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**Department of Defense
Fiscal Year (FY) 2021 Budget Estimates**

February 2020



Office of the Secretary Of Defense

Defense-Wide Justification Book Volume 1 of 2

Defense Production Act Purchases

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Defense-Wide
 FY 2021 President's Budget
 Exhibit P-1 FY 2021 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

11 Feb 2020

Appropriation -----	FY 2019 (Base + OCO) -----	FY 2020 Base Enacted -----	FY 2020 Emergency -----	FY 2020 OCO Enacted -----
Defense Production Act Purchases	86,356	64,393		
Total Defense-Wide	86,356	64,393		

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Defense-Wide
 FY 2021 President's Budget
 Exhibit P-1 FY 2021 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

11 Feb 2020

Appropriation -----	FY 2020 Total Enacted (Base+Emerg+ OCO) -----	FY 2021 Base -----	FY 2021 OCO for Base Requirements -----	FY 2021 OCO for Direct War and Enduring Costs -----
Defense Production Act Purchases	64,393	181,931		
Total Defense-Wide	64,393	181,931		

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Defense-Wide
FY 2021 President's Budget
Exhibit P-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Feb 2020

Appropriation

FY 2021
Total
OCO

FY 2021
Total
(Base + OCO)

Defense Production Act Purchases

181,931

Total Defense-Wide

181,931

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Defense-Wide
FY 2021 President's Budget
Exhibit P-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Feb 2020

Appropriation: Defense Production Act Purchases

Budget Activity	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted
01. Defense Production Act Purchases	86,356	64,393		
Total Defense Production Act Purchases	86,356	64,393		

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Defense-Wide
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11 Feb 2020

Appropriation: Defense Production Act Purchases

Budget Activity	FY 2020 Total Enacted (Base+Emerg+ OCO)	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs
01. Defense Production Act Purchases	64,393	181,931		
Total Defense Production Act Purchases	64,393	181,931		

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Defense-Wide
FY 2021 President's Budget
Exhibit P-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Feb 2020

Appropriation: Defense Production Act Purchases

Budget Activity	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
01. Defense Production Act Purchases		181,931
Total Defense Production Act Purchases		181,931

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Defense-Wide
 FY 2021 President's Budget
 Exhibit P-1 FY 2021 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

11 Feb 2020

Appropriation: 0360D Defense Production Act Purchases

Line No	Item Nomenclature	Ident Code	FY 2019 (Base + OCO) Quantity Cost	FY 2020 Base Enacted Quantity Cost	FY 2020 Emergency Quantity Cost	FY 2020 OCO Enacted Quantity Cost	S e c
Budget Activity 01: Defense Production Act Purchases							
Defense Production Act Purchases							
1	Defense Production Act Purchases	A	86,356	64,393			U
Total Defense Production Act Purchases			86,356	64,393			
Total Defense Production Act Purchases			86,356	64,393			

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Defense-Wide
 FY 2021 President's Budget
 Exhibit P-1 FY 2021 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

11 Feb 2020

Appropriation: 0360D Defense Production Act Purchases

Line No	Item Nomenclature	Ident Code	FY 2020 Total Enacted (Base+Emerg+ OCO)		FY 2021 Base		FY 2021 OCO for Base Requirements		FY 2021 OCO for Direct War and Enduring Costs		S e c
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	
Budget Activity 01: Defense Production Act Purchases											

Defense Production Act Purchases											
1	Defense Production Act Purchases	A		64,393		181,931					U
Total Defense Production Act Purchases				64,393		181,931					
Total Defense Production Act Purchases				64,393		181,931					

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Defense-Wide
 FY 2021 President's Budget
 Exhibit P-1 FY 2021 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

11 Feb 2020

Appropriation: 0360D Defense Production Act Purchases

Line		Ident	FY 2021	FY 2021	
No	Item Nomenclature	Code	Total	Total	S
			OCO	(Base + OCO)	e
			Quantity	Cost	Quantity
			-----	-----	-----
Budget Activity 01: Defense Production Act Purchases					

Defense Production Act Purchases					
1	Defense Production Act Purchases	A		181,931	U
Total Defense Production Act Purchases			-----	181,931	
Total Defense Production Act Purchases			-----	181,931	

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Appropriation 0360D: Defense Production Act Purchases

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Exhibit P-40, Budget Line Item Justification: PB 2021 Office of the Secretary Of Defense										Date: February 2020		
Appropriation / Budget Activity / Budget Sub Activity: 0360D: Defense Production Act Purchases / BA 01: Defense Production Act Purchases / BSA 10: Defense Production Act Purchases							P-1 Line Item Number / Title: Title3 / Defense Production Act Purchases					
ID Code (A=Service Ready, B=Not Service Ready):				Program Elements for Code B Items: 0902199D8Z				Other Related Program Elements: N/A				
Line Item MDAP/MAIS Code: N/A												
Resource Summary	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
Procurement Quantity (<i>Units in Each</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Cost (<i>\$ in Millions</i>)	266.754	53.578	64.393	181.931	-	181.931	45.974	46.949	47.549	49.005	Continuing	Continuing
Less PY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Net Procurement (P-1) (<i>\$ in Millions</i>)	266.754	53.578	64.393	181.931	-	181.931	45.974	46.949	47.549	49.005	Continuing	Continuing
Plus CY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Total Obligation Authority (<i>\$ in Millions</i>)	266.754	53.578	64.393	181.931	-	181.931	45.974	46.949	47.549	49.005	Continuing	Continuing
<i>(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)</i>												
Initial Spares (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Flyaway Unit Cost (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Unit Cost (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
<p>Description:</p> <p>Title III of the Defense Production Act (DPA) provides the President of the United States broad authorities to ensure the timely availability of domestic industrial base capabilities essential for the national defense. DPA Title III is an important DoD program with the authority to utilize economic incentives to create, maintain, protect, expand, or restore domestic sources for critical components, critical technology items, and industrial resources. The DPA is authorized by 50 U.S.C. Sections 4501-4568.</p> <p>This budget includes a project portfolio that will appropriately utilize DPA Title III authorities to strengthen domestic industrial base capabilities essential to national defense. The multi-year projects in this budget will incentivize domestic sources to establish, strengthen, and expand domestic industrial base capabilities in key areas such as strategic radiation-hardened microelectronics and the rare earths supply chain.</p>												

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ID Code (A=Service Ready, B=Not Service Ready):				Program Elements for Code B Items: 0902199D8Z			Other Related Program Elements: N/A			
Line Item MDAP/MAIS Code: N/A										
Exhibits Schedule					Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Exhibit Type	Title*	Subexhibits	ID CD	MDAP/MAIS Code	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)
P-5	1 / Defense Production Act Purchases				- / 266.754	- / 53.578	- / 64.393	- / 181.931	- / -	- / 181.931
P-40	Total Gross/Weapon System Cost				- / 266.754	- / 53.578	- / 64.393	- / 181.931	- / -	- / 181.931
*Title represents 1) the Number / Title for Items; 2) the Number / Title [DODIC] for Ammunition; and/or 3) the Number / Title (Modification Type) for Modifications.										
Note: Totals in this Exhibit P-40 set may not be exact or sum exactly due to rounding.										
<p>Justification: Strategic overview:</p> <p>DPA Title III investments are driven by strategy starting with the National Security Strategy and National Defense Strategy. DPA Title III investments are also supporting Department of Defense modernization priorities and the recommendations from the interagency report in response to Executive Order 13806: Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States (E.O. 13806).</p> <p>Defense-Wide Review (DWR) reduced \$7.915 million across the FYDP on Defense Production Act Purchases Title III to focus on the Secretary's guidance to streamline operations, increase efficiency, and promote greater affordability within the OSD and Defense Agencies and Field Activities in order to ensure the Department's optimum alignment to the National Defense Strategy and DoD strategic guidance, with particular focus on building a more lethal, resilient, agile, and ready force while strengthening alliances, prioritizing cyber and space capabilities, and focusing on innovation to maintain the technological advantage.</p> <p>The Office of Management and Budget (OMB) has added \$120 million to FY 2021 budget to aid the Department in resourcing the DPA Fund so the DPA Title III Program can address critical shortfalls in the domestic industrial base, as identified in the interagency report in response to Executive Order 13086, and ensure the industrial base can support the Department's strategic modernization initiatives. Industrial base efforts that this \$120 million will fund include rare earths, critical chemicals, small unmanned aerial systems, hypersonic applications, electronics, and space. Specified numbers for each effort are estimates that are subject to change based on ongoing market research and the acquisition process.</p> <p>The National Security Space Industrial and Supply Base (NSS ISB) Risk Mitigation Program was developed to formulate a systematic process to fund mitigation efforts to rectify shortfalls in the space industrial and supply base. The objective is to ensure access to critical technologies and capabilities in the quality, quantity, and timeframes required to support U.S. Government space programs. Projects in this program are addressing cross-platform, multi-agency/Service requirements. Projects are developed in response to risk mitigation determinations and prioritized critical requirements of stakeholders in DoD and other agencies, as represented through the Department's Space Industrial Base Working Group.</p> <p>Program Change Summary (\$ in Millions)</p> <p>FY 2021 resources (\$M): FY 2021 Request*: \$181.931 * Includes Defense Wide Review Reductions: - \$1.960, DoD Programmatic Adjustments/Transfers: + \$30.700, and OMB Increase: + \$120.000</p> <p>FY 2020 resources (\$M): FY 2020 Request: \$34.393 Congressional increase: +\$30.000 Total FY 2020 Appropriated: \$64.393</p>										

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ID Code (A=Service Ready, B=Not Service Ready):	Program Elements for Code B Items: 0902199D8Z	Other Related Program Elements: N/A
Line Item MDAP/MAIS Code: N/A		
<p>FY 2019 resources (\$M): FY 2019 Request: \$38.578 Congressional increase: +\$15.000 Total FY 2019 Appropriated: \$53.578</p> <p>This budget includes essential transformational initiatives using the authorities of Title III of the DPA. Project descriptions are provided below for each of the P5 exhibit projects listed, and the single or multi-year cost phasing of each of the projects is addressed in the P5 exhibit.</p> <p>Project Descriptions:</p> <p>NSS ISB – Space Qualified Solar Cell Supply Chain: The purpose of these projects is to ensure a domestic capability to supply this critical power supply component for national security space assets. Projects involve ensuring a viable domestic source for space qualified germanium substrates and high performance photovoltaic cells, panels, and systems. Current projects are helping domestic photovoltaic manufacturing and integration companies maintain their performance lead over foreign competitors by expanding production of AIAA S-111 space-qualified photovoltaic solar cells with improved cost and performance efficiencies. Performance improvements include characterizing high-efficiency inverted metamorphic (IMM) solar cells grown on Gallium Arsenide substrates as a drop-in replacement for ZTJ triple-junction solar cells, and completing the qualification of the IMM solar cells to the AIAA S-111A standard. Other improvements on high-efficiency XTJ Prime triple- junction solar cells grown on Germanium substrates include increasing the cell Beginning-of-Life efficiency and reducing End-of-Life cost per watt. Multiple awards were made in FY 2019 utilizing prior year funds. Additional projects are expected to be awarded in FY 2020 utilizing prior year funds.</p> <p>NSS ISB - Next Generation Reaction Wheel Assemblies (RWA): This project addresses a need for a multiple-phase Next-Generation scalable Reaction Wheel (NGRW) to provide a systematic comprehensive, low cost/risk investment affording potential for high return on investment. The goal is to generate or revive a domestic competitor, or to expand the existing vendor's product line, with a focus on smaller wheels using advanced technologies. In addition, the effort will explore encouraging a business partnership to maintain a second source in the U.S. Also, the project will investigate using another product controlled by a U.S. company. A study phase was completed and the execution phase is anticipated to be awarded in FY 2020 utilizing prior year funds.</p> <p>NSS ISB - Radiation-Hardened Digital/Analog Production & Qualification: This project funds work at the 45nm and 14nm nodes. It is imperative that government organizations responsible for national security, e.g., intelligence acquisition, missile early warning, missile defense, and other space requirements maintain a strong industrial base to supply technology necessary to design, develop, and fabricate secure, radiation hardened, high reliability, and DoD space qualified Application Specific Integrated Circuits (ASIC), Application Specific Standard Products (ASSP), such as very high speed data switches, and Multi-Core General Purpose Processors (MCGPP) at the less than or equal to 45nm technology node to support onboard processing and other critical applications. The objective of this project is to enhance the Radiation Hardened By Design flow, optimize selected circuit designs to reduce power and increase performance, and complete the design, fabrication, testing, and qualification of certain critical devices to include the MC-GPP. In addition to achieving an estimated improvement in performance of > 25% for power and performance for some specific designs, the proposed effort will support life-time acquisition buys of these critical circuits for some identified systems with attendant reductions in system technical, cost, and schedule risks. An award was made toward this effort in FY 2019 utilizing prior year funds. Additional projects are anticipated in FY 2020 utilizing both prior year and FY 2020 funds.</p> <p>NSS ISB – Access to Field Programmable Gate Arrays (FPGA) for Space Applications: The DoD and Intelligence Community have identified FPGAs as a critical enabling technology across a wide variety of present and future systems. Advanced, commercially available FPGAs are manufactured off-shore and are considered vulnerable to tampering and insertion of malicious software and/or hardware. This program seeks to improve the security posture and reduce the risk associated with FPGA technology by addressing security concerns in the design, development, fabrication, and supply lifecycle of FPGA devices. The objective of this program is to develop and demonstrate an approach to gain access to advanced, assured, and space qualified reprogrammable FPGA technology to support DoD/IC applications including satellite and strategic missile systems. Concerning this effort "assured" is defined as assurance of the integrity and availability, of a product wherein that product will reliably operate as intentionally designed and not contain any malicious hardware and/or software that will compromise the intended application; e.g., exfiltration of sensitive data, etc. A study phase was completed, and the execution phase is anticipated to be awarded in FY 2020 utilizing prior year and FY 2020 funds.</p>		

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ID Code (A=Service Ready, B=Not Service Ready):	Program Elements for Code B Items: 0902199D8Z	Other Related Program Elements: N/A
Line Item MDAP/MAIS Code: N/A		
<p>NSS ISB – Fibers and Composites: These projects are intended to ensure the domestic industrial base can provide key qualified fibers and composites that are critical to NSS, such as rocket nozzle throats, light weight structures, and light-weight, resilient shielding and interconnects. Current items of interest include fibers, fabrics, and components made out of rayon, polyacrylonitrile (PAN), and carbon nanotubes. These efforts mitigate key risks factors such as reliance on foreign sources and very limited or no domestic suppliers.</p> <p>NSS ISB - Infrared Sensor Substrates (Cadmium Zinc Telluride / Mercury Cadmium Telluride): The purpose of this effort is to establish and maintain a high quality production capability for Mercury Cadmium Telluride (MCT) epitaxy grown on Cadmium Zinc Telluride (CZT) substrates via molecular beam epitaxy (MBE) at key US-owned and operated foundries in order to assure the necessary supply of infrared focal plane arrays (IRFPAs) to National Security Space (NSS) agencies when needed. The primary goal is ensure domestic availability of these detectors, and demonstrate on-shore MCT detectors are equivalent in performance to IRFPAs utilizing off-shore substrates. Additional awards were made toward this effort in FY 2019 utilizing prior year funds. Further efforts are anticipated in FY 2020 utilizing prior year and FY 2020 funds.</p> <p>NSS ISB – ROIC Foundry Improvement and Sustainment: This project is a follow-on to a prior read-out integrated circuit (ROIC) project that focused on maintaining minimal, yet adequate, production capabilities at domestic foundries to ensure a necessary supply of strategic ROICs for Government space programs while simultaneously improving product design and processes.</p> <p>Projects Other (non-NSS)/ISB:</p> <p>Strategic Radiation Hardened Trusted Microelectronics Foundry: The purpose of this effort is to provide an assured capability to produce or acquire strategic radiation hardened trusted microelectronics in compliance with Department of Defense instruction 5200.44 to supply critical microelectronic components for necessary radiation environments involved with the acquisition of delivery systems for nuclear weapons. The project provides production, engineering, and sustainment services in support of Strategic Radiation Hardened microelectronics fabrication via a Defense Microelectronics Activity-accredited Trusted Supplier using a Trusted flow. Multiple contracts have been awarded toward this effort in FY 2019 utilizing FY 2018 and FY 2019 funds.</p> <p>Critical Chemicals for DoD Missiles and Munitions: Multiple efforts are being scoped to address critical shortfalls in the domestic industrial capability to produce materials for DoD missiles and munitions. In January 2019, the President signed four Presidential Determinations addressing vulnerabilities in the supply chain for critical chemicals for DoD munitions, including: precursor materials, inert materials, energetic materials, and advanced manufacturing techniques for producing the materials. Relying on foreign sources, especially China, for these critical chemicals poses a risk to the Department's readiness to deter and defeat adversaries. Multiple projects are anticipated to be awarded in FY 2020 utilizing FY 2019 funds.</p> <p>Rare Earth Supply Chain: In July 2019, the President signed 5 Presidential Determinations addressing the rare earth elements supply chain, including: Light Rare Earth Separation and Processing, Heavy Rare Earth Separation and Processing, Production of Rare Earth Metals and Alloys, Production of Neodymium Iron Boron Rare Earth Permanent Magnets, and Production of Samarium Cobalt Rare Earth Permanent Magnets. This line of effort will establish a domestic industrial capability to support key aspects of the rare earth supply chain. China dominates the Rare Earth Elements (REE) market on a global scale in both mining and processing of RE raw materials and has the ability to manipulate global markets. Relying on foreign sources for these critical materials poses a risk to the DoD's readiness to deter and defeat adversaries. Important defense applications for the end product of this supply chain, REE permanent magnets, include jet fighter engines, missile guidance systems, antimissile defense, space-based satellites, and communication systems. Efforts are currently being developed to bolster the domestic industrial base to support the separation and processing of rare earth elements and domestic production capability for Neodymium Iron Boron (NdFeB) rare earth permanent magnets. Multiple projects are anticipated to be awarded in FY 2020 utilizing prior year funds.</p> <p>Hypersonics Industrial Base: The DPA Title III program is actively working with stakeholders to identify gaps in the industrial capability to produce components for hypersonic systems and scale production from prototype levels to the required capacity. Multiple projects are anticipated to address hypersonic industrial base shortfalls, should the President authorize the use of DPA Title III authorities.</p> <p>Assured Electronics Supply: The challenges facing the electronics industrial base are wide-reaching and significant. Commercial industry has trended toward yearly product refreshes and updating technology nodes frequently, leaving legacy DoD systems that must be maintained for decades with severe obsolescence issues. On the opposite end of the spectrum, new systems that desire to integrate the newest technologies face challenges obtaining assured and/or trusted supply as much of the electronics manufacturing supply chain has gone overseas. In addition, domestic suppliers that exist are reluctant to work with unique DoD requirements as it would negatively affect their commercial runs and overall business viability. The DPA Title III Program, in concert with its stakeholders, is working to identify and vet efforts to serve DoD's need for electronic materials, digital/analog/mixed signal integrated circuits, discrete components, displays, power electronic components, electro-optical/IR components, radio frequency components, advanced packaging, and other cross-cutting technologies.</p>		

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Appropriation / Budget Activity / Budget Sub Activity: 0360D: Defense Production Act Purchases / BA 01: Defense Production Act Purchases / BSA 10: Defense Production Act Purchases		P-1 Line Item Number / Title: Title3 / Defense Production Act Purchases
ID Code (A=Service Ready, B=Not Service Ready):	Program Elements for Code B Items: 0902199D8Z	Other Related Program Elements: N/A
Line Item MDAP/MAIS Code: N/A		
<p>Small Unmanned Aerial Systems (sUAS): In June 2019, the President issued a Presidential Determination authorizing the use DPA Title III to strengthen the domestic industrial base for sUAS. The sUAS domestic industrial base has struggled to compete commercially in the midst of dominant foreign competition and DPA Title III is currently assessing where investments would best remedy the domestic industrial base shortfall and result in an economically viable domestic supplier. The DPA Title III program is working with stakeholders across USG to determine an appropriate investment strategy to enable the domestic industrial base to meet requirements. FY 2020 funds have been aligned to this effort with awards anticipated as early as late FY 2020, with additional efforts to follow depending upon the availability of funds.</p> <p>Next Generation Soldier Protection: The purpose of this project is to create a manufacturing capacity to produce lightweight, high-strength, inherently fire-resistant co-polymer aramid fibers to provide lightweight force protection for Soldiers and air, ground, and naval platforms and bases. Examples include lighter and stronger body armor, helmets, pelvic protection, enhanced combat vehicle survivability, enhanced aviation platform survivability, and integrated base protection. A next generation of co-polymer aramid fibers would provide a step-change increase in tenacity over existing fibers, a key attribute for enabling lighter-weight ballistic protection. This project was awarded in FY 2019 utilizing prior year funds, and funding was reallocated to reflect updated project requirements.</p> <p>Secure Composite Shipping Containers Production Capacity: Developed under funding from the Department of Homeland Security (DHS) Advanced Research Projects Agency (HSARPA), the Secure Hybrid Composite Container (SHCC) is an intermodal ISO shipping container providing advanced security features, while meeting all the operational, structural, and customs requirements of standard steel 20ft and 40ft shipping containers. The container includes the capability to be tracked during its shipment and alert officials to track deviations and alarms. The ultimate goal of the container is to provide the level of security to law enforcement officials to ensure contraband products and malicious agents have not been inserted into the container for smuggling into the US. Investment under Title III to establish initial production capability for the secure hybrid composite container can help satisfy an estimated 3,000 container per year initial government need from the Department of Defense, Department of State, and the Intelligence Community agencies requiring secure shipping containers. A production line with an output of approximately 100 containers per year output is planned. This project was awarded in FY 2019 utilizing prior year funding.</p> <p>Shielded Infrastructures: The purpose of this project is to further increase the production capacity of conductive composite nanomaterials to meet emerging DoD requirements for light weight, unique form factor, electromagnetically shielded products. It is anticipated to leverage the success of a prior DPA Title III project by integrating and scaling the technology (chemical vapor depositioned nickel coated nano-materials) into other novel applications such as non-metallic enclosures, cases, laminates, injection moldings, wallpapers, paints, windows, etc. This project is anticipated to be awarded in FY 2020 utilizing prior year funds.</p> <p>Lithium Sea-Water Batteries: The purpose of this project is to establish the domestic production capability for Lithium Sea-Water (Li-SW) batteries. Currently, no commercially available battery technology has been tested to meet the energy-density, performance, and environment requirements needed to enable the Next Generation Airborne Passive Sensor (NGAPS) sonobuoys. The Office of Naval Research has conducted research and proven that Li-SW batteries will be able to meet the NGAPS requirements if manufactured in the required form factor. The need exists to establish a production line for Li-SW batteries, and to maintain affordable unit prices to support the DoD's needs. This project is anticipated to be awarded in FY 2020 utilizing prior year funds.</p> <p>Alane (AlH3) Fuel: This project will create the domestic manufacturing capability for Aluminum Hydride (AlH3) or "Alane" Fuel. Alane fuel is a high-energy-density fuel that is not petroleum-based and is environmentally friendly. Alane fuel cells utilized in Alane-fuel-powered systems provide higher energy density than the traditional lithium ion batteries on the market. Alane fuel-powered systems are alternatives to the traditional battery packs utilized in military platforms and by soldiers today. These small form factor systems reduce the load carrying burden on soldiers and systems, therefore increasing mobility, operational effectiveness, and survivability. There is currently no domestic industrial manufacturing capability for these cells and a public/private partnership under the authorities of Title III of the Defense Production Act will spur industry to create the initial capability to meet defense needs as well as provide an impetus for domestic commercial adaptability and use of the technology. This project is anticipated to be awarded in FY 2020 utilizing prior year funds, and funding was reallocated to reflect updated project requirements.</p> <p>Thin Wall Castings for Military Applications: Domestic foundries prefer to prioritize high volume, low-risk commercial work over low volume, high-risk defense work. This environment has led to a reduced number of suppliers qualified to provide large, aerospace-grade castings, limited investment in new technologies, and increased cost and lead-times for defense aerospace-related casting products. The objective of this project is to sustain and expand economically viable, merchant suppliers for large, complex, thin-walled aerospace grade magnesium and aluminum sand casting products for rotorcraft platforms, such as the CH-53K. This project was awarded in FY 2020 and is utilizing prior year funds.</p> <p>High Purity Beryllium: The purpose of this project is to ensure the availability of high purity Beryllium metal for DoD and national security requirements through capital improvements to an existing sole source supplier. Beryllium, a light weight metal, possesses unique properties that make it indispensable in many of today's critical defense systems. High purity beryllium is used extensively in structures, digital electronics, and instruments found in defense weapon systems where stiffness, low weight, good thermal conductivity, and dimensional stability are required. Defense demand for beryllium generally includes</p>		

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Exhibit P-40, Budget Line Item Justification: PB 2021 Office of the Secretary Of Defense		Date: February 2020
Appropriation / Budget Activity / Budget Sub Activity: 0360D: Defense Production Act Purchases / BA 01: Defense Production Act Purchases / BSA 10: Defense Production Act Purchases		P-1 Line Item Number / Title: Title3 / Defense Production Act Purchases
ID Code (A=Service Ready, B=Not Service Ready):	Program Elements for Code B Items: 0902199D8Z	Other Related Program Elements: N/A
Line Item MDAP/MAIS Code: N/A		
<p>the following four areas: sensors, missile and satellite applications, avionics, and nuclear weapons managed by the Department of Energy. This project is a follow-on to a previous DPA Title III project from 2005 to 2012 which established the domestic production capability for primary High Purity Beryllium metal through the design and implementation of a facility. The current project will implement capital improvements required to gain production efficiencies at the facility constructed by the previous effort. This project was awarded in FY 2019 utilizing prior year funds.</p> <p>AN-SSQ Series Sonobuoys Production Capability: The purpose of this effort is to ensure the availability of qualified AN/SSQ-101B sonobuoys. The domestic industrial base for AN/SSQ series sonobuoys was deemed at risk of not being able to produce the needed classes and quantities of sonobuoys and would require assistance to establish the required production lines. This project is anticipated to be awarded in FY 2020 utilizing prior year funds.</p> <p>F135 Integrally Bladed Rotors (IBR): The purpose of this effort is to expediently restore the domestic production capacity for 2nd and 3rd stage integrally bladed rotors (IBRs) for the F135 engine to minimize impact on the F-35 Joint Strike Fighter (JSF) delivery schedule. This effort mitigates the loss of a qualified source in the F135 engine's global supply chain. This project was awarded in FY 2019 utilizing FY 2019 funds.</p> <p>Three-Dimensional (3D) Microelectronics for Information Protection: The purpose of this effort is to establish a domestic, merchant supplier manufacturing capability to provide two- and three-dimensional high density packaging technology, which accepts a wide range of custom and commercial-off-the-shelf components that can drastically increase the security of DoD platforms. This DPA Title III effort is working to create a low rate initial production capability of the packaging technology to enable the early DoD adopters to reliably procure products and achieve cost savings for their programs. The contract for this project was awarded in March 2018, and a second phase of this effort is anticipated to be awarded in FY 2021 utilizing FY 2021 funds.</p>		

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Exhibit P-5, Cost Analysis: PB 2021 Office of the Secretary Of Defense													Date: February 2020					
Appropriation / Budget Activity / Budget Sub Activity: 0360D / 01 / 10						P-1 Line Item Number / Title: Title3 / Defense Production Act Purchases							Item Number / Title [DODIC]: 1 / Defense Production Act Purchases					
ID Code (A=Service Ready, B=Not Service Ready) :										MDAP/MAIS Code:								
Resource Summary				Prior Years		FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Procurement Quantity <i>(Units in Each)</i>				-		-		-		-		-		-				
Gross/Weapon System Cost <i>(\$ in Millions)</i>				266.754		53.578		64.393		181.931		-		181.931				
Less PY Advance Procurement <i>(\$ in Millions)</i>				-		-		-		-		-		-				
Net Procurement (P-1) <i>(\$ in Millions)</i>				266.754		53.578		64.393		181.931		-		181.931				
Plus CY Advance Procurement <i>(\$ in Millions)</i>				-		-		-		-		-		-				
Total Obligation Authority <i>(\$ in Millions)</i>				266.754		53.578		64.393		181.931		-		181.931				
(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)																		
Initial Spares <i>(\$ in Millions)</i>				-		-		-		-		-		-				
Gross/Weapon System Unit Cost <i>(\$ in Millions)</i>				-		-		-		-		-		-				
Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.																		
Cost Elements	Prior Years			FY 2019			FY 2020			FY 2021 Base			FY 2021 OCO			FY 2021 Total		
	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)
Hardware - National Security Space (NSS) Industrial & Supply Base (ISB) Risk Mitigation Program Cost																		
Non Recurring Cost																		
NSS ISB: Space Qualified Solar Cell Supply Chain	-	-	28.840	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NSS ISB: Next Generation Reaction Wheels Assembly	-	-	3.474	-	-	-	-	-	2.628	-	-	-	-	-	-	-	-	-
NSS ISB: Radiation-Hardened Digital/ Analog Production & Qualification	-	-	14.750	-	-	0.200	-	-	3.139	-	-	8.361	-	-	-	-	-	8.361
NSS ISB: Field-Programmable Gate Arrays (FPGA) for Space Applications	-	-	6.948	-	-	-	-	-	-	-	-	7.271	-	-	-	-	-	7.271
NSS ISB: Fibers and Composites	-	-	5.450	-	-	-	-	-	2.800	-	-	-	-	-	-	-	-	-
NSS ISB: Infrared Sensor Substrates (Cadmium Zinc Telluride / Mercury Cadmium Telluride)	-	-	23.779	-	-	-	-	-	4.000	-	-	2.000	-	-	-	-	-	2.000
NSS ISB: ROIC Foundry Improvement and Sustainment	-	-	1.920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal: Non Recurring Cost	-	-	85.161	-	-	0.200	-	-	12.567	-	-	17.632	-	-	-	-	-	17.632

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Exhibit P-5, Cost Analysis: PB 2021 Office of the Secretary Of Defense													Date: February 2020					
Appropriation / Budget Activity / Budget Sub Activity: 0360D / 01 / 10							P-1 Line Item Number / Title: Title3 / Defense Production Act Purchases						Item Number / Title [DODIC]: 1 / Defense Production Act Purchases					
ID Code (A=Service Ready, B=Not Service Ready) :										MDAP/MAIS Code:								
Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.																		
Cost Elements	Prior Years			FY 2019			FY 2020			FY 2021 Base			FY 2021 OCO			FY 2021 Total		
	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)
Subtotal: Hardware - National Security Space (NSS) Industrial & Supply Base (ISB) Risk Mitigation Program Cost	-	-	85.161	-	-	0.200	-	-	12.567	-	-	17.632	-	-	-	-	-	17.632
Hardware - Industrial Base Risk Mitigation Cost																		
Recurring Cost																		
Program Management and Administrative Support	-	-	-	-	-	1.724	-	-	8.266	-	-	11.722	-	-	-	-	-	11.722
Subtotal: Recurring Cost	-	-	-	-	-	1.724	-	-	8.266	-	-	11.722	-	-	-	-	-	11.722
Non Recurring Cost																		
Strategic Radiation Hardened Trusted Microelectronics Foundry	-	-	20.000	-	-	20.000	-	-	20.000	-	-	20.000	-	-	-	-	-	20.000
Critical Chemical for DoD Munitions	-	-	4.000	-	-	1.749	-	-	6.826	-	-	22.000	-	-	-	-	-	22.000
Rare Earth Supply Chain	-	-	43.595	-	-	6.405	-	-	0.000	-	-	32.000	-	-	-	-	-	32.000
Hypersonics Industrial Base	-	-	-	-	-	-	-	-	-	-	-	25.000	-	-	-	-	-	25.000
Assured Electronics Supply	-	-	-	-	-	-	-	-	-	-	-	18.000	-	-	-	-	-	18.000
Small Unmanned Aerial Systems	-	-	-	-	-	-	-	-	4.000	-	-	17.000	-	-	-	-	-	17.000
Next Generation Soldier Protection	-	-	22.848	-	-	0.000	-	-	12.452	-	-	0.000	-	-	-	-	-	0.000
Secure Composite Shipping Containers	-	-	16.800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shielded Infrastructure	-	-	6.800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Circular Lithium-Sea Water (Li-SW) Batteries	-	-	10.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alane (AlH3) Fuel	-	-	5.700	-	-	-	-	-	0.282	-	-	8.577	-	-	-	-	-	8.577
Thin Wall Castings for Military Applications	-	-	16.080	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
High Purity Beryllium	-	-	11.770	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AN-SSQ Series Sonobuoys Production Capability	-	-	10.800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Exhibit P-5, Cost Analysis: PB 2021 Office of the Secretary Of Defense														Date: February 2020				
Appropriation / Budget Activity / Budget Sub Activity: 0360D / 01 / 10						P-1 Line Item Number / Title: Title3 / Defense Production Act Purchases								Item Number / Title [DODIC]: 1 / Defense Production Act Purchases				
ID Code (A=Service Ready, B=Not Service Ready) :											MDAP/MAIS Code:							
Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.																		
Cost Elements	Prior Years			FY 2019			FY 2020			FY 2021 Base			FY 2021 OCO			FY 2021 Total		
	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$ M)	Qty (Each)	Total Cost (\$ M)
F135 Integrally Bladed Rotors (IBR)	-	-	-	-	-	23.500	-	-	-	-	-	-	-	-	-	-	-	-
3D Microelectronics for Information Protection	-	-	13.200	-	-	-	-	-	-	-	-	10.000	-	-	-	-	-	10.000
Subtotal: Non Recurring Cost	-	-	181.593	-	-	51.654	-	-	43.560	-	-	152.577	-	-	-	-	-	152.577
Subtotal: Hardware - Industrial Base Risk Mitigation Cost	-	-	181.593	-	-	53.378	-	-	51.826	-	-	164.299	-	-	-	-	-	164.299
Gross/Weapon System Cost	-	-	266.754	-	-	53.578	-	-	64.393	-	-	181.931	-	-	-	-	-	181.931

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