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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 0303133F / <i>High Frequency Radio Systems</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	-	49.912	15.881	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.793
675046: <i>Systems Engineering &amp; Integration</i>	-	49.912	15.881	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.793
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

Mission Description and Budget Item Justification: The HF Modernization program is designed to replace existing legacy High Frequency (HF) radios with a modernized HF radio on all Air Force (AF) aircraft that currently are equipped with HF radios (e.g., AN/ARC-190). The current HF radios installed on AF aircraft have reached obsolescence and there is a compelling need to modernize the HF capabilities. The replacement radio will have similar form and fit, but increased capability. The new radio needs to incorporate new technologies such as 3G/4G Automatic Link Establishment (ALE), wide band features that allow the radio to operate from 3 KHz up to 48 KHz channel spacing, and Low Probability of Intercept/Low Probability of Detection (LPI/LPD) features. The new HF radio should be software defined (SDR) to accommodate growth for newer technologies and embedded cryptographic options.

The current AN/ARC-190 radios, that serve a majority of HF airborne needs, will approach end of life ~2025 and do not have current capabilities to be sustainable for future years. Current and future AF aircraft with validated requirements for HF radios will experience a shortage of HF radios starting in FY20. With the increased shortage of spares, as the current HF radios continue to fail, Air Traffic Control (ATC), Air Operation Centers (AOC), and other controlling agencies will lose the ability to communicate with aircraft. HF Modernization provides alternate means of communication when satellite communications are not available due to nature and man-made disruptions. It is essential that these airborne radios keep pace to guarantee interoperability or theater C2 will be degraded.

Program management and administration efforts consist of, but are not limited to, contract services and government costs. This program element may include necessary civilian pay expenses required to manage, execute, and deliver HF Modernization weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

Funding for this exhibit contained in PE 0303133F.

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.

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<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	51.612	15.881	0.000	0.000	0.000	
Current President's Budget	49.912	15.881	0.000	0.000	0.000	
Total Adjustments	-1.700	0.000	0.000	0.000	0.000	
• 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	0.000	0.000				
• Other Adjustments	-1.700	0.000	0.000	0.000	0.000	
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>				<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> High Frequency Radio System				49.912	15.881	0.000
<b>Description:</b> Development of High Frequency Radio System						
<b>FY 2020 Plans:</b> Development of High Frequency Radio System						
<b>FY 2021 Plans:</b> N/A, there is no FY21 funding for this effort.						
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decrease from FY20 to FY21 as a result of DoD CIO funding availability.						
<b>Accomplishments/Planned Programs Subtotals</b>				49.912	15.881	0.000
<b>D. Other Program Funding Summary (\$ in Millions)</b> N/A						
<b>Remarks</b> Major Thrust - Funding decrease from FY20 to FY21 as result of DOD CIO funding availability.						
<b>E. Acquisition Strategy</b> Efforts awarded on an annual basis, exercising existing contract options, to support Development of High Frequency Radio System.						

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Air Force</b>												<b>Date: February 2020</b>			
<b>Appropriation/Budget Activity</b> 3600 / 7				<b>R-1 Program Element (Number/Name)</b> PE 0303133F / High Frequency Radio Systems				<b>Project (Number/Name)</b> 675046 / Systems Engineering & Integration							
<b>Product Development (\$ 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>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
High Frequency Radio System	TBD	Not specified. : TBD	-	49.912		15.881		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			-	49.912		15.881		-		-		-	Continuing	Continuing	N/A
			<b>Prior Years</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>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>			-	49.912		15.881		-		-	-	Continuing	Continuing	N/A	
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2021 Air Force		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0303133F / <i>High Frequency Radio Systems</i>	<b>Project (Number/Name)</b> 675046 / <i>Systems Engineering &amp; Integration</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

<b><i>High Frequency Radio System</i></b>	
Development	[REDACTED]

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Air Force		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0303133F / <i>High Frequency Radio Systems</i>	<b>Project (Number/Name)</b> 675046 / <i>Systems Engineering &amp; Integration</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>High Frequency Radio System</i></b>				
Development	2	2019	4	2020