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**Department of Defense
Fiscal Year (FY) 2020 Budget Estimates**

March 2019



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 2020 President's Budget
Exhibit P-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

12 Mar 2019

<u>Appropriation</u>	<u>FY 2020 Base</u>	<u>FY 2020 OCO for Base Requirements</u>	<u>FY 2020 OCO for Direct War and Enduring Costs</u>	<u>FY 2020 Total OCO</u>
Defense Production Act Purchases	34,393			
Total Defense-Wide	34,393			

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Defense-Wide
FY 2020 President's Budget
Exhibit P-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

12 Mar 2019

<u>Appropriation</u>	<u>FY 2020 Total (Base + OCO)</u>
Defense Production Act Purchases	34,393
Total Defense-Wide	34,393

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Defense-Wide
 FY 2020 President's Budget
 Exhibit P-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

12 Mar 2019

Appropriation: Defense Production Act Purchases

Budget Activity	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted
01. Defense Production Act Purchases	67,402	53,578		53,578
Total Defense Production Act Purchases	67,402	53,578		53,578

Defense-Wide
 FY 2020 President's Budget
 Exhibit P-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

12 Mar 2019

Appropriation: Defense Production Act Purchases

Budget Activity	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO
-----	-----	-----	-----	-----
01. Defense Production Act Purchases	34,393			
Total Defense Production Act Purchases	34,393			

Defense-Wide
FY 2020 President's Budget
Exhibit P-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

12 Mar 2019

Appropriation: Defense Production Act Purchases

Budget Activity	FY 2020 Total (Base + OCO)
01. Defense Production Act Purchases	34,393
Total Defense Production Act Purchases	34,393

Defense-Wide
 FY 2020 President's Budget
 Exhibit P-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

12 Mar 2019

Appropriation: 0360D Defense Production Act Purchases

Line No	Item Nomenclature	Ident Code	FY 2018 (Base + OCO)		FY 2019 Base Enacted		FY 2019 OCO Enacted		FY 2019 Total Enacted		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		67,402		53,578				53,578	U
Total Defense Production Act Purchases				67,402		53,578				53,578	
Total Defense Production Act Purchases				67,402		53,578				53,578	

Defense-Wide
 FY 2020 President's Budget
 Exhibit P-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

12 Mar 2019

Appropriation: 0360D Defense Production Act Purchases

Line No	Item Nomenclature	Ident Code	FY 2020 Base		FY 2020 OCO for Base Requirements		FY 2020 OCO for Direct War and Enduring Costs		FY 2020 Total OCO		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		34,393							U
Total Defense Production Act Purchases				34,393							
Total Defense Production Act Purchases				34,393							

Defense-Wide
 FY 2020 President's Budget
 Exhibit P-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

12 Mar 2019

Appropriation: 0360D Defense Production Act Purchases

Line No	Item Nomenclature	Ident Code	FY 2020 Total (Base + OCO)		S e c -
			Quantity	Cost	
<u>Budget Activity 01: Defense Production Act Purchases</u>					
Defense Production Act Purchases					
1	Defense Production Act Purchases	A	34,393		U
Total Defense Production Act Purchases			<u>34,393</u>		
Total Defense Production Act Purchases			34,393		

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Appropriation 0360D: Defense Production Act Purchases

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Exhibit P-40, Budget Line Item Justification: PB 2020 Office of the Secretary Of Defense **Date:** March 2019

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
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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
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Line Item MDAP/MAIS Code: N/A

Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Procurement Quantity (<i>Units in Each</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Cost (<i>\$ in Millions</i>)	219.884	67.402	53.578	34.393	-	34.393	34.681	28.854	28.837	29.021	Continuing	Continuing
Less PY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Net Procurement (P-1) (<i>\$ in Millions</i>)	219.884	67.402	53.578	34.393	-	34.393	34.681	28.854	28.837	29.021	Continuing	Continuing
Plus CY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Total Obligation Authority (<i>\$ in Millions</i>)	219.884	67.402	53.578	34.393	-	34.393	34.681	28.854	28.837	29.021	Continuing	Continuing

(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)

Initial Spares (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Flyaway Unit Cost (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Unit Cost (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-

Description:

Title III of the Defense Production Act (DPA) provides the Department of Defense (DoD) with a powerful tool to ensure the timely creation and availability of domestic production capabilities for technologies that have the potential for wide-ranging impact on the operational capabilities and technological superiority of United States defense systems. DPA Title III is an important DoD program that is focused on creating, maintaining, protecting, and expanding or restoring domestic production capacity to strengthen domestic industry and to establish the industrial base capacity for essential national defense capabilities.

The Defense Production Act is authorized by 50 U.S.C. Sections 4501-4568. This budget includes essential transformational initiatives using the authorities of Title III of the DPA. The multi-year projects in this budget will incentivize domestic sources to establish, strengthen, and expand domestic industrial base capabilities for essential materials, industrial resources, or critical technology items that support transformational initiatives and maintain the technological superiority of U.S. defense systems.

In accordance with the provisions of the Defense Production Act of 1950, as amended, (50 U.S.C. Sections 4501-4568), notification to Congress of the intent of the DoD to execute any of the projects described in this exhibit to correct domestic industrial base shortfalls of industrial resources, materials, or critical technology items essential for the execution of the national security strategy will be provided via letter notification before the referenced projects are initiated.

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Exhibit P-40, Budget Line Item Justification: PB 2020 Office of the Secretary Of Defense **Date:** March 2019

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

Exhibits Schedule					Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 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				- / 219.884	- / 67.402	- / 53.578	- / 34.393	- / -	- / 34.393
P-40	Total Gross/Weapon System Cost				- / 219.884	- / 67.402	- / 53.578	- / 34.393	- / -	- / 34.393

*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.

Justification:

Strategic overview:

DPA Title III investments for DoD are informed by the Department's key investment strategy documents including the National Defense Strategy, and the results of the Presidential Executive Order on Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States (E.O. 13806). Investments for DoD will enable the production of capacity for technologies and materials emerging from the technology base when the private sector is unable to respond within DoD timelines.

The National Security Space Industrial and Supply Base (NSS ISB) Risk Mitigation Program was developed by the DoD to formulate a systematic process to fund mitigation efforts to rectify shortcomings 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.

The FY 2020 request facilitates the National Security Strategy, National Defense Strategy and the recently released Nation Defense Business Operations Plan by supporting:

Strategic Goal 1: Rebuild military readiness as we build a more lethal joint force, and

Strategic Objective 1.2 - Lay the foundation for future readiness through recapitalization, innovation, and modernization

Strategic Objective 1.3 - Enhance information technology and cybersecurity capabilities

Program Change Summary (\$ in Millions)

FY 2020 resources (\$M):

FY 2020 Request*: \$34.393

* Includes cost for program management and administrative support for projects.

FY 2019 resources (\$M):

FY 2019 Request: \$38.578

Congressional increase: +\$15.000

Total FY 2018 Appropriated: \$53.578

FY 2018 resources (\$M):

FY 2018 Request: \$37.401

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Exhibit P-40, Budget Line Item Justification: PB 2020 Office of the Secretary Of Defense		Date: March 2019
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>Congressional increase: +\$30.000 Total FY 2018 Appropriated: \$67.401</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 - Electron Beam Direct Write: This project addresses a need for an advanced lithography tool for government integrated circuit developments. It will have benefits in vastly reduced mask costs, improved design turn-around times, improved yield & reliability, improved design security (trust), and increased die sizes. Production versions of this tool would be inserted in U.S. integrated circuit foundries fabricating parts for space and defense applications at a relatively low cost (versus commercial advanced lithography solutions in development) per system. The project will accomplish the first such insertion. The project is to complete the development of a piece of lithography equipment that uses multiple electron beams (e-beams) to enable the direct transfer ("writing") of integrated circuit layer descriptions to a physical wafer being processed. Accomplishing this project brings a host of benefits when coupled with 1 D (1-dimensional or "unidirectional") layout techniques as part of a complementary ebeam write (CEBW) methodology. Project was executed using available prior year funding.</p> <p>NSS ISB - Photovoltaic Production Enhancements: The purpose of this effort is to help domestic 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 of increasing the cell Beginning-of-Life efficiency and reduce End-of-Life cost per watt.</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) project 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, investigate 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. Project funding was reallocated to reflect updated project requirements.</p> <p>NSS ISB - Radiation-Hardened Digital/Analog Production & Qualification: This 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 Trusted, 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, design flow, optimize selected circuit designs to reduce power and increase performance and complete the design, fabrication, test 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. Project was initiated using available prior year funding.</p> <p>NSS ISB - Trusted Field Programmable Gate Arrays (FPGAs): 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 do not meet the DoD requirements for Trusted systems as they 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 ensure the availability of advanced "Trusted" and space qualified reprogrammable FPGA technology to support DoD/IC applications including satellite and strategic missile systems. Concerning this effort "Trust" 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. Project funding was reallocated to reflect updated project requirements.</p>		

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Exhibit P-40, Budget Line Item Justification: PB 2020 Office of the Secretary Of Defense		Date: March 2019
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>NSS-ISB - Radiation Test Facilities: Radiation test facilities remain a critical asset to NSS and all of DoD to be able to quantify and qualify the radiation hardness of electronic components. This funding will upgrade and sustain these facilities to fulfill this need. As program budgets shrink in upcoming years, programs are less willing to sustain these facilities, leaving the burden on SMC and the NRO to fund them out of their ever shrinking O&M budget. Without assistance, one of the critical facilities will close (costing over \$1B to reconstitute). Without the current test infrastructure, the DoD would be very under capacity for this capability. Project funding was reallocated to reflect updated project requirements.</p> <p>NSS ISB - High Strength/High Modulus (HS/HM) Carbon Fibers: This investment program will ensure there is a domestic industry of qualified to produced High Strength and High Modulus (HS/HM) carbon fibers for NSS and Defense applications. The program's purpose is to reduce inherent supply chain risks associated with a sole source foreign producer in Japan of unique and proprietary level materials while making available to DoD existing domestic second sources of similar materials that are reportedly higher quality, better performing and less expensive. Project funding was reallocated to reflect updated project requirements.</p> <p>NSS ISB - Mercury Cadmium Telluride Infrared Sensors: The goal of this program 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 to demonstrate on-shore MCT detectors are equivalent in performance to IRFPAs utilizing off-shore substrates.</p> <p>Projects Other (non-NSS)/ISB:</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 security system is designed to confirm the integrity of the container and report breaches to the cognizant authorities. 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. Project was funded using prior year funding.</p> <p>Next Generation Jammer Gallium Nitride (GaN) MMIC & Wideband Circulator Technologies (Prior Years and FY 2017- FY 2019): This project is an investment in production technology and capacity expansion for gallium nitride (GaN) monolithic microwave integrated circuits (MMICs) and wideband circulator technologies for Next Generation Jammer (NGJ) program requirements. The objective is to establish/expand one or more domestic sources for GaN integrated circuit components to ensure the availability of critical components required for the Next Generation Jammer and other electronic warfare systems. Additionally, this initiative will mitigate program risk by ensuring on-shore availability of critical components, maintain secure sources for these essential electronic components through oversight of sources and processes, and address process and quality improvements to drive down costs. Project funding was reallocated to reflect updated project requirements.</p> <p>Strategic Radiation Hardened Trusted Microelectronics Foundry: This project was a new start in FY 2018. This project provides an assured capability to produce or acquire strategic radiation hardened trusted microelectronics consistent with Department of Defense Instruction 5200.44 to supply necessary microelectronic components for necessary radiation environments involved with the acquisition of delivery systems for nuclear weapons. It 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.</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. Project funding was reallocated to reflect updated project requirements.</p>		

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Exhibit P-40, Budget Line Item Justification: PB 2020 Office of the Secretary Of Defense		Date: March 2019
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>Lithium Sea-Water Batteries: This is a new start project using prior year funds. The project is to procure a pilot plant for to produce specialized Lithium Sea-Water batteries for Navy Sonobuoys utilizing the Next Generation Airborne Passive Sensor. The project includes design, testing, and validation of the batteries pilot plant line. This includes development and construction of pilot lines for circular protected lithium electrodes, catalyzed cathodes, and battery assembly to meet Navy production requirements.</p> <p>Alane (AlH3) Fuel: This project will create the domestic manufacturing capability for Aluminum Hydride (AlH3) or "Alane" Fuel. Alane-powered fuel cells are higher energy-density than traditional lithium ion batteries on the market and will meet the required form factors for all defense needs. Lightweight cells made with Alane reduce the burden that soldiers must carry and therefore increase mobility, operational effectiveness, and survivability of the soldiers and systems they are used in. 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.</p> <p>Shielded Infrastructures: The purpose of this follow-on effort is to leverage the success of the original DPA Title III project for Conductive Composite Nanomaterials by integrating and scaling the technology (chemical vapor deposited nickel coated nano-materials) into other novel applications such as non-metallic enclosures, cases, laminates, injection moldings, wallpapers, paints, windows, etc.</p>		

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Exhibit P-5, Cost Analysis: PB 2020 Office of the Secretary Of Defense **Date:** March 2019

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
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ID Code (A=Service Ready, B=Not Service Ready) : **MDAP/MAIS Code:**

Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Procurement Quantity (Units in Each)	-	-	-	-	-	-
Gross/Weapon System Cost (\$ in Millions)	219.884	67.402	53.578	34.393	-	34.393
Less PY Advance Procurement (\$ in Millions)	-	-	-	-	-	-
Net Procurement (P-1) (\$ in Millions)	219.884	67.402	53.578	34.393	-	34.393
Plus CY Advance Procurement (\$ in Millions)	-	-	-	-	-	-
Total Obligation Authority (\$ in Millions)	219.884	67.402	53.578	34.393	-	34.393

(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)

Initial Spares (\$ in Millions)	-	-	-	-	-	-
Gross/Weapon System Unit Cost (\$ in Millions)	-	-	-	-	-	-

Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.

Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 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																		
Recurring Cost																		
Program Management and Administrative Support	-	-	6.099	-	-	6.098	-	-	6.100	-	-	6.100	-	-	-	-	-	6.100
<i>Subtotal: Recurring Cost</i>	-	-	<i>6.099</i>	-	-	<i>6.098</i>	-	-	<i>6.100</i>	-	-	<i>6.100</i>	-	-	-	-	-	<i>6.100</i>
Non Recurring Cost																		
NSS ISB: Electron Beam Direct Write	-	-	32.300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NSS ISB: Photovoltaic Substrates Supply Chain Diversification	-	-	1.330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NSS ISB: Next Generation Reaction Wheels Assembly	-	-	1.229	-	-	-	-	-	1.454	-	-	1.700	-	-	-	-	-	1.700
NSS ISB: Radiation-Hardened Digital/ Analog Production & Qualification	-	-	8.500	-	-	-	-	-	0.987	-	-	5.650	-	-	-	-	-	5.650
NSS ISB: Cadmium Zinc Telluride Substrates	-	-	7.890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NSS ISB: Next Generation Star Trackers	-	-	12.367	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Exhibit P-5, Cost Analysis: PB 2020 Office of the Secretary Of Defense													Date: March 2019					
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 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 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)
NSS ISB: Trusted Field Programmable Gate Arrays	-	-	6.851	-	-	-	-	-	-	-	-	3.129	-	-	-	-	-	3.129
NSS ISB: Radiation-Hardened Transistors & Diodes	-	-	2.996	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NSS ISB: Radiation Test Facilities	-	-	0.614	-	-	-	-	-	0.302	-	-	-	-	-	-	-	-	-
NSS ISB: HS/HM Carbon Fibers	-	-	3.839	-	-	-	-	-	1.874	-	-	-	-	-	-	-	-	-
NSS ISB: Mercury Cadmium Telluride	-	-	13.900	-	-	-	-	-	-	-	-	3.025	-	-	-	-	-	3.025
NSS ISB: Photovoltaic Production Enhancements	-	-	2.767	-	-	-	-	-	16.593	-	-	1.500	-	-	-	-	-	1.500
<i>Subtotal: Non Recurring Cost</i>	-	-	<i>94.583</i>	-	-	-	-	-	<i>21.210</i>	-	-	<i>15.004</i>	-	-	-	-	-	<i>15.004</i>
<i>Subtotal: Hardware - National Security Space (NSS) Industrial & Supply Base (ISB) Risk Mitigation Program Cost</i>	-	-	<i>100.682</i>	-	-	<i>6.098</i>	-	-	<i>27.310</i>	-	-	<i>21.104</i>	-	-	-	-	-	<i>21.104</i>
Hardware - Other Cost																		
Non Recurring Cost																		
Secure Composite Shipping Containers	-	-	16.800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thin Wall Castings for Military Applications	-	-	18.273	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Circular Lithium-Sea Water (Li-SW) Batteries	-	-	10.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Next Generation Jammer Gallium Nitride (GaN) MMIC & Wideband Circulator Technologies	-	-	31.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scale Up of Green Energetic (DBX-1)	-	-	4.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Next Generation Soldier Protection	-	-	21.320	-	-	13.980	-	-	-	-	-	-	-	-	-	-	-	-
Modernized Production Adenovirus Vaccine (MPAV)	-	-	15.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

UNCLASSIFIED

Exhibit P-5, Cost Analysis: PB 2020 Office of the Secretary Of Defense													Date: March 2019					
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 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 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)
Alane (AlH3) Fuel	-	-	-	-	-	19.000	-	-	-	-	-	-	-	-	-	-	-	-
Activated Carbon Capacity Expansion	-	-	2.809	-	-	2.160	-	-	-	-	-	-	-	-	-	-	-	-
Shielded Infrastructure	-	-	-	-	-	6.163	-	-	5.724	-	-	-	-	-	-	-	-	-
Strategic Radiation Hardened Trusted Microelectronics Foundry	-	-	-	-	-	20.001	-	-	20.544	-	-	13.289	-	-	-	-	-	13.289
<i>Subtotal: Non Recurring Cost</i>	-	-	119.202	-	-	61.304	-	-	26.268	-	-	13.289	-	-	-	-	-	13.289
<i>Subtotal: Hardware - Other Cost</i>	-	-	119.202	-	-	61.304	-	-	26.268	-	-	13.289	-	-	-	-	-	13.289
Gross/Weapon System Cost	-	-	219.884	-	-	67.402	-	-	53.578	-	-	34.393	-	-	-	-	-	34.393