Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force											Date: February 2016	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0207448F / *C2ISR Tactical Data Link*							
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	-	1.699	1.674	1.515	0.000	1.515	1.749	1.750	1.782	1.814	Continuing	Continuing
675045: *C2ISR Tactical Data Link*	-	1.699	1.674	1.515	0.000	1.515	1.749	1.750	1.782	1.814	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Tactical Data Links (TDL), as a subset of the broader airborne network, are used in a combat environment to exchange information such as messages, data, radar tracks, target information, platform status, imagery, and command assignments. TDLs provide interoperability, local and global connectivity, and situational awareness to the user when operating under rapidly changing operational conditions. TDLs provide a jam-resistant; secure digital data transfer network capability with new and standardized waveforms and data formats allowing line-of-sight (LOS) and beyond-line- of-sight (BLOS) intra- and inter-flight communications. TDLs increase mission effectiveness, provide positive identification of aircraft in the network, correlate on and off-board sensor data sharing, target, and threat information, and provide the datalink to accomplish time critical targeting and other mission update functions. TDLs are used by all service theater command and control (C2) elements, weapons platforms, and sensors.

TDLs include, but are not limited to: Link 16, Link 11, Situational Awareness Data Link (SADL), Multifunction Advanced Data Link (MADL) Variable Message Format (VMF), Integrated Broadcast Service (IBS), Intra-Flight Data Link (IFDL), and Tactical Targeting Network Technology (TTNT). TDL efforts include incorporating changes and additions to the Link-16 message standard (MIL-STD-6016E) and applicable Interface Change Proposals (ICPs), assisting with Air Force and joint interoperability certification testing with the Air Combat Command (ACC) and Joint Interoperability Test Center (JITC); future development, integration, and verification of Operational Flight Program (OFP) upgrades due to TDL integration; support of data gathering processes; studying and incorporating data link technologies to ensure effectiveness and efficiency of the Global Strike and Global Persistent Attack CONOPS.

This effort provides critical capability and enhancements to the airborne network by creating common development, integration and interoperability among ground and C2 platforms and responds to quick reaction capability integration and demonstration including, but not limited to Airborne Warning and Control System (AWACS), Joint Surveillance Target Attack Radar System (JSTARS), the Air and Space Operations Center (AOC), Global Hawk, Predator, Reaper, Rivet Joint, Combat Sent, and Cobra Ball. TDLs keep all C2ISR platforms and data linked weapons current/interoperable in the airborne network to enable Global Strike, Global Persistent Attack, Offensive and Defensive Counterair (OCA and DCA) and Suppression of Enemy Air Defenses (SEAD) missions.

Activities also include studies and analysis to support both current program planning and execution, as well as future program planning.

This program is in Budget Activity 7, Operational System Development. These budget activities include development efforts to upgrade systems currently fielded or has approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0207448F / *C2ISR Tactical Data Link*	

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	1.744	1.681	1.748	0.000	1.748
Current President's Budget	1.699	1.674	1.515	0.000	1.515
Total Adjustments	-0.045	-0.007	-0.233	0.000	-0.233
• Congressional General Reductions	0.000	-0.007			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.045	0.000			
• Other Adjustments	0.000	0.000	-0.233	0.000	-0.233

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: E-3 AWACS Block 40/45 Mode 5 and MIL-STD- 6016E Link 16 Enhancements	0.586	1.010	0.801
Description: Improve E-3 AWACS Block 40/45 Link 16 interoperability and compatibility by incorporating key changes to communications software baseline. ***FY 2015 Accomplishments:*** - Studied and assessed the sustainability of the Joint Tactical Information Distribution System (JTIDS) Class 2H terminal - Studied and assessed the top technical risks for upgrading the AWACS JTIDS terminal with a terminal supporting Link 16 enhancements, especially the Crypto Modernization (CM) and Frequency Remapping (FR) mandates - Supported JALN analysis activities related to airborne networking operations of C2 platform ***FY 2016 Plans:*** - Upgrade advanced MIDS terminal lab assets for integration prototyping - Complete the study and assessment to address the sustainability of the JTIDS Class 2H terminal - Continue the study to evaluate the top technical risks for replacing the AWACS JTIDS Class 2H terminal with a more advanced Multifunctional Information Distribution System (MIDS) terminal - Complete the assessment for the use of Ethernet instead of a MIL-STD-1553B interface to the AWACS JTIDS Class 2H terminal and the implementation of a Tactical Targeting Network Technology (TTNT) IP communication capability with the terminal -- Support more advanced MIDS terminal, will complete development, evaluation, and documentation of a report that will address an upgraded High Powered Antenna (HPA) and antenna interface options for AWACS, to include potential modification of the current JTIDS Class 2H HPA --- Conduct study assessing impact of incorporating MIDS terminal into AWACS			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force	Date: February 2016
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0207448F / *C2ISR Tactical Data Link*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
---- Results of study implemented into AWACS ***FY 2017 Plans:*** - Will continue the integration of a more advanced MIDS terminal to include required Human/Computer Interface (HCI) changes and advanced terminal capabilities (such as Concurrent Multinetting (CMN4) for AWACS - Will fund further integration prototyping of the upgraded High Power Amplifier (HPA) and antenna interface			
Title: Aerial Network Engineering Lab ***Description:*** Funded Command and Control (C2) focused airborne networking studies supporting data link enhancements to include, but not limited to Link-16 Pathfinder and strength track reporting and fusion/correlation. ***FY 2015 Accomplishments:*** - Performed C2 focused airborne networking studies supporting data link enhancements -- Completed lab demonstrations to better understand impacts of advanced Link-16 Network management and planning concepts on system integration -- Analyzed the system level engineering fusion/correlation translation of sensor data, Multi-function Advanced Data Link (MADL), and Intra-Flight Data Link (IFDL) on host system Operational Flight Programs (OFPs) ***FY 2016 Plans:*** - Perform C2 focused airborne networking studies supporting data link enhancements -- Begin lab demonstrations to better understand impacts of advanced Link-16 radio terminal modernization that will include strengthening the network against jamming -- Begin updates to lab emulators that model fusion/correlation and translation of sensor data that includes: MADL and IFDL on host system OFPs ***FY 2017 Plans:*** - Will continue C2 focused airborne networking studies supporting data link enhancements -- Will continue lab demonstrations to better understand impacts of advanced Link-16 radio terminal modernization that will include strengthening the network against jamming --- Will provide reports that highlight most promising Link 16 anti-jam technologies to pursue for further operational development - Will complete analysis of information provided by previous years lab demonstrations that focused on IFDL and MADL track correlation and fusion -- Will provide a report that highlights major focus areas for testing the 5th to 4th Generation Gateway with C2ISR platforms	0.332	0.332	0.332
Title: E-3 AWACS Block 40/45 User Identified Critical Interface Change Proposals (ICPs)	0.781	0.332	0.382

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force	Date: February 2016
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0207448F / *C2ISR Tactical Data Link*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: E-3 AWACS Block 40/45 User Identified Critical ICPs will be implemented such as time slot reallocation, strength track reporting and correlation, global area reference system, and MIL-STD updates. ***FY 2015 Accomplishments:*** - Integrated and tested E-3 AWACS Block 40/45 User Identified Interface Change Proposals (ICPs) -- These included time slot reallocation, strength track reporting and correlation, Global Area Reference System (GARS), and MIL-STD updates ***FY 2016 Plans:*** - Activity implements E-3 AWACS Block 40/45 User Identified Interface Change Proposals (ICPs) -- These include time slot reallocation, strength track reporting and correlation, Global Area Reference System (GARS), and MIL-STD updates ***FY 2017 Plans:*** - Activity will implement E-3 AWACS Block 40/45 User Identified Interface Change Proposals and Mil-Std Updates			
Accomplishments/Planned Programs Subtotals	1.699	1.674	1.515

D. 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
• RDTE:BA05:PE 0604281F: *TDN Enterprise*	30.282	59.996	82.380	0.000	82.380	74.628	22.073	22.512	22.909	Continuing	Continuing
• APAF:BA05:Line Item #F01500: *F-15*	0.002	2.837	0.000	0.000	0.000	4.424	5.032	6.617	6.739	Continuing	Continuing
• APAF:BA05:Line Item #F01600: *F-16*	0.000	3.200	6.447	0.000	6.447	6.117	6.755	8.371	8.525	Continuing	Continuing
• APAF:BA05:Line Item #B00200: *B-2A*	0.049	0.474	0.415	0.000	0.415	0.295	0.247	0.201	0.206	Continuing	Continuing
• APAF:BA05:Line Item #B01B00: *B-1B*	0.223	1.011	1.380	0.000	1.380	0.535	0.794	0.000	0.000	Continuing	Continuing
• OPAF:BA03:Line Item #831010: *Comsec Equipment*	0.000	2.246	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• OPAF:BA03:Line Item #834010: *General Information Technology*	0.000	0.000	1.580	0.000	1.580	1.490	1.490	1.516	1.544	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force	Date: February 2016
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0207448F / *C2ISR Tactical Data Link*

D. 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

Remarks

E. Acquisition Strategy

Air Force Program Executive Officer for Command, Control, Communications, Intelligence, Surveillance, Reconnaissance and Networks (PEO C3I&N) is the PEO for C2ISR TDL. PEO C3I&N manages activities for the common development, integration and interoperability across the entire airborne network. These actions ensure TDLs are procured and maintained as a joint, end-to-end, command and control system. This program executes various types of contract types to provide technical expertise necessary to test, evaluate and provide recommended solutions to modernize C2 platform data links. The program delivers annual lab tested software implementations of Airborne Warning and Control System (AWACS) Link 16 Interface Change Proposals (ICPs). Additionally, the program participates in annual lab demonstrations that produce reports as required to assist with platform integration of Link 16 modernization efforts.

The E-3 Platform architecture utilizes a JTIDS Class 2H Link 16 radio with defined environmental and physical cabinet constraints. An Investigation Report (IR) was initiated to investigate the integration of an Ethernet enabled Concurrent Multinetting (CMN) MIDS JTRS variant into the E-3 platform. To understand the dynamics of the L-16 enhancements and facilitate integration of new Link 16 capabilities onto the E-3 platform to ensure cross-service interoperability; an IR was issued.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force			Date: February 2016
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207448F / *C2ISR Tactical Data Link*	Project (Number/Name) 675045 / *C2ISR Tactical Data Link*	

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
C2ISR Tactical Data Link Software Enhancements	SS/CPFF	Various : CA	-	0.586	May 2015	1.010	Jun 2016	0.801	Mar 2017	0.000		0.801	Continuing	Continuing	TBD
		Subtotal	-	0.586		1.010		0.801		0.000		0.801	-	-	-

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
C2ISR Tactical Data Link Aerial Network Engineering Lab	SS/ Various	AFLCMC Hanscom AFB : Bedford, MA	-	0.332	Oct 2014	0.332	Oct 2015	0.332	Oct 2016	0.000		0.332	Continuing	Continuing	TBD
		Subtotal	-	0.332		0.332		0.332		0.000		0.332	-	-	-

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
		Subtotal	-	-		-		-		-		-	-	-	-

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
C2ISR Tactical Data Link PMA - Program Office and Contractor Support	Various	Various : Various	-	0.616	Jan 2015	0.172	Dec 2015	0.220	Dec 2016	0.000		0.220	Continuing	Continuing	TBD
C2ISR Tactical Data Link FFRDC Support	SS/ Various	MITRE : Bedford, MA	-	0.165	Oct 2014	0.160	Oct 2015	0.162	Oct 2016	0.000		0.162	Continuing	Continuing	TBD
		Subtotal	-	0.781		0.332		0.382		0.000		0.382	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force			Date: February 2016
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207448F / *C2ISR Tactical Data Link*	Project (Number/Name) 675045 / *C2ISR Tactical Data Link*	

	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	-	1.699		1.674		1.515		0.000		1.515	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207448F / *C2ISR Tactical Data Link*	**Project (Number/Name)** 675045 / *C2ISR Tactical Data Link*

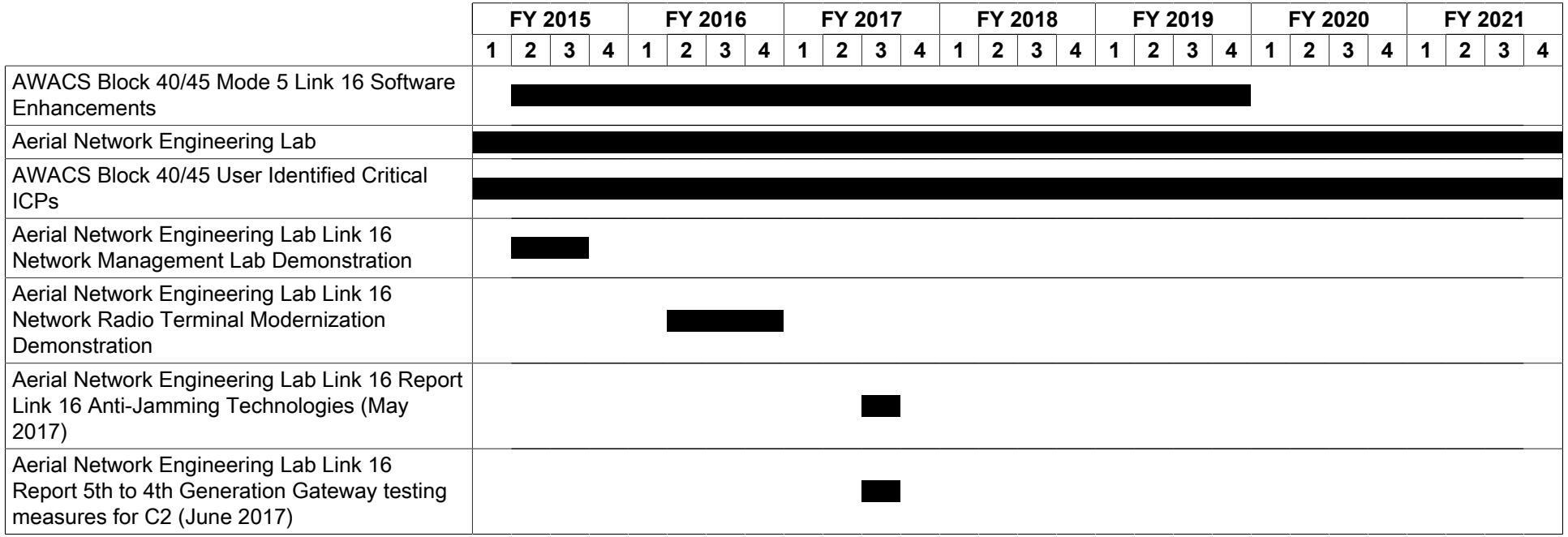

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207448F / *C2ISR Tactical Data Link*	**Project (Number/Name)** 675045 / *C2ISR Tactical Data Link*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
AWACS Block 40/45 Mode 5 Link 16 Software Enhancements	2	2015	4	2019
Aerial Network Engineering Lab	1	2015	4	2021
AWACS Block 40/45 User Identified Critical ICPs	1	2015	4	2021
Aerial Network Engineering Lab Link 16 Network Management Lab Demonstration	2	2015	3	2015
Aerial Network Engineering Lab Link 16 Network Radio Terminal Modernization Demonstration	2	2016	4	2016
Aerial Network Engineering Lab Link 16 Report Link 16 Anti-Jamming Technologies (May 2017)	3	2017	3	2017
Aerial Network Engineering Lab Link 16 Report 5th to 4th Generation Gateway testing measures for C2 (June 2017)	3	2017	3	2017

THIS PAGE INTENTIONALLY LEFT BLANK