, Software and Systems Development	1	2014	4	2015
Follow on Hardware, Software and Systems Development	1	2016	4	2020