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 4: *Advanced Component Development & Prototypes (ACD&P)*						**R-1 Program Element (Number/Name)** PE 0305236F *I Common Data Link Executive Agent (CDL EA)*					
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	-	40.293	41.509	41.880	0.000	41.880	42.708	43.537	44.438	45.249	Continuing	Continuing
641334: *Common Data Link (CDL)*	-	40.293	41.509	41.880	0.000	41.880	42.708	43.537	44.438	45.249	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Common Data Link Executive Agent (CDL EA) provides the DoD standard for interoperable, multi-service, multi-agency, Intelligence, Surveillance, and Reconnaissance (ISR) datalinks for 10,000+ DoD manned/unmanned airborne and ground platforms. As the DoD CDL EA, the Air Force is responsible for cross-service application of CDL RDT&E Military Intelligence Program (MIP) funds facilitating compliance to Congressional and DoD mandates. The CDL EA develops, modifies, distributes, and maintains specifications for the CDL waveform family; ensuring design configuration control, commonality, and interoperability among ISR platforms. Additionally, funds support managing resources allocated for development, maturation, and migration of CDL technologies.

CDL EA enables compliance with OSD and Congressional mandates to effectively utilize spectrum, use approved cryptographic equipment, and provide direct support to current operations. CDL is a vital link in DoD's existing and emerging communication architectures, providing flexibility to accommodate Command and Control (C2) data and myriad types of Signals Intelligence (SIGINT), Geospatial Intelligence (GEOINT), and Full-Motion Video (FMV) data. The CDL specifications permit current and future ISR asset operations worldwide by providing sensor data directly via point-to-point and broadcast to ground sites, airborne platforms and dismounted users. Also, CDL provides the capability to relay data via air-to-air or compatible satellite links when the asset and ground site are not in line-of-sight.

CDL EA's research and development activities support a broad array of tactical, operational, and strategic ISR users and include achieving higher data rates, open architecture development, multi- access and multi-node network management, cryptographic modernization, advancements needed to operate in contested environments, terminal and antenna design enhancements, operations in other spectral bands, and improving spectrum efficiency. Further, CDL development improves large area surveillance missions while supporting continuous improvements and implementation of line-of-sight platform and CDL terminal Command and Control (C2), plus increased ISR (C2ISR) capabilities. Activities also include studies and analysis to support current and future requirements documentation, program planning and execution. CDL prototype terminal designs provide for future technology insertion and reduce non-recurring engineering and life-cycle costs to the user.

In addition, the Cryptographic Core Modernization (CCM) thrust enables CDL to develop a miniaturized gigabit rate Communications Security (COMSEC) device capable of managing CDL data. The miniaturized COMSEC device will allow faster throughput while reducing Size, Weight, and Power (SWaP) requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CDL Executive Agent capabilities. 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.

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 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 Program Element (Number/Name) PE 0305236F *I Common Data Link Executive Agent (CDL EA)*

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	42.338	41.509	42.196	0.000	42.196
Current President's Budget	40.293	41.509	41.880	0.000	41.880
Total Adjustments	-2.045	0.000	-0.316	0.000	-0.316
• 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	-2.045	0.000			
• Other Adjustments	0.000	0.000	-0.316	0.000	-0.316

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Common Data Link (CDL) Technology Advancement	9.670	10.000	10.165	0.000	10.165

Description: CDL evolutionary concept development, exploratory prototyping, advanced technology demonstrations, and studies of emerging technologies and capability gaps.

FY 2018 Plans:
- Continue to research and evaluate technology developments for enhancing networking, as well as more effective ground and lightweight airborne terminal components
- Continue to develop multispectral operations flexibility, increased spectrum efficiency and integration of improved transmission components
- Continue development of a common development environment as it applies to CDL specification maintenance and update
- Continue development of enhanced, CDL-based intelligence, surveillance and reconnaissance (ISR) communication capabilities across multiple platforms and echelons
- Continue exploratory prototyping efforts and advanced technology demonstrations in support of emerging communication backbone architecture development across air, space and terrestrial layers; to include: agile high capacity data transport, assured communications and multi-mode access networks

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305236F I *Common Data Link Executive Agent (CDL EA)*	

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue to research and develop upgrades to support current and future specification employment profiles *FY 2019 Base Plans:* - Will continue to research and evaluate technology developments for enhancing networking, as well as more effective ground and lightweight airborne terminal components - Will continue to develop multispectral operations flexibility, increased spectrum efficiency and integration of improved transmission components - Will continue development of a common development environment as it applies to CDL specification maintenance and update - Will continue development of enhanced, CDL-based ISR communication capabilities across multiple platforms and echelons - Will continue exploratory prototyping efforts and advanced technology demonstrations in support of emerging communication backbone architecture development across air, space and terrestrial layers; to include: agile high capacity data transport, assured communications and multi-mode access networks - Will continue to research and develop upgrades to support current and future specification employment profiles *FY 2019 OCO Plans:* None *FY 2018 to FY 2019 Increase/Decrease Statement:* Increase in FY19 funding due to inflation adjustment.					
Title: Common Data Link (CDL) Specification Development, Validation, Test and Maintenance **Description:** Systems engineering lifecycle for CDL and NATO STANAG 7085 specification development: requirement decomposition, specification development (modeling, maturation, documentation), specification validation (and associated component prototyping), testing, configuration management, and process maintenance. *FY 2018 Plans:* - Continue development and testing of Higher Data Rates to existing and emerging terminals, while also prototyping terminal development that combines Size, Weight and Power (SWaP) improvements with higher data rate capability and integration of improved transmission components - Continue adding capabilities required to support the Joint Aerial Layer Network (JALN) High Capacity Backbone (HCB), Anti-Access Area-Denial (A2AD) requirements, and other emerging operational capabilities - Continue development of spectrally efficient CDL waveform specification	27.278	24.690	24.715	0.000	24.715

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 4: *Advanced Component Development & Prototypes (ACD&P)*		**R-1 Program Element (Number/Name)** PE 0305236F *I Common Data Link Executive Agent (CDL EA)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue to work with CDL industry partners and DoD Services to document, validate and implement common terminal control interfaces through use of commercially recognized standards - Continue configuration control of the CDL architecture, standards, specifications and modules - Continue development of CDL test equipment capable of compliance testing to the latest, validated version of CDL specifications ***FY 2019 Base Plans:*** - Will continue development and testing of Higher Data Rates to existing and emerging terminals, while also prototyping terminal development that combines Size, Weight and Power (SWaP) improvements with higher data rate capability and integration of improved transmission components - Will continue adding capabilities required to support the Joint Aerial Layer Network (JALN) High Capacity Backbone (HCB), Anti-Access Area-Denial (A2AD) requirements, and other emerging operational capabilities - Will continue development of spectrally efficient CDL waveform specification - Will continue to work with CDL industry partners and DoD Services to document, validate and implement common terminal control interfaces through use of commercially recognized standards - Will continue configuration control of the CDL architecture, standards, specifications and modules - Will continue development of CDL test equipment capable of compliance testing to the latest, validated version of CDL specifications ***FY 2019 OCO Plans:*** None ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase in FY19 funding due to inflation adjustment.					
Title: Common Data Link (CDL) Cryptographic Modernization ***Description:*** Phased development effort to modernize CDL Communications Security (COMSEC) devices and standards to maximize performance and reduce SWaP requirements while supporting interoperability, commonality, modularity, portability, remote management, multi-level security and releasability. ***FY 2018 Plans:*** - Continue development of generation two (Gen 2) Nano and Mini cryptographic core modernization (CCM) modules for US and NATO release - Continue follow-on Nano and Mini CCM Security Validation Testing (SVT) and subsequent National Security Agency (NSA) information assurance (IA) certification	3.345	6.819	7.000	0.000	7.000

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 4: *Advanced Component Development & Prototypes (ACD&P)*			**R-1 Program Element (Number/Name)** PE 0305236F *I Common Data Link Executive Agent (CDL EA)*		

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue development of multi-channel, gigabit data rate (Mega) cryptographic cores with Gen 2 advances and begin the CCM transition to over-the-air re-keying capabilities in Generation 3 - Begin development and design of common End Cryptographic Units (ECUs) for use with medium- and large-sized ISR terminals ***FY 2019 Base Plans:*** - Will continue development of generation two (Gen 2) Nano and Mini cryptographic core modernization (CCM) modules for US and NATO release - Will continue follow-on Nano and Mini CCM Security Validation Testing (SVT) and subsequent National Security Agency (NSA) information assurance (IA) certification - Will continue development of multi-channel, gigabit data rate (Mega) cryptographic cores with Gen 2 advances - Will continue development and design of common End Cryptographic Units (ECUs) for use with medium- and large-sized ISR terminals ***FY 2019 OCO Plans:*** None ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase in FY19 funding due to inflation adjustment.					
Accomplishments/Planned Programs Subtotals	40.293	41.509	41.880	0.000	41.880

D. Other Program Funding Summary ($ in Millions)

 N/A

Remarks

E. Acquisition Strategy

 The Air Force serves as the DoD Common Data Link Executive Agent, with support from each Service's designated CDL lead and the Airborne Network Division (AFLCMC/HNA). The CDL EA develops interoperable ISR data links mandated for use by Assistant Secretary of Defense (Networks and Information Integration) (ASD(NII)) policy. Once CDL technology development matures and a specification is published, services are responsible for CDL compliant platform and terminal procurement; National Security Agency (NSA) and Joint Interoperability Test Command (JITC) ensure compliance certifications; integration; and installation. Acquisition strategy varies by contract. Whenever possible, contracts are awarded under full and open competition.

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305236F *I Common Data Link Executive Agent (CDL EA)*	

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 2019 Air Force			Date: February 2018	
Appropriation/Budget Activity 3600 / 4		**R-1 Program Element (Number/Name)** PE 0305236F / Common Data Link Executive Agent (CDL EA)	**Project (Number/Name)** 641334 / Common Data Link (CDL)	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air Force Information Assurance Modernization / Network Management	MIPR	NSA : Ft Meade, MD	-	3.345	Nov 2016	7.000	Jan 2018	7.000	Jan 2019	-		7.000	Continuing	Continuing	-
Air Force Network Modernization	MIPR	Air Force : Various	-	-		7.000	Nov 2017	5.000	Nov 2018	-		5.000	Continuing	Continuing	-
Marine CDL for Tactical UAS	Various	Various : Various	-	7.750	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	-
Terminal Database	C/CPFF	Booze Allen : McClean, VA	-	0.700	May 2017	0.700	Nov 2017	0.700	Nov 2018	-		0.700	Continuing	Continuing	-
Compliance Test Tool	C/Various	Various : Various	-	2.991	Jun 2017	3.000	Mar 2018	3.000	Mar 2019	-		3.000	Continuing	Continuing	-
Under Threshold Combined	Various	Various : Various	-	7.045	Dec 2016	4.981	Nov 2017	5.131	Nov 2018	-		5.131	Continuing	Continuing	-
Subtotal			-	21.831		22.681		20.831		-		20.831	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Service Tech Support & Spec Development	MIPR	Various : Various	-	7.800	Jan 2017	8.900	Dec 2017	9.000	Dec 2018	-		9.000	Continuing	Continuing	-
Subtotal			-	7.800		8.900		9.000		-		9.000	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Interoperability Test Center (JITC)	MIPR	JITC : Ft Huachuca, AZ	-	0.550	Jun 2017	0.800	Mar 2018	1.000	Mar 2019	-		1.000	Continuing	Continuing	-
46 Test Squadron	PO	46 TS/OGEX : Eglin AFB, FL	-	0.369	Nov 2016	0.369	Nov 2017	0.369	Nov 2018	-		0.369	Continuing	Continuing	-
Subtotal			-	0.919		1.169		1.369		-		1.369	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 I 4		**R-1 Program Element (Number/Name)** PE 0305236F I Common Data Link Executive Agent (CDL EA)	**Project (Number/Name)** 641334 I Common Data Link (CDL)

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
PMA-MITRE Engineering Support (FFRDC)	SS/T&M	MITRE Corp : Bedford, MA	-	0.050	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	-
PMO/Service- MITRE Engineering Direct Mission Support (FFRDC)	SS/T&M	MITRE Corp. : Bedford, MA	-	6.078	Nov 2016	5.650	Nov 2017	5.650	Nov 2018	-		5.650	Continuing	Continuing	-
PMA - PMO Support (A&AS)	C/CPFF	PE Systems : Littleton, MA	-	0.766	Mar 2017	0.860	Jul 2018	0.860	Jul 2019	-		0.860	Continuing	Continuing	-
PMA - Under Threshold Program Mgmt/Tech Support	Various	Various : Various	-	2.849	Jun 2017	2.249	Dec 2017	4.170	Dec 2018	-		4.170	Continuing	Continuing	-
Subtotal			-	9.743		8.759		10.680		-		10.680	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	-	40.293		41.509		41.880		-		41.880	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*	**Project (Number/Name)** 641334 / *Common Data Link (CDL)*

	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

Common Data LInk

- CDL Technology Advancement
- Spectrum efficient/Frequency agile CDL
- Capability Gap Analysis / Roadmap Update
- Multi-access / Mesh Network Advancements
- CDL Specification Development, Validation, Test and Maintenance
- SUAS SWAP Constrained Rev B Terminals
- CDL Compliance Test Set
- CDL Crytpographic Modernization
- Multi-algorithm US/Coalition crypto core modules (Generation 2)
- End Cryptographic Unit (ECUs) design

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force			**Date:** February 2018	
Appropriation/Budget Activity 3600 *I* 4	**R-1 Program Element (Number/Name)** PE 0305236F *I Common Data Link Executive Agent (CDL EA)*		**Project (Number/Name)** 641334 *I Common Data Link (CDL)*	

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Common Data LInk				
CDL Technology Advancement	1	2017	4	2023
- Spectrum efficient/Frequency agile CDL	1	2017	2	2018
- Capability Gap Analysis / Roadmap Update	1	2017	3	2018
- Multi-access / Mesh Network Advancements	1	2017	4	2020
CDL Specification Development, Validation, Test and Maintenance	1	2017	4	2023
- SUAS SWAP Constrained Rev B Terminals	1	2017	4	2018
- CDL Compliance Test Set	1	2017	2	2020
CDL Crytpographic Modernization	1	2017	2	2021
- Multi-algorithm US/Coalition crypto core modules (Generation 2)	1	2017	3	2018
- End Cryptographic Unit (ECUs) design	3	2017	2	2020