Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Air Force											Date: May 2017	
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 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	-	1.629	1.515	1.754	0.000	1.754	1.751	1.783	1.814	1.852	Continuing	Continuing
675045: *C2ISR Tactical Data Link*	-	1.629	1.515	1.754	0.000	1.754	1.751	1.783	1.814	1.852	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 data link 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), the Control and Reporting Center (CRC), Global Hawk, Predator, Reaper, Rivet Joint, Combat Sent, and Cobra Ball. TDLs keep all Command and Control Intelligence, Surveillance, and Reconnaissance (C2ISR) platforms and data linked weapons current/interoperable in the airborne network to enable Global Strike, Global Persistent Attack, Offensive and Defensive Counterair (OCA / DCA) and Suppression of Enemy Air Defenses (SEAD) missions. Due to new/evolving Link 16 User identified Interface Changes Proposals (ICPs), studies and analysis will be performed to identify impacts to current and future systems, and to identify the required changes and impacts of implementing these new capabilities. The activities will 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.

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B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	1.674	1.515	1.749	0.000	1.749
Current President's Budget	1.629	1.515	1.754	0.000	1.754
Total Adjustments	-0.045	0.000	0.005	0.000	0.005
• Congressional General Reductions	0.000	0.000			
• 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	0.005	0.000	0.005

C. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: E-3 AWACS Block 40/45 Mode 5 and MIL-STD- 6016E Link 16 Enhancements	0.965	0.801	0.930

Description: Improve E-3 AWACS Block 40/45 Link 16 interoperability and compatibility by incorporating key changes to communications software baseline.

FY 2016 Accomplishments:
-Upgraded advanced Multifunction Informational Distribution System (MIDS) terminal lab assets for integration prototyping
-Conducted a study to evaluate the top technical risks for replacing the AWACS Joint Tactical Information Distribution System (JTIDS) Class 2H terminal with a more advanced MIDS terminal
-Completed 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 TTNT IP communication capability with the terminal
-Completed documentation and evaluation 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

FY 2017 Plans:
-Integrate a more advanced MIDS terminal
--This includes required Human/Computer Interface (HCI) changes and advanced terminal capabilities such as Concurrent Multinetting (CMN4) for AWACS
-Fund further integration prototyping of the upgraded High Power Amplifier (HPA) and antenna interface

FY 2018 Plans:
-Will continue to integrate a more advanced MIDS terminal

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
--This will include required Human/Computer Interface (HCI) changes and advanced terminal capabilities such as Concurrent Multinetting (CMN4) for AWACS)			
Title: Aerial Network Engineering Lab ***Description:*** 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 2016 Accomplishments:*** -Performed C2-focused airborne networking studies that supported data link enhancements -Began lab demonstrations to better understand impacts of advanced Link-16 radio terminal modernization --This included strengthening the network against jamming ***FY 2017 Plans:*** -Perform C2-focused airborne networking studies to support data link enhancements -Continue lab demonstrations to better understand impacts of advanced Link-16 radio terminal modernization --This will include strengthening the network against jamming -Provide reports that highlight most promising Link 16 anti-jam technologies to pursue for further operational development ***FY 2018 Plans:*** - Will continue performing C2-focused airborne networking studies to support data link enhancements - Will continue lab demonstrations to better understand impacts of advanced Link-16 radio terminal modernization --This will include strengthening the network against jamming -Will continue to provide reports that highlight most promising Link 16 anti-jam technologies to pursue for further operational development	0.332	0.332	0.332
Title: User Identified Critical Interface Change Proposals (ICPs) ***Description:*** User-identified critical ICP implementation includes time slot reallocation, strength track reporting and correlation, Global Area Reference System (GARS), and MIL-STD updates. This effort was previously titled "E-3 AWACS Block 40/45 Critical User Identified Interface Change Proposals." However, these ICPs apply to multiple C2ISR platforms. These plans were outlined in previous PB/BES document submissions. They include, but are not limited to those listed under the Mission Description and Budget Item Justification found in Exhibit R-2, Section A. ***FY 2016 Accomplishments:*** -Implemented user-identified critical ICPs	0.332	0.382	0.492

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
--This included time slot reallocation, strength track reporting and correlation, GARS, and MILSTD updates ***FY 2017 Plans:*** -Implement user-identified critical ICPs and MIL-STD updates ***FY 2018 Plans:*** -Will continue to implement user-identified critical ICPs and MIL-STD updates			
Accomplishments/Planned Programs Subtotals	1.629	1.515	1.754

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• RDTE:BA05:PE 0604281F: *TDN Enterprise*	49.495	82.380	38.250	0.000	38.250	100.028	46.839	42.914	35.171	Continuing	Continuing
• APAF:BA05:Line Item #F01500: *F-15*	2.837	0.000	0.000	0.000	0.000	46.903	53.211	40.167	20.933	Continuing	Continuing
• APAF:BA05:Line Item #F01600: *F-16*	3.200	6.447	0.000	0.000	0.000	6.755	8.371	8.525	8.695	Continuing	Continuing
• APAF:BA05:Line Item #B00200: *B-2A*	0.474	0.415	1.718	0.000	1.718	0.884	0.201	0.206	0.210	Continuing	Continuing
• APAF:BA05:Line Item #B01B00: *B-1B*	1.011	1.380	0.000	0.000	0.000	1.431	0.000	0.000	0.000	Continuing	Continuing
• OPAF:BA03:Line Item #834010: *General Information Technology*	0.002	1.842	0.312	0.000	0.312	0.177	0.180	1.698	1.701	Continuing	Continuing

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 C2 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 AWACS Link 16 ICPs. Additionally, the program participates in annual lab demonstrations that produce reports as required to assist with platform integration of Link 16 modernization efforts.

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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 CMN4 MIDS JTRS variant into the E-3 platform. A separate IR was issued 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.

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.