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 0604820A / *Radar Development*							
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	-	5.022	12.309	15.983	-	15.983	20.844	20.612	30.106	41.402	Continuing	Continuing
E10: *Sentinel*	-	5.022	12.309	15.983	-	15.983	20.844	20.612	30.106	41.402	Continuing	Continuing

A. Mission Description and Budget Item Justification

This system is a supporting program of the overall Air and Missile Defense (AMD) architecture and will provide for an incrementally fielded Integrated Air and Missile Defense Fire Control System/capability for the composite Army Air and Missile Defense Brigades. The Sentinel system is used with the Forward Area Air Defense Command and Control (FAAD C2) element and is a key component to the Integrated Air and Missile Defense (IAMD) architecture via the IAMD Battle Command System (IBCS) to provide critical air surveillance of the forward areas.

The Sentinel currently consists of two primary variants: the AN/MPQ-64A1 system mounted on a High Mobility Multi-purpose Wheeled Vehicle (HMMWV), and an enhanced radar variant, the AN/MPQ-64A3 mounted on a 2.5 ton trailer and towed by an armored Family of Medium Tactical Vehicle (FMTV) platform. Sentinel also consists of Identification Friend or Foe (IFF), and Forward Area Air Defense (FAAD) Command, Control and Intelligence (C2I) interfaces. The radar is deployed in both an air defense role and a force protection role for Counter-Rocket, Artillery, and Mortar (C-RAM) missions. The sensor is an advanced three-dimensional battlefield X-Band air defense phased-array radar with an instrumented range of 75 kilometers. Sentinel is capable of operating day or night, in adverse weather conditions, in the battlefield environments of dust, smoke, aerosols and enemy countermeasures. It provides 360-degree azimuth coverage for acquisition tracking. Sentinel contributes to the digital battlefield by automatically detecting, classifying, identifying and reporting targets (cruise missiles, unmanned aerial systems, rotary wing and fixed wing aircraft). Sentinel acquires targets sufficiently forward of the battle area to allow weapons reaction time and engagement at optimum ranges. Sentinel's integrated IFF reduces the potential for fratricide of US and Coalition aircraft.

The Research and Development funding supports Sentinel modernization/upgrades, hardware/software issue resolution, resolution of obsolescence issues, engineering studies, and cost reduction initiatives. The funding for Fiscal Year (FY) 2015 through FY 2021 development activities addresses the following Sentinel system capability gaps and obsolescence issues identified by the User: 1) Target Detection gap; 2) Target Tracking gap; 3) Net Readiness gap; 4) Electronic Counter Measures (ECM) gap; 5) Unmanned Aerial Systems (UAS) Defense gap; and 5) Rockets, Artillery & Mortars (RAM) gap.

Battle Space Improvement addresses the Target Detection gap that currently exists with the Sentinel system. This development effort modifies the radar signal processor algorithms and will increase target acquisition and tracking range capability against the threat set within the instrumented range band. This effort also develops modifications to the radar hardware by utilizing an upgraded common signal processing card to the radar signal processor to provide a common hardware and software processing configuration across the Sentinel radar fleet.

Stop, Stare and Track addresses the Target Tracking Gap. This development effort provides direct Fire Control Radar (FCR) support in an integrated air and missile defense architecture. In addition this provides significantly improved Non-Cooperative Target Recognition (NCTR) timeline and performance against all targets to include UAS, Cruise Missiles, Rotary Wing and Fixed Wing aircraft. This upgrade also enables rapid classification of cued Rockets, Artillery and Mortars (RAM), UAS, Rotary

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army	Date: February 2016
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604820A *I Radar Development*

Wing and Fixed Wing aircraft, as well as very accurate Point of Origin (POO) and Point of Impact (POI) of RAM targets and enables a robust kill assessment capability of engaged targets.

Cross Domain Solution (CDS) Network Interface addresses net readiness and system security concerns. This effort develops a CDS interface to isolate the Sentinel radar from connected networks of lower classification levels. Allows for ongoing cyber security initiatives to be reviewed and addressed as they arise. Ensures that Information Assurance/Cyber security is part of Sentinel operations, missions and functions. Makes certain that practices necessary to ensure the protection of information and personnel are instituted.

Electronic Attack/Electronic Protect (EA/EP) addresses the electronic countermeasures (ECM) gap. This effort conducts additional design and testing to verify initial EA/EP results and updates the database and associated software and hardware with more extensive EA/EP signatures to address evolving threats.

Signal Data Processor (SDP)/North Finding Module (NFM) addresses the Target Detection, Target Tracking, and Electronic Countermeasures (ECM) capability gaps and funds the mitigation of the SDP and NFM obsolescence issues. SDP cards are estimated to go obsolete every four to six years.

Medium Bandwidth Waveform upgrade will address latent tracking issues that currently exist with Sentinel in certain applications. This development effort modifies firmware as well as software in the Sentinel radar. This effort will provide better target resolution and more accurate tracking in the slant range coordinate. This improved target resolution and tracking accuracy will provide improved retention of target identification and more robust tracking that addresses the latent tracking issues.

Mode S upgrade to existing Sentinel Identification Friend or Foe (IFF) will address Sentinel's objective requirement to interrogate IFF mode S which is currently not being met. Mode S transmissions are a key component of the Automatic Dependent Surveillance-Broadcast (ADS-B) surveillance technology being used by the Federal Aviation Administration for tracking aircraft as part of the Next Generation Air Transportation System (NextGen). In the United States, all aircraft required to have transponders (most aircraft) must transition to mode S capable units by 2020. Without the Mode S upgrade, Sentinel will have to rely on these aircraft transponders responding to the legacy mode 3/A interrogations. The data available in the mode S response will be valuable in identifying the aircraft and correlating Sentinel tracks with civil aviation tracks/data and other track data sources.

The Active Electronically Scanned Array (AESA) is the next generation of radar technology to replace the current phase and frequency scanned array used by Sentinel today. The AESA Antenna will provide increased capability including extended range for ground-based surveillance and situational awareness, faster and more accurate Non-Cooperative Target Recognition (NCTR) for clearing fires and preventing fratricide, improved Fire Control (FC) quality track accuracy, and management of larger track loads. The AESA will also provide improved operation in severe/urban clutter. The system will detect and track small targets, such as Unmanned Aerial Systems (UAS) and Cruise Missiles, in clutter and will detect and track slow targets, such as UAS and Rotary Wing (RW) aircraft, at low altitudes in clutter. The system will detect, track, and classify Rocket, Artillery, and Mortar (RAM) threats and will support Integrated Air and Missile Defense Battle Command System (IBCS) requirements and can contribute sensor support for mitigating current and future Indirect Fire Protection Capability Increment 2 mission requirements.

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 0604820A / *Radar Development*		
B. Program Change Summary ($ in Millions)	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**
Previous President's Budget	5.221	12.309	11.465	-	11.465
Current President's Budget	5.022	12.309	15.983	-	15.983
Total Adjustments	-0.199	0.000	4.518	-	4.518
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.199	-			
• Adjustments to Budget Years	-	-	4.518	-	4.518

Change Summary Explanation

Funding adjustment from within Sentinel Program to allow for analysis and development of the follow on sensor technology to commence in FY17.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604820A / *Radar Development*				Project (Number/Name) E10 / *Sentinel*			
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**
E10: *Sentinel*	-	5.022	12.309	15.983	-	15.983	20.844	20.612	30.106	41.402	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604820A / *Radar Development*	**Project (Number/Name)** E10 / *Sentinel*

Cross Domain Solution (CDS) Network Interface addresses net readiness and system security concerns. This effort develops a CDS interface to isolate the Sentinel radar from connected networks of lower classification levels. Allows for ongoing cyber security initiatives to be reviewed and addressed as they arise. Ensures that Information Assurance/Cyber security is part of Sentinel operations, missions and functions. Makes certain that practices necessary to ensure the protection of information and personnel are instituted.

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Product Development	3.449	8.733	13.047	-	13.047
Description: Funding is provided for the following efforts:					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604820A / *Radar Development*	**Project (Number/Name)** E10 / *Sentinel*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
FY 2015 Accomplishments: Integrate firmware, software and hardware. Build prototype subsystems/components for testing. Complete software code coding and modification of the system search and track logic, clutter mapping, and waveforms. Characterize performance, design & replace firmware, software and hardware. Perform technical assessments, concept studies, cost reduction, risk reduction, threat analysis, and required documentation. ***FY 2016 Plans:*** Integrate firmware, software and hardware. Build prototype subsystems/components for testing. Complete software code coding and modification of the system search and track logic, clutter mapping, and waveforms. Characterize performance, design & replace firmware, software and hardware. Perform technical assessments, concept studies, cost reduction, risk reduction, threat analysis, and required documentation for modifications to address evolving threats. ***FY 2017 Base Plans:*** Integrate firmware, software and hardware. Build prototype subsystems/components for testing. Complete software code coding and modification of the system search and track logic, clutter mapping, and waveforms. Characterize performance, design & replace firmware, software and hardware. Perform technical assessments, concept studies, cost reduction, risk reduction, threat analysis, and required documentation. Initiate analysis of technology, program documentation and development of contract requirement packages in support of follow on sensor technology.					
Title: Test & Evaluation ***Description:*** Funding is provided for the following efforts: ***FY 2015 Accomplishments:*** Conduct software qualification test and hardware verification testing, field testing against representative targets. Prepare logistics products and required documentation for materiel release of software and hardware upgrades. ***FY 2016 Plans:*** Conduct software qualification test and hardware verification testing, field testing against representative targets. Prepare logistics products and required documentation for materiel release of software and hardware upgrades. ***FY 2017 Base Plans:*** Conduct software qualification test and hardware verification testing, field testing against representative targets. Prepare logistics products and required documentation for materiel release of software and hardware upgrades.	1.027	2.491	1.576	-	1.576
Title: Management Support	0.546	1.085	1.360	-	1.360

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604820A / *Radar Development*	**Project (Number/Name)** E10 / *Sentinel*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Description: This funds Government and technical support. ***FY 2015 Accomplishments:*** Provides government management, technical and administrative support in FY 2015. ***FY 2016 Plans:*** Provides government management, technical and administrative support in FY 2016. ***FY 2017 Base Plans:*** Provides government management, technical and administrative support in FY 2017.					
Accomplishments/Planned Programs Subtotals	5.022	12.309	15.983	-	15.983

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• PE 0605456A: *Proj PA3, PAC-3/MSE MISSILE*	33.709	2.272	-	-	-	-	-	-	-	0	35.981
• SSN C53101: *MSE Missile*	532.605	514.946	423.201	-	423.201	459.040	497.009	529.839	520.513	Continuing	Continuing
• PE 0205456: *Proj EF9, System Integration and Test*	78.720	64.159	69.417	-	69.417	79.562	80.962	96.042	113.641	Continuing	Continuing
• PE 0604114A: *Proj EX2; Lower Tier Air Missile Defense (LTAMD) Capability*	-	-	35.132	-	35.132	93.208	78.820	87.128	84.826	Continuing	Continuing
• SSN C50016: *Lower Tier Air and Missile Defense (AMD)*	110.300	115.075	126.470	-	126.470	112.888	122.768	150.444	120.542	Continuing	Continuing
• PE 0604319A: *Proj DU3, IFPC2 (FY12 PE0603305A IFPC II - Intercept)*	92.475	155.361	-	-	-	40.003	80.004	120.004	120.006	Continuing	Continuing
• PE 0605052A: *Proj EY7; IFPC Increment 2 - Block 1*	-	-	83.995	-	83.995	63.370	43.204	109.323	133.326	Continuing	Continuing
• SSN C62001: *INDIRECT FIRE PROTECTION CAPABILITY, INC 2-1 Block 1 System*	-	-	19.920	-	19.920	47.289	138.547	174.760	287.325	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604820A / *Radar Development*	**Project (Number/Name)** E10 / *Sentinel*

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• SSN C62002: *INDIRECT FIRE PROTECTION CAPABILITY, INC 2-1 Block 1 Missile*	-	-	-	-	-	73.552	123.106	186.840	146.300	Continuing	Continuing
• PE 0605457A: *Proj S40, Army Integrated Air and Missile Defense (AIAMD)*	147.250	222.075	252.811	-	252.811	169.070	152.942	32.914	34.447	Continuing	Continuing
• SSN BZ5075: *IAMD Battle Command System*	-	20.917	204.969	-	204.969	287.220	372.916	440.567	439.780	Continuing	Continuing
• PE 0604741A: *Proj 126, 146, 149; Air Defense C2I Eng Dev*	15.294	34.569	36.256	-	36.256	20.141	19.658	17.738	11.651	Continuing	Continuing
• SSN AD5070: *Air & MSL Defense Planning & Control Sys*	27.374	28.176	54.376	69.958	124.334	17.005	17.960	6.366	6.951	Continuing	Continuing
• SSN WK5057: *Sentinel Mods*	44.305	43.285	40.171	-	40.171	28.379	32.720	42.294	48.626	Continuing	Continuing
• PE 0202429A: *Proj EP8, JLENS COCOM EXERCISE*	43.248	10.565	45.482	-	45.482	6.746	-	-	-	0	106.041

Remarks

This program is an integral part of the Army Integrated Air and Missile Defense (IAMD) architecture.

D. Acquisition Strategy

Sentinel was procured from Thales Raytheon Systems (TRS) as a non-developmental item. TRS owns the Technical Data Package (TDP) for the Sentinel A3 and its predecessors and therefore no other contractor has the technical ability to modify the Sentinel radar or Sentinel software. The modifications planned for the Sentinel that fall into this category are: Battle Space Improvement, Stop Stare and Track, Cross Domain Solution, Electronic Attack/Electronic Protect, Signal Data Processor/North Finding Module, Medium Bandwidth, and Mode S. For the Active Electronically Scanned Array, the product office will issue a new contract to develop the new antenna to be integrated and tested with the TRS maintained Sentinel back end.

Battle Space Improvement (Sentinel A3): The Sentinel Product Office will contract with Thales Raytheon Systems (TRS) to update and modify the radar signal processor algorithms. The updated software will be tested, documented and released for installation.

Stop, Stare and Track (Sentinel A3): The Sentinel Product Office will contract with Thales Raytheon Systems (TRS) to develop new and/or modify existing Sentinel software. The updated software will be tested, documented and released for installation.

Cross Domain Solution Interface (Sentinel A3): The Sentinel Product Office will contract with Thales Raytheon Systems (TRS) to develop an interface solution to isolate Sentinel transmission from connected networks of lower classifications.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604820A / *Radar Development*	**Project (Number/Name)** E10 / *Sentinel*

Electronic Attack/Electronic Protect (EA/EP) (Sentinel A3): The Sentinel Product Office will contract with Thales Raytheon Systems (TRS) to verify the initial EA/EP Database and update the database, software and hardware with more extensive EA/EP signatures to address evolving threats. The updated database will be tested, documented and released for installation.

Signal Data Processor (SDP)/North Finding Module (NFM) Obsolescence (Sentinel A3): The Sentinel Product Office will contract with Thales Raytheon Systems (TRS) to upgrade and mitigate the Signal Data Processor and North Finding Module issues. The updated SDP and NFM hardware will be tested, documented and released for installation in the field.

Medium Bandwidth Waveform (Sentinel A3): The Sentinel Product Office will contract with Thales Raytheon Systems (TRS) to address latent tracking issues that currently exist with Sentinel in certain applications. The effort modifies firmware as well as software in the Sentinel radar. The updated medium bandwidth waveform software and firmware will be tested, documented and released for installation in the field.

Mode S (Sentinel A3): The Sentinel Product Office will contract with Thales Raytheon Systems (TRS) to address Sentinel's objective requirement to interrogate Identification Friend or Foe (IFF) mode S on board commercial aircraft. The updated software will be tested, documented and released for installation in the field.

Active Electronically Scanned Array (AESA): The Sentinel Product Office will award a new contract to develop the new AESA antenna to be integrated with the TRS maintained Sentinel back end. The CMDS Product Office will support requirement documentation and conduct design analysis to include analysis of technology, decision review preparation, and contract package development for acquisition of the AESA antenna to upgrade the current Sentinel A3. The software and hardware will be tested, documented and released for installation in the field.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604820A / *Radar Development*	Project (Number/Name) E10 / *Sentinel*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Improved Sentinel Development	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	11.398	-		-		-		-		-	0	11.398	0
System of Systems Mod Development & Integration	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	1.169	-		-		-		-		-	0	1.169	0
Battle Space Improvement	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.219	0.048		-		-		-		-	0	0.267	0
Stop, Stare and Track	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.483	0.048		-		-		-		-	0	0.531	0
Cross Domain Solution Network Interface / Cyber Security	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.000	0.030		0.277		-		-		-	0	0.307	0
Electronic Attack/ Electronic Protect	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.000	0.306		0.310		0.427		-		0.427	Continuing	Continuing	0
Signal Data Processor North Finding Module	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.000	0.114		0.269		0.127		-		0.127	Continuing	Continuing	0
Medium Bandwidth Waveform	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.000	-		0.229		0.215		-		0.215	Continuing	Continuing	0
Active Electronically Scanned Array	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.000	-		-		0.591		-		0.591	Continuing	Continuing	0

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604820A / *Radar Development*	Project (Number/Name) E10 / *Sentinel*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	13.269	0.546		1.085		1.360		-		1.360	-	-	0.000

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Improved Sentinel Development	SS/CPFF	Thales Raytheon Systems : Fullerton, CA	102.729	-		-		-		-		-	0	102.729	0
System of Systems Mod Development & Integration	SS/CPFF	Thales Raytheon Systems : Fullerton, CA	20.820	-		-		-		-		-	0	20.820	0
Battle Space Improvement	Various	Thales Raytheon Systems & Various : Fullerton,CA / Various	1.601	-		-		-		-		-	0	1.601	0
Stop, Stare, and Track	Various	Thales Raytheon Systems & Various : Fullerton, CA / Various	3.604	-		-		-		-		-	0	3.604	0
Cross Domain Solution Network Interface / Cyber Security	Various	Thales Raytheon Systems & Various : Fullerton, CA / Various	0.000	0.210		2.400		-		-		-	0	2.610	0
Electronic Attack/ Electronic Protect	Various	Thales Raytheon Systems & Various : Fullerton, CA / Various	0.000	1.994		3.037		4.179		-		4.179	0	9.210	0
Signal Data Processor/ North Finding Module	Various	Thales Raytheon Systems & Various : Fullerton, CA / Various	0.000	1.245		2.353		1.071		-		1.071	Continuing	Continuing	0
Medium Bandwidth Waveform	Various	Thales Raytheon Systems & Various : Fullerton, CA	0.000	-		0.943		0.702		-		0.702	Continuing	Continuing	0

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604820A / *Radar Development*	Project (Number/Name) E10 / *Sentinel*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Active Electronically Scanned Array	Various	Various : Various	0.000	-		-		7.095		-		7.095	Continuing	Continuing	0
		Subtotal	128.754	3.449		8.733		13.047		-		13.047	-	-	0.000

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Improved Sentinel Development	SS/CPFF	Thales Raytheon Systems : Fullerton, CA	16.930	-		-		-		-		-	0	16.930	0
System of Systems Mod Development & Integration	SS/CPFF	Thales Raytheon Systems : Fullerton, CA	0.352	-		-		-		-		-	0	0.352	0
		Subtotal	17.282	-		-		-		-		-	0.000	17.282	0.000

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Improved Sentinel Mod Development	SS/CPFF	Thales Raytheon Systems : Fullerton, CA	34.599	-		-		-		-		-	0	34.599	0
System of Systems Mod Development & Integration	SS/CPFF	Thales Raytheon Systems : Fullerton, CA	2.331	-		-		-		-		-	0	2.331	0
Battle Space Improvement	Various	Thales Raytheon Systems & Various : Fullerton, CA / Various	0.869	0.432		-		-		-		-	0	1.301	0
Stop, Stare and Track	Various	Thales Raytheon Systems & Various : Fullerton, CA / Various	1.847	0.432		-		-		-		-	0	2.279	0

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604820A / *Radar Development*	Project (Number/Name) E10 / *Sentinel*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cross Domain Solution Network Interface / Cyber Security	Various	Thales Raytheon Systems & Various : Fullerton, CA / Various	0.000	-		0.832		-		-		-	0	0.832	0
Electronic Attack/ Electronic Protect	Various	Thales Raytheon Systems & Various : Fullerton, CA / Various	0.000	0.163		0.600		0.907		-		0.907	Continuing	Continuing	0
Signal Data Processor North Finding Module	Various	Thales Raytheon Systems & Various : Fullerton, CA / Various	0.000	-		0.781		0.324		-		0.324	Continuing	Continuing	0
Medium Bandwidth Waveform	Various	Thales Raytheon Systems & Various : Fullerton, CA	0.000	-		0.278		0.345		-		0.345	Continuing	Continuing	0
		Subtotal	39.646	1.027		2.491		1.576		-		1.576	-	-	0.000

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	198.951	5.022		12.309		15.983		-		15.983	-	-	0.000

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604820A / *Radar Development*	**Project (Number/Name)** E10 / *Sentinel*

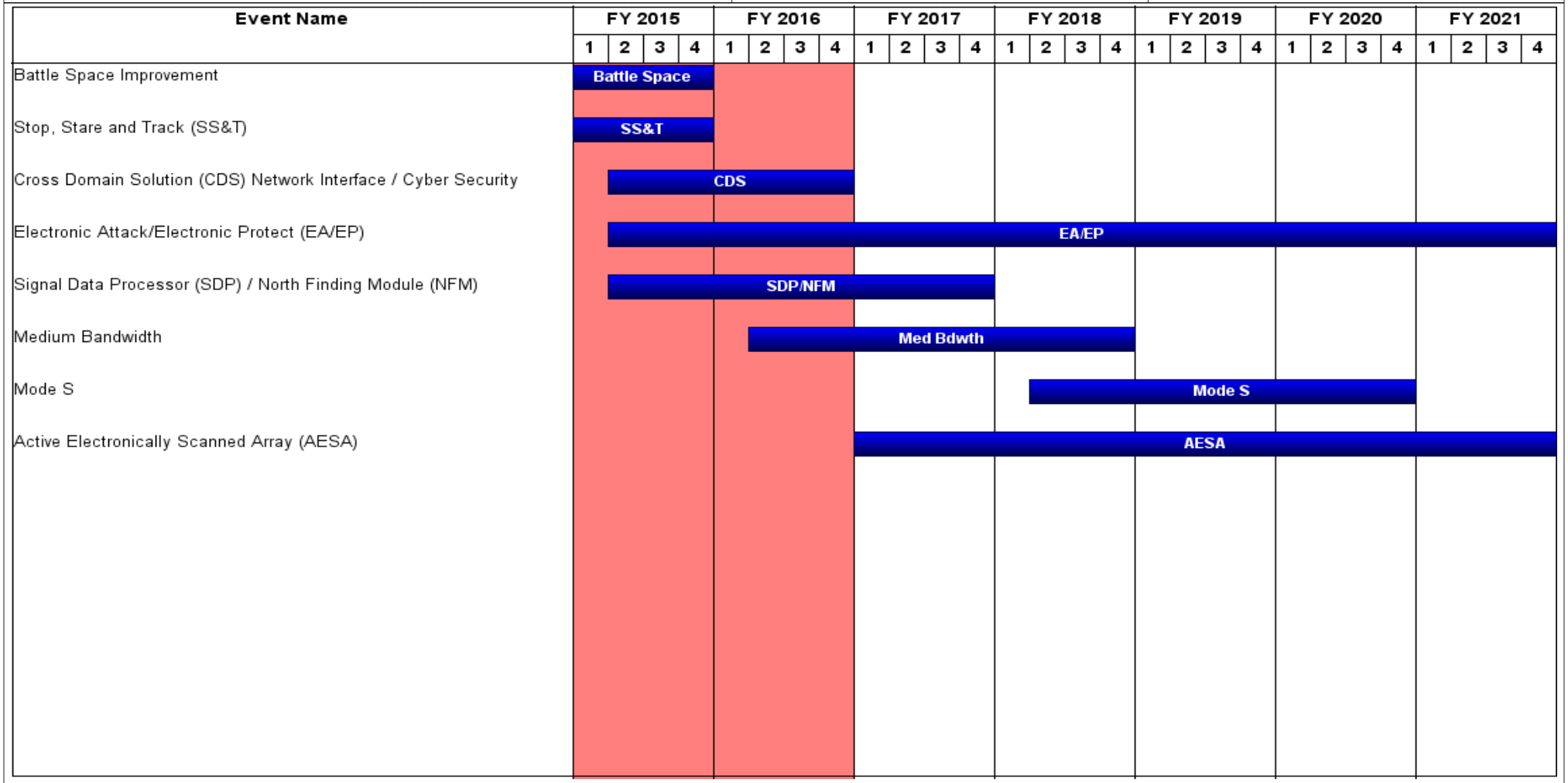

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604820A / *Radar Development*	**Project (Number/Name)** E10 / *Sentinel*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Battle Space Improvement	4	2012	4	2015
Stop, Stare and Track (SS&T)	4	2012	4	2015
Cross Domain Solution (CDS) Network Interface / Cyber Security	2	2015	4	2016
Electronic Attack/Electronic Protect (EA/EP)	2	2015	4	2021
Signal Data Processor (SDP) / North Finding Module (NFM)	2	2015	4	2017
Medium Bandwidth	2	2016	4	2018
Mode S	2	2018	4	2020
Active Electronically Scanned Array (AESA)	1	2017	4	2021

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