Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force											Date: April 2022	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206853SF *I National Security Space Launch Program (SPACE) - EMD*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	533.016	201.510	124.103	0.000	124.103	82.361	23.383	55.679	56.764	Continuing	Continuing
650006: *Next Generation Launch System Investment*	-	533.016	201.510	124.103	0.000	124.103	82.361	23.383	55.679	56.764	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Prior Years Funding $2,089.431M was executed in PE 1206853F.

A. Mission Description and Budget Item Justification

The National Security Space Launch (NSSL) program provides a space launch service that satisfies the government's National Launch Forecast (NLF) requirements to place National Security Space (NSS) space vehicles on orbit. NSSL is a launch service, not a weapon system, which is primarily funded with production funds.

NSSL Phase 2 development, started late FY 2014, funds research and development activities and related studies, to include, but not limited to, investments in new and/or upgraded launch systems and associated launch facilities to meet NSS launch needs leveraging domestic commercial launch providers. The RDT&E program will also fund continued research and development activities, mission manifest capability development & future studies for emerging NSS launch needs. These efforts will develop technologies for space access, mobility, and logistics (SAML) through multiple public-private partnerships; help sustain the U.S. industrial base; address emergent needs for launch-related space access and lower procurement costs by promoting competition. Examples include, but are not limited to, orbital transfer, on-orbit servicing, digital engineering, and novel on-orbit propulsion technologies.

The Space Force will continue investments in the Launch Service Agreement (LSA) public-private partnership with United Launch Alliance Vulcan Centaur for launch system development. In addition, the Space Force will complete rocket propulsion system (RPS) with Aerojet Rocketdyne for the RL10 upper stage engine development and the associated technical maturation program. Future development to capitalize on new technology and innovations developed by industry may continue to utilize public-private partnerships. The Space Force will also be leveraging opportunities to integrate Department of Defense payloads on to launch services procured commercially or by other Government agencies (e.g. NASA) where excess margin is available.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853SF *I National Security Space Launch Program (SPACE) - EMD*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver NSSL system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF. In FY 2021 $1.649M was expended for civilian pay expenses in this program element, and in FY 2022 $2.079M 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.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	550.978	221.510	0.000	0.000	0.000
Current President's Budget	533.016	201.510	124.103	0.000	124.103
Total Adjustments	-17.962	-20.000	124.103	0.000	124.103
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-20.000			
• 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	-17.962	0.000			
• Other Adjustments	0.000	0.000	124.103	0.000	124.103

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: 650006: *Next Generation Launch System Investment*		
Congressional Add: *Next Generation Rocket Engine Testing*	15.000	-
Congressional Add: *Upper Stage Resiliency Enhancements*	75.000	-
Congressional Add Subtotals for Project: 650006	90.000	-
Congressional Add Totals for all Projects	90.000	-

Change Summary Explanation

FY 2021: -17.962M decrease for SBIR.

FY 2022: -20.000M Congressional directed reduction for Enabling Investments.

FY 2023: The FY 2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, an explanation of the change between the two budget positions for FY 2023 cannot be made in a relevant manner.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: NSSL Enabling Investments	0.000	16.871	0.000
Description: Enabling Investments are a continuous portfolio of RDT&E projects that will increase U.S. space dominance through the end of the decade and beyond. The portfolio consists of multiple public-private partnerships to develop technologies for space access, mobility, and logistics (SAML). Examples include, but are not limited to, orbital transfer, on-orbit servicing, digital engineering, and novel on-orbit propulsion technologies. ***FY 2022 Plans:*** Launch Enterprise will continue its SAML RDT&E agreements awarded in FY 2021, including work on upper stage resiliency enhancements and next generation rocket engine testing. Additional enabling technology agreements will be awarded in FY 2022 within the SAML as the requirements evolve and are defined. ***FY 2023 Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decreased due to no planned FY 2023 funding for SAML. Launch Enterprise will evaluate the technologies from the FY 2022 efforts that warrant additional investments.			
Title: Launch Service Agreement	434.216	178.303	124.103
Description: Invest in providers of domestic Launch Services. This investment enables the transition from the use of non-Allied space launch engines to commercial launch services that also meet NSS needs. Execute Other Transaction Authority (OTA) agreements to develop various industry solutions utilizing public-private partnerships. Continued the technical maturation and risk reduction activities in support of Launch Service OTAs. ***FY 2022 Plans:*** Continue NSSL Phase 2 public-private partnership investment with United Launch Alliance (ULA) for the development of the Vulcan Centaur launch system. This investment includes completion of Initial Operational Capability activities, continued development for the heavy lift variant (Category C) of the Vulcan Centaur, including Critical Design Review, and initiation of West Coast launch complex improvements. Additionally, FY 2022 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 Plans:*** Continue NSSL Phase 2 public-private partnership investment with United Launch Alliance (ULA) for the development of the Vulcan Centaur launch system. This investment includes continued development for the heavy lift (Category C) capability of			

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853SF *I National Security Space Launch Program (SPACE) - EMD*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
the Vulcan Centaur, including Design Certification Review, and continued West Coast space launch complex improvements. Additionally, FY 2023 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 decrease due to the near completion of Vulcan development requiring fewer milestone payments.			
Title: Rocket Propulsion System Development ***Description:*** Invest in domestic rocket propulsion systems (RPS) under the Launch Service Agreement Other Transaction Authority (OTA) agreements. This investment enables the transition from the use of non-Allied space launch engines to domestic rocket propulsion systems. Continue to execute a single RPS OTA agreement utilizing a public-private partnership. ***FY 2022 Plans:*** Conclude public-private partnership with Aerojet Rocketdyne for upper stage engine development, ensuring an available, domestic, cost-effective solution. This investment includes completion of development engine qualification testing. ***FY 2023 Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decrease due to completion of the Rocket Propulsion Development effort.	8.800	6.336	0.000
Accomplishments/Planned Programs Subtotals	443.016	201.510	124.103

	FY 2021	FY 2022
Congressional Add: Next Generation Rocket Engine Testing ***FY 2021 Accomplishments:*** Launch enterprise executed FY 2021 legislation by competitively awarding engine testing prototype projects to potential NSSL phase three providers. As part of the enabling investments portfolio, the Program awarded one Other Transaction Authority Agreements using the Space Enterprise Consortium at the end of FY 2021.	15.000	-
Congressional Add: Upper Stage Resiliency Enhancements ***FY 2021 Accomplishments:*** Launch enterprise executed FY 2021 legislation by competitively awarding upper stage resiliency enhancement projects to potential NSSL phase three providers. As part of the enabling	75.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
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	FY 2021	FY 2022
investments portfolio, the Program awarded three Other Transaction Authority Agreements using the Space Enterprise Consortium at the end of FY 2021.		
Congressional Adds Subtotals	90.000	-

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• SPSF 01 NSSL00: *National Security Space Launch*	996.371	1,337.347	1,056.133	-	1,056.133	2,126.485	2,521.314	2,535.711	2,283.073	Continuing	Continuing

Remarks

E. Acquisition Strategy

Launch Enterprise will continue execution of NSSL Phase 2 Public-Private Partnership investments and NSSL Enabling Investments, including those for Next Generation Rocket Engine Testing and Upper Stage Resiliency Enhancements. Phase 2 consists of RDT&E investment in commercial launch system prototypes developed via the Space Force's Launch Service Agreements (LSAs) and Rocket Propulsion System (RPS) Other Transaction Authority (OTA) agreements to ensure two domestic launch service providers are certified to meet all NSS requirements. Phase 2 ends the use of the Russian RD-180 engine and leverages the U.S. launch industry to meet more stressing national security needs. This strategy ensures space launch operations meet requirements for Assured Access to Space (AATS) codified in 10 USC 2273 and Congressional direction to end U.S. reliance on non-allied propulsion systems. Enabling Investments, initiated by FY 2021 Congressional Adds and continued in FY 2022, are developing advanced space access capabilities to sustain competition for launch services starting in FY 2025 per the NSSL Phase 2 acquisition strategy. Enabling Investments foster a robust launch industrial base and leverage launch innovation to maintain American leadership in launch capabilities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force			Date: April 2022
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206853SF / *National Security Space Launch Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RPS OTA	C/Various	Aerojet Rocketdyne : Canoga Park, CA	-	8.800	Nov 2020	6.336	Nov 2021	-		-		-	0.000	15.136	-
LSA OTA1	C/Various	United Launch Alliance : Denver, CO	-	327.405	Nov 2020	132.124	Nov 2021	87.997	Nov 2022	-		87.997	Continuing	Continuing	-
LSA OTA2	C/Various	Blue Origin : Kent, WA	-	36.000	Nov 2020	-		-		-		-	0.000	36.000	-
LSA OTA3	C/Various	Northrop Grumman : Chandler	-	40.341	Nov 2020	-		-		-		-	0.000	40.341	-
FFRDC Mission Assurance	RO	Aerospace : El Segundo, CA	-	12.560	Nov 2020	17.495	Dec 2021	10.919	Dec 2022	-		10.919	Continuing	Continuing	-
Launch Enterprise System Engineering and Integration	C/CPFF	Various : various	-	11.443	Mar 2021	13.804	Nov 2021	10.024	Nov 2022	-		10.024	Continuing	Continuing	-
Congressional Add Next Generation Rocket Engine Testing	C/Various	Space X : El Segundo, CA	-	14.891	Sep 2021	-		-		-		-	0.000	14.891	-
Congressional Add Upper Stage Resiliency Enhancements 1	C/Various	Rocket Lab : Long Beach, CA	-	24.999	Sep 2021	-		-		-		-	0.000	24.999	-
Congressional Add Upper Stage Resiliency Enhancements 2	C/Various	United Launch Alliance : Denver, CO	-	24.999	Sep 2021	-		-		-		-	0.000	24.999	-
Congressional Add Upper Stage Resiliency Enhancements 3	C/Various	Blue Origin : Kent, WA	-	24.999	Sep 2021	-		-		-		-	0.000	24.999	-
NSSL Enabling Investments Orbital Transfer & Maneuver (OTM)	C/Various	TBD : TBD	-	-		16.871	Jun 2022	-		-		-	0.000	16.871	-
		Subtotal	-	526.437		186.630		108.940		-		108.940	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force			Date: April 2022
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206853SF / *National Security Space Launch Program (SPACE) - EMD*	Project (Number/Name) 650006 / *Next Generation Launch System Investment*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Organic Civilian Support	Reqn	DOD : El Segundo, CA	-	1.649	Oct 2020	2.079	Oct 2021	2.142	Oct 2022	-		2.142	Continuing	Continuing	-
		Subtotal	-	1.649		2.079		2.142		-		2.142	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace : El Segundo, CA	-	1.010	Nov 2020	1.229	Dec 2021	0.954	Dec 2022	-		0.954	Continuing	Continuing	-
Advisory and Assistance Services	Various	Various : Various	-	1.103	Dec 2020	5.141	Nov 2021	6.277	Nov 2022	-		6.277	Continuing	Continuing	-
Other Support	Various	Various : Various	-	2.817	Nov 2020	6.431	Nov 2021	5.790	Nov 2022	-		5.790	Continuing	Continuing	-
		Subtotal	-	4.930		12.801		13.021		-		13.021	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	533.016		201.510		124.103		-		124.103	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206853SF / *National Security Space Launch Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*

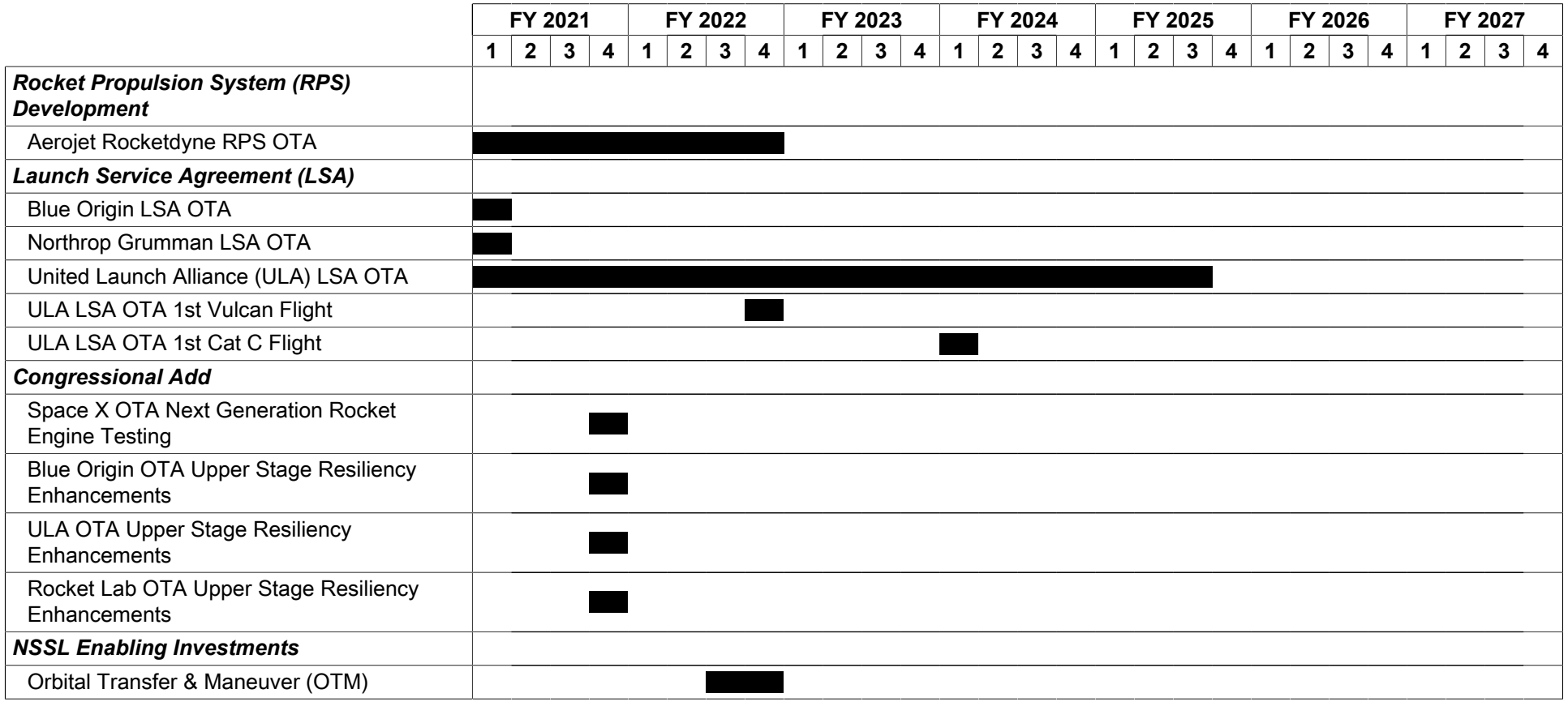

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206853SF / *National Security Space Launch Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Rocket Propulsion System (RPS) Development				
Aerojet Rocketdyne RPS OTA	1	2021	4	2022
Launch Service Agreement (LSA)				
Blue Origin LSA OTA	1	2021	1	2021
Northrop Grumman LSA OTA	1	2021	1	2021
United Launch Alliance (ULA) LSA OTA	1	2021	3	2025
ULA LSA OTA 1st Vulcan Flight	4	2022	4	2022
ULA LSA OTA 1st Cat C Flight	1	2024	1	2024
Congressional Add				
Space X OTA Next Generation Rocket Engine Testing	4	2021	4	2021
Blue Origin OTA Upper Stage Resiliency Enhancements	4	2021	4	2021
ULA OTA Upper Stage Resiliency Enhancements	4	2021	4	2021
Rocket Lab OTA Upper Stage Resiliency Enhancements	4	2021	4	2021
NSSL Enabling Investments				
Orbital Transfer & Maneuver (OTM)	3	2022	4	2022