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

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 1206853F / <i>National Security Space Launch Program (SPACE) - EMD</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	1,251.558	428.525	432.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2,112.092
650006: <i>Next Generation Launch System Investment</i>	1,251.558	428.525	432.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2,112.092
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Program MDAP/MAIS Code: 176

Note

- Prior year funding shown in Cost Table includes FY 2014 - FY 2017 that was executed in Program Element (PE) 0604853F.

A. Mission Description and Budget Item Justification

In FY 2021, PE 1206853F, National Security Space Launch Program efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206853SF, National Security Space Launch Program from Appropriation 3600, Budget Activity 05 due to the creation of a new Appropriation for Space Force.

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.

This program, started late FY 2014, funds research and development activities and related studies, to include, but not limited to, items necessary to invest 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 inform for future launch service development initiatives in order to continue sustained industry competition for Phase 3 starting in FY 2025 and future procurements.

The Air Force is investing in Launch Service Agreement (LSA) public-private partnerships for the development of new and/or upgraded domestic launch systems with commercial launch service providers. The anticipated result is two domestic, commercial launch service providers that will meet all current NSS launch requirements. In addition, the Air Force is continuing a technical maturation program to address the highest risks for rocket propulsion system (RPS) and LSA development. Development of the required RPSs have continued under the LSA public-private partnerships. Future development to capitalize on new technology and innovations developed by industry may continue to utilize public-private partnerships. The Air Force will also be leveraging opportunities to integrate Department of Defense payloads on to launch services procured commercially or by other Government agencies (i.e. NASA) where excess margin is available.

Space acquisition must respond with speed and agility to emerging adversary threats. Space and Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing 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

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authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose capabilities.

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 1206392F and 1206398F.

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	443.035	432.009	561.163	0.000	561.163
Current President's Budget	428.525	432.009	0.000	0.000	0.000
Total Adjustments	-14.510	0.000	-561.163	0.000	-561.163
• 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	-14.510	0.000			
• Other Adjustments	0.000	0.000	-561.163	0.000	-561.163

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

Project: 650006: *Next Generation Launch System Investment*
 Congressional Add: *Launch Service Agreement Congressional Add*

	FY 2019	FY 2020
Congressional Add Subtotals for Project: 650006	200.000	-
Congressional Add Totals for all Projects	200.000	-

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

	FY 2019	FY 2020	FY 2021
Title: Rocket Propulsion System Development	0.000	37.500	0.000
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.			

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>FY 2020 Plans: Continue to execute public-private partnership for an industry upper stage engine common to multiple launch service providers, ensuring a domestic, cost-effective solution.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: Launch Service Agreement</p> <p>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.</p> <p>FY 2020 Plans: Continue investments with public-private partnerships with domestic launch providers for the development of new launch systems or upgrades to existing launch systems with the goal of two or more domestic, commercial launch providers that also meet NSS requirements. Includes RPS Investment and associated technical maturation and risk reduction activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. LSA profile is based on the anticipated 4QTR 2019 award of Phase 2 that will result in the LSA efforts continuing with two service providers. Until the Phase 2 award the LSA funding cannot be broken out by provider due to the competitive nature of this acquisition strategy.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		228.525	394.509	0.000
Accomplishments/Planned Programs Subtotals		228.525	432.009	0.000
		FY 2019	FY 2020	
Congressional Add: Launch Service Agreement Congressional Add		200.000	-	

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	FY 2019	FY 2020
FY 2019 Accomplishments: Invested in public-private partnerships with domestic launch providers for the development of new launch systems or upgrades to existing launch systems with the goal of two or more domestic, commercial launch providers that also meet NSS requirements.		
Congressional Adds Subtotals	200.000	-

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• SPAF 01 Line Item MSEELV: <i>Evolved Expendable Launch Veh (Space)</i>	787.646	1,237.635	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2,025.281
• SPAF 01 Line Item <i>MSEELC: Evolved Expendable Launch Capability</i>	615.081	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	615.081

Remarks

E. Acquisition Strategy

The Department intends to pursue a strategy to competitively invest in two or more domestic launch providers' development of new launch systems or upgrades to existing systems for future NSS launch services. This shared investment approach may also leverage commitments to a portion of the planned launch services (between FY 2020 and FY 2025) to decrease the required up front Government investment.

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

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206853F / <i>National Security Space Launch Program (SPACE) - EMD</i>	Project (Number/Name) 650006 / <i>Next Generation Launch System Investment</i>
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Product Development (\$ in Millions)				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	C/CPAF	Not specified : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Aerojet Rocketdyne OTA	C/Variou	Aerojet Rocketdyne : Canoga Park, CA	297.001	-		37.500	Nov 2019	-		-		-	0.000	334.501	-
United Launch Service RPS OTA	C/Variou	United Launch Service : Centennial, CO	128.630	-		-		-		-		-	0.000	128.630	-
United Launch Service LSA OTA	C/Variou	United Launch Service : Centennial, CO	109.000	160.231	Dec 2018	-		-		-		-	0.000	269.231	-
Orbital ATK OTA	C/Variou	Orbital ATK : Magna, UT	168.714	-		-		-		-		-	0.000	168.714	-
Northrop Grumman OTA	C/Variou	Northrop Grumman : Chandler, AZ	115.647	154.580	Dec 2018	-		-		-		-	0.000	270.227	-
Space X OTA	C/Variou	Space X : Hawthorne, CA	97.844	-		-		-		-		-	0.000	97.844	-
Blue Origin OTA	C/Variou	Blue Origin : Kent, WA	109.000	71.197	Dec 2018	-		-		-		-	0.000	180.197	-
AFRL Risk Reduction Study	C/Variou	Various : Various	0.000	7.074	Apr 2019	-		-		-		-	0.000	7.074	-
RAND Study	C/Variou	Various : Various	0.000	1.261	Apr 2019	-		-		-		-	0.000	1.261	-
Broad Agency Announcement Technical Maturation Studies	C/Variou	Various : Various	37.390	-		-		-		-		-	0.000	37.390	-
NASA Advance Booster Engine Demonstration Risk Reduction (ABEDRR)	SS/ Variou	Various : Various	40.374	-		-		-		-		-	0.000	40.374	-
Georgia Tech Combustion Stability Technical Maturation UARC	SS/ Variou	Various : Various	7.948	-		-		-		-		-	0.000	7.948	-
NASA Combustion Stability Technical Maturation Study	SS/ Variou	Various : Various	6.800	-		-		-		-		-	0.000	6.800	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 5				PE 1206853F / National Security Space Launch Program (SPACE) - EMD				650006 / Next Generation Launch System Investment							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AFRL Combustion Stability Technical Maturation Study	SS/ Various	Various : Various	3.179	-		-		-		-		-	0.000	3.179	-
AFRL Hydrocarbon Boost Technical Maturation Demonstration	SS/ Various	Various : Various	37.154	-		-		-		-		-	0.000	37.154	-
FFRDC Mission Assurance	SS/CPAF	Aerospace : El Segundo, CA	27.899	11.424	Nov 2018	17.732	Nov 2019	-		-		-	0.000	57.055	-
Launch Enterprise System Engineering and Integration	C/FP	Various : Various	7.415	8.649	Mar 2019	12.040	Mar 2020	-		-		-	0.000	28.104	-
Launch Service Agreement (Including the Rocket Propulsion System)	C/TBD	TBD : TBD	0.000	-		352.784	Jan 2020	-		-		-	0.000	352.784	-
Subtotal			1,193.995	414.416		420.056		-		-		-	0.000	2,028.467	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Support	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Organic Civilian Support	Reqn	DOD : El Segundo, CA	2.979	1.918	Oct 2018	1.960	Oct 2019	-		-		-	0.000	6.857	15.628
Subtotal			2.979	1.918		1.960		-		-		-	0.000	6.857	N/A
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	SS/CPAF	Aerospace : El Segundo, CA	7.476	2.498	Nov 2018	0.955	Nov 2019	-		-		-	0.000	10.929	5.263

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206853F / <i>National Security Space Launch Program (SPACE) - EMD</i>	Project (Number/Name) 650006 / <i>Next Generation Launch System Investment</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
<i>Rocket Propulsion System (RPS) Development</i>																												
Aerojet Rocketdyne OTA																												
<i>Launch Service Agreement (LSA)</i>																												
Blue Origin OTA																												
Northrop Grumman OTA																												
United Launch Services OTA																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206853F / <i>National Security Space Launch Program (SPACE) - EMD</i>	Project (Number/Name) 650006 / <i>Next Generation Launch System Investment</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Rocket Propulsion System (RPS) Development</i>				
Aerojet Rocketdyne OTA	1	2019	4	2020
<i>Launch Service Agreement (LSA)</i>				
Blue Origin OTA	1	2019	4	2020
Northrop Grumman OTA	1	2019	4	2020
United Launch Services OTA	1	2019	4	2020