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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604706F / <i>Life Support Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	14.137	28.608	25.437	0.000	25.437	-	-	-	-	-	-
65412A: <i>Life Support Systems</i>	-	14.137	28.608	25.437	0.000	25.437	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

This program saves Airmen's lives and improves aircrew performance through better aircrew flight equipment and airman combat systems. Air Force acquisition teams lead the upgrade and fielding of new equipment/systems by assessing deficiencies in existing equipment, identifying and assessing existing products or developing new technology, and conducting required Safe-to-Fly tests, certifications, and studies. Program efforts include, but are not limited to, the following projects: directed energy protective equipment; flight helmets and visors; oxygen breathing systems for aircrew; radios and locator beacons; support equipment; nuclear flash blindness protection; night vision devices; noise reduction devices; all types of flight suits/ensembles to protect aircrew against all environmental threats; anti-gravity (anti-G) suits; flame resistant, retardant and blast/ballistic protective gear; aircraft seating; impact protection equipment; flotation devices; parachutes; ejection systems; post-ejection survival systems; all equipment, from head to toe, to enable aircrew to safely and effectively perform their mission, and survive post-ejection; physiological monitoring devices and other aircrew/life support/ground crew systems required by the warfighter.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver insert program name for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 no funds was expended for civilian pay expenses in this program element, and in FY21 \$0.678M is forecasted for civilian pay expenses in this program element.

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.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	14.624	23.660	23.973	0.000	23.973
Current President's Budget	14.137	28.608	25.437	0.000	25.437
Total Adjustments	-0.487	4.948	1.464	0.000	1.464
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	5.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.487	-0.052			
• Other Adjustments	0.000	0.000	1.464	0.000	1.464

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 65412A: *Life Support Systems*

Congressional Add: *Physiological Monitoring*

Congressional Add: *Next Generation Ejection Seat Congressional Add*

Congressional Add Subtotals for Project: 65412A

Congressional Add Totals for all Projects

	<b>FY 2020</b>	<b>FY 2021</b>
	-	5.000
	5.800	-
Congressional Add Subtotals for Project: 65412A	5.800	5.000
Congressional Add Totals for all Projects	5.800	5.000

**Change Summary Explanation**

FY21 Increase of \$5M Congressional Add for Unexplained Physiological Events (UPE) for pilot monitoring and alerting.

FY22 Increase for anthropometric studies and scanners.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
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**Title:** Aircrew Performance Studies/Technology Projects and Minor Development Efforts

4.912	8.818	10.710
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**Description:** Air Force Life Cycle Management Center's Aircrew Performance Branch is the single USAF focal point for Aircrew Flight Equipment (AFE) Safe-to-Fly (STF) testing certification, addressing Safety Investigation Board (SIB) recommendations, along with studies and analysis. In addition, funding is for efforts that are responses to real-time capability gaps identified by the warfighter which may be satisfied by testing and qualifying commercial-off-the-shelf (COTS) products and/or performing minor development efforts that require less than 10M per year related to aircrew flight equipment and life support equipment. Previous successful efforts may evolve into enduring capabilities as other users / MAJCOMs seek to incorporate these STF assets into their inventory. Integrated Aircrew Ensemble (IAE), Aircrew Body Armor (ABA), Aircrew Laser Eye Protection - Technical Insertion

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>(ALEP-TI), Next Generation Fixed Wing Helmet (NGFWH), BA-X Low Profile Parachute (LPP) and Nuclear Flash Blindness Goggles (NFBG) are currently the active programs within Life Support Systems (LSS). Funds may be used to address associated emerging aircrew/ground crew/egress requirements and for program management activities.</p> <p><b>FY 2021 Plans:</b> Perform STF testing and certification of COTS products. Address SIB recommendations. Continue the development/test efforts of aircrew laser eye protection - technical insertion (ALEP-TI) radio upgrades, next generation fixed wing helmet, next generation nuclear flash blindness technology, and improvement of parachute/flotation devices.</p> <p><b>FY 2022 Plans:</b> Perform STF testing and certification of COTS products. Address SIB recommendations. Continue the development/test efforts of aircrew laser eye protection - technical insertion (ALEP-TI) radio upgrades, next generation fixed wing helmet, next generation nuclear flash blindness technology, and improvement of parachute/flotation devices.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase tied to next generation nuclear flash blindness development</p>				
<p><b>Title:</b> Next Generation Ejection Seat</p> <p><b>Description:</b> The new ejection seat escape system shall safely accommodate greater variation in aircrew minimum/maximum weights, a minimum aircrew sitting height of 31 inches, and the use of Helmet Mounted Displays. It shall reduce the risk of injuries to the arms and legs (especially limb flail), neck, and spinal column throughout the entire ejection event.</p> <p><b>FY 2021 Plans:</b> Continue contract effort awarded as part of Congressional add for initial system qualification, test assets, and training materials. Baseline system qualification will validate a common ejection system design for integration in F-15, F-16, F-22, and A-10 aircraft.</p> <p><b>FY 2022 Plans:</b> Continue contract effort awarded for aircraft integration qualification testing for follow-on NGES variants. Delta effort for F-16 is scheduled to begin in FY22 to support continuous ejection system qualification.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to additional anthropometric efforts</p>		-	9.584	10.000
<p><b>Title:</b> Female Airmen Equipment</p> <p><b>Description:</b> Female Fitment within Human Systems Division (HSD) of the Air Force Life Cycle Management Center develops and sustains organizational issued equipment (OCIE) &amp; personal protective equipment (PPE) for female Airmen to enhance mission performance while improving safety and survival. HSD aligned Female Fitment as a top priority, matching CSAF vision,</p>		3.425	5.206	4.727

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
<p>and ensures that as best possible, the fullest extent of the AF female anthropometric range is incorporated into all of its programs. Outreach with other AF organizations and sister services ensures that requirements are collected to vector current and future programs. Anthropometric data collection ensures that these programs produce the OCIE and PPE that will allow women to perform their best in the missions they are assigned. OCIE and PPE for female aircrew includes, but is not limited to, the development and/or refinement of flight suits, bladder relief systems, helmets, ejection seats, G-suits, aircrew body armor, oxygen masks, and feedback mechanisms.</p> <p><b>FY 2021 Plans:</b> Continue testing and development of female flight equipment. Items anticipated to be worked, but not limited to, include the AF GearFit App for aircrew members to provide equipment feedback and suggestions, In-flight bladder relief projects, female flight suits, aircrew harnesses, aircrew body armor, and anthropometric studies</p> <p><b>FY 2022 Plans:</b> Continue testing and development of female flight equipment: Items anticipated to be worked, but not limited to, include the AF GearFit App, in-flight bladder relief, aircrew harness, oxygen masks, and anthropometric studies</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The plus up from FY21 continuing into FY22 allows for work to match the pace established by CSAF for expediting projects to the field.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	8.337	23.608	25.437

	FY 2020	FY 2021
<b>Congressional Add:</b> Physiological Monitoring	-	5.000
<b>FY 2021 Plans:</b> The Physiological Monitoring Congressional Add will be acquiring test assets required to evaluate SPYDR system and perform Developmental Test.		
<b>Congressional Add:</b> Next Generation Ejection Seat Congressional Add	5.800	-
<b>FY 2020 Accomplishments:</b> EMD Contract Award to begin qualification testing of selected seat and receive long lead items.		
<b>Congressional Adds Subtotals</b>	5.800	5.000

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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 04 Line Item 842990: <i>Items Less Than \$5 Million</i> <i>(Safety and Rescue Equipment)</i>	72.540	24.407	62.195	-	62.195	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

The majority of efforts funded in this project employ a streamlined acquisition approach. Whenever practical, Government-Off-The-Shelf/Commercial-Off-The-Shelf (GOTS/COTS) items are tested and evaluated as candidates for solutions to user needs. This normally involves characterization, verification, and qualification testing to ensure GOTS/COTS equipment is properly certified and adapted for military purposes. However, acquisition strategies may be carried out at the project level for traditional Engineering and Manufacturing Development (EMD), e.g., Integrated Aircrew Ensemble (IAE) and Aircrew Laser Eye Protection - Technical Insertion (ALEP-TI). Funds may be used to address associated emerging aircrew/ground crew/egress requirements and for program management activities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604706F / Life Support Systems	<b>Project (Number/Name)</b> 65412A / Life Support Systems
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
Congressional Add for Physiological Monitoring	Various	Not specified : TBD	-	-		4.849		-		-		-	-	-	-
Aircrew Performance Studies/Technology Projects/Minor Development Efforts	Various	Multiple Contractors : TBD	-	2.757		5.918	Jan 2021	8.830	Jan 2022	-		8.830	-	-	-
Integrated Aircrew Ensemble (IAE)	C/FPIF	Tiax : Lexington, MA	-	0.180	Jan 2020	0.081	Jan 2021	-		-		-	-	-	-
Next Generation Ejection Seat (NGES)	SS/FPIF	Collins Aerospace : Colorado Springs, CO	-	5.800	Feb 2020	9.584	Nov 2020	10.000	Nov 2021	-		10.000	-	-	-
Female Flight Equipment	Various	Multiple Contractors : TBD	-	3.425	Dec 2019	5.206	Dec 2020	4.727	Dec 2021	-		4.727	-	-	-
<b>Subtotal</b>			-	12.162		25.638		23.557		-		23.557	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
Program Tests (IAE, ACES, NGFWH, etc.)	Various	Various : Various, NV	-	1.250		1.650		1.230		-		1.230	-	-	-
<b>Subtotal</b>			-	1.250		1.650		1.230		-		1.230	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
Program Management Administration (PMA)	TBD	AFLCMC : Wright-Patterson AFB, OH	-	0.725		1.320		0.650		-		0.650	-	-	-
<b>Subtotal</b>			-	0.725		1.320		0.650		-		0.650	-	-	N/A

**Remarks**  
PMA Description: Program Management Support and Travel.



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
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>Life Support Systems RDTE Efforts</i></b>																																
Aircrew Performance Aircrew Laser Eye Protection - Technical Insertion (ALEP-TI)																																
Continue projects in support of Aircrew Performance/Female Equipment																																
Aircrew Performance Next Generation Fixed Wing Helmet Development																																
Next Generation Ejection Seat Qualification Effort																																
Integrated Aircrew Ensemble G-Suit Redesign																																
Female Bladder Relief LRIP																																
A2CU-F LRIP																																
Maternity FDU LRIP																																

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**Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force** **Date:** May 2021

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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Life Support Systems RDTE Efforts</i></b>				
Aircrew Performance Aircrew Laser Eye Protection - Technical Insertion (ALEP-TI)	1	2020	4	2025
Continue projects in support of Aircrew Performance/Female Equipment	1	2020	4	2025
Aircrew Performance Next Generation Fixed Wing Helmet Development	2	2020	3	2022
Next Generation Ejection Seat Qualification Effort	4	2020	4	2025
Integrated Aircrew Ensemble G-Suit Redesign	1	2021	3	2024
Female Bladder Relief LRIP	2	2021	2	2022
A2CU-F LRIP	1	2022	1	2023
Maternity FDU LRIP	1	2022	1	2023