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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Air Force **Date:** February 2020

<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 0207412F <i>I Control and Reporting Center (CRC)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	6.216	8.109	16.041	0.000	16.041	10.546	10.459	17.119	17.434	Continuing	Continuing
67485L: <i>Theater Air Control System Imp (TACSI)</i>	-	6.216	8.109	16.041	0.000	16.041	10.546	10.459	17.119	17.434	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

**CONTROL AND REPORTING CENTER (CRC)**

The CRC is a mobile, ground-based theater air control system (TACS) surveillance and battle management command and control (BMC2) element. It is a customizable, modular, transportable, and persistent weapon system employed at the tactical level to support air and surface operations to provide direct command and control to all air assets in an assigned Area of Responsibility (AOR) and to report back to the Joint Force Air Combat Commander (JFACC). The CRC is a family of systems which include: AN/TYQ-23A(V)1 Tactical Air Operations Module (TAOM), AN/TSC-147, AN/TRC-213/214 Remote Radio Secure Voice System (RRSVS), and the AN/TPS-75 radar, CRC's organic radar. Air Combat Command (ACC) CRC Capability Road map provides for the modernization of this family of systems and will be programmed into phased updates through 2037.

CRC is part of the AF's Advanced Battle Management System (ABMS) initiative, to which CRC will provide a tactical C2 capability. A CRC Bridge to ABMS strategy in FY21 will consolidate previous modernization efforts into a larger initiative that continues the upgrading of battle management command and control, sensors, and communications systems. These continuing modernization efforts will allow CRC to update and improve software, ingest and disseminate Ground Moving Target Indicator feeds and tracks, enable efforts for OMS/UCI compliance, and integrate Top Secret hardware and software capability solutions.

CRC development efforts support CRC Bridge to ABMS include, but are not limited to: AN/TRC-213/214 RRSVS radio modernization upgrades (Saturn/MUOS/EOIP), continuous software development, Mode 5 Implementation, Ground Moving Target Indicator (GMTI) tracker, Top Secret (TS)/Joint Worldwide Intelligence Communication System (JWICS) and Talon Thresher, continue to pursue emerging technology for Open Mission System(OMS)/Open System Architecture (OSA) advancements, TPS-75 modernization, along with possible hardware changes to support ABMS architecture and L/V/C Operations capability. Also, CRC modifications are required for the system to keep pace with evolving COTS/GOTS components, DoD directives, changes in the underlying IT environment, and to remain interoperable, certified, supportable, and compliant through the development, integrations, testing, fielding, training and related equipment of new capabilities and upgrades to the CRC.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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This program is in Budget Activity 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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	6.413	8.109	16.070	0.000	16.070
Current President's Budget	6.216	8.109	16.041	0.000	16.041
Total Adjustments	-0.197	0.000	-0.029	0.000	-0.029
• 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	-0.197	0.000			
• Other Adjustments	0.000	0.000	-0.029	0.000	-0.029

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> CRC Bridge to ABMS	0.000	0.000	16.041	-	16.041
<b>Description:</b> CRC Bridge to ABMS efforts will incorporate all future modernization efforts. The following efforts will continue and/or begin in FY21:					
-- Radio Modernization: Upgrading existing radio configuration to include new software and hardware capable of Mobile User Objective System (MUOS) and Second-generation Anti-Jam Tactical Ultra high frequency Radio for NATO (SATURN)					
-- Bridge to ABMS: Open Mission System / Universal Command and Control Interface (OMS/UCI) development/integration, organic system software development and upgrades, Mode 5 Implementation, Joint Worldwide Intelligence Communication System (JWICS) integration, Ground Moving Target Indicator (GMTI) tracker integration, Multi-Level Security/ Cross Domain Solution (MLS/CDS)Implementation, Live Virtual Construct (L/V/ C) Operations Capability, and TPS-75 modernization efforts.					
<b>FY 2020 Plans:</b> N/A					
<b>FY 2021 Base Plans:</b>					

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>					
-- Complete Radio Modernization prototypes and perform DT/OT testing activities (JITC and AFSIT). This effort was consolidated into 'CRC Bridge to ABMS' program narrative in FY21 as defined above.					
-- Develop, test, & integrate GMTI prototypes.					
-- Pursue efforts related to, but not excluded to, OMS/UCI development/integration, continuous software development, Mode 5 Implementation, JWICS integration, MLS/CDS Implementation, L/V/C Operations Capability, and TPS-75 modernization.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY21 begins CRC Bridge to ABMS thrust.					
<b>Title:</b> CRC AN/TRC-213/214 RRSVS Radio Modernization Upgrade					
<b>Description:</b> RRSVS radio modernization upgrade includes, but is not limited to: upgrade software located in AN/TRC-213 (V) 3 in order to operate with upgraded AN/TRC-214. This will allow AN/TRC-214 to utilize the Mobile User Objective System (MUOS) constellation of satellites, support Integrated Waveform (IW), Second generation Anti-jam Tactical Ultra high frequency Radio for NATO (SATURN), Ensure sufficient channel capacity for remote radio interface, interoperability with required crypto equipment, combine channel inputs, enable operators to use J-voice, full IP capability, and allow for external VoIP/VoSIP connectivity.					
<b>FY 2020 Plans:</b> -- Continue development of AN/TRC-214 RRSVS radio prototypes, and commence testing process. Begin AN/TRC-213 RRSVS radio software upgrade development. -- Continue development of GMTI design, development, integration and testing.					
<b>FY 2021 Base Plans:</b> N/A					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreases from FY20 to FY21 as effort re-aligns under the "CRC Bridge to ABMS" program thrust.					
<b>Title:</b> Multiple Source Correlator Tracker Software Solutions Upgrade					
<b>Description:</b> Prior to FY20, the MSCT 5.9 software upgrade was to incorporate increments 2 & 3 from CRC Functional Capabilities Document (FCD) v1.1. The intent of this upgrade is to ingest GMTI data into the CRC.					
	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
	4.793	6.109	0.000	-	0.000
	1.183	1.500	0.000	0.000	0.000

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>					
CRC's software strategy has changed effective FY20 and MSCT will no longer be pursued; CRC's software development efforts will commence in FY21 as part of the CRC Bridge to ABMS thrust.					
<b>FY 2020 Plans:</b> - MSCT 5.9 commercial software development cancelled in FY20. CRC software requirements have been included in software solutions development in 'CRC Bridge to ABMS' thrust in FY21.					
<b>FY 2021 Base Plans:</b> N/A					
<b>FY 2021 OCO Plans:</b> N/A					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreases from FY20 to FY21 as effort re-aligns under the "CRC Bridge to ABMS" program thrust.					
<b>Title:</b> Ground Moving Target Indicator (GMTI) Tracker					
<b>Description:</b> The GMTI tracker will allow Battle Managers in the CRC TOC to follow ground vehicles in the same manner current Battle Managers track aircraft enabling an entire site picture of the battle space.					
<b>FY 2020 Plans:</b> Award contract and begin development GMTI tracker incorporation into the CRC.					
<b>FY 2021 Base Plans:</b> N/A					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreases from FY20 to FY21 as effort re-aligns under the "CRC Bridge to ABMS" program thrust.					
<b>Title:</b> CRC Modernization Phase 1					
<b>Description:</b> MSCT software upgrades, 3 Dimensional Expeditionary Long Range Radar ( 3 DELRR) Integration, Secret Internet Protocol Network ( SIPR Integration), and Multi Functional Information Distribution System Joint Tactical Radio System (MIDS JTRS Link 16 Upgrade)is completed.					
<b>FY 2020 Plans:</b>					
	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
	0.000	0.500	0.000	-	0.000
	0.240	0.000	0.000	-	0.000

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
<b><i>FY 2021 Base Plans:</i></b>					
N/A					
<b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b>					
N/A					
<b>Accomplishments/Planned Programs Subtotals</b>	6.216	8.109	16.041	0.000	16.041

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item	7.346	0.000	13.374	-	13.374	18.861	20.404	8.722	215.679	Continuing	Continuing
833040: <i>Theater Air Control Sys Improvements</i>											

**Remarks**

**E. Acquisition Strategy**  
 The CRC Capability Roadmap provides for the modernization of the CRC family of systems and will be programmed into phased updates through 2024 to further advance current and future battlespace awareness and tactical battle management command and control capabilities. A variety of contract and organic vehicles will be used depending on type of effort and skills required. Management strategy relies on Air Force Program Executive Office for Digital (AFPEO BM) as the Milestone Decision Authority and the Air Force Life Cycle Management Center (AFLCMC) as the Contracting Authority.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207412F / <i>Control and Reporting Center (CRC)</i>	<b>Project (Number/Name)</b> 67485L / <i>Theater Air Control System Imp (TACSI)</i>
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<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Product Development - CRC Bridge to ABMS	C/Variou	Various : Various, UT	-	-		-		11.178	Jun 2021	-		11.178	Continuing	Continuing	-
AN/TRC-213/214 RRSVS Radio Modernization Upgrade	C/Variou	Various : Various, MD	-	2.223	Aug 2019	3.487	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
Multiple Source Correlator Tracker Software Solutions Upgrade	C/Variou	Various : Various, UT	-	0.500	Feb 2020	-		-		-		-	Continuing	Continuing	-
a Ground Moving Target Indicator (GMTI) Tracker	C/Variou	Various : Various, UT	-	-		2.609	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
<b>Subtotal</b>			-	2.723		6.096		11.178		-		11.178	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Direct Cite Authority - Additional 16 Civilian Positions	TBD	Various : Hill AFB, UT	-	-		-		2.128	Oct 2020	-		2.128	Continuing	Continuing	-
Support	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			-	-		-		2.128		-		2.128	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Test Support - CRC Bridge to ABMS	PO	Various : Various, FL	-	-		-		1.240	Aug 2021	-		1.240	Continuing	Continuing	-
Test Support - CRC Modernization Phase 1	Variou	Various : Various, IA	-	0.240	Mar 2020	-		-		-		-	Continuing	Continuing	-
Test Support-Radio Modernization	PO	Various : Various, FL	-	0.736	Jan 2020	0.640	Aug 2020	-		-		-	Continuing	Continuing	-





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Air Force		<b>Date:</b> February 2020
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>AN/TRC-213/214 RRSVS Radio Modernization Upgrade</i></b>				
Design & Development	2	2019	4	2020
Integration & Testing	4	2020	1	2022
<b><i>Multiple Source Correlator Tracker Software Solution Upgrade</i></b>				
Design & Development	2	2019	2	2020
Integration & Testing	2	2020	4	2020
<b><i>Ground Moving Target Indicator (GMTI) Tracker</i></b>				
Research and contract award	2	2019	2	2020
Design & Development	3	2020	2	2021
Integration & Testing	3	2021	1	2022
<b><i>CRC Bridge to ABMS</i></b>				
Development & Integration	3	2021	4	2025