

# UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force										Date: February 2018		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0207448F I C2ISR Tactical Data Link							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	1.406	1.754	1.738	0.000	1.738	1.770	1.800	1.839	1.873	Continuing	Continuing
675045: C2ISR Tactical Data Link	-	1.406	1.754	1.738	0.000	1.738	1.770	1.800	1.839	1.873	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, Situation 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-6016F) 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.

# UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force				Date: February 2018		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development		R-1 Program Element (Number/Name) PE 0207448F I C2ISR Tactical Data Link				
This program element may include necessary civilian pay expenses required to manage, execute, and deliver TDL weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F and 0605898F.						
This program is in BA 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.						
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget		1.515	1.754	1.751	0.000	1.751
Current President's Budget		1.406	1.754	1.738	0.000	1.738
Total Adjustments		-0.109	0.000	-0.013	0.000	-0.013
• Congressional General Reductions		-0.109	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		0.000	0.000			
• Other Adjustments		0.000	0.000	-0.013	0.000	-0.013
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2017	FY 2018	FY 2019
Title: MIL-STD- 6016F Link 16 Enhancements				0.732	0.930	0.930
Description: Improve Link 16 interoperability and compatibility by incorporating key changes to communications software baseline.						
FY 2018 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).						
FY 2019 Plans:						
- Will continue to integrate a more advanced MIDS terminal.						

# UNCLASSIFIED

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Air Force		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207448F / <i>C2ISR Tactical Data Link</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>-- This will include required Human/Computer Interface (HCI) changes and advanced terminal capabilities such as Concurrent Multinetting (CMN4) for ground and C2 platforms including but not limited to AWACS, JSTARS, the AOC, Global Hawk, Predator, Reaper and Rivet Joint.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> N/A</p>				
<p><b>Title:</b> Aerial Network Engineering Lab</p> <p><b>Description:</b> 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.</p> <p><b>FY 2018 Plans:</b></p> <ul style="list-style-type: none"> <li>- Perform C2-focused airborne networking studies to support data link enhancements.</li> <li>- Conduct lab demonstrations to better understand impacts of advanced Link-16 radio terminal modernization.</li> <li>-- This will include strengthening the network against jamming.</li> <li>- Provide reports that highlight most promising Link 16 anti-jam technologies to pursue for further operational development.</li> </ul> <p><b>FY 2019 Plans:</b></p> <ul style="list-style-type: none"> <li>- Will continue performing C2-focused airborne networking studies to support data link enhancements.</li> <li>- Will continue lab demonstrations to better understand impacts of advanced Link-16 radio terminal modernization.</li> <li>-- This will include strengthening the network against jamming.</li> <li>- Will continue to provide reports that highlight most promising Link 16 anti-jam technologies to pursue for further operational development.</li> </ul> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> N/A</p>		0.332	0.332	0.332
<p><b>Title:</b> User Identified Critical Interface Change Proposals (ICPs)</p> <p><b>Description:</b> User-identified critical ICP implementation includes time slot reallocation, strength track reporting and correlation, Global Area Reference System (GARS), and MIL-STD updates.</p> <p>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.</p> <p><b>FY 2018 Plans:</b></p>		0.342	0.492	0.476

# UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force										Date: February 2018		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0207448F I C2ISR Tactical Data Link							
C. Accomplishments/Planned Programs (\$ in Millions)										FY 2017	FY 2018	FY 2019
- Implement user-identified critical ICPs and MIL-STD updates.												
FY 2019 Plans:												
- Will continue to implement user-identified critical ICPs and MIL-STD updates.												
FY 2018 to FY 2019 Increase/Decrease Statement:												
Funding decreased due to a minimal taper in development.												
Accomplishments/Planned Programs Subtotals										1.406	1.754	1.738
D. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• RDTE 05 PE 0604281F: TDN Enterprise	78.167	38.250	207.746	-	207.746	261.742	202.483	202.505	192.550	Continuing	Continuing	
• APAF 05 Line Item F01500: F-15	0.000	0.000	3.698	-	3.698	0.000	0.000	0.000	0.000	Continuing	Continuing	
• APAF 05 Line Item F01600: F-16	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing	
• APAF 05 Line Item B00200: B-2A	0.000	1.718	2.296	-	2.296	0.200	0.204	0.208	0.211	Continuing	Continuing	
• APAF 05 Line Item B01B00: B-1B	1.380	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing	
• OPAF 03 Line Item 834010: General Information Technology	1.842	0.312	0.176	-	0.176	0.179	9.439	11.613	42.727	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.												
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.												

**UNCLASSIFIED**

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0207448F / C2ISR Tactical Data Link	
<b>F. Performance Metrics</b> 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.		

**UNCLASSIFIED**

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force													Date: February 2018		
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)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
C2ISR Tactical Data Link Software Enhancements	Various	AFLCMC Hanscom AFB : Bedford, MA	-	0.761	Mar 2017	1.000	Mar 2018	1.171	Mar 2019	-		1.171	Continuing	Continuing	-
Subtotal			-	0.761		1.000		1.171		-		1.171	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
C2ISR Tactical Data Link Aerial Network Engineering Lab	SS/ Various	AFLCMC Hanscom AFB : Bedford, MA	-	0.332	Oct 2016	0.337	Oct 2017	0.337	Oct 2018	-		0.337	Continuing	Continuing	-
Subtotal			-	0.332		0.337		0.337		-		0.337	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
C2ISR Tactical Data Link PMA - Program Office and Contractor Support	Various	AFLCMC : Bedford, MA	-	0.220	Dec 2016	0.238	Dec 2017	0.230	Dec 2018	-		0.230	Continuing	Continuing	-
C2ISR Tactical Data Link FFRDC Support	SS/ Various	MITRE : Bedford, MA	-	0.093	Oct 2016	0.179	Oct 2017	-		-		-	Continuing	Continuing	-
Subtotal			-	0.313		0.417		0.230		-		0.230	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	1.406		1.754		1.738		-		1.738	Continuing	Continuing	N/A
Remarks															

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force																Date: February 2018			
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)			
3600 / 7								PE 0207448F / C2ISR Tactical Data Link								675045 / C2ISR Tactical Data Link			

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
C2ISR Tactical Data Link																												
Mode 5 Link 16 Software Enhancements																												
Aerial Network Engineering Lab																												
User Identified Critical ICPs																												

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
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

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
C2ISR Tactical Data Link				
Mode 5 Link 16 Software Enhancements	1	2017	4	2019
Aerial Network Engineering Lab	1	2017	4	2023
User Identified Critical ICPs	1	2017	4	2023