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

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604281F / <i>Tactical Data Networks Enterprise</i>
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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	-	30.282	59.996	82.380	0.000	82.380	74.628	22.073	22.512	22.909	Continuing	Continuing
655050: <i>TDL System Integration</i>	-	17.506	32.912	34.990	0.000	34.990	37.271	22.073	22.512	22.909	Continuing	Continuing
655262: <i>Family of Gateways</i>	-	12.776	27.084	47.390	0.000	47.390	37.357	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Tactical Data Networks Enterprise (TDNE) develops, enhances and fields Tactical Data Links (TDL), advanced waveforms, radios, network management tools, and associated hardware and software that comprise the aerial layer network. This will be accomplished by upgrading currently fielded communications and TDL systems and by developing and fielding more advanced systems in the future. Additional investments include addressing warfighter urgent demands through the establishment of Quick Reaction Capabilities (QRC). TDNE supports the development and fielding of aerial layer networking capabilities across multiple core functions including air superiority, ground precision attack, command and control, space operations, intelligence, surveillance and reconnaissance (ISR), and personal recovery. These activities provide the Joint Forces Air Component Commander with networks to build a common operating picture of the battlespace.

TDL System Integration will provide for the study (acquisitions current and proposed), analysis, enhancement, development, integration, demonstration, test, and evaluation of Tactical Data Links (TDLs) as a subset of the broader aerial layer networks. TDLs are used in both peace time and combat environments to exchange information such as character-oriented and fixed-formatted messages, data, radar tracks, target information, platform status, imagery, free-text messaging and command assignments. TDLs provide interoperability, local and global connectivity, and situational awareness to the user when training or fighting under rapidly changing operational conditions. TDLs increase mission effectiveness by providing enhanced air domain situational awareness, positive combat identification of aircraft in the network, fusion/correlation of on- and off-board sensor data, digital sharing of machine-to-machine target and threat information, thereby, enabling time critical targeting and other mission assignment tasking. 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), Variable Message Format (VMF), Intra-Flight Data Link (IFDL), and other Advanced TDL Link technologies, such as Tactical Targeting Network Technology (TTNT), Common Data Link (CDL), and Multifunction Advanced Data Link (MADL). TDLs typically include both a waveform specification as well as the standards for exchanging messages.

Family of Gateways executes development of the 5th to 4th Generation Gateway acquisition program that enables F-22 IFDL and F-35 MADL to Link 16 translation. Funding also supports Family of Gateways study (acquisitions current and proposed), analysis, enhancement, development, integration, demonstration, test, and evaluation efforts. Results of this analysis work allows multi-national combat forces to exchange information quickly and accurately by bridging discrete airborne, terrestrial, maritime, and space-based C4ISR networks producing operational effects not possible within individual networks. Gateway functions include enabling interoperability between data formats, protocols, and communication mediums. Additionally, gateway functions extend connectivity range, consolidate data from multiple networks into high capacity links for transmission to key C4ISR nodes, route information between disadvantaged users, and fuse/correlate data from multiple sources to improve accuracy. Gateway functions also provide application hosting, shared data storage, on-demand information access, smart data forwarding, and system monitoring/network management. TDNE executes quick reaction response capability requests by the warfighter and support activities (including ramp-up) associated with the Joint Aerial Layer Network (JALN) Enterprise activities as directed by the JALN Council. Funding ensures the continued enhanced interoperability of

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Air Force and joint assets through efforts such as early systems engineering and use of the Political, Operational, Economic and Technical (POET) process for program requirements analysis and architectural design development/coordination of all TDN standards and management capabilities, configuration management, platform/system interoperability assessments, development of government reference architectures, interoperability certification testing, and flight testing. This includes North Atlantic Treaty Organization, Command and Control and Communications (NATO C3I) interoperability studies and analysis.

The FY 2017 funding request was reduced by \$2.047 million to account for the availability of prior year execution balances.
The FY 2017 funding request was reduced \$0.676 million for inflation

This program is in Budget Activity 5, System Development and Demonstration (SDD), because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	39.059	60.256	37.240	0.000	37.240
Current President's Budget	30.282	59.996	82.380	0.000	82.380
Total Adjustments	-8.777	-0.260	45.140	0.000	45.140
• Congressional General Reductions	0.000	-0.260			
• 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	-7.570	0.000			
• SBIR/STTR Transfer	-1.207	0.000			
• Other Adjustments	0.000	0.000	45.140	0.000	45.140

Change Summary Explanation

FY 2015: \$7.57 million reduced to support the Global Aircrew Strategic Network Terminal program; \$1.207 million reduced to support SBIR

FY 2017:

- Funding increase is \$47.863 million for 5th to 4th Generation Gateway development
- The FY 2017 funding request was reduced by \$2.047 million to account for the availability of prior year execution balances
- The FY 2017 funding requested was adjusted \$0.676 million for inflation

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Air Force										Date: February 2016		
Appropriation/Budget Activity 3600 / 5					R-1 Program Element (Number/Name) PE 0604281F / <i>Tactical Data Networks Enterprise</i>				Project (Number/Name) 655050 / <i>TDL System Integration</i>			
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
655050: <i>TDL System Integration</i>	-	17.506	32.912	34.990	0.000	34.990	37.271	22.073	22.512	22.909	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

TDL System Integration provides for the study, analysis, enhancement, development, integration, demonstration, coalition interoperability exercises, costing, test, trials, and evaluation of Tactical Data Links (TDL) as a subset of the broader aerial layer network. TDLs are used in both peacetime and combat environments to exchange information such as character-oriented and fixed-formatted messages, data, radar tracks, target information, platform status, imagery, free-text messaging and command assignments. TDLs provide interoperability, local and global connectivity, and situational awareness to the user when training or fighting under rapidly changing operational conditions. TDLs increase mission effectiveness by providing enhanced air domain situational awareness, positive combat identification of aircraft in the network, fusion/correlation of on- and off-board sensor data, digital sharing of machine to machine target and threat information and, thereby, enabling time critical targeting and other mission assignment tasking. TDLs are used by all service, NATO, and coalition theater C2 elements, weapons platforms, and sensors.

The number of Air Force platforms hosting TDLs has expanded from C2 aircraft (E-3, E-8, E-11A, EQ-4B, or other (JALN analyzed platforms, etc.) to the fighter, bomber, intelligence, surveillance and reconnaissance (ISR), tanker, airlift and other tactical fleets (F-15, F-16, F-22A, Rivet Joint, B-1, B-2, B-52, KC-46, etc.), as well as to precision guided munitions. Utilization of TDLs in a joint and international environment requires the integration of terminals into host platforms and interoperability of TDL networks across all deployed joint, NATO, and coalition platforms. Mandates have dictated a required upgrade in Low Volume Terminal (LVT) and Multifunction Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) terminals in order to meet new frequency and cryptographic re-programming requirements. Integration and test costs will be associated with these mandates. TDLs have become the primary means of tactical battlefield communications.

Efforts in this project include waveform and integration activities.

Waveform:

Waveform activities include but are not limited to, enabling and supporting Joint Interoperability of Tactical Command and Control Systems (JINTACCS), Coalition Interoperability, Link 16 Enhancements, and development of a next generation waveform. Funding will provide training, logistics development, certification of individual TDL implementations to joint/allied standards, establishment of service-wide network management procedures/operations, and system wide enhancements/testing.

Integration:

Integration activities include but are not limited to, Data Link Test Facility (DTF), Block Upgrade 2 (BU2) retrofit, Block Cycle 1 retrofit (BC1), Air Force Participating Test Unit (AFPTU), interoperable System Management and Requirements Transformation (iSMART), Joint Airborne Network Tactical Edge (JAN-TE), Network Centric Capability Assessment (NCCA), NATO interoperability, Coalition interoperability, TDL Planning, Analysis, and Monitoring (TDL PAM), integration analysis of C2 of JALN, Cursor on Target (CoT), Tactical Communications Suite (TCS), and analysis of integration on platforms of existing TDN systems, system-of-systems analysis. Funding will ensure continued enhanced interoperability of Air Force, Joint, NATO, and Coalition assets through efforts such as early systems engineering and use of the POET process for program requirements analysis and architectural design development/coordination of all TDN standards and management capabilities, configuration

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<p>management, platform/system interoperability assessments, development of government reference architectures, integration of cyber technologies, interoperability certification testing, and flight testing.</p> <p>Activities also include studies and analysis (engineering and cost) to support both current program planning and execution and future program planning efforts for Tactical Data Networks, including development of joint concepts for C2 of JALN, JALN Analysis of Alternatives (AoA) follow-on analysis, and JALN gateway planning.</p> <p>Activities will also include NATO/Coalition Interoperability that provides program office system engineering to support Foreign Military Sales (FMS) case development, FMS planning for tech refresh modifications, Crypto-Modernization and TDL PAM.</p>				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<p>Title: Tactical Data Networks (TDN) Integration</p> <p>Description: Tactical Data Networks (TDN) Integration activities include but are not limited to, DTF, AFPTU, NCCA, NATO/Coalition Interoperability, Joint Aerial Layer Network (JALN) Analysis of Alternatives (AoA) follow-on, JALN gateway planning, and TDL PAM</p> <p>FY 2015 Accomplishments:</p> <ul style="list-style-type: none"> - Developed, certified, developmental training, and development of logistics plans for individual TDL implementations to joint/allied standards -- Provided management with the necessary engineering, technical and administrative support needed to facilitate development - Provided manpower and procured test equipment to support planning (e.g. Link-16 Modernization) testing, integration and fielding of all MIDS LVT and MIDS JTRS current and upgrade configurations for the various fighter/bomber and ground platforms -- Supported to TDL interoperability testing of development and fielded systems through the DTF -- Supported DoD mandated TDL Military-Standards (MIL-STD) conformance testing and interoperability assessments for all TDL capable Air Force platforms through the AFPTU -- Joint aerial layer network (JALN) focused studies and analysis (e.g. Anti-Jam Applique for Weapon Systems (AJAWS), F35 Contested LOS Voice study, Truck study, etc.) that support data link enhancements -- Assessed tactical airborne network and network management gaps that are validated in existing requirements documents through the Network Centric Capability Assessments (NCCA) -- Completed studies and analysis that include but not limited to supporting both current program planning and execution and future program planning efforts for Tactical Data Networks, including development of joint concepts for C2 and network management of the Joint Aerial Layer Network (JALN), and JALN gateway planning -- Provided support to Coalition Interoperability that provides program office system engineering to support Foreign Military Sales (FMS) case development, FMS planning for tech refresh modifications, and Crypto-Modernization <p>FY 2016 Plans:</p>		10.530	11.864	13.710

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

	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Fund the development, certification, developmental training, and to develop logistics plans for individual TDL implementations to joint/allied standards, and will provide management with the necessary engineering, technical and administrative support needed to facilitate development - Provide support planning (e.g. TDL/Link16 Modernization), testing, integration and fielding of all MIDS LVT and MIDS JTRS current and upgrade configurations -- Provide support to TDL interoperability testing of development and fielded systems through the DTF -- Support DoD mandated TDL MIL-STD conformance testing and interoperability assessments for all TDL capable Air Force platforms through the AFPTU - Conduct Aerial layer network focused studies and analysis that support data link enhancements -- Conduct assessments of tactical airborne network and network management gaps that are validated in existing requirements documents through the Network Centric Capability Assessments (NCCA) --- Studies and analysis include but are not limited to supporting both current program planning and execution and future program planning efforts for Tactical Data Networks, including development of joint concepts for C2 and network management of the Joint Aerial Layer Network (JALN), and JALN gateway planning - Provide support to Coalition Interoperability that provides program office system engineering to support NATO C3I, Foreign Military Sales (FMS) case development, FMS planning for tech refresh modifications, and Crypto-Modernization - Support development of TDL PAM acquisition effort <p>FY 2017 Plans:</p> <ul style="list-style-type: none"> - Will continue development, certification, developmental training, and to develop logistics plans for individual TDL implementations to joint/allied standards, and will provide management with the necessary engineering, technical and administrative support needed to facilitate development - Will continue the planning for testing, integration, and fielding of all MIDS LVT and MIDS JTRS current and upgrade configurations - Will continue Support to TDL interoperability testing of development and fielded systems through the DTF - Will continue support to DoD mandated TDL MIL-STD conformance testing and interoperability assessments for all TDL capable Air Force platforms through the AFPTU - Will continue Aerial layer network focused studies and analysis that support data link enhancements, and assessment of tactical airborne network and network management gaps that are validated in existing requirements documents through the Network Centric Capability Assessments (NCCA) - Will continue studies, analysis and demonstrations that include but are not limited to supporting both current program planning and execution and future program planning efforts for Tactical Data Networks, including development of joint concepts for C2 and network management of the Joint Aerial Layer Network (JALN), and JALN gateway planning 			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Will continue support to Coalition Interoperability that provides program office system engineering to support NATO C3I, Foreign Military Sales (FMS) case development, FMS planning for tech refresh modifications, and Crypto-Modernization - Will continue support of development of TDL PAM acquisition effort - Will prepare the TDL PAM acquisition strategy as well as the RFP 				
<p>Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)</p> <p>Description: Joint Interoperability of Tactical Command and Control Systems (JINTACCS) ensures interoperability of AF Tactical Data Link (TDL) systems with associated joint, allied, and coalition systems and includes configuration management of TDL Military Standards (MIL-STDs), TDL message development, interoperability test/certification, and TDL message standard implementation using interoperable System Management and Requirements Transformation (iSMART) for Links 11A/B, 16, 22, Variable Message Format (VMF), Integrated Broadcast Service (IBS), Multifunction Advanced Data Link (MADL), etc.</p> <p>FY 2015 Accomplishments:</p> <ul style="list-style-type: none"> - Ensured compatibility and interoperability of TDLs by developing TDL messaging capability that addressed new or updated operational requirements, and by conducting required joint compatibility and interoperability tests - Ensured management had support needed to facilitate AF updates to TDL MIL-STDs <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Provides the necessary engineering, technical, and administrative support required to add and/or update AF platform & system information exchange requirements - Ensures compatibility and interoperability of TDLs by funding required AF/Joint MIL-STD compliance and interoperability tests - Ensures compatibility and interoperability of TDLs by developing TDL messaging capability that addressed new or updated operational requirements, and by conducting required joint compatibility and interoperability tests -- Ensures management has support needed to facilitate AF updates to TDL MIL-STDs <p>FY 2017 Plans:</p> <ul style="list-style-type: none"> - Will provide the necessary engineering, technical, and administrative support required to add and/or update AF platform & system information exchange requirements - Will ensure compatibility and interoperability of TDLs by funding required AF/Joint MIL-STD compliance and interoperability tests - Will continue to ensure compatibility and interoperability of TDLs by developing TDL messaging capability that addressed new or updated operational requirements -- Will begin support to IFDL and MADL specific message translation development in support of the 5th to 4th Generation Gateway program - Will continue support conducting required joint compatibility and interoperability tests 		5.422	6.850	6.924

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
-- Will ensure management has support needed to facilitate AF updates to TDL MIL-STDs				
Title: Cursor on Target (CoT)		1.554	1.574	1.585
Description: Cursor on Target (CoT) is an extensible, 'What, When, Where' (W3) XML message format for interconnecting Command, Control, Communication & Computer (C4), intelligence, surveillance & reconnaissance (ISR) systems. The Cursor on Target (CoT) suite consists of the W3 base schema, tailored sub-schemas, and a set of software plug-ins and translators that facilitate machine to machine (M2M) transmission of Command and Control (C2), intelligence, surveillance and reconnaissance (ISR), and situational awareness data at reduced cost compared with traditional integration methods.				
FY 2015 Accomplishments:				
<ul style="list-style-type: none"> - Supported development, test, certification and accreditation of new Cursor on Target (CoT) apps/plugin/schema, investigated the development of the Cursor on Target(CoT) MIL-STD or CoT STANAG and transitioning of apps/plugin to sustainment - Began initial effort for componentized message infrastructure architecture including the router - Developed troubleshooting support (CoT adoption and configuration assistance) continuing to support COT users - Provided management with the necessary engineering, technical, and administrative support needed to facilitate development and support the annual COT User Group meeting 				
FY 2016 Plans:				
<ul style="list-style-type: none"> - Provides support development, test, certification and accreditation of new Cursor on Target (CoT) apps/plugin/debugger, pursue the development of the Cursor on Target (CoT) STANAG or commercial standard - Conducts CoT on MADL implementation study thus expanding the use of COT - Pursue Website set up and development that will provide additional support (tutorial videos, FAQs, message board, signup, etc.) - Provides engineering, technical, and administrative support needed to facilitate development and support the annual COT User Group meeting - Plans discussions for integration/testing of COT in the DTF 				
FY 2017 Plans:				
<ul style="list-style-type: none"> - Will support development, test, certification and accreditation of new Cursor on Target (CoT) apps/plugin/debugger, pursue the development of the Cursor on Target (CoT) STANAG or commercial standard - Will conduct CoT on MADL implementation study thus expanding the use of COT - Will develop Website set up that will provide additional support (tutorial videos, FAQs, message board, signup, etc.) - Will continue to provide engineering, technical, and administrative support needed to facilitate development and support the annual COT User Group meeting - Will pursue integration/testing of COT in the Datalinks Test Facility 				
Title: 5th to 4th Generation Gateway		0.000	12.624	12.771

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017
<p>Description: 5th to 4th Generation Gateway facilitates sharing track and sensor data between 5th Generation and 4th Generation aircraft as well as Command and Control (C2) nodes. Gateway functions include enabling interoperability between data formats, protocols, and communication mediums. Additionally, gateway functions extend the connectivity range; consolidate data from multiple networks, domains and sensors into high capacity links for transmission to key C2ISR nodes, route information between disadvantaged users, and correlate data from multiple sources to facilitate early detection & tracking while enabling collaborative targeting. The addition of multi-domain capabilities as a future requirement of the 5th to 4th Generation Gateway enables track sharing at the tactical edge for the timely destruction of ground and airborne target sets. These additional capabilities are a combat fires multiplier that enhance total force synergy for target prosecution and weapons employment. The initial increment of this Gateway program provides the baseline 5th to 4th communication capability for the future requirements of the Gateway program of record to build upon.</p> <p>FY 2015 Accomplishments: N/A</p> <p>FY 2016 Plans: - Provide support for development and fielding of the 5th to 4th Generation Gateway -- Begin activities in support of source selection and award of a 5th to 4th development and production contract and plan for future upgrades - This activity was previously bound to Project 655262 Family of Gateways</p> <p>FY 2017 Plans: - Will continue development of the 5th to 4th Generation Gateway -- Will provide systems engineering support to the 5th to 4th Generation Gateway program manager to support Engineering, Manufacturing and Development, including Bending the Cost Curve type activities - This activity was previously bound to Project 655262 Family of Gateways</p>			
Accomplishments/Planned Programs Subtotals	17.506	32.912	34.990

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
• RDTE: BA07: PE 0207448F: <i>C2ISR TDL</i>	1.699	1.674	1.515	0.000	1.515	1.749	1.750	1.782	1.814	Continuing	Continuing
• APAF: BA05: Line Item #F01500: <i>F-15</i>	0.002	2.837	0.000	0.000	0.000	5.266	46.903	53.211	40.167	Continuing	Continuing

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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 Complete</u>	<u>Total Cost</u>
• APAF: BA05: Line Item #F01600: <i>F-16</i>	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: <i>B-2A</i>	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: <i>B-1B</i>	0.223	1.011	1.380	0.000	1.380	0.535	0.794	0.000	0.000	Continuing	Continuing
• APAF: BA05: Line Item #OTHACF: <i>Other Aircraft</i>	0.000	0.239	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• OPAF: BA03: Line Item #834010: <i>General Information Technology</i>	0.000	0.002	3.422	0.000	3.422	1.799	1.665	1.694	1.725	Continuing	Continuing
• OPAF: BA03: Line Item #831010: <i>Comsec Equipment</i>	0.000	2.426	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Airborne Networking Directorate provides for common development, integration, and interoperability across the entire airborne network and ensures that data links are procured and maintained as a joint, end-to-end command and control system. Platform acquisition strategies vary by program, but the majority of development and integration is normally accomplished by the weapon system prime contractor.

E. 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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 5				PE 0604281F / Tactical Data Networks Enterprise				655050 / TDL System Integration							
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
TDN Integration	Various	Various : Various	-	1.572	Jun 2015	1.101	Jan 2016	1.700	Jan 2017	0.000		1.700	Continuing	Continuing	TBD
TDN Integration - Tactical Edge Network C2	MIPR	Various : Various	-	0.000		0.500	Mar 2016	2.000	Mar 2017	0.000		2.000	Continuing	Continuing	TBD
5th to 4th Generation Gateway	MIPR	Various : Various	-	0.000		12.624	Sep 2016	12.770	Sep 2017	0.000		12.770	Continuing	Continuing	TBD
Subtotal			-	1.572		14.225		16.470		0.000		16.470	-	-	-
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
TDN Integration - NCCA	C/T&M	MITRE : Bedford, MA	-	1.315	Nov 2014	1.315	Dec 2015	1.400	Nov 2016	0.000		1.400	Continuing	Continuing	TBD
Cursor on Target	C/T&M	MITRE : Bedford, MA	-	1.330	Dec 2014	1.404	Dec 2015	1.300	Oct 2016	0.000		1.300	Continuing	Continuing	TBD
Subtotal			-	2.645		2.719		2.700		0.000		2.700	-	-	-
Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
TDN Integration - DTF	PO	46th Test Squadron : Eglin AFB, FL	-	1.809	Jan 2015	1.000	Mar 2016	1.358	Feb 2017	0.000		1.358	Continuing	Continuing	TBD
JINTACCS	C/FFP	Spectrum Comm Inc : Newport News, VA	-	2.015	Feb 2015	2.171	Feb 2016	2.731	Feb 2017	0.000		2.731	Continuing	Continuing	TBD
TDN Integration - AFPTU	MIPR	Various : Various	-	0.000		1.369	Mar 2016	0.000		0.000		0.000	Continuing	Continuing	TBD
TDN Integration - JALN AoA	MIPR	Various : Various	-	3.376	Mar 2015	3.554	Mar 2016	5.379	Mar 2017	0.000		5.379	Continuing	Continuing	TBD
Subtotal			-	7.200		8.094		9.468		0.000		9.468	-	-	-

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

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604281F / <i>Tactical Data Networks Enterprise</i>	Project (Number/Name) 655050 / <i>TDL System Integration</i>
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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			
TDN Integration PMA - A&AS support - NCCA, Coalition Interoperability, JALN AoA	C/CPAF	Various : Various	-	0.968	Jan 2015	0.500	May 2016	1.300	Jan 2017	0.000		1.300	Continuing	Continuing	TBD
Cursor on Target PMA - A&AS support	C/CPAF	Various : Various	-	0.199	Dec 2014	0.171	May 2016	0.211	Dec 2016	0.000		0.211	Continuing	Continuing	TBD
TDN Integration PMA - FFRDC support - NCCA	C/T&M	MITRE : Bedford, MA	-	0.160	Jan 2015	0.160	Dec 2015	1.700	Oct 2016	0.000		1.700	Continuing	Continuing	TBD
TDN Integration PMA - FFRDC support - Coalition Interoperability, JALN AoA	C/T&M	MITRE : Bedford, MA	-	3.508	Nov 2014	5.590	Jan 2016	1.841	Oct 2016	0.000		1.841	Continuing	Continuing	TBD
TDN Integration PMA - Travel, Government Purchase Cards, etc...DTF, NCCA, Coalition Interoperability, AFPTU, JALN AoA	Various	Various : Various	-	0.876	Jan 2015	1.127	Jan 2016	0.900	Jan 2017	0.000		0.900	Continuing	Continuing	TBD
JINTACCS PMA - Travel, Government Purchase Cards, etc...	Various	Various : Various	-	0.087	Jan 2015	0.025	Jan 2016	0.100	Jan 2017	0.000		0.100	Continuing	Continuing	TBD
Cursor on Target PMA - Travel, Government Purchase Cards, etc...	Various	Various : Various	-	0.291	Oct 2014	0.301	Dec 2015	0.300	Dec 2016	0.000		0.300	Continuing	Continuing	TBD
Subtotal			-	6.089		7.874		6.352		0.000		6.352	-	-	-

	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		-	17.506	32.912	34.990	0.000	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604281F / <i>Tactical Data Networks Enterprise</i>	Project (Number/Name) 655050 / <i>TDL System Integration</i>

	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

TDN Integration	[REDACTED]																											
JINTACCS	[REDACTED]																											
Cursor on Target (CoT)	[REDACTED]																											
5th to 4th Generation Gateway - Development	[REDACTED]																											
5th to 4th Development/Production Contract Award (Nov 2016)	[REDACTED]																											
5th to 4th Milestone C (Aug 2018)	[REDACTED]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604281F / <i>Tactical Data Networks Enterprise</i>	Project (Number/Name) 655050 / <i>TDL System Integration</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TDN Integration	1	2015	4	2021
JINTACCS	1	2015	4	2021
Cursor on Target (CoT)	1	2015	4	2021
5th to 4th Generation Gateway - Development	1	2016	4	2018
5th to 4th Development/Production Contract Award (Nov 2016)	1	2017	1	2017
5th to 4th Milestone C (Aug 2018)	4	2019	4	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Air Force										Date: February 2016		
Appropriation/Budget Activity 3600 / 5					R-1 Program Element (Number/Name) PE 0604281F / <i>Tactical Data Networks Enterprise</i>				Project (Number/Name) 655262 / <i>Family of Gateways</i>			
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
655262: <i>Family of Gateways</i>	-	12.776	27.084	47.390	0.000	47.390	37.357	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Family of Gateways provides for the study (acquisitions current and proposed), analysis, enhancement, development, integration, costing, demonstration, test, and evaluation efforts that will allow joint combat forces to exchange information quickly and accurately by bridging discrete airborne, terrestrial, maritime, and space-based C4ISR networks producing operational effects not possible within individual networks. Gateway functions include enabling interoperability between data formats, protocols, and communication mediums. Additionally, gateway functions extend the connectivity range, consolidate data from multiple networks into high capacity links for transmission to key C2ISR nodes, route information between disadvantaged users, and fuse/correlate data from multiple sources to improve accuracy. Gateway functions also provide application hosting, shared data storage, on-demand information access, smart data forwarding, and system monitoring/network management. Funding in this project will also support requests by the warfighter such as the Battlefield Airborne Communications Node (BACN), 5th to 4th and 5th to 5th Generation efforts. Additionally, Family of Gateways will support activities associated with the JALN Enterprise recommendations, in line with applicability of existing TDL performance, upgrade plans and engineering analysis of system designs and TDN Performance Improvements.

Efforts in this project include waveform, ground, and quick reaction capability activities.

Waveforms:

Waveform activities include, but are not limited to Situational Awareness Data Link (SADL) and 5th to 4th Generation and 5th-5th Generation efforts. SADL integrates US Air Force close air support aircraft with the networked battlefield via the US Army's Enhanced Position Location Reporting System (EPLRS) or the Operational Tactical Interface for SADL (OTIS). The 5th to 4th Generation Gateway facilitates sharing of 5th Generation aircraft track data with 4th Generation aircraft as well as C2 nodes.

Ground:

Ground activities include, but are not limited to the TDL PAM. Funding will support enhancements to the interoperability and capabilities of fielded gateways through processing capability upgrades, operating system updates, display/graphical user interface upgrades, incorporation of additional messaging standards and protocols, and completion of gateway architecture fielding.

Quick Reaction Capability:

Quick reaction capability activities include, but are not limited to BACN. Funding will support AF rapid acquisition requirements for communications bridging of waveforms through gateway technology.

Activities also include studies and analysis to support both current program planning and execution and future program planning efforts for Family of Gateways.

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604281F / <i>Tactical Data Networks Enterprise</i>	Project (Number/Name) 655262 / <i>Family of Gateways</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017
<p>Title: 5th to 4th Generation Gateway</p> <p>Description: 5th to 4th Generation Gateway facilitates sharing track and sensor data between 5th Generation and 4th Generation aircraft as well as Command and Control (C2) nodes. Gateway functions include enabling interoperability between data formats, protocols, and communication mediums. Additionally, gateway functions extend the connectivity range; consolidate data from multiple networks, domains and sensors into high capacity links for transmission to key C2ISR nodes, route information between disadvantaged users, and correlate data from multiple sources to facilitate early detection & tracking while enabling collaborative targeting. The addition of multi-domain capabilities as a future requirement of the 5th to 4th Generation Gateway enables track sharing at the tactical edge for the timely destruction of ground and airborne target sets. These additional capabilities are a combat fires multiplier that enhance total force synergy for target prosecution and weapons employment. The initial increment of this Gateway program provides the baseline 5th to 4th communication capability for the future requirements of the Gateway program of record to build upon.</p> <p>FY 2015 Accomplishments:</p> <ul style="list-style-type: none"> -Conducted acquisition planning for the 5th to 4th Generation Gateway -- Funded risk reduction projects and engineering, technical, and administrative support required for Request For Proposal (RFP) development -- Funded risk reduction efforts including MADL to Link 16 Data Forward standards as well as Data porting to a new card was completed -- Initiated F15 Size Weight and Power (SWaP) study to provide power availability to be included in the RFP -- Worked on preparation of the RFP with release in early FY16 <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Initiate source selection and award of a 5th to 4th development and production contract, and planning for future upgrades -- Begin acquisition of materiel items, including datalink radio terminals, required for the development, fabrication and testing of 5th to 4th Gen Gateway prototypes to include multi-domain capability integration using OMS constructs -- Execute various risk reduction activities at PEO direction <p>FY 2017 Plans:</p> <ul style="list-style-type: none"> - Will develop the 5th to 4th Generation Gateway - Will upgrade the 46TS facility to MADL capability and conduct Link-16 NDL development demo - Will complete design reviews associated with development of Engineering and Manufacturing Development (EMD) prototypes - Will provide Government Furnished Equipment (GFE) radios to gateway developer - Will begin construction of the EMD prototypes - Will begin acquisition of A kits utilizing OMS constructs to provide rapid upgrades 	12.776	27.084	47.390

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604281F / <i>Tactical Data Networks Enterprise</i>	Project (Number/Name) 655262 / <i>Family of Gateways</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017
- Will procure Boeing engineering support to design and construction of the EMD prototypes and A kits through Operational Testing			
Accomplishments/Planned Programs Subtotals	12.776	27.084	47.390

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
• RDTE: BA07: PE 0207448F: <i>C2ISR TDL</i>	1.699	1.674	1.515	0.000	1.515	1.749	1.750	1.782	1.814	Continuing	Continuing
• APAF: BA05: Line Item #F01500: <i>F-15</i>	0.002	2.837	0.000	0.000	0.000	5.266	46.903	53.211	40.167	Continuing	Continuing
• APAF: BA05: Line Item #F01600: <i>F-16</i>	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: <i>B-2A</i>	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: <i>B-1B</i>	0.223	1.011	1.380	0.000	1.380	0.535	0.794	0.000	0.000	Continuing	Continuing
• APAF: BA05: Line Item #OTHACF: <i>Other Aircraft</i>	0.000	0.239	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• OPAF: BA03: Line Item #834010: <i>General Information Technology</i>	0.000	0.002	3.422	0.000	3.422	1.799	1.665	1.694	1.725	Continuing	Continuing
• OPAF: BA03: Line Item #831010: <i>COMSEC Equipment</i>	0.000	2.246	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy
The Airborne Networking Directorate provides for common development, integration and interoperability across the entire airborne network and ensures that data links are procured and maintained as a joint, end-to-end, command and control system. Platform acquisition strategies vary by program, but the majority of development and integration is normally accomplished by the weapon system prime contractor.

E. 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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
3600 / 5				PE 0604281F / Tactical Data Networks Enterprise						655262 / Family of Gateways					
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
5th To 4th Generation Gateway development	MIPR	Various : Various	-	6.458	Feb 2016	18.188	Jun 2016	40.990	Jun 2017	0.000		40.990	Continuing	Continuing	TBD
Subtotal			-	6.458		18.188		40.990		0.000		40.990	-	-	-
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
Subtotal			-	-		-		-		-		-	-	-	-
Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
5th-4th Generation Gateway Engineering services	Various	Various : Bedford, MA	-	4.152	Feb 2016	4.815	Mar 2016	2.205	Jan 2017	0.000		2.205	Continuing	Continuing	TBD
Subtotal			-	4.152		4.815		2.205		0.000		2.205	-	-	-
Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
5th To 4th Generation Gateway PMA - A&AS support	C/Various	Various : Various	-	1.252	Sep 2015	2.136	Jun 2016	2.099	Jan 2017	0.000		2.099	Continuing	Continuing	TBD
5th To 4th Generation Gateway PMA - FFRDC support	C/Various	MITRE : Bedford, MA	-	0.342	Feb 2016	0.125	Jun 2016	0.346	Jun 2016	0.000		0.346	Continuing	Continuing	TBD
5th To 4th Generation Gateway PMA - Travel,	Various	Various : Various	-	0.572	Sep 2015	1.820	Jun 2016	1.750	Jun 2017	0.000		1.750	Continuing	Continuing	TBD

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604281F / <i>Tactical Data Networks Enterprise</i>	Project (Number/Name) 655262 / <i>Family of Gateways</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
5th to 4th Generation Gateway - Development	1	2015	4	2018
5th to 4th Development/Production Contract Award (Nov 2016)	1	2017	1	2017
5th to 4th Milestone C (Aug 2018)	4	2019	4	2019