Department of Defense
Fiscal Year (FY) 2017 President's Budget Submission

February 2016

Office of the Secretary Of Defense

Defense-Wide Justification Book Volume 1 of 1

Defense Production Act Purchases

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Table of Volumes

Volume 1 Table of Contents

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Defense-Wide
FY 2017 President's Budget
Exhibit P-1 FY 2017 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Jan 2016

Appropriation: 0360D Defense Production Act Purchases

Line No	Item Nomenclature	Ident Code	FY 2015 (Base & OCO) Quantity	FY 2015 (Base & OCO) Cost	FY 2016 Base Enacted Quantity	FY 2016 Base Enacted Cost	FY 2016 OCO Enacted Quantity	FY 2016 OCO Enacted Cost	FY 2016 Total Enacted Quantity	FY 2016 Total Enacted Cost	Sec
Budget Activity 01: Defense Production Act Purchases											
	Defense Production Act Purchases										
1	Defense Production Act Purchases	A		96,638		76,680				76,680	U
	Total Defense Production Act Purchases			96,638		76,680				76,680	
	Total Defense Production Act Purchases			96,638		76,680				76,680	

P-1C1: FY 2017 President's Budget (Published Version of PB Position), as of January 11, 2016 at 10:38:45

Defense-Wide
FY 2017 President's Budget
Exhibit P-1 FY 2017 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Jan 2016

Appropriation: 0360D Defense Production Act Purchases

Line No	Item Nomenclature	Ident Code	FY 2017 Base Quantity	FY 2017 Base Cost	FY 2017 OCO Quantity	FY 2017 OCO Cost	FY 2017 Total Quantity	FY 2017 Total Cost	Sec
Budget Activity 01: Defense Production Act Purchases									
Defense Production Act Purchases									
1	Defense Production Act Purchases	A		44,065				44,065	U
Total Defense Production Act Purchases				44,065				44,065	
Total Defense Production Act Purchases				44,065				44,065	

P-1C1: FY 2017 President's Budget (Published Version of PB Position), as of January 11, 2016 at 10:38:45

Line Item Table of Contents (by Appropriation then Line Number)

Appropriation 0360D: Defense Production Act Purchases

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Line Item Table of Contents (Alphabetically by Line Item Title)

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Exhibit P-40, Budget Line Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
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:** TitleIII / 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	Item MDAP/MAIS Code(s): N/A	

Resource Summary	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
Procurement Quantity *(Units in Each)*	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Cost *($ in Millions)*	1,598.637	96.638	76.680	44.065	-	44.065	37.109	38.657	35.939	30.348	Continuing	Continuing
Less PY Advance Procurement *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-
Net Procurement (P-1) *($ in Millions)*	1,598.637	96.638	76.680	44.065	-	44.065	37.109	38.657	35.939	30.348	Continuing	Continuing
Plus CY Advance Procurement *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-
Total Obligation Authority *($ in Millions)*	**1,598.637**	**96.638**	**76.680**	**44.065**	**-**	**44.065**	**37.109**	**38.657**	**35.939**	**30.348**	**Continuing**	**Continuing**
(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)												
Initial Spares *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-
Flyaway Unit Cost *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Unit Cost *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-

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 U.S. defense systems. DPA Title III is unique in that it is the sole DoD program focused on creating, maintaining, protecting, 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. App. 2061 et seq. 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 key technologies 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. App. 2061 et seq.), 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 for technologies and/or materials essential for the execution of the national security strategy of the United States will be provided via letter notification before the referenced projects are initiated.

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Exhibits Schedule				Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Exhibit Type	Title*	Subexhibits	ID CD	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			- / 1,598.637	- / 96.638	- / 76.680	- / 44.065	- / -	- / 44.065
P-40	**Total Gross/Weapon System Cost**			**- / 1,598.637**	**- / 96.638**	**- / 76.680**	**- / 44.065**	**- / -**	**- / 44.065**

Exhibits Schedule				FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
Exhibit Type	Title*	Subexhibits	ID CD	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			- / 37.109	- / 38.657	- / 35.939	- / 30.348	Continuing	Continuing
P-40	**Total Gross/Weapon System Cost**			**- / 37.109**	**- / 38.657**	**- / 35.939**	**- / 30.348**	**Continuing**	**Continuing**

*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 Quadrennial Defense Review (QDR) and the Long Range Research and Development Plan (LRRDP). 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. Technology focus areas include space, undersea, air dominance, strike, missile defense, and emerging technologies.

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. FY 2017 and outyear funds will develop projects in response to risk mitigation determinations and prioritized critical requirements of stake holders in DoD and other agencies, as represented through the Department's Space Industrial Base Working Group.

Program Change Summary ($ in Millions)

FY 2017 resources ($M)
$ 20.141 Previous President's Budget
+ 23.924 Realignment of resources for DoD priorities (listed below)
$ 44.065 FY 2017 Current President's Budget request

FY 2017 Realignment of DoD resources $23.924:
+ $15.000 Support for the National Security Space Industrial and Supply Base - Space Industrial Base Capabilities
+ $ 7.200 Support for a DoD advanced microelectronics Trusted Foundry
+ $ 2.000 Navy's Next Generation Jammer gallium nitride (GaN) monolithic microwave integrated circuits (MMICs) and wideband circulator technologies for Next Generation Jammer (NGJ) program requirements
- $ .276 Efficiencies and Inflation Adjustments

FY 2016 resources ($M):

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$ 46.680 Previous President's Budget request
+ 30.000 Congressional increase
$ 76.680 Total Appropriated

FY 2015 resources ($M):
$ 21.638 FY 2015 request
+ 30.000 Congressional increase
$ 51.638 Total Appropriated
+ 45.000 Transfer from Department of Energy for Advanced Drop-In Biofuel Production
$ 96.638 Revised Total

$30.000 FY 2015 Congressional increase was applied to the following projects, whose total values exceeded the amount of the Congressional increase:
Activated Carbon Capacity Expansion ($13.865)
Thin Wall Castings for Military Applications ($18.273)

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.

FY 2017 Project Descriptions

NSS-ISB - Space Industrial Base Capabilities (FY 2017 and outyears): projects will 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. Funds will develop projects in response to risk mitigation determinations and prioritized critical requirements of stake holders in DoD and other agencies, as represented through the Department's Space Industrial Base Working Group.

Projects Other (non NSS-ISB):
Advanced Microelectronics Trusted Foundry (FY 2017 new start): This project supports the Department's efforts to maintain domestic trusted sources of advanced microelectronics production. AT&L's strategy is focused on improving capability to evaluate and validate trust of microelectronics parts and advance standards to incentivize the commercial marketplace to recognize trust as a competitive design standard, and develop alternative approaches to the current manufacturing-driven means of trust to enable broader DoD access to commercial state of the art technology.

Next Generation Jammer GaN MMIC and Wideband Circulator (FY2017- FY2019 and Prior Years): 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.

FY 2016 Project Descriptions

Advanced Weapon Component/Materials Production (FY 2016 – continuing): This line item includes the FY 2016 Congressional increase of $30 million. The purpose of this continuous effort is to use DPA Title III authorities to make investments in the domestic industrial base that maintain the timely availability of critical-need, technologically superior production capabilities that are independently available within the U.S. for both current and future weapon systems, as informed by the Department's key investment strategy documents including the Quadrennial Defense Review (QDR) and the Long Range Research and Development Plan (LRRDP). These resources will focus on projects that span multiple agencies, weapons platforms, and Service needs, enabling the production of capacity for technologies and materials

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emerging from the technology base that the private sector is unable to respond to within DoD timelines. Technology focus areas include space, undersea, air dominance, strike, missile defense, and emerging technologies.

NSS ISB - Cadmium Zinc Telluride Substrates (Prior Years – FY 2016): The purpose of this potential project is to enhance the ability of the domestic industrial base to produce large format, space-qualified cadmium zinc telluride (CZT) substrates for use in government satellite systems. Due to evolving National Security Space (NSS) threat requirements, several agencies responsible for missile early warning, missile defense, and other space requirements need to maintain a strong industrial base for mercury cadmium telluride (MCT) based infrared detector technology. A key material for the MCT detector arrays is the lattice-matching substrate CZT on which the detector array is grown. Existing domestically-produced CZT substrates do not meet the size and quality requirements necessary to produce large, space-quality infrared focal plane arrays. The focus of this effort will be on the expansion of CZT boule growth and large format, (211)-oriented substrate production; the stretch objective is the production of 9cm x 9.5cm substrates from 150mm diameter boules.

NSS ISB - Electron Beam Direct Write (FY 2016 new start): 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 proposed 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.

NSS ISB - Next Generation Reaction Wheel Assemblies (RWA) (FY 2016 new start): 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.

NSS ISB - Next-Generation Star Trackers System (Prior Years – FY 2016): This project will establish the development and production of an affordable and reliable modular, Next Generation Star Tracker System (NGSTS) that uses advanced domestically-produced Complementary Metal Oxide Semiconductor (CMOS) detectors with a capability that meets the specifications of the DPA Title III Advanced CMOS Capability Project. This involves adherence to the Staring Technology for Enhanced Linear Line-of-site Angular Recognition (STELLAR) specification. A NGSTS with CMOS technology is needed to meet military and civil US Government (including National Security Space) and commercial market demands for the foreseeable future, and will reassert the viability and competitiveness of the domestic industrial base.

NSS ISB - Photovoltaic Substrates Supply Chain Diversification (FY 2016 new start): The purpose of this effort is to improve national security by addressing a critical gap in the North American supply chain for defense-critical, high-purity germanium (Ge) metal used for space-qualified photovoltaics in a wide range of warfighting and surveillance assets. Those assets include ground-based infrared (IR) optics for night vision operations, airborne IR windows and optical systems, space-based IR optics, and high-efficiency, multi-junction (M-J) photovoltaics (solar cells) used on over 95% of all space satellite assets, both Government and commercial. The investment will ensure the long-term domestic supply of space-qualified Ge substrates by successfully diversifying into higher-margin products that will maintain profitability and allow the company to serve Ge wafer markets.

NSS ISB - Radiation-Hardened Digital/Analog Production & Qualification (FY 2016 new start): 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 (MC-GPP) 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 45nm ASIC/ASSP 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.

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NSS ISB - Radiation-Hardened Transistors & Diodes (FY 2016 new start): Many present and future DoD and intelligence systems have identified Rad Hard components as a critical base technology. There are very few remaining suppliers of Rad Hard space qualified components such as diodes, Metal Oxide on Silicon Field Effect Transistors (MOSFET), insulated-gate bipolar transistor (IGBT), Optocouplers and other Optical devices, Glassless diodes, JANKC diode dies, and more. These components are used almost universally to provide power and conditioned signals to Application-Specific Integrated Circuit (ASIC) and Field Programmable Gate Arrays (FPGA) circuits. Since this is an extremely niche market, a single company is the only manufacturer of components that designs and produces entirely with US persons in a US facility, and specializes in military, aerospace and space. The company also provides products to commercial space, to companies such as Boeing, Lockheed Martin, and Space Systems Loral. The reduction in demand for strategic radiation hardened electronics (RHE) (e.g., >1Mrad total ionization dose) over the past 15 years has resulted in a substantial decrease of the industrial base, which is down to two main suppliers, and only one supplier, which designs and manufactures their components in the USA today and has a proven process for Rad Hard by Design products.

NSS ISB - Trusted Field Programmable Gate Arrays (FPGAs) (FY 2016 new start): 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.

Projects Other (non NSS-ISB):

Secure Composite Shipping Containers Production Capacity (FY 2016 - FY 2019 new start): 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.

FY2015 Project Descriptions

NSS ISB - Additive Manufacturing for Liquid Rocket Engines (Prior Years – FY 2015): Awarded in July 2014, this project aims to advance the domestic capability for precision manufacturing of components utilized by National Security Space (NSS) agencies to launch critical assets into Earth orbit. Advanced additive manufacturing equipment, now being deployed, provides up to a 600% volumetric increase in the powder bed compared to existing additive manufacturing equipment. This essential equipment provides the necessary build envelope and capabilities to produce larger critical components for liquid rocket engines (LREs). The industrial base for precision manufactured components for LREs is high cost and is facing component obsolescence challenges. Direct Metal Laser Sintering (DMLS), an additive manufacturing technique, is estimated to provide a 30% to 80% reduction in critical component cost and schedule for upper stage precision manufactured components. Under this effort the contractor will establish and ex-situ qualify the production of various RL10 and RS-68 nickel, aluminum, and copper LRE components.

NSS ISB - Complementary Metal Oxide Semiconductor (CMOS) Focal Plane Arrays (FPA) for Visible Sensors for Star Trackers (Prior Years – FY 2015): This project will expand and enhance the domestic industrial base's ability to produce visible - imagers manufactured using Advanced Complementary Metal Oxide Semiconductor (CMOS) technology. Advanced CMOS imagers are designed to enable flexible visible imaging systems on-board satellite and other systems for DoD and other US Government needs. Current domestic Star Tracker manufacturers are using older, more expensive, and less capable Charged Couple Device (CCD) sensor technology that has put domestic suppliers at a disadvantage with international competitors.

NSS ISB - Read-Out Integrated Circuit (ROIC) Foundry Improvement and Sustainability (Prior Years – FY 2015): This project will maintain minimal yet adequate production capabilities at domestic foundries to assure the necessary supply of strategic ROICs deemed useful for Government space programs. This initiative is driven by low yields due to defect density, large die size and design complexity, and long periods

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of time between orders due to the small market for large format ROICs. Essential systems include Ballistic Missile Defense, Space Tracking and Surveillance System and Exoatmospheric Kill Vehicles that rely on ROIC technology.

NSS ISB - Space Qualified Solar Cell Germanium Substrate Supply Chain (Prior Years – FY 2015): The purpose of this project is to ensure that the Government and its National Security Space (NSS) suppliers can procure defense-critical, NSS-qualified germanium substrates in quantity from a viable, operationally superior US domestic germanium substrate manufacturer. Objectives include increasing quality and yield, implementing internal refining and material recycling capability, expanding product family offering (from 4" substrates to 6" substrates) and reducing cost. Germanium substrates are the basis for the solar cells used on all NSS satellites and are forecast to continue as such for the next 10-15 years.

Projects Other (non NSS-ISB):

Activated Carbon Capacity Expansion (Prior Years – FY 2015): The objective this project is to expand domestic production capacity of activated carbon, which is used by the DoD to protect against many Chemical, Biological, Radiological, and Nuclear (CBRN) agents that could be used during acts of war or terrorism. Copper-silver-zinc-molybdenum-trietheylenediamine (ASZM-TEDA) impregnated activated carbon is the only grade of carbon deemed acceptable by the DoD for collective and personal CBRN protection systems and devices. Currently, DoD relies on a single activated carbon manufacturing facility with one production line to support 70+ DoD systems that utilize ASZM-TEDA activated carbon. The company is not currently incentivized to expand capacity to meet DoD surge requirements. This DPA Title III project will expand domestic manufacturing capacity for activated carbon by partnering with a viable, world-class domestic manufacturer whose production processes will manufacture product to meet both DoD requirements and the needs of non-DoD user communities.

Advanced Drop-In Biofuel Production (Prior Years – FY 2015): This is an effort to establish and scale-up domestic Integrated Biofuel Production Enterprises using three domestic firms. Phase 1 activities evaluated production technology, technical maturity, site selection, plant design, permitting, and detailed cost estimation for four projects. In Phase 2 each of the three firms whose proposals were accepted will construct and commission a biofuel production plant capable of producing renewable, drop-in liquid transportation fuels leveraging existing infrastructure. The renewable fuel will be delivered to DoD fully blended with conventional petroleum and ready for immediate DoD operational use with no modification to distribution or aircraft/ship systems.

Modernization of Steel Plate Production (Prior Years – FY 2015): The purpose of this project is to enhance the domestic manufacturing capability to produce very wide (up to 190 inches) and heavy (over 55 tons) steel plate used in US Navy ship construction. Modernization of plate production processes will improve quality and yield, increase throughput, reduce production cost, and result in improved ship construction efficiency. These improvements translate into less shipyard processing and rework time, and lower ship construction costs. This project will improve domestic manufacturing capability for Navy-grade alloy heavy steel plate by partnering with a viable, world-class domestic manufacturer whose production processes will supply product to meet both DoD requirements and the needs of commercial user communities.

Scale Up of Green Energetics (Prior Years – FY 2015): This project will expand the domestic manufacturing capability for non-toxic (green) drop-in replacement for current primary energetic (explosive) materials that contain toxic compounds. The capabilities associated with existing primary energetic materials, which include lead azide (LA), lead styphnate (LS), and mercury (II) 5-nitrotetrazole (DXN-1), are essential for numerous ammunition, missile and aircraft applications. However, safer alternatives are needed due to the regulated toxins and heavy metals contained in these materials that present dangerous environmental, health and safety concerns. Executive Order 12856 calls for the replacement of toxic materials used by the Federal Government. Current domestic manufacturing capacity for alternative non-toxic primary energetic material is insufficient to meet DoD requirements, and several market barriers exist which inhibit private sector investments in capacity expansion. A public/private partnership under the authorities of Title III of the Defense Production Act will spur industry to increase DBX-1 capacity, thereby enabling DoD to transition from toxic energetics to safer alternatives.

Thin Wall Castings for Military Applications (FY 2015): This DPA Title III project will maintain, modernize and expand the US manufacturing capability for the production of complex, large, multi-core magnesium and aluminum sand casted rotorcraft parts by incentivizing the industrial base through a mix of government and contractor-shared investments. All US Military rotorcraft vehicles require complex, large, multi-core magnesium and aluminum sand casted components to remain operationally viable and combat ready. The US domestic supply base for the production of complex, large, multi-core magnesium and aluminum sand casted components is in need of modernization but does not have adequate profitability or economic incentive to undertake the necessary investments on its own. These investments will be designed and managed to recapitalize aging domestic foundries and to strengthen a diminishing supply base in order to meet DoD rotorcraft part requirements.

Exhibit P-5, Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation / Budget Activity / Budget Sub Activity: 0360D / 01 / 10	P-1 Line Item Number / Title: TitleIII / 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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
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Plus CY Advance Procurement *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-
Total Obligation Authority *($ in Millions)*	**1,598.637**	**96.638**	**76.680**	**44.065**	**-**	**44.065**	**37.109**	**38.657**	**35.939**	**30.348**	**Continuing**	**Continuing**
(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)*	-	-	-	-	-	-	-	-	-	-	-	-

Budget Years Cost values do not sum to the represented total intentionally:
(+) Prior Years Cost Delta: 1,286.646 million

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

Cost Elements	Prior Years			FY 2015			FY 2016			FY 2017 Base			FY 2017 OCO			FY 2017 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: Comp Metal Oxide Semiconductor Focal Plane Arrays for Visible Sensors for Star Trackers	-	-	9.416	-	-	1.690	-	-	-	-	-	-	-	-	-	-	-	-
NSS ISB: Read Out Integrated Circuit (ROIC) Foundry Improvement and Sustainability	-	-	7.832	-	-	2.371	-	-	-	-	-	-	-	-	-	-	-	-
NSS ISB: Cadmium Zinc Telluride Substrates	-	-	6.200	-	-	2.100	-	-	4.100	-	-	-	-	-	-	-	-	-
NSS ISB: Space Qualified Solar Cell Germanium Substrate Supply Chain	-	-	6.180	-	-	1.500	-	-	-	-	-	-	-	-	-	-	-	-
NSS ISB: Additive Manufacturing for Liquid Rocket Engines	-	-	6.000	-	-	0.700	-	-	-	-	-	-	-	-	-	-	-	-

Exhibit P-5, Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation / Budget Activity / Budget Sub Activity: 0360D / 01 / 10	P-1 Line Item Number / Title: TitleIII / 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 2015			FY 2016			FY 2017 Base			FY 2017 OCO			FY 2017 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: Electron Beam Direct Write	-	-	-	-	-	-	-	-	11.500	-	-	-	-	-	-	-	-	-
NSS ISB: Trusted Field Programmable Gate Arrays	-	-	-	-	-	-	-	-	1.500	-	-	-	-	-	-	-	-	-
NSS ISB: Radiation-Hardened Digital/ Analog Production & Qualification	-	-	-	-	-	-	-	-	2.700	-	-	-	-	-	-	-	-	-
NSS ISB: Radiation-Hardened Transistors & Diodes	-	-	-	-	-	-	-	-	2.000	-	-	-	-	-	-	-	-	-
NSS ISB: Next Generation Reaction Wheels Assembly	-	-	-	-	-	-	-	-	0.500	-	-	-	-	-	-	-	-	-
NSS ISB: Photovoltaic Substrates Supply Chain Diversification	-	-	-	-	-	-	-	-	0.800	-	-	-	-	-	-	-	-	-
NSS ISB: Space Industrial Base Capability	-	-	-	-	-	-	-	-	-	-	-	21.000	-	-	-	-	-	21.000
NSS ISB: Next Generation Star Trackers	-	-	6.228	-	-	6.139	-	-	10.402	-	-	-	-	-	-	-	-	-
Subtotal: Non Recurring Cost	-	-	*41.856*	-	-	*14.500*	-	-	*33.502*	-	-	*21.000*	-	-	-	-	-	*21.000*
Subtotal: Hardware - National Security Space (NSS) Industrial & Supply Base (ISB) Risk Mitigation Program Cost	**-**	**-**	***41.856***	**-**	**-**	***14.500***	**-**	**-**	***33.502***	**-**	**-**	***21.000***	**-**	**-**	**-**	**-**	**-**	***21.000***
Hardware - Other Cost																		
Non Recurring Cost																		
Activated Carbon Capacity Expansion	-	-	29.135	-	-	13.865	-	-	-	-	-	-	-	-	-	-	-	-
Modernization of Steel Plate Production	-	-	18.000	-	-	3.000	-	-	-	-	-	-	-	-	-	-	-	-
Scale Up of Green Energetics	-	-	2.000	-	-	2.000	-	-	-	-	-	-	-	-	-	-	-	-
Advanced Drop-In Biofuel Production	-	-	205.000	-	-	45.000	-	-	-	-	-	-	-	-	-	-	-	-
Thin Wall Castings for Military Applications	-	-	-	-	-	18.273	-	-	-	-	-	-	-	-	-	-	-	-

Exhibit P-5, Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation / Budget Activity / Budget Sub Activity: 0360D / 01 / 10	P-1 Line Item Number / Title: TitleIII / 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 2015			FY 2016			FY 2017 Base			FY 2017 OCO			FY 2017 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)
Secure Composite Shipping Containers	-	-	-	-	-	-	-	-	7.267	-	-	2.000	-	-	-	-	-	2.000
Advanced Weapon Component/Materials Production	-	-	-	-	-	-	-	-	35.911	-	-	11.865	-	-	-	-	-	11.865
Advanced Microelectronics Trusted Foundry	-	-	-	-	-	-	-	-	-	-	-	7.200	-	-	-	-	-	7.200
Next Generation Jammer Gallium Nitride (GaN) MMIC & Wideband Circulator Technologies	-	-	16.000	-	-	-	-	-	-	-	-	2.000	-	-	-	-	-	2.000
Subtotal: Non Recurring Cost	-	-	*270.135*	-	-	*82.138*	-	-	*43.178*	-	-	*23.065*	-	-	-	-	-	*23.065*
Subtotal: Hardware - Other Cost	**-**	**-**	***270.135***	**-**	**-**	***82.138***	**-**	**-**	***43.178***	**-**	**-**	***23.065***	**-**	**-**	**-**	**-**	**-**	***23.065***
Gross/Weapon System Cost	**-**	**-**	**1,598.637**	**-**	**-**	**96.638**	**-**	**-**	**76.680**	**-**	**-**	**44.065**	**-**	**-**	**-**	**-**	**-**	**44.065**

Cost Elements	FY 2018			FY 2019			FY 2020			FY 2021			To Complete			Total Cost		
	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: Comp Metal Oxide Semiconductor Focal Plane Arrays for Visible Sensors for Star Trackers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.106
NSS ISB: Read Out Integrated Circuit (ROIC) Foundry Improvement and Sustainability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.203
NSS ISB: Cadmium Zinc Telluride Substrates	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.400
NSS ISB: Space Qualified Solar Cell Germanium Substrate Supply Chain	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.680

Exhibit P-5, Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation / Budget Activity / Budget Sub Activity: 0360D / 01 / 10	**P-1 Line Item Number / Title:** TitleIII / 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:**

Cost Elements	FY 2018			FY 2019			FY 2020			FY 2021			To Complete			Total Cost		
	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: Additive Manufacturing for Liquid Rocket Engines	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.700
NSS ISB: Electron Beam Direct Write	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.500
NSS ISB: Trusted Field Programmable Gate Arrays	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.500
NSS ISB: Radiation-Hardened Digital/ Analog Production & Qualification	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.700
NSS ISB: Radiation-Hardened Transistors & Diodes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.000
NSS ISB: Next Generation Reaction Wheels Assembly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.500
NSS ISB: Photovoltaic Substrates Supply Chain Diversification	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.800
NSS ISB: Space Industrial Base Capability	-	-	21.000	-	-	21.000	-	-	21.000	-	-	15.000	Continuing			Continuing		
NSS ISB: Next Generation Star Trackers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.769
Subtotal: Non Recurring Cost	-	-	*21.000*	-	-	*21.000*	-	-	*21.000*	-	-	*15.000*	*Continuing*			*Continuing*		
Subtotal: Hardware - National Security Space (NSS) Industrial & Supply Base (ISB) Risk Mitigation Program Cost	**-**	**-**	***21.000***	**-**	**-**	***21.000***	**-**	**-**	***21.000***	**-**	**-**	***15.000***	*Continuing*			*Continuing*		
Hardware - Other Cost																		
Non Recurring Cost																		
Activated Carbon Capacity Expansion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.000
Modernization of Steel Plate Production	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.000
Scale Up of Green Energetics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.000
Advanced Drop-In Biofuel Production	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250.000

Exhibit P-5, Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation / Budget Activity / Budget Sub Activity: 0360D / 01 / 10	**P-1 Line Item Number / Title:** TitleIII / 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:**	

Cost Elements	FY 2018			FY 2019			FY 2020			FY 2021			To Complete			Total Cost		
	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)
Thin Wall Castings for Military Applications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.273
Secure Composite Shipping Containers	-	-	3.000	-	-	6.824	-	-	-	-	-	-	-	-	-	-	-	19.091
Advanced Weapon Component/Materials Production	-	-	10.109	-	-	7.833	-	-	14.939	-	-	15.348	Continuing			Continuing		
Advanced Microelectronics Trusted Foundry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.200
Next Generation Jammer Gallium Nitride (GaN) MMIC & Wideband Circulator Technologies	-	-	3.000	-	-	3.000	-	-	-	-	-	-	-	-	-	-	-	24.000
Subtotal: Non Recurring Cost	-	-	*16.109*	-	-	*17.657*	-	-	*14.939*	-	-	*15.348*	*Continuing*			*Continuing*		
Subtotal: Hardware - Other Cost	**-**	**-**	***16.109***	**-**	**-**	***17.657***	**-**	**-**	***14.939***	**-**	**-**	***15.348***	*Continuing*			*Continuing*		
Gross/Weapon System Cost	**-**	**-**	**37.109**	**-**	**-**	**38.657**	**-**	**-**	**35.939**	**-**	**-**	**30.348**	**Continuing**			**Continuing**		

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