

UNCLASSIFIED

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

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603605F / <i>Advanced Weapons Technology</i>
------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------

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	-	32.578	31.388	28.258	0.000	28.258	-	-	-	-	-	-
633151: <i>High Power Solid State Laser Technology</i>	-	14.418	31.388	18.359	0.000	18.359	-	-	-	-	-	-
633152: <i>High Power Microwave Development and Integration</i>	-	18.160	0.000	9.899	0.000	9.899	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This program provides for the development, integration, demonstration, and detailed assessment of directed energy (DE) weapon technologies for potential application on Air Force platforms. These include high energy laser (HEL), high power microwaves (HPM), and other unconventional weapon generation and transmission technologies, which can support a wide range of Air Force applications. The program develops a corresponding susceptibility, vulnerability, and lethality database for directed energy weapons. This program also develops laser-enabled atmospheric-compensated optical imaging for space situational awareness (SSA). Efforts in this program have been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver science & technology capabilities. The use of program funds in this program element would be in addition to the civilian pay expenses budgeted in program elements 0601102F, 0602102F, 0602201F, 0602202F, 0602203F, 0602204F, 0602602F, 0602605F, 0602788F, 1206601SF, and 0602298F.

The Department of the Air Force technologies in this program are both enabling and enduring as we invest in maturing emerging technologies that address established mission gaps, and transformational technologies that address integrated enterprise capabilities intended to reshape the future force across air, space, and cyber warfighting domains. Development of transformational operational capabilities through advanced technology solutions focuses on five strategic capabilities: Global Persistent Awareness; Resilient Information Sharing; Rapid, Effective Decision-Making; Complexity, Unpredictability, and Mass; and Speed and Reach of Disruption and Lethality.

This program is in Budget Activity 3, Advanced Technology Development because this budget activity includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment.

UNCLASSIFIED

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

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603605F / <i>Advanced Weapons Technology</i>
------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	37.404	0.000	0.000	0.000	0.000
Current President's Budget	32.578	31.388	28.258	0.000	28.258
Total Adjustments	-4.826	31.388	28.258	0.000	28.258
• Congressional General Reductions	0.000	-0.057			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	-0.060	31.445			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.232	0.000			
• Other Adjustments	-3.534	0.000	28.258	0.000	28.258

Change Summary Explanation

Air Force activities supporting Directed Energy advanced technology development in FY 2022 decreased compared to FY 2021 by 0.690 Million. Funding decreased in order to implement the Department of the Air Force Science and Technology 2030 Strategy for transformational capabilities.

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
Appropriation/Budget Activity 3600 / 3					R-1 Program Element (Number/Name) PE 0603605F / <i>Advanced Weapons Technology</i>				Project (Number/Name) 633151 / <i>High Power Solid State Laser Technology</i>			
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
633151: <i>High Power Solid State Laser Technology</i>	-	14.418	31.388	18.359	0.000	18.359	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for the development, integration, demonstration, and detailed technical assessment of high energy laser devices, advanced imaging and beam control technologies needed for applications such as force protection, force application, precision engagement, and aircraft self-protection. Laser system concept assessments to include vulnerability assessments and target effect testing are performed.

This project includes the initiation and development of programs addressing Department of the Air Force capability gaps and provides technologies for transformational future force capabilities. Transformational efforts will be identified through a competitive process and be responsive to DAF design priorities. Selected efforts will be designated as transformational, indicating enterprise-level priority.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: High Energy Laser/Beam Control	14.418	31.388	17.418	0.000	17.418
Description: Develop and demonstrate advanced beam control technologies, integrated laser systems, and aircraft self-protection laser technologies. Demonstrate beam control components integrated with high energy lasers for the Department of the Air Force utility.					
FY 2021 Plans: Complete system integration of 50 kilo-Watt high power podded laser system for flight demonstration. Complete high power ground test for podded 50 kilo-Watt laser system. Begin preparations for high power flight test.					
FY 2022 Base Plans: Continue SHIELD (Self-Protect High Energy Laser Demonstrator) system development and integration for technical demonstration. Continue planning for flight testing.					
FY 2022 OCO Plans: Not applicable.					
FY 2021 to FY 2022 Increase/Decrease Statement:					

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603605F / <i>Advanced Weapons Technology</i>	Project (Number/Name) 633151 / <i>High Power Solid State Laser Technology</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY 2022 decreased compared to FY 2021 by \$13.970 million. Funding decreased in order to implement the Department of the Air Force Science and Technology 2030 Strategy for transformational capabilities. FY 2022 funding levels consistent with planed investments for Directed Energy advance technology development.					
<p>Title: Transformational Technology Development</p> <p>Description: This effort includes the initiation and development of programs addressing Department of the Air Force capability gaps and provides technologies for transformational future force capabilities. Transformational efforts will be identified through a competitive process and be responsive to DAF design priorities. Selected efforts will be designated as transformational, indicating enterprise-level priority.</p> <p>FY 2021 Plans: Select Transformational Technology Development efforts in FY 2021 that support the National Defense Strategy and Department of Air Force priorities.</p> <p>FY 2022 Base Plans: Fund the follow-on efforts for projects started in FY 2021. Select Transformational Technology Development efforts in FY 2022 that support the National Defense Strategy and Department of the Air Force priorities</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: FY 2022 increased compared to FY 2021 by 0.941 million. Funding is increased due to additional emphasis in the development of high energy laser weapon systems.</p>	0.000	0.000	0.941	0.000	0.941
Accomplishments/Planned Programs Subtotals	14.418	31.388	18.359	0.000	18.359

C. Other Program Funding Summary (\$ in Millions) N/A
Remarks
D. Acquisition Strategy N/A

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
Appropriation/Budget Activity 3600 / 3					R-1 Program Element (Number/Name) PE 0603605F / <i>Advanced Weapons Technology</i>				Project (Number/Name) 633152 / <i>High Power Microwave Development and Integration</i>			
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
633152: <i>High Power Microwave Development and Integration</i>	-	18.160	0.000	9.899	0.000	9.899	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops and demonstrates high power microwave and other unconventional electromagnetic field generation and transmission technologies that can be integrated into future weapon systems to support a wide range of the Department of the Air Force missions such as air base defense or the damage/destruction of an adversary's electronic infrastructure. It also provides inputs to the susceptibility, vulnerability, and lethality databases used across the Department of Defense to understand thresholds for scalable effects of directed energy weapons.

This project includes the initiation and development of programs addressing DAF capability gaps and provides technologies for transformational future force capabilities. Transformational efforts will be identified through a competitive process and be responsive to DAF design priorities. Selected efforts will be designated as transformational, indicating enterprise-level priority.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: High Power Microwave Technologies	18.160	0.000	3.826	0.000	3.826
Description: Develop and evaluate high power microwave and other unconventional weapon technologies for various platforms, including aerial, for applications such as counter-electronics. Develop and evaluate high power microwave technologies for non-kinetic and counter-electronic weapon applications.					
FY 2021 Plans: Down-select to an advance reusable platform. Initiate high power microwave payload integration. Continue to characterize, model, test and evaluate current and projected blue directed energy threats on current red assets. Integrate the high power microwave payload into the aerial platform for the joint flight demonstration with the Navy. Design agile waveform high power sources.					
FY 2022 Base Plans: Initiate high power microwave payload integration into an advanced, reusable, aerial platform. Continue to characterize, model, test and evaluate current and projected blue Directed Energy weapons against relevant red assets. Conduct the joint static technology demonstration of a compact High Power Microwave weapon with the Navy. Design next generation High Power Microwave sources.					
FY 2022 OCO Plans:					

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021		
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603605F / <i>Advanced Weapons Technology</i>	Project (Number/Name) 633152 / <i>High Power Microwave Development and Integration</i>			
B. Accomplishments/Planned Programs (\$ in Millions)					
Not applicable.					
FY 2021 to FY 2022 Increase/Decrease Statement: FY 2022 increased compared to FY 2021 by \$3.826 million. FY 2022 funding levels are below originally planned investments for high power microwave advanced technology development. Funding decreased in order to implement the Department of the Air Force Science and Technology 2030 Strategy for transformational future force capabilities.					
Title: Transformational Technology Development					
Description: This effort includes the initiation and development of programs addressing Department of the Air Force capability gaps and provides technologies for transformational future force capabilities. Transformational efforts will be identified through a competitive process and be responsive to DAF design priorities. Selected efforts will be designated as transformational, indicating enterprise-level priority.					
FY 2021 Plans: Select Transformational Technology Development efforts in FY 2021 that support the National Defense Strategy and Department of Air Force priorities.					
FY 2022 Base Plans: Fund the follow-on efforts for projects started in FY 2021. Select Transformational Technology Development efforts in FY 2022 that support the National Defense Strategy and Department of the Air Force priorities					
FY 2021 to FY 2022 Increase/Decrease Statement: FY 2022 increased compared to FY 2021 by 6.073 million. Funding is increased due to additional emphasis in the development of transformational capabilities.					
Accomplishments/Planned Programs Subtotals					
	0.000	0.000	6.073	-	6.073
	18.160	0.000	9.899	0.000	9.899
C. Other Program Funding Summary (\$ in Millions)					
N/A					
Remarks					
D. Acquisition Strategy					
N/A					