

NATIONAL INSTITUTE
OF STANDARDS AND TECHNOLOGY

FISCAL YEAR 2019
BUDGET SUBMISSION TO CONGRESS

**DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
Budget Estimates, Fiscal Year 2019
Congressional Submission**

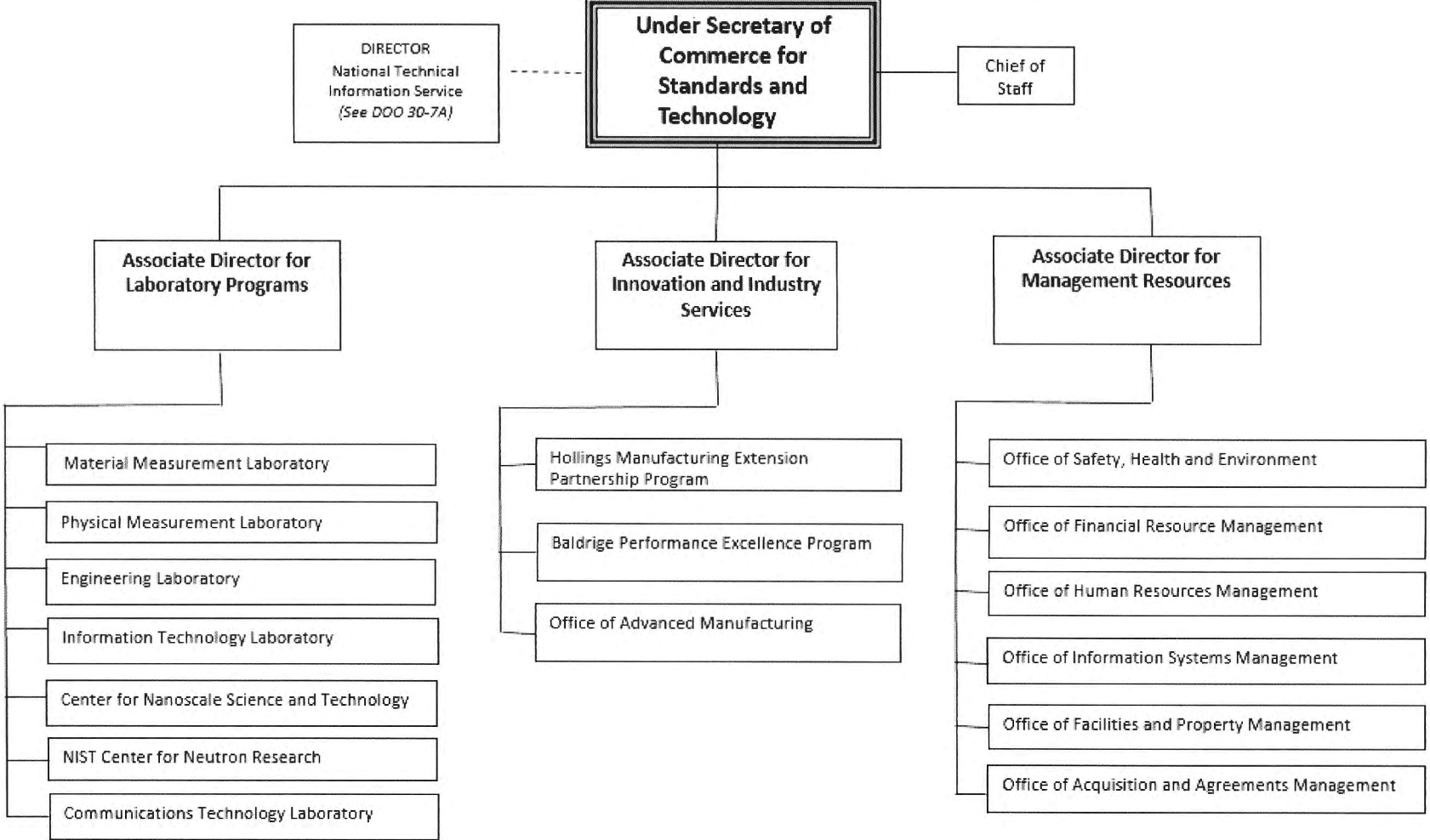
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U.S. DEPARTMENT OF COMMERCE
National Institute of Standards and Technology



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**Department of Commerce
National Institute of Standards and Technology
Budget Estimates, Fiscal Year 2019**

Executive Summary

The FY 2019 budget request is \$629.072 million, \$316.463 million below the FY 2018 Annualized Continuing Resolution level.

The FY 2019 discretionary budget request for NIST includes three appropriation accounts.

1. Scientific and Technical Research and Services (STRS): FY 2019 budget request for STRS is \$573.4 million, \$111.9 million below the FY 2018 Annualized Continuing Resolution level. The National Institute of Standards and Technology (NIST) mission is: To promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. NIST is authorized by the NIST Organic Act (15 USC 271), which outlines major roles for NIST in promoting national competitiveness and innovation. For more than 110 years, NIST has maintained the national standards of measurement, a role the U.S. Constitution assigns to the Federal government to ensure fairness in the marketplace. NIST was founded in 1901 and is one of the Nation's oldest physical science laboratories. Today, the NIST Laboratory Programs work at the frontiers of measurement science ensuring the U.S. system of measurements is firmly grounded on sound scientific and technical principles. Today, the NIST Laboratories address increasingly complex measurement challenges, ranging from the very small (quantum devices for sensing and advanced computing) to the very large (vehicles and buildings), and from the physical to virtual infrastructure (cybersecurity and the internet of things). As new technologies develop and evolve, NIST's measurement research and services remain critical to national defense, homeland security, trade, and innovation.

2. Industrial Technology Services (ITS): The FY 2019 budget request is \$15.1 million, \$136.9 million below the FY 2018 Annualized Continuing Resolution level. The account funds two programs:
 - Manufacturing USA: The FY 2019 budget request for Manufacturing USA is \$15.1 million, \$9.7 million below the FY 2018 Annualized Continuing Resolution level. Manufacturing USA, the National Network for Manufacturing Innovation, serves to create effective robust manufacturing research infrastructure for U.S. industry and academia to solve industry-relevant problems. The Manufacturing USA consists of linked Institutes for Manufacturing Innovation with common goals, but unique concentrations. In an Institute, industry, academia, and government partners leverage existing resources, collaborate, and co-invest to nurture manufacturing innovation and accelerate commercialization. The request continues

to fund the National Institute for Innovation in Manufacturing Biopharmaceuticals manufacturing institute as well as the coordination of the Manufacturing USA network.

- Hollings Manufacturing Extension Partnership (MEP): The FY 2019 President’s Budget request discontinues Federal funding for the MEP program, a reduction of \$127.2 million from the FY 2018 Annualized Continuing Resolution level. In FY 2019, the MEP centers will be required to change to an entirely self-supporting basis. The MEP program is a Federal-state-industry partnership that provides U.S. manufacturers with access to technologies, resources, and industry experts. The MEP program consists of Manufacturing Extension Partnership Centers located across the country that work directly with their local manufacturing communities to strengthen the competitiveness of our Nation’s domestic manufacturing base. Funding for the MEP Centers is a cost-sharing arrangement consisting of support from the Federal government, non-Federal sources including state and local government/entities and fees charged to the manufacturing clients for services provided by the MEP Centers.
3. Construction of Research Facilities: The FY 2019 budget request for CRF is \$40.5 million, \$67.6 million below the FY 2018 Annualized Continuing Resolution level. The President’s Budget provides funds for basic maintenance of NIST’s current facilities.

FY 2019 Budget Request from the FY 2018 Annualized Continuing Resolution Level

Appropriation	(Dollar amounts in millions)					
	FY 2018 Annualized Continuing Resolution Level		FY 2019 President’s Budget		Change from FY 2018 Annualized Continuing Resolution	
	Positions	Amount	Positions	Amount	Positions	Amount
Scientific and Technical Research and Services	2,527	\$685.3	2,150	\$573.4	(377)	(\$111.9)
Industrial Technology Services	101	152.0	20	15.1	(81)	(136.9)
Construction of Research Facilities	116	108.2	116	40.5	0	(67.7)
Working Capital Fund	700	0.0	700	0.0	0	0.0
TOTAL DISCRETIONARY RESOURCES	3,444	945.5	2,986	629.0	(458)	(316.5)

Department of Commerce
National Institute of Standards and Technology
FY 2019 PROGRAM INCREASES / DECREASES / TERMINATIONS
(Dollar amounts in thousands)
(Largest to Smallest)

Decreases

Page No. in CJ	Appropriation	Budget Program	Activity/Subactivity	Positions	Budget Authority
NIST - 24	STRS		Measurement science, services, and programs/Laboratory programs	(325)	(\$91,294)
NIST - 93	CRF		Construction and major renovations/Construction and major renovations	0	(68,297)
NIST - 44	STRS		Measurement science, services, and programs/Standards coordination and special programs	(46)	(23,138)
NIST - 71	ITS		Manufacturing USA	0	(9,807)
NIST - 34	STRS		Measurement science, services, and programs/Corporate services	(6)	(2,218)
Subtotal, Decreases				(377)	(194,754)

Terminations

Page No. in CJ	Appropriation	Budget Program	Activity/Subactivity	Positions	Budget Authority
NIST - 63	ITS		Hollings manufacturing extension partnership/Hollings manufacturing extension partnership	(81)	(127,331)
Subtotal, Terminations				(81)	(127,331)
Total, Increases, Decreases and Terminations				(458)	(322,085)

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**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
SUMMARY OF RESOURCE REQUIREMENTS**
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations	Appropriation
Annualized CR, 2018	2,527	2,492	\$691,175	\$702,388	\$685,314
less: Unobligated balance from prior year	0	0	0	(10,213)	0
less: Transfers from DoJ	0	0	(4,470)	(4,470)	0
less: Transfer from EAC	0	0	(1,391)	(1,391)	0
less: FY 2018 deobligation estimate	0	0	0	(1,000)	0
2019 Adjustments to base:					
plus: Inflationary/Adjustments to base	0	0	4,765	4,765	4,765
2019 Base Request	2,527	2,492	690,079	690,079	690,079
plus: 2019 Program changes	(377)	(377)	(116,650)	(116,650)	(116,650)
plus: Transfer from DoJ	0	0	0	0	0
plus: Transfer from EAC	0	0	1,499	1,499	0
2019 Estimate	2,150	2,115	574,928	574,928	573,429

**Comparison by activity/subactivity
with totals by activity**

		2017		2018		2019		2019		Increase/Decrease	
		Actual		Annualized CR		Base		Estimate		from 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Measurement science, services, and programs											
Laboratory programs	Pos./Approp	2,297	\$604,716	2,297	\$600,610	2,297	\$607,936	1,972	\$516,642	(325)	(\$91,294)
Laboratory programs	FTE/Obl.	2,223	619,357	2,265	608,034	2,265	607,936	1,940	518,141	(325)	(89,795)
Corporate services	Pos./Approp	45	17,311	45	17,193	45	13,850	39	11,632	(6)	(2,218)
Corporate services	FTE/Obl.	44	16,500	45	17,221	45	13,850	39	11,632	(6)	(2,218)
Standards coordination and special programs	Pos./Approp	185	67,973	185	67,511	185	68,293	139	45,155	(46)	(23,138)
Standards coordination and special programs	FTE/Obl.	179	76,252	182	77,133	182	68,293	136	45,155	(46)	(23,138)
TOTALS	Pos./Approp	2,527	690,000	2,527	685,314	2,527	690,079	2,150	573,429	(377)	(116,650)
	FTE/Obl.	2,446	712,109	2,492	702,388	2,492	690,079	2,115	574,928	(377)	(115,151)

**Comparison by activity/subactivity
with totals by activity**

	2017		2018		2019		2019		Increase/Decrease	
	Actual		Annualized CR		Base		Estimate		from 2019 Base	
	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Adjustments for:										
Recoveries		(4,654)		(1,000)		0		0		0
Refunds		(56)		0		0		0		0
Unobligated balance, start of year		(21,719)		(10,213)		0		0		0
Unobligated balance, end of year		10,213		0		0		0		0
Unobligated balance, expired account		7		0		0		0		0
Budget Authority		695,900		691,175		690,079		574,928		(115,151)
Financing from transfers:										
Transfers from DoJ for forensic sciences and OLES		(4,500)		(4,470)		0		0		0
Transfer from Election Assistance Commission		(1,400)		(1,391)		0		(1,499)		(1,499)
Appropriation		690,000		685,314		690,079		573,429		(116,650)

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM AND PERFORMANCE: REIMBURSABLE OBLIGATIONS
(Dollar amounts in thousands)

Comparison by activity/subactivity	2017		2018		2019		2019		Increase/Decrease		
	Actual		Annualized CR		Base		Estimate		from 2019 Base		
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	
Laboratory programs											
Laboratory programs	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
SUMMARY OF FINANCING
(Dollar amounts in thousands)

	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/Decrease from 2019 Base
Total Obligations	\$712,109	\$702,388	\$690,079	\$574,928	(\$115,151)
Offsetting collections from:					
Federal funds	0	0	0	0	0
Non-Federal sources	0	0	0	0	0
Total offsetting collections	0	0	0	0	0
Adjustments for:					
Recoveries and refunds	(4,710)	(1,000)	0	0	0
Unobligated balance, start of year	(21,719)	(10,213)	0	0	0
Unobligated balance, end of year	10,213	0	0	0	0
Unobligated balance, expired	7	0	0	0	0
Budget Authority	695,900	691,175	690,079	574,928	(115,151)
Financing:					
Transfer to other accounts (+)	0	0	0	0	0
Transfers from other accounts (-)	(5,900) ^{1/}	(5,861) ^{1/}	0	(1,499) ^{1/}	(1,499)
Appropriation	690,000	685,314	690,079	573,429	(116,650)

^{1/} Transfers of \$1,400K from EAC and \$4,500K from DOJ in FY 2017; planned transfers of \$1,391K from EAC and \$4,470K from DOJ in FY 2018; and planned \$1,499K from EAC in FY 2019.

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
ADJUSTMENTS TO BASE
(Dollar amounts in thousands)

	<u>FTE</u>	<u>Amount</u>
<u>Other Changes:</u>		
Annualization of FY 2018 pay raise.....	...	\$1,604
2019 Pay increase and related costs.....	...	0
Annualization of positions financed in FY 2018.....	0	0
Change in compensable days.....	...	1,376
Personnel benefits:		
Civil Service Retirement System (CSRS).....	...	(321)
Federal Employees' Retirement System (FERS).....	...	614
Thrift Savings Plan (TSP).....	...	92
Federal Insurance Contribution Act (FICA) - OASDI.....	...	321
Health insurance.....	...	793
Employees' Compensation Fund.....	...	79
Travel and transportation of persons:		
Mileage.....	...	0
Per Diem.....	...	74
Rental Payments to GSA.....	...	3
Communications, utilities, and miscellaneous charges:		
Postage.....	...	2
HCHB Electricity.....	...	0
HCHB Water/Sewer.....	...	0
Electricity rate increase.....	...	261
Natural gas rate decrease.....	...	(126)
Other services:		
Working Capital Fund (Departmental Management).....	...	680
Commerce Business Systems (CBS).....	...	(3,501)
NARA storage costs.....	...	(5)
Working Capital Fund (Departmental Management net admin savings).....	...	0
Scientific journal subscriptions.....	...	186
General pricing level adjustment.....	...	2,633
Total, Adjustments to base.....	0	4,765

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services**

APPROPRIATION ACCOUNT: Scientific and Technical Research and Services

FY 2019 budget request for Scientific and Technical Research and Services (STRS) is \$573.4 million, \$111.9 million below the FY 2018 Annualized Continuing Resolution level. The STRS account contains three budget activities/subactivities: Laboratory Programs, Corporate Services, and Standards Coordination and Special Programs.

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

Activity: Laboratory programs
Subactivity: Laboratory programs

Line Item		2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Strategic and emerging research initiative fund	Pos./Approp	47	\$15,875	47	\$11,747	47	\$11,896	47	\$12,162	0	\$266
	FTE/Obl.	45	20,628	46	12,424	46	11,896	46	12,162	0	266
National measurement and standards laboratories	Pos./Approp	1,888	495,609	1,888	494,290	1,888	500,251	1,587	417,281	(301)	(82,970)
	FTE/Obl.	1,827	503,358	1,861	499,098	1,861	500,251	1,560	418,780	(301)	(81,471)
User facilities	Pos./Approp	266	80,150	266	81,526	266	82,429	242	73,317	(24)	(9,112)
	FTE/Obl.	258	82,405	263	81,875	263	82,429	239	73,317	(24)	(9,112)
Postdoctoral research associateship program	Pos./Approp	96	13,082	96	13,047	96	13,360	96	13,882	0	522
	FTE/Obl.	93	12,966	95	14,637	95	13,360	95	13,882	0	522
Total	Pos./Approp	2,297	604,716	2,297	600,610	2,297	607,936	1,972	516,642	(325)	(91,294)
	FTE/Obl.	2,223	619,357	2,265	608,034	2,265	607,936	1,940	518,141	(325)	(89,795)

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

Activity: Laboratory Programs
Subactivity: Laboratory Programs

Goal Statement

The goal of laboratory programs is to deliver world-class measurement science, standards, and technology to our stakeholders in industry, academia, and government in order to drive technological innovation that strengthens the economic and industrial competitiveness of the United States and improves our quality of life.

Base Program

The NIST laboratory programs work at the frontiers of measurement science ensuring the U.S. system of measurements is firmly grounded on sound scientific and technical principles. The NIST laboratories address increasingly complex measurement challenges, ranging from the very small (quantum devices) to the very large (vehicles and buildings), and from the physical (resilient infrastructure) to the virtual (cybersecurity). As new technologies develop and evolve, NIST's measurement research and services remain central to innovation, productivity, trade, national security, and public safety.

The NIST laboratory programs provide industry, academia, and other Federal agencies with:

- World class research capabilities in measurement science forming the foundation of our global system of weights and measures and enable innovation.
- Basic and applied measurements, calibrations, and standards impacting every aspect of our economy and lives from the accuracy of airplane altimeters, to the reliability of clinical measurements, to the strength of the encryption technologies that protect our digital lives and businesses.
- Unbiased technical support for the development of industry-led, open, consensus-based documentary standards and specifications driving the deployment of advanced technology solutions and facilitate global commerce.
- Unique, cutting-edge user facilities helping over 3,000 scientists from academia and industry move the state of the art forward in advanced materials, nanotechnology, bioscience, and other emerging technology areas.

NIST's mission is essential for U.S. commerce and global competitiveness. The Nation's founders knew the importance of weights and measures, that standards and technology are fundamental to effective commerce and trade, representing a critically important role of the Federal government. Article 1 Section 8 of the Constitution gives the government the power to "fix the Standard of Weight and Measures," and Congress established the National Bureau of Standards (renamed NIST in 1988) to do just that. This role makes NIST, a National Metrology Institute, responsible for the dissemination of the fundamental units of measurement, the basis of international trade and commerce, and to enable scientific progress. NIST is the best in the world at what it does. Other nations of the world are now seeking to gain advantage over the United States' leadership in standards, technology and trade by making substantial investments in the work and facilities of their own National Metrology Institutes, such as those in China and Germany.

A clear example of the fundamental and infrastructural nature of NIST's mission space is NIST's work in the dissemination of the time and frequency standards. The dissemination of the time standard, traceable to NIST's atomic clock in Boulder, CO, underpins a tremendous amount of activity in our modern commercial system. For example, NIST official time is used to time-stamp hundreds of billions of dollars in U.S. financial transactions each working day. NIST time is also disseminated to industry and the public through the Internet Time Service which receives about 40 billion automated requests per day to synchronize clocks in computers and network devices. Additionally, other technological breakthroughs that we now take for granted are dependent upon the accuracy and precision of NIST's atomic clocks. This includes cellular telephones, Global Positioning System (GPS) satellite receivers, and the electric power grid.

Furthermore, the investment in the measurement science mission of NIST has proven to have a significant economic impact with a series of economic impact studies showing the average investment in NIST research has a direct benefit to cost ratio of 47:1¹. That is, for every tax dollar invested in NIST, almost \$50 of value is created in the economy year over year.

There is no other private sector, or government entity having capability, capacity, or mission to provide the types of services as those provided by NIST.

Examples of Accomplishments

Recent highlights of accomplishments from the laboratory programs include:

- Biomanufacturing and Bioengineering: NIST has made investments in applied research resulting in new reference materials that will provide much-needed measurement science and standards capabilities to the growing biotherapeutics and engineering biology industries. Sales continue for NIST's exhaustively analyzed antibody protein to help the biopharmaceutical industry ensure the quality of treatments and genome reference materials for gene sequencing, providing laboratories with even more capability to accurately map DNA for genetic testing, medical diagnoses, and future customized drug therapies. In 2017, NIST

¹ <https://www.nist.gov/director/summary-nist-laboratory-economic-impact-studies>

was granted a U.S. patent for a cell-line authentication method that researchers, medical laboratories, and drug manufacturers can use to verify the type and quality of mouse cells used in their experiments, to eliminate potential sources of error.

- Advanced Manufacturing: NIST launched the Smart Manufacturing Systems Test Bed, an innovative model factory that will facilitate the advanced manufacturing technology known as the “digital thread” helping manufacturers cut costs, provide higher quality goods, and shorten production time by as much as 75 percent. The digital thread project enables the repurposing, reuse, and traceability of information throughout the product lifecycle. The digital thread relies on standardized, three-dimensional models for electronically exchanging and processing information all the way from design through inspection of the final part. The test bed is a shared resource with a suite of software tools, real-world manufacturing equipment, and services for online data streaming and storage. Researchers from academic institutions and public-private consortia have already begun using data available from the test bed.
- Advanced Materials for Manufacturing: At the request of the U.S. Mint, NIST rapidly developed three new materials with the capability to reduce the production costs for U.S. nickels, dimes and quarters, while maintaining compatibility with current vending, production and security requirements. In half the time it would normally take, NIST produced the desired materials with all required attributes (including electrical conductivity, corrosion resistance, color, and low cost) using predictive models developed by NIST. Four patent applications have been filed associated with this work.
- Quantum Based Measurements: NIST recently demonstrated a Chained Bell Test experiment to probe a fundamental assumption of quantum mechanics coined by Albert Einstein as “spooky actions at a distance”, the idea that ions can have undetermined local properties, or can influence each other faster than the speed of light. The method used by this team of researchers, led by Nobel Laureate David Wineland, uses a series of manipulations of ions to produce stronger statistical results than conventional so-called Bell tests. The researchers used an ion trap setup -- similar to what is used in quantum computing experiments -- to perform these experiments.

This small subset of recent accomplishments is representative of the diverse nature of scientific needs satisfied by the laboratory programs. Many more interesting accomplishments and industry impacts can be found at: <https://www.nist.gov/director/pao>

Statement of Operating Objectives

Priority Objectives for FY 2019

NIST Laboratory Research Priorities

As industry’s national laboratory, NIST is dedicated to supporting U.S. competitiveness through the delivery of measurements and standards in areas of national priority from advanced communications and cybersecurity to advanced manufacturing and disaster resilience. To ensure its research programs are aligned with national needs, NIST continually collects information on major national

issues, monitors shifting trends in science and technology, and reviews the performance of internal operational processes. This is accomplished through a variety of mechanisms including meetings, workshops, industry visits, external advisory boards, and annual independent peer review of its programs. This input is viewed in the context of the NIST mission to make decisions on where NIST needs to develop specific capabilities, how to best marshal existing resources to address current issues, and how to continually optimize the organization for improved performance.

To continue to be the bedrock of innovation in the U.S., NIST must continue to grow new capabilities over the next decade. Based on input from stakeholders within the institute, across government, and in industry and academia NIST will prioritize efforts to expand and strengthen its research efforts in the following areas:

- **Enabling the future bioeconomy.** As proof-of-concept academic work in engineering biology meets the market realities of bringing lab science to product initiation, there are questions in how to compare biological products, measure whether desired outcomes are realized, and optimize biological systems for desired behaviors. NIST will deliver tools and standards to measure biological technologies, outputs, and processes that will enhance economic sectors from healthcare to manufacturing and beyond.
- **Unleashing the economic potential of the Internet of Things (IoT).** The IoT generally refers to scenarios where network connectivity and computing capability extends to objects, sensors, and everyday items not normally considered computers, allowing these devices to generate, exchange, and consume data with minimal human intervention. Robust, secure, and competitive technology advances in the IoT must be built on a solid foundation of measurement and standards. NIST will develop new tools and approaches for IoT systems' security, establish technologies to relieve network congestion and device interference, and facilitate greater confidence in device interoperability.
- **Enhancing mission-critical research through Artificial Intelligence (AI) and data.** NIST will develop resources and expertise to apply AI and big data techniques to measurement science, including curated datasets to train and test AI systems, model AI behavior and compare AI systems, and apply AI to research efforts where big data requires the application of advanced learning algorithms.
- **Revolutionizing commerce through quantum measurements.** In May 2019, the International System of Units (SI) is slated to be redefined with units based on fundamental constants of nature, and NIST must lead in this transition to quantum definitions. NIST will use its world-leading quantum science expertise to develop physical reference standards and "self-calibrating" sensors that will enable a world where measurement devices are ubiquitous, reliable, and affordable.

Explanation and Justification

Summary of Resources (Dollars in Thousands)

	FY 2017 Enacted		FY 2018 Annualized CR		FY 2019 Request	
	Personnel	Amount	Personnel	Amount	Personnel	Amount
Pos./Approp.	2,297	\$604,716	2,297	\$600,610	1,972	\$516,642
FTE/Obl.	2,223	619,357	2,265	608,143	1,940	518,141

Laboratory Programs (FY 2019 Request by Program Area shown below. Total Funding: \$516.642 million and 1,972 Positions)

NIST Laboratory Programs is focused on the following mission functions and programmatic areas:

Exploratory Measurement Science (\$47.8 million) – NIST’s mission requires deep expertise in a broad range of disciplines. With research and development projects conducted by the NIST laboratories directly impacting many science and technology sectors – from engineering applications relating to smart systems, communications, and building research to cutting edge basic research in quantum information science, systems biology, atomic physics, and nanomaterials - it is essential that NIST maintain a portfolio of exploratory research programs that provides NIST the ability to invest in higher-risk and potentially transformative measurement science research in order to stay on the cutting-edge of technology so that NIST remains positioned to support U.S. technological interests well into the future. Exploratory research and development funding at NIST supported the early work of all four of NIST’s Nobel Prize winners in Physics (Dr. William Phillips, 1997; Dr. Eric Cornell, 2001; Dr. Jan Hall, 2005; and Dr. David Wineland, 2012). The results from a recently funded project in advanced X-ray sensors is now being used to study cosmological physics, while a simplified spinoff of the same innovation has been commercialized with sales of about \$10 million. Ongoing exploratory projects are revolutionizing the way NIST establishes the basic SI units, with the goal of embedding NIST quantum measurements on to factory floors, speeding innovation.

Advanced Manufacturing and Material Measurements (\$125.3 million) – A partner to the U.S. manufacturing sector for more than a century, NIST has a proven track record in delivering tools and technical assistance that existing manufacturers and aspiring start-ups need. NIST’s laboratories provide industry with precision measurement technologies, tests, protocols, and world class scientific and engineering knowledge. Through targeted research across of broad portfolio of technologies impacting manufacturing from advanced materials to smart manufacturing systems NIST will continue to ensure that the U.S. remains a competitive force in advanced manufacturing to ensure our economic and national security. The NIST laboratories have prioritized research efforts that support advanced manufacturing by pushing forward the state-of-the-art across multiple key technology areas.

Fundamental Measurement, Quantum Science, and Measurement Dissemination (\$103.2 million) – At the heart of NIST's mission is the dissemination of the fundamental units of measurement. NIST determines the definitive methods for nearly every kind of measurement employed in commerce and research (e.g., length, mass, force, acceleration, time and frequency, electricity, temperature, humidity, and pressure), provides NIST-traceable calibrations, and disseminate standards and best practices throughout the Nation. Additionally, NIST works continuously push the outermost frontiers of metrology, devising new tools and techniques to meet the ever-changing demands of American industry and science.

Advanced Communications, Networks, and Scientific Data Systems (\$51.9 million) – Advances in communications, information, and data collection and analysis are providing extraordinary platforms for innovation, growth, and social progress. These fast-moving fields are creating multiple new measurement and validation challenges and NIST is committed to helping the U.S. achieve and maintain global leadership in these areas.

Cybersecurity and Privacy (\$76.6 million) – NIST is the Department of Commerce lead agency on Cybersecurity issues. NIST works to secure the digital environment through a portfolio that bridges foundational cybersecurity research, applied cybersecurity research and development, and through the development of publicly available standards and technical guidance. Through internal research and collaboration with the private sector, academia, standards development organizations, other government agencies, and national and international stakeholders, NIST is addressing current and future measurement research that supports the Nation's cybersecurity.

Health and Biological Systems Measurements (\$16.2 million) – NIST strives to provide a solid foundation of measurement assurance to enable reproducibility of biomedical research results and confidence in clinical decision-making. As a non-regulatory research agency, NIST plays an essential role in enabling innovations in health and bioscience: medical researchers and manufacturers of diagnostics and treatments rely on NIST research, calibrations, and standards development leadership to help them efficiently develop new products, meet regulatory requirements, and ensure efficacy and safety of treatments. NIST develops the needed measurements to further technology in key emerging bioscience areas, including regenerative medicine, the microbiome, and synthetic biology. New and improved measurement capabilities rapidly progress our understanding of biology – from genomics to engineered biology, to bioinformatics and nutrition – and provide the basis for industries to harness these advances for new medical technologies. NIST is committed to meeting the metrology needs to support this industry by prioritizing research efforts.

Physical Infrastructure and Resilience (\$52.3 million) – The U.S. built environment is critical for economic and social stability and competitiveness. The performance of our physical infrastructure including buildings, roads, electricity grid, and other lifelines can have a profound impact on our daily lives and our ability to thrive, and disruptions to it can have severe consequences.

NIST User Facilities (\$43.3 million) – Industry, academia, and other government agencies have access to unique NIST user facilities that support innovation in emerging technology areas. The NIST Center for Neutron Research (NCNR) provides world-class neutron measurement capabilities to the U.S. research community, and the NIST Center for Nanoscale Science and Technology

(CNST) supports the U.S. nanotechnology enterprise from discovery to production by providing access to world-class nanoscale measurement and fabrication methods and technology. The customer-focused missions of both NCNR and CNST include the development and application of entirely new measurement and fabrication techniques while ensuring safe and reliable facility operations. NIST will continue to provide industry and academia with access to world class neutron measurement capabilities and state of the art nanofabrication and nanometrology facilities.

The work outlined above cuts across the six NIST laboratory organizational units which house the staff and facilities necessary to conduct and deliver the ground-breaking measurement science, standards, and technology work in the focus areas described earlier.

The laboratories are in Gaithersburg, Maryland and Boulder, Colorado. Additional information on recent activities specific to each of these laboratories can be found online through the web sites provided below:

- Communications Technology Laboratory (CTL): The Communications Technology Laboratory advances the measurement science underlying wireless technologies ranging from the microchips that generate and process signals to the antennas that send and receive them. CTL work establishes the metrological foundations for higher speeds, better connections and more ubiquitous access amid rising wireless demand. With expertise honed over decades of theoretical and experimental work in antennas and wireless propagation, materials science, and electronics measurement and testing, CTL is an independent, unbiased arbiter of trusted measurements and standards to government and industry. CTL focuses efforts in establishing vital technological foundations for the ongoing wireless revolution across three primary program areas:
 - Public Safety Communications Research – Conducting research that enables the development of performance-based standards for first responder communications.
 - Spectrum Sharing and Optimization – Facilitating and coordinating spectrum sharing and related engineering capabilities while creating a trusted capability for spectrum sharing evaluations.
 - Next Generation (5G) Wireless – Advancing measurement science for next generation wireless systems including characterizing millimeter wave (mmWave) radio channels and performance assessment.

<https://www.nist.gov/ctl>

- Engineering Laboratory (EL): The Engineering Laboratory conducts research on engineering and manufacturing processes, systems, and equipment; engineering of sustainable and energy efficient buildings; and engineering of disaster resilient buildings, communities, and infrastructure. EL's studies of the scene of major disasters guide research and develop recommendations for design and construction practices to reduce hazards. NIST validates research in realistic end-use scenarios using EL's unique test facilities, including the National Fire Research Laboratory that uniquely combines large scale, realistic environment, and structural loads to study the fire behavior of buildings and construction materials; the Robotics Test Facility for evaluating robotic sensing, manipulation, endurance, and search and rescue performance; and the Net-Zero Energy Residential Facility, a testbed

for combining and assessing new home-scale energy technologies in a realistic environment. EL research and facilities support areas of national importance, such as:

- Disaster Resilience – Advancing the engineering of the built environment to enhance the resilience of U.S. buildings, communities, and infrastructure to earthquakes, wind, and fire.
- Smart Manufacturing – Advancing information exchange, interoperability, and control systems for manufacturing, including robotics and additive manufacturing.
- Sustainability and Energy– Advancing the engineering of sustainable and energy efficient materials, products, and systems used in buildings and building construction.
- Cyber-Physical Systems – Advancing the engineering that accelerates the development of reliable, resilient, and efficient cyber-physical systems, including the smart grid.

<https://www.nist.gov/el>

- Information Technology Laboratory (ITL): The Information Technology Laboratory develops and deploys standards, tests, and metrics to make the Nation's information systems more secure, usable, interoperable, and reliable. ITL's strategy is to maximize the benefits of IT to society through a balanced IT measurement science and standards portfolio of three major activities: fundamental research in mathematics, statistics, and IT; applied IT research and development; and standards development and technology transfer. As a world-class measurement and testing laboratory spanning diverse areas of computer science, mathematics, statistics, and systems engineering, ITL supports areas of national importance, including:
 - Cybersecurity – Bridging foundational and applied cybersecurity research and development and cybersecurity operations through the development of standards and technical guidance.
 - Health Information Technology – Improving quality and reducing costs of healthcare by advancing performance standards and testing tools that enable a robust IT infrastructure.
 - Information Science – Improving the reliability of human-computer interactions, video analytics, data science, and biometrics, and usability of these technologies in areas of national importance.
 - Quantum Information – Analyzing quantum algorithms and developing benchmarks for quantum computer performance.

<https://www.nist.gov/itl>

- Material Measurement Laboratory (MML): The Material Measurement Laboratory is the national reference laboratory for measurements in the chemical, biological and material sciences. MML activities range from research on the composition, structure, and properties of industrial, biological, and environmental materials and processes to the development and dissemination of tools including reference measurement procedures, certified reference materials, critically evaluated data, and

best-practice guides that help assure measurement quality. MML enables measurements in areas of national importance, including:

- Advanced Materials – Providing a gateway to new discoveries that involve nanomaterials, structural steels, complex fluids, and more.
- Energy – Characterizing the performance of fossil, renewable, and next-gen alternative fuels.
- Health Care – Enhancing technology realization in clinical diagnostics, tissue engineering, and more efficient manufacture of biologic drugs.
- Infrastructure – Assessing aging physical infrastructure and determining drinking water quality.
- Manufacturing – Accelerating development of lightweight alloys for fuel-efficient automobiles, materials for advanced electronics, and chemical manufacturing.
- Safety, Security and Forensics – Ensuring confidence in gunshot and explosive residue detection, the performance of body armor materials, and DNA-based human identity testing.

<https://www.nist.gov/mml>

- **NIST Center for Neutron Research (NCNR)**: The NIST Center for Neutron Research is one of the Nation's premier neutron research facilities. The NCNR provides 250 days of reactor operation annually, serves over 2,500 researchers from 165 organizations and labs, and accounts for over half of all U.S. neutron research. The remainder of the year is dedicated to the mandatory maintenance and refueling of the reactor, as it is critical that the research reactor operates in a safe and reliable manner in order to support the NCNR mission. The NCNR is operated as a national user facility using a peer-reviewed, merit-based proposal approach. To address science and engineering problems of major interest, the NCNR continually invests in developing state-of-the-art neutron measurement capabilities:
 - Cold neutrons – NCNR optimizes cold neutrons for studying the structure of materials including polymers, pharmaceuticals, and magnetic materials, a capability constantly evolved through upgrades in enhance productivity for a variety of techniques.
 - Neutron Scattering – Users of the NCNR can probe the structure of materials at the nanometer scale through neutron scattering techniques. NCNR is expanding this capability in 2017 with the installation of an NCNR-developed energy-dispersive detector.
 - Neutron Imaging – NCNR is increasing its outstanding neutron imaging capabilities – which are uniquely able to image light elements, like hydrogen and lithium, and can help researchers optimizing fuel cell and battery designs - a new cold neutron microscope under development.
 - Powerful Partnerships – NCNR develops instrumentation in partnership with other agencies and stakeholders, including the Center for High Resolution Neutron Scattering, co-funded with NSF, and the private-public *n*Soft Consortium focused on soft-matter research.

<https://www.nist.gov/ncnr>

- Physical Measurement Laboratory (PML): The Physical Measurement Laboratory is a world leader in measurement science, developing tools and techniques to meet the demands of American industry and science, providing calibrations, and disseminating standards and best practices. PML develops measurement methods and fundamental science for length, force and shock, time, electricity, gas flow, and radiation that underpin the international system of weights and measures upon which science and the global economy rely. This measurement expertise also helps America address key technical challenges in:
 - Manufacturing – Helping industry improve efficiency by providing measurement solutions, researching new embedded standards, laser welding diagnostics, computer memory technology.
 - Energy – Enabling effective transition to solid state lighting and initiating research to support advanced electric grid, hydrogen fuel cell and rechargeable battery technologies.
 - Healthcare – Providing traceability for medical diagnostics, nuclear medicine treatments, and expanding capabilities into new modalities, like hyperspectral imaging.
 - Quantum science – Leading research in quantum states, photonics, quantum information, quantum computation, and leading the transition to quantum-based measurements.

<https://www.nist.gov/pml>

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
PROGRAM CHANGES FOR 2019
(Dollar amounts in thousands)**

	Pos./BA FTE/Obl.	2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>
Laboratory Programs		2,297	\$607,936	1,972	\$516,642	(325)	(\$91,294)
		2,265	607,936	1,940	518,141	(325)	(89,795)

Laboratory Programs (-325 Positions, -\$91.3 million) -- The funding for the NIST laboratory programs will be reduced by \$91.29 million and proposes the elimination of 325 employees. Of those employees, over 200 of them come from NIST's scientific workforce, a more than 10 percent reduction in scientists and engineers. The request for laboratory programs is approximately a 15 percent reduction from the FY 2018 Annualized Continuing Resolution levels.

NIST will ensure that the agency maintains a robust core competency in underpinning measurement science so that NIST may continue to provide the measurements and standards necessary to drive innovation in key priority areas, which include advanced manufacturing, communications, quantum science, and cybersecurity. At the same time, NIST will seek to support forward looking measurement science research to ensure it is positioned to meet the challenges of the future. To preserve a core foundation in measurement science, NIST is proposing reductions to programs and projects across the NIST laboratory portfolio, targeting those that are of lower priority for reasons such as technology maturity, sub-critical effort, where the work no longer requires the leading-edge measurement science capabilities of NIST, or where services may be acquired from international sources. The impacted areas and proposed reductions are summarized below:

Advanced Manufacturing and Material Measurements (-71 Positions, -\$26.3 million) – The FY 2019 request will reduce NIST's total spending focused on advanced manufacturing and material measurements from \$151.6 million to \$125.3 million a 17.3% reduction. The development and manufacture of new materials is essential to U.S. competitiveness and domestic high-value manufacturing in various economic sectors, including computing, energy, automotive, and textiles. There are significant measurement science and standards challenges with advanced materials. NIST will terminate sub-critical research efforts in thin film photovoltaics reducing the cost of solar energy, inorganic electronic materials critical for electronics, materials for advanced battery systems, as well as capabilities focused on computational modeling and characterization of advanced materials systems. NIST will discontinue lower-priority programs focusing on material reliability measurements for current generation

semiconductors, the advancement of ultraprecise measurement technologies to measure changes in structure and magnetic state of semiconductors, the development and dissemination of 3D nanometer scale dimensional measurements, and research focused on the measurements necessary to advance micro-electrical mechanical systems, very small sensors and devices that have been successfully commercialized in a host of applications from automobiles and smartphones to personal fitness devices. NIST will also eliminate its nanomaterial environment, health, and safety (nano-EHS) program, ending the research and development efforts. As part of this proposed change, NIST will stop development of new silicon nano-EHS standard reference material and will not renew nanoscale reference materials in the current catalog.

Fundamental Measurement, Quantum Science, and Measurement Dissemination (-136 Positions, -\$26.6 million) – The FY 2019 request will reduce NIST’s spending in areas of core metrology and measurement dissemination from \$129.8 million to \$103.2 million, a 20.5% reduction. To consolidate and focus work on NIST efforts in quantum science, while maintaining essential core capabilities in measurement science research and measurement dissemination NIST will eliminate efforts that have been replaced by newer technologies, measurement science work that lies outside of NIST’s core mission space, and programs that can no longer be supported due to facility deterioration.

Specifically, NIST will reduce programs focused on environmental measurements that are used by industry to innovate and comply with state and local regulations. These reductions include measuring the impact of aerosols on pollution and climate change, as well as the impact of volatile organic compounds on indoor air quality. In addition, these reductions eliminate key research staff making it necessary for NIST to halt the production of secondary gas reference materials which help prolong the life of primary reference materials used to calibrate scientific instrumentation, reducing costs for users. NIST will also shut down the NIST marine environment program and our associated partnership with the Hollings Marine Laboratory in Charleston, South Carolina, thus discontinuing maintenance of standard reference materials used to support the measurement of hazards in water, including groundwater and coastal waters. NIST will discontinue the dissemination of the U.S. time and frequency via the NIST radio stations in Hawaii and Ft. Collins, CO. These radio stations transmit signals that are used to synchronize consumer electronic products like wall clocks, clock radios, and wristwatches, and may be used in other applications like appliances, cameras, and irrigation controllers.

NIST will also scale back efforts to disseminate, and halt efforts to improve, and expand the atomic spectra database that serves a wide range of users.

Advanced Communications, Networks, and Scientific Data Systems (-56 Positions, -\$12.1 million) – The FY 2019 request will reduce NIST spending in advanced communications, networks, and scientific data systems from \$64.0 million to \$51.9 million, a 18.9% reduction. NIST will reduce several projects in order to consolidate efforts on highest priority research to address a growing number of measurement science and standards issues converging around Internet of Things, Smart Systems, and Artificial Intelligence and data. NIST will reduce projects focusing on assessment of technologies for indoor location tracking of first responders, support for smart grid communications protocols, as well as the development of standards for the smart grid and other cyber physical systems, including the elimination of work on the development of standards and guidelines for wireless

communications and process control for the manufacturing industry. These reductions will include the elimination of \$7.2 million in contracts and grants to research universities addressing advanced communications, networks and scientific data systems.

Cybersecurity and Privacy (-4 Positions, -\$1.9 million) – Cybersecurity remains a top priority for NIST and reductions to this area have been minimized. The FY 2019 budget request will reduce spending in the areas related to cybersecurity from \$78.5 million to \$76.6 million, a 2.3% decrease. These cuts will not impact the NCCOE, NICE, or efforts to promote the adoption of the cybersecurity framework. NIST will also curtail work on biometrics for commercial and government applications, as well as eliminate the Tool Chain Assurance Research Competition that focuses on reducing bugs in software that reduce security.

Health and Biological Systems Measurements (-20 Positions, -\$4.9 million) – The FY 2019 budget request will reduce NIST's spending on health and biological science measurements not related to biomanufacturing from \$21.1 million to a proposed level of \$16.2 million, a 23.2% reduction. NIST is focusing its efforts in the biosciences to build the measurement science capabilities necessary to support progress in engineering biology and providing the measurement assurance for advanced imaging, gene editing, and other new platform technologies. NIST will eliminate older biological science and health measurement programs focused on measuring DNA damage, characterizing radionuclide based imaging techniques often used in the diagnosis of cancer, and developing new imaging tools to help advance new nanoscale therapies. In addition, NIST will discontinue a line of Standard Reference Material products on dietary health supplements, which have had limited demand outside of their initial use by the National Institutes of Health and the Food and Drug Administration to support labelling.

Physical Infrastructure and Resilience (-21 Positions, -\$5.9 million) – The FY 2019 request will reduce efforts supporting physical infrastructure and resilience from \$58.2 million to \$52.3 million a 10.1% reduction. NIST will continue to develop high-priority measurement methods and disseminate reference materials and data that support innovation in performance and resilience of the built environment. However, NIST will eliminate lower-priority work on certain structural materials characterization and testing, including studies on the weathering of polymers conducted in support of a NIST-led consortia. In addition, NIST will eliminate the extramural Fire Grants Program that funds grants at multiple universities and standards development organizations (SDOs).

NIST User Facilities (-17 Positions, -\$13.6 million) – The FY 2019 request will reduce the funding available to support NIST's user facility efforts from \$56.9 million to \$43.3 million a 23.9% reduction. NIST's user facilities, the NIST Center for Neutron Research (NCNR) and the nanofabrication facility provide over 3,000 scientists from academia and industry unique world-class capabilities that help move the state-of-the-art forward in advanced materials, nanotechnology, bioscience, and other emerging technology areas. To meet the funding levels outlined in the President's FY 2019 budget request, NIST will reduce support at both facilities. At the NCNR, NIST will remove instruments from the user program, selected to have the least impact on the overall user community, stop the development of new instruments, and cut back on support services provided to users. At the

nanofabrication facility, the reduced funds will slow the rate of replacement of the equipment, and reduce the number of staff available to support facility users. The proposed reductions will also eliminate \$1.2 million in research grants related to neutron research and nanotechnology.

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services**

PROGRAM CHANGE PERSONNEL DETAIL

Activity: Laboratory Programs
Subactivity: Laboratory Programs
Program Change: Laboratory Programs

Title	Grade	Number	Annual Salary	Total Salaries
Scientist/Engineer	ZP V	(65)	\$134,271	(\$8,727,587)
Scientist/Engineer	ZP IV	(103)	114,149	(11,737,388)
Scientist/Engineer	ZP III	(19)	81,235	(1,543,459)
Information Technology Specialist	ZP V	(5)	134,271	(671,353)
Information Technology Specialist	ZP IV	(15)	114,149	(1,712,241)
Information Technology Specialist	ZP III	(3)	81,235	(243,704)
Information Technology Specialist	ZP II	(1)	56,016	(56,016)
Administrative Officer	ZA IV	(3)	114,149	(342,448)
Administrative Officer	ZA III	(5)	81,235	(406,173)
Technician	ZT V	(1)	96,597	(96,597)
Technician	ZT IV	(7)	81,235	(568,643)
Technician	ZT III	(10)	61,688	(616,882)
Management and Program Analyst	ZA IV	(16)	114,149	(1,826,390)
Management and Program Analyst	ZA III	(33)	81,235	(2,680,744)
Management and Program Analyst	ZA II	(3)	56,016	(168,049)
Administrative Support	ZA III	(36)	56,016	(2,016,593)
Total		<u>(325)</u>		<u>(33,434,269)</u>
Less lapse		0	0.00%	0
Total full-time permanent (FTE)		<u>(325)</u>		<u>(33,434,269)</u>
2019 pay Adjustment (0.0%)				0
				<u>(33,434,269)</u>

Personnel Data

Full-time Equivalent Employment:

Full-time permanent

(325)

Other than full-time permanent

0

Total

(325)

Authorized Positions:

Full-time permanent

(325)

Other than full-time permanent

0

Total

(325)

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)**

Activity: Laboratory Programs
Subactivity: Laboratory Programs

Object Class	2019 Increase/Decrease
11.1 Full-time permanent compensation	(\$33,434)
11.3 Other than full-time permanent	0
11.5 Other personnel compensation	0
11.8 Special personnel services payments	0
11.9 Total personnel compensation	(33,434)
12.1 Civilian personnel benefits	(10,635)
13 Benefits for former personnel	0
21 Travel and transportation of persons	(494)
22 Transportation of things	(23)
23 Rent, communications, and utilities	0
23.1 Rental payments to GSA	0
23.2 Rental payments to others	0
23.3 Communications, utilities, and misc. charges	(9,368)
24 Printing and reproduction	(120)
25 Other contractual services	0
25.1 Advisory and assistance services	0
25.2 Other services from non-Federal sources	(10,769)
25.3 Other goods and services from Federal sources	(5,568)
25.4 Operation and maintenance of facilities	0
25.5 Research and development contracts	0
25.6 Medicare care	0
25.7 Operation and maintenance of equipment	(1,877)
25.8 Subsistence and support of persons	0
26 Supplies and materials	(978)
31 Equipment	(6,028)
32 Lands and structures	0
33 Investments and loans	0
41 Grants, subsidies and contributions	(12,000)
99.9 Total obligations	(91,294)

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
 (Dollar amounts in thousands)

Activity: Corporate services
 Subactivity: Corporate services

Line Item		2017		2018		2019		2019		Increase/Decrease	
		Actual		Annualized CR		Base		Estimate		from 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Corporate services	Pos./Approp	45	\$17,311	45	\$17,193	45	\$13,850	39	\$11,632	(6)	(\$2,218)
	FTE/Obl.	44	16,500	45	17,221	45	13,850	39	11,632	(6)	(2,218)
Total	Pos./Approp	45	17,311	45	17,193	45	13,850	39	11,632	(6)	(2,218)
	FTE/Obl.	44	16,500	45	17,221	45	13,850	39	11,632	(6)	(2,218)

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

Activity: Corporate Services
Subactivity: Corporate Services

Goal Statement

The goal of the Corporate Services program is to support NIST's mission to deliver world-class measurement science, standards, and technology to our stakeholders in industry, academia, and government to drive technological innovation that strengthens the economic and industrial competitiveness of the United States and improves our quality of life.

Base Program

This program includes the NIST central information technology (IT) support for NIST's mission programs and operations providing secure, centrally managed IT infrastructure resources leading to improved measurement methods, standards advances, reference data, and research results benefiting numerous sectors of the U.S. economy. This program also provides the necessary resources to operate and maintain administrative and financial management systems for NIST that satisfy the requirements established by the Department of Commerce (DOC); Office of Management and Budget; Government Accountability Office; Department of Treasury; and Congress. In FY 2020, NIST plans to merge the corporate services line item with the laboratory programs as the functions are intertwined with accomplishing the goal of delivering world-class measurement science, standards and technology.

Statement of Operating Objectives

In FY 2019, the Corporate Services will focus on the following:

- Complete migration of NIST's business systems to DOC's consolidated hosting environment at the Department of Transportation (DOT) Data Center,
- Maintain compliance with DOC's cybersecurity priorities, and
- Complete migration of Windows 7 endpoints to Windows 10 while relegating Windows 7 endpoints with program-specific requirements to a network restricted to research functions.

Explanation and Justification

Summary of Resources (Dollars in Thousands)

	FY 2017 Actual		FY 2018 Annualized CR		FY 2019 Request	
	Personnel	Amount	Personnel	Amount	Personnel	Amount
Pos./Approp.	45	\$17,311	45	\$17,193	39	\$11,632
FTE/Obl.	44	16,500	45	17,221	39	11,632

Corporate Services (Total Funding: \$11.632 million and 39 Positions)

Computer Support - The scope of this effort includes managing customer requests and incident reports, securing NIST's IT assets, maintaining networking and telecommunications infrastructure, deploying and managing endpoint devices and software, maintaining identity management and system authentication capabilities, and supporting mission-specific software capabilities. These resources enable NIST laboratories and programs to meet mission-specific needs, disseminate NIST results to the public, and collaborate with NIST partners.

Business Systems - The DOC is undertaking major consolidation and modernization initiatives of multiple business systems, functions, and processes. DOC envisions common, Department-wide, user-friendly, and flexible systems to support the management of financial, procurement, travel, grants, property, and other administrative functions. As part of its consolidation efforts, the DOC plans to migrate business systems operated at individual bureaus to a DOT Data Center in Oklahoma City. NIST's business systems are an integral part of the vision for consolidation and modernization formulated by the DOC. For FY 2019, NIST plans to complete the migration of its business systems to the DOT Data Center, validating that the requisite interfaces to other Federal payment and administrative systems are operational and ensuring that the essential administrative and customer capabilities are maintained.

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
PROGRAM CHANGES FOR 2019
(Dollar amounts in thousands)

		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>
Corporate Services	Pos./BA	45	\$13,850	39	\$11,632	(6)	(\$2,218)
	FTE/Obl.	45	13,850	39	11,632	(6)	(2,218)

Corporate Services Decrease (-6 Positions, -\$2.2 million) - Consistent with NIST's priority to focus resources on the laboratory programs, NIST is proposing reductions to the Corporate Services sub program line by approximately 16 percent, a reduction of \$2.2 million dollars. The proposed reductions streamline management's monitoring of operational metrics and CIO-wide trends potentially increasing risk of service interruptions. Network maintenance will be kept on most critical network components; however, less critical systems may experience increased times to respond to network connections and Windows desktop incidents and requests. The cuts will equally impact each of the NIST mission functions and programmatic areas that make up the research portfolio of the NIST Laboratory Programs.

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services**

PROGRAM CHANGE PERSONNEL DETAIL

Activity: Corporate Services
Subactivity: Corporate Services
Program Change: Corporate Service Decrease

Title	Grade	Number	Annual Salary	Total Salaries
Information Technology Specialist	ZP V	(1)	134,271	(\$134,271)
Information Technology Specialist	ZP IV	(3)	114,149	(342,448)
Management and Program Analyst	ZA IV	(1)	114,149	(114,149)
Management and Program Analyst	ZA III	(1)	81,235	(81,235)
Total		<u>(6)</u>		<u>(672,103)</u>
Less lapse		0		0
Total full-time permanent (FTE)		<u>(6)</u>		<u>(672,103)</u>
2019 pay Adjustment (0.0%)				<u>0</u>
				<u>(672,103)</u>

Personnel Data

Full-time Equivalent Employment:

Full-time permanent	(6)
Other than full-time permanent	0
Total	<u>(6)</u>

Authorized Positions:

Full-time permanent	(6)
Other than full-time permanent	0
Total	<u>(6)</u>

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity:	Corporate Services		
Subactivity:	Corporate Services	Object Class	2019 Increase/Decrease
		11.1 Full-time permanent compensation	(\$672)
		11.3 Other than full-time permanent	0
		11.5 Other personnel compensation	0
		11.8 Special personnel services payments	0
		11.9 Total personnel compensation	(672)
		12.1 Civilian personnel benefits	(214)
		13 Benefits for former personnel	0
		21 Travel and transportation of persons	(6)
		22 Transportation of things	0
		23 Rent, communications, and utilities	0
		23.1 Rental payments to GSA	0
		23.2 Rental payments to others	0
		23.3 Communications, utilities, and misc. charges	(197)
		24 Printing and reproduction	0
		25 Other contractual services	0
		25.1 Advisory and assistance services	0
		25.2 Other services from non-Federal sources	(560)
		25.3 Other goods and services from Federal sources	(30)
		25.4 Operation and maintenance of facilities	0
		25.5 Research and development contracts	0
		25.6 Medicare care	0
		25.7 Operation and maintenance of equipment	(216)
		25.8 Subsistence and support of persons	0
		26 Supplies and materials	(18)
		31 Equipment	(305)
		32 Lands and structures	0
		33 Investments and loans	0
		41 Grants, subsidies and contributions	0
		99.9 Total obligations	(2,218)

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)**

Activity: Standards coordination and special programs
Subactivity: Standards coordination and special programs

Line Item	2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Standards coordination and special programs	Pos./Approp	185 \$67,973	185 \$67,511	185 \$68,293	139 \$45,155	(46) (\$23,138)				
	FTE/Obl.	179 76,252	182 77,133	182 68,293	136 45,155	(46) (23,138)				
Total	Pos./Approp	185 67,973	185 67,511	185 68,293	139 45,155	(46) (23,138)				
	FTE/Obl.	179 76,252	182 77,133	182 68,293	136 45,155	(46) (23,138)				

**Department of Commerce
National Institute of Standards and Technology
Scientific Technical Research Services
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

Activity: Standards Coordination and Special Programs
Subactivity: Standards Coordination and Special Programs

Goal Statement

The primary goal of the Standards Coordination and Special Programs is to provide for cross-cutting NIST functions in both the management of cross-cutting laboratory research projects, and NIST's engagement in standards policy and documentary standards development.

Base Program

Standards Coordination and Special Programs formally houses two cross-cutting NIST activities managed by the Associate Director for Laboratory Programs (ADLP) that deal with coordinated high-profile R&D programs, documentary standards coordination and policy development. At the FY 2019 request levels, NIST will work to eventually consolidate these activities into the Laboratory Programs activity and subactivity in future budget submissions.

1. The Special Programs Office (SPO) manages a selection of cross-cutting NIST research activities for the ADLP, enhancing management oversight, and resource coordination for high-profile programs that critically depend on the expertise and capabilities of two or more NIST laboratories.

The main areas of research coordinated by SPO include:

- Forensic Sciences: The SPO manages research across the NIST laboratories helping strengthen the scientific rigor of forensic techniques in areas including firearms and tool mark analysis, pattern and impression analysis including latent friction ridge analysis, footprint, tread and tire analysis, trace evidence including paint and coatings, fiber, hair, glass, metals and plastics analysis, geological evidence analysis, questioned document analysis, crime scene analysis, fire scene and fire debris analysis, explosives analysis, controlled substance and toxicology analysis, computer forensics, multi-media, digital and image analysis, voice spectral analysis, serology and DNA analysis, and medicolegal and death investigation. At the FY 2019 request levels the management of this research will be absorbed by the responsible NIST laboratories.

- Greenhouse Gas Measurements and Climate Research Program: The SPO continues to coordinate research in various NIST labs focused on providing the measurement science basis for accurate and comparable quantitative measurements of greenhouse gas emissions. This work can enable the development of international measurement standards to ensure the accuracy of global assessments of greenhouse gas emissions. At the FY 2019 request levels, the management of this research will be absorbed by the responsible NIST laboratories.
 - National Security Standards Program: The SPO coordinates efforts with external agency partners to develop technical standards and conformity assessment activities, related to national security. The focus is on measurement science and standards for Chemical/Biological/Radiological/Nuclear/Explosive detection, personal protective equipment, and physical infrastructure resilience and security.
2. The Standards Coordination Office (SCO) advises NIST leadership on policy and strategy as they relate to NIST's statutory role and responsibilities in standardization and serves as a normative standards and conformity assessment related multi-functional resource for NIST and U.S. government staff. The primary work areas of the SCO include:
- Standards Coordination: Standards effectively expedite trade and stimulate economic growth when they are developed, maintained, and applied in accordance with national policy, processes, and procedures. NIST provides guidance, training, information, and assistance so that companies, government agencies, standards bodies, and others can successfully work together on essential standardization and conformity assessment activities.
 - Standards Policy: The U.S. government's role in the development and use of standards and conformity assessment is guided by the National Technology Transfer and Advancement Act, OMB Circular A-119, and other Federal laws, regulations, and international agreements.
 - Standards and Trade and Regulation: NIST provides a range of resources and activities to help users navigate the complex U.S. and international standards landscape. NIST operates the World Trade Organization, Technical Barriers to Trade Related Inquiry Point and Notification Authority and Standards Information Center providing unique standards, conformity assessment and technical regulations related information to NIST staff, U.S. government employees, U.S. exporters, and foreign trading partners.
 - Conformity Assessment and Laboratory Accreditation: Standards expedite trade across borders only when agreed-upon standards are followed consistently. NIST fosters compliance by evaluating conformity assessment accreditation bodies and ensuring adherence to standards specified in international agreements. NIST operates the National Voluntary Laboratory Accreditation Program (NVLAP) for the U.S.; provides accreditation to testing and calibration laboratories based on evaluation of their technical qualifications and competence to perform certain types of tests in specified fields using internationally accepted guides and standards; and designs and implements procedures for accrediting laboratories for their capability to provide calibrations traceable to national standards.

In addition to the work of the SPO and the SCO, this budget activity and subactivity also houses the funding for the NIST Centers of Excellence Program. The NIST Center of Excellence Program supports collaborations between NIST and leading

research institutes in emerging technology areas to expand NIST's impact and mission delivery through strategic partnerships with the country's foremost experts in critical technology areas. In FY 2019, NIST will continue to support two Centers of Excellence in Advanced Materials (<https://www.nist.gov/coe/advanced-materials-center-excellence>), and Community Resilience (<https://www.nist.gov/coe/community-resilience-center-excellence>).

Many more interesting accomplishments and industry impacts can be found at: <https://www.nist.gov/standardsgov/what-we-do/standardization-coordination> and at <https://www.nist.gov/spo>.

Statement of Operating Objectives

Special Programs Office – NIST will complete the transition of the management of the remaining funds that support internal R&D in forensics, greenhouse gas measurements, and national security standards activities into the relevant NIST Laboratories organizations, and this transition will be reflected in future budget submissions. In forensic science, NIST will continue to conduct the research necessary to support the development of science based standards, measurement methods, tests and validation studies to underpin reliable, accurate, interoperable and validated forensic analysis. NIST researchers work both on technologies for forensic analysis and the mathematical and statistical tools that help quantify confidence in the results of a forensics test. To disseminate this work into the forensic community, NIST develops measurement protocols, calibration systems, reference and materials and data, and works with standards-developing organizations to formalize many of these as consensus standards.

Standards Coordination Office – NIST's SCO plays a unique role in the Federal government in coordinating Federal standards activities with those of the private sector and as a resource to Federal agencies and the private sector on the U.S. approach to standards and conformity. Thus, SCO is well positioned to support the Administration priorities addressing trade, technology, innovation and competitiveness.

In support of the Administration's stated priorities on re-negotiating the North American Free Trade Agreement, SCO experts will contribute to, and support the Office of the U.S. Trade Representative (USTR) in the review and revision of various NAFTA chapters. SCO will leverage its expertise in administering the Technical Barriers to Trade Related Inquiry Point and Notification Authority to support negotiations on texts relating to Technical Barriers to Trade and Good Regulatory Practice. Furthermore, SCO staff will contribute to the negotiations on digital trade and telecommunications. Working with experts from other NIST laboratories, SCO experts will also support USTR negotiations that may be initiated to support a potential future U.S.-U.K. trade arrangement.

SCO will expand its efforts to support U.S. exporters by increasing awareness and use of export assistance tools such as Notify U.S., which enable interested stakeholders to learn about regulations being proposed by foreign countries that could impact exports to those markets. In addition to informing and raising awareness about potentially new technical barriers to trade, SCO also enables U.S. stakeholders to comment on these proposed foreign regulations. SCO will step up its work in this area.

SCO will continue its effort to raise awareness and improve information sharing relating to emerging standards issues among Federal agencies. Such information sharing is a critical component of ensuring that agencies can understand, and respond to developments in the U.S. and abroad that can impact U.S. competitiveness and innovation ability. Examples of efforts include work currently underway in collaboration with the Interagency International Cyber Security Standards Working Group to develop a strategy for Federal agencies' engagement in standards to support cybersecurity for Internet of Things technologies and devices. These efforts also include a strong element of partnership with the U.S. private sector and particularly the U.S. standards system, coordinated by the American National Standards Institute (ANSI), which represents U.S. interests in standards developing bodies such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission.

Explanation and Justification

The activities carried out under this activity and subactivity are conducted by two offices reporting to the Associate Director of Laboratory Programs at NIST.

- Standards Coordination Office (SCO): The SCO conducts standards-related programs, and provides knowledge and services that strengthen the U.S. economy and improve the quality of life. Our goal is to equip U.S. industry with the standards-related tools and information necessary to effectively compete in the global marketplace.
<https://www.nist.gov/standardsgov>
- Special Programs Office (SPO): The Special Programs Office fosters communication and collaboration between NIST and external communities focused on critical national needs. To meet those needs, SPO works closely with and forges partnerships among government, military, academia, professional organizations, and private industry to provide world-class leadership in standards and technology innovation. Currently the SPO coordinates programs in Forensic Science, Greenhouse Gas Measurements, and National Security Standards.
<https://www.nist.gov/spo>

Through its work in this activity and subactivity, NIST has delivered significant impact to stakeholders in the Federal government and industry. Programs managed by the SPO and SCO have yielded significant impacts including:

- The NIST SPO Forensic Science Center of Excellence, the Center for Statistics and Applications in Forensic Evidence (CSAFE) released their first results. They established a new algorithm resulting in an automatic selection of breechface marks, improved removal of circular symmetry and the computation of probability of obtaining a higher score by chance. In addition, through SPO guidance, the CSAFE work has resulted in State and Local Crime Laboratories requesting for collaboration. Crime Laboratories in California, Idaho, Nebraska, Virginia, and Texas, are seeking assistance and education from CSAFE about the new 3D technologies and learn about the various algorithms for comparison.

- As illicit use of the synthetic opioid fentanyl increases, police officers and other first responders face a growing risk of accidental exposure. In collaboration with a major supplier of forensic analytes, a workshop has been organized to discuss the potential expansion of standard reference libraries and quality materials to rapidly and accurately identify emerging psychoactive substances, such as the various analogs of fentanyl which have been linked to overdose deaths around the U.S. NIST researchers have investigated the feasibility of screening unknown evidence for fentanyl using field deployable technologies. The research showed that these technologies can reliably detect low levels of fentanyl in mixed drug samples. Based in part on this proof-of-concept, field deployable devices that can alert officers to the presence of fentanyl so they can take extra precaution in handling.
- The LA Megacity Carbon project is a public-private partnership that has established a greenhouse gas observing network in the Southern California Air Basin. Data and analyses from this network contributed significantly to providing scientifically-based estimates of the amount of natural gas vented to the atmosphere by the Aliso Canyon natural gas leak. Several independent measurement approaches have been applied to determination of the amount of natural gas involved. Several papers are currently in preparation by authors from NASA's Jet Propulsion Laboratory (JPL) and NIST addressing various aspects of this research. This public-private partnership includes NIST, JPL, the California Air Resources Board, Scripps Institution of Oceanography, and Earth Networks.
- SCO efforts contributed directly to the U.S. positions on the development and use of international standards being reflected in the 2017 G-20 Leaders Statement. This is particularly noteworthy as this is the first time ever that heads of nations representing over 80 percent of the world's economy have endorsed an approach to standards development and use that reflects fundamental U.S. positions. SCO played a pivotal role in helping shape and shepherd this outcome.
- The SCO is leveraging its long-standing partnership with U.S. Trade Representative on the important role of documentary standards in trade and has raised the profile of standards as key to national and economic security among key offices in the Executive Office of the President.
- The SCO, through laboratory accreditation and its role as the U.S. designating authority in international telecom equipment Mutual Recognition Agreements, has facilitated U.S. testing laboratories' capabilities in reducing market access burdens for U.S telecom equipment companies doing business globally.
- NVLAP conducted an evaluation of the asbestos proficiency testing program that supports the asbestos accreditation program. Improvements identified as a result of assessment recommendations and refined analytical method will reduce test result uncertainty and improve the efficiency of laboratory testing in accredited laboratories.

Summary of Resources (Dollars in Thousands)

	FY 2017 Enacted		FY 2018 Annualized CR		FY 2019 Request	
	Personnel	Amount	Personnel	Amount	Personnel	Amount
Pos./Approp.	185	\$67,973	185	\$67,511	139	\$45,155
FTE/Obl.	179	76,252	182	77,162	136	45,155

Standards Coordination and Special Programs (Total Funding: \$45.155 million and 139 Positions)

NIST’s mission is an inherently governmental. The Nation’s founders knew the importance of weights and measures -- that it is critical to commerce and trade and a critical role of the Federal government. Section 8 of the Constitution gives the government the power to “fix the Standard of Weight and Measures” and Congress established the National Bureau of Standards (renamed NIST in 1988) in 1901 to do just that. This role makes NIST a National Metrology Institute responsible for the dissemination of the fundamental units of measurement -- the basis of international trade and commerce, and scientific progress. NIST is commonly recognized as the best in the world at what it does as a National Metrology Institute. The research managed by the SPO depends upon the one of a kind measurement expertise provided by the NIST laboratories to solve problems of national significance.

In the areas of documentary standards which is the purview of the SCO, NIST also has a unique role. The National Technology Transfer Advancement Act (PL 104-113) and OMB Circular A-119 assign NIST the responsibility of coordinating Federal government activities in the documentary standards development and conformity assessment procedures. NIST provides a forum for Federal agency representatives to learn about standards and conformity assessment developments in the U.S. and abroad, share perspectives that can inform agency or USG positions on standards, and exchange current practices. By leading this Committee, NIST complements the coordination role provided by the ANSI for the private sector.

In addition, approximately 400 NIST technical staff from five of NIST’s laboratories (with the exception of the user facilities) play a significant role in documentary standards development process by participating in almost 100 unique standards development organizations and contributing their technical skills and expertise in over 1,500 standards activities, including 100 standards-related leadership roles. Documentary standards development activities are effective means for disseminating NIST-developed technologies and measurement protocols since industry actively participates and rapidly adopts these standards.

The work supported by the Standards Coordination and Special Programs line item is aligned with the NIST Laboratory work described in the Fundamental Measurement, Quantum Science, and Measurement Dissemination portfolio.

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
PROGRAM CHANGES FOR FY 2019
(Dollar amounts in thousands)**

		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>
Standards Coordination and Special Programs	Pos./BA	185	\$68,293	139	\$45,155	(46)	(\$23,138)
	FTE/Obl.	182	68,293	136	45,155	(46)	(23,138)

Standards Coordination and Special Programs (-46 Positions, -\$23.1 million) - Consistent with NIST's priority to focus resources on the laboratory programs, NIST is proposing reductions to the Standards Coordination and Special Programs sub-program line by 34 percent, a reduction of \$23.138 million dollars. The Standards Coordination and Special Programs sub-program line houses two cross-NIST activities managed by the Associate Director for Laboratory Programs: crosscutting R&D programs, and documentary standards coordination and policy development. The proposed reductions will largely eliminate external R&D partnerships that expand and broaden the impact of the NIST Laboratory R&D programs. They will also eliminate crosscutting R&D program management functions of the Special Programs Office, leaving the individual NIST laboratories responsible for remaining intramural work to taking on those responsibilities. Specific details of the reductions are outlined below.

Office of Special Programs (-38 Positions, -\$14.7 million) – NIST proposes to reduce the Office of Special Programs by \$14.7 million. In accordance with prioritizing investment in core NIST research, the reductions will terminate all extramural grant programs supported by the office, and eliminate the cross-NIST program management functions of the office. The management of the remaining funds supporting internal R&D activities in the NIST laboratories will be taken over by the responsible lab organization, potentially reducing the sum value of the research activities due to a lack of coordination and management of the entire portfolio of activities. The major activities within the Office of Special Programs that will be eliminated include: (1) NIST will eliminate research grants to external partners, including the funds supporting the Urban Dome program, which supports test-beds in urban environments that advance the development of technologies for the direct measurement of greenhouse gas emissions at the scale of an urban region or city. These reductions will terminate support for three urban test beds: the Indianapolis Flux Experiment, or INFLUX; the Los Angeles Megacity Carbon Project; and the Northeast Corridor Project which stretches from Washington, D.C. to Boston, Massachusetts; (2) To reduce costs, NIST will no longer support a centrally managed forensic science research program. NIST measurement science research supported by the current program will continue but will be managed by the specific NIST laboratory responsible for carrying out the work; (3) NIST will also reduce support for the operation

of the OSAC program which was funded by the Department of Justice to facilitate the development and promulgation of consensus-based forensic science standards and guidelines that are fit-for-purpose and based on sound scientific principles, promote their use by accreditation and certification bodies, and establish and maintain working relationships with similar organizations.

Standards Coordination Office (-8 Positions, -\$4.4 million) – NIST plans to cut the Standards Coordination Office by \$4.4 million. These cuts allow the office to retain its focus on ongoing standards policy coordination across the U.S. government, standards conformity assessment, and continued support for resources that help U.S. stakeholders navigate the complex international standards landscape. The reductions would eliminate \$740 thousand in grants and contracts for standards education and training related activities targeted at integrating standards and standardization which affect up to 92 percent of U.S. exports, into undergraduate and graduate programs in science, engineering, business, public policy, and law. In addition, NIST would reduce by \$3.5 million the Lab 2 Market (L2M) Initiative, a program intended to enhance technology transfer across the Federal government. The reduction in L2M funding will specifically eliminate support for Small Business Customer Improvement Initiatives to provide inventors and entrepreneurs a single online point of entry for information about Federal patents and technologies, as well as funding to support the improvement of interagency reporting and technology transfer metrics.

NIST Center of Excellence Program (0 Positions, -\$4.0 million) – The NIST Center of Excellence Program supports collaborations between NIST and leading research institutes in emerging technology areas to expand NIST's impact and mission delivery through strategic partnerships with the country's foremost experts in critical technology areas. Currently NIST supports three Centers of Excellence in Advanced Materials, Community Resilience, and Forensic Science. To meet the requested funding levels for FY 2019, NIST would retain the centers most closely aligned with NIST's core mission space in advanced materials and disaster resilience. NIST would end funding for the most recently awarded of the three, the Forensic Science Center of Excellence. The center is focused on advancing the development and adoption of probabilistic methods to enhance forensic analysis.

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
PROGRAM CHANGE PERSONNEL DETAIL**

Activity: Standards Coordination and Special Programs
 Subactivity: Standards Coordination and Special Programs
 Program Change: Standards Coordination and Special Programs Decrease

Title	Grade	Number	Annual Salary	Total Salaries
Scientist/Engineer	ZP V	(6)	\$134,271	(\$805,623)
Scientist/Engineer	ZP IV	(13)	114,149	(1,483,942)
Scientist/Engineer	ZP III	(4)	81,235	(324,939)
Management and Program Analyst	ZA IV	(5)	114,149	(570,747)
Management and Program Analyst	ZA III	(5)	81,235	(406,173)
Management and Program Analyst	ZA II	(3)	56,016	(168,049)
Administrative Support Assistant	WG VII	(1)	56,016	(56,016)
Administrative Support Assistant	ZS IV	(3)	50,717	(152,150)
Administrative Support Assistant	ZS III	(5)	41,210	(206,052)
Administrative Support Assistant	ZS II	(1)	33,044	(33,044)
Total		(46)		(4,206,737)
Less lapse				0.00%
Total full-time permanent (FTE)		(46)		(4,206,737)
2019 pay Adjustment (0.0%)				(4,206,737)
 Personnel Data				
Full-time Equivalent Employment:				
Full-time permanent		(46)		
Other than full-time permanent		0		
Total		(46)		

Authorized Positions:

Full-time permanent

(46)

Other than full-time permanent

0

Total

(46)

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Standards Coordination and Special Programs
Subactivity: Standards Coordination and Special Programs

Object Class	2019 Increase/Decrease
11.1 Full-time permanent compensation	(\$4,207)
11.3 Other than full-time permanent	0
11.5 Other personnel compensation	0
11.8 Special personnel services payments	0
11.9 Total personnel compensation	(4,207)
12.1 Civilian personnel benefits	(1,338)
13 Benefits for former personnel	0
21 Travel and transportation of persons	(85)
22 Transportation of things	(4)
23 Rent, communications, and utilities	0
23.1 Rental payments to GSA	0
23.2 Rental payments to others	0
23.3 Communications, utilities, and misc. charges	(2,642)
24 Printing and reproduction	(6)
25.1 Advisory and assistance services	0
25.2 Other services from non-Federal sources	(1,327)
25.3 Other goods and services from Federal sources	(456)
25.4 Operation and maintenance of facilities	0
25.5 Research and development contracts	(320)
25.6 Medicare care	0
25.7 Operation and maintenance of equipment	(255)
25.8 Subsistence and support of persons	0
26 Supplies and materials	(198)
31 Equipment	(300)
32 Lands and structures	0
33 Investments and loans	0
41 Grants, subsidies and contributions	(12,000)
99.9 Total obligations	(23,138)

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate ^{1/}	Increase/Decrease from 2019 Base
11 Personnel compensation					
11.1 Full-time permanent	\$255,310	\$260,919	\$263,038	\$224,725	(\$38,313)
11.3 Other than full-time permanent	25,611	26,197	26,408	26,408	0
11.5 Other personnel compensation	6,422	6,422	6,422	6,422	0
11.9 Total personnel compensation	287,343	293,538	295,868	257,555	(38,313)
12.1 Civilian personnel benefits	91,550	94,599	96,841	84,654	(12,187)
13 Benefits for former personnel	28	28	28	28	0
21 Travel and transportation of persons	11,463	11,463	11,537	10,952	(585)
22 Transportation of things	1,088	1,088	1,106	1,079	(27)
23.1 Rental payments to GSA	173	194	195	195	0
23.2 Rental payments to others	1,884	1,918	1,957	1,957	0
23.3 Communications, utilities, and miscellaneous charges	19,315	19,315	19,525	7,318	(12,207)
24 Printing and reproduction	683	683	695	569	(126)
25.1 Advisory and assistance services	4,271	4,246	4,060	4,060	0
25.2 Other services	70,127	49,618	33,338	22,181	(11,157)
25.3 Purchases of goods and services from Government accounts	35,756	35,640	33,038	26,984	(6,054)
25.5 Research and development contracts	26,025	26,025	26,467	26,147	(320)
25.7 Operation and maintenance of equipment	9,774	9,774	9,940	7,592	(2,348)
26 Supplies and materials	26,789	26,789	27,374	26,180	(1,194)
31 Equipment	36,001	37,650	38,290	31,657	(6,633)
32 Land and structures	0	0	0	0	0
41 Grants, subsidies, and contributions	89,820	89,820	89,820	65,820	(24,000)
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	19	0	0	0	0
99 Total Obligations	712,109	702,388	690,079	574,928	(115,151)

^{1/} FY 2019 amounts in object class are slightly different from the President's Budget Appendix due to refocus of program changes made after MAX A-11 Database closed.

Object Class		2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate ^{1/}	Increase/Decrease from 2019 Base
99	Total Obligations	\$712,109	\$702,388	\$690,079	\$574,928	(\$115,151)
	Less Prior Year Recoveries	(4,654)	(1,000)	0	0	0
	Less Prior Year Refunds	(56)				
	Less Prior Year Unobligated Balance	(21,719)	(10,213)	0	0	0
	Plus Unobligated Balance, End of Year	10,213				
	Plus Unobligated Balance, Expired	7				
	Total Budget Authority	695,900	691,175	690,079	574,928	(115,151)
	Transfer from Election Assistance Commission	(1,400)	(1,391)	0	(1,499)	(1,499)
	Transfers from DoJ for forensic sciences and Office of Law Enforcement Standards	(4,500)	(4,470)	0	0	0
	Appropriation	690,000	685,314	690,079	573,429	(116,650)

Personnel Data

Full-time equivalent employment:

Full-time permanent	2,148	2,194	2,194	1,817	(377)
Other than full-time permanent	298	298	298	298	0
Total	2,446	2,492	2,492	2,115	(377)

Authorized Positions:

Full-time permanent	2,204	2,204	2,204	1,827	(377)
Other than full-time permanent	323	323	323	323	0
Total	2,527	2,527	2,527	2,150	(377)

^{1/} FY 2019 amounts in object class are slightly different from the President's Budget Appendix due to refocus of program changes made after MAX A-11 Database closed.

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
APPROPRIATION LANGUAGE AND CODE CITATIONS**

1. For necessary expenses of the National Institute of Standards and Technology,

15 U.S.C. 272; 273; 278b-j; p
15 U.S.C. 290b-f
15 U.S.C. 1151-52
15 U.S.C. 1454(d-e)
15 U.S.C. 1511, 1512
15 U.S.C. 3710a-d
15 U.S.C. 3711a
15 U.S.C. 7301-7313
15 U.S.C. 7406
15 U.S.C. 7506(a)

15 U.S.C. 272; 273; 278b-j; provides basic authority for the performance of the functions and activities of the National Institute of Standards and Technology, authorizes appropriations for these purposes to be provided to the general public and specific institutions, governments, firms, and individuals, and requires the notification of Congress of a reprogramming of funds that exceeds a limit specified in public law.

15 U.S.C. 290b-f directs the Secretary of Commerce to provide for the collection, compilation, critical evaluation, publication, and dissemination of standard reference data and the authority to establish a non-agricultural technology office.

15 U.S.C. 1151-1152 establishes within the Department of Commerce, a central clearinghouse for technical information useful to American business and industry and provides for the dissemination of this technical, scientific information via the National Technical Information Service.

15 U.S.C. 1454(d-e) provides NIST with the authority to request that manufacturers and distributors of a commodity participate in voluntary product standards when there is undue proliferation of weights, measures, and quantities. Reports and recommendations to Congress are to be made upon industry failure to adopt these standards.

15 U.S.C. 1511, 1512 specifies that all bureaus of the Department of Commerce come under the authority of the Secretary of Commerce and that such bureaus including NIST shall be subject to the authority of the Secretary of Commerce.

15 U.S.C. 3710a-d provides the authority to enter into CRADAs, to make cash awards to scientific personnel for inventions, to retain royalties and to distribute royalties for inventions, and to communicate and coordinate for the Offices of Research and Technology Applications in Federal laboratories.

15 U.S.C. 3711a provides the authority for the Baldrige National Quality award.

15 U.S.C. 7301-7313 establishes National Construction Safety Teams within NIST to respond to building and structural emergencies.

15 U.S.C. 7406 provides authority for NIST to conduct Cyber Security Research and Development to minimize security risks associated with computer systems used by the Federal government.

15 U.S.C. 7506(a) provides for the establishment of a nanotechnology research and development program within NIST.

P.L. 110-143 121 STAT 1809 provides NIST to assist in developing a research program to establish guidelines for the remediation of former methamphetamine laboratories in the United States as well as developing new detection technologies and appropriate Standard Reference Materials for methamphetamine detection testing.

2. \$573,429,000, to remain available until expended, no specific authority
3. of which not to exceed \$9,000,000 may be transferred to the "Working Capital Fund." 15 U.S.C. 278b 15 U.S.C. 278b provides in part: "The National Institute of Standards and Technology is authorized to utilize in the performance of its functions the Working Capital Fund".
4. Public Law 110-69, America Competes Act, 121 Stat 572, passed August 9, 2007 reauthorizes the Scientific and Technical Research and Services appropriation through 2010. Public Law 111-358, America Competes Reauthorization Act, 2010, 124 Stat 3982, passed January 4, 2011 reauthorized the Scientific and Technical Research and Standards appropriation through 2013. In addition, an Emergency Communication and Tracking Technologies Research initiative and a Green Manufacturing and Construction initiative were authorized to develop advanced technologies in these areas.
5. Public Law 111-5 American Recovery and Reinvestment Act of 2009 appropriates \$220,000,000 for the Scientific and Technical Research and Services appropriation from FY 2009 to FY 2010 and makes available by reimbursable agreement \$10,000,000 from the Department of Energy for the development of Smart Grid Technology by reference to Public Law 110-140, the Energy Independence and Security Act of 2007, and makes available by reimbursable agreement \$2,230,186 for a service level agreement with the National Telecommunications and Information Administration. In addition, \$20,000,000 is transferred from the Department of Health and Human Services for continued work on advancing health care information enterprise integration.

6. Public Law 113-274 Cybersecurity Enhancement Act of 2014 amended Section 2c of the National Institute of Standards and Technology Act (15 U.S.C. 272(c) and established a Public-Private collaboration on Cybersecurity by designating the Director of the Institute activities that facilitate and support on an ongoing basis the development of a voluntary, consensus-based, industry-led set of standards, guidelines, best practices, methodologies, procedures, and processes to cost-effectively reduce cyber risks to the critical infrastructure of the United States.

**Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
ADVISORY AND ASSISTANCE SERVICES**
(Obligations in thousands of dollars)

	<u>FY 2017</u> <u>Actual</u>	<u>FY 2018</u> <u>Annualized CR</u>	<u>FY 2019</u> <u>Estimate</u>
Consulting Services			
Management and professional support services	\$2,129	\$2,018	\$2,081
Studies, analyses, and evaluations	535	519	519
Engineering and technical services	<u>1,607</u>	<u>1,709</u>	<u>1,460</u>
Total	4,271	4,246	4,060

Significant Activities

Advisory and assistance services funded by the STRS appropriation include the review and evaluation of the technical functions and operations of NIST by the Board on Assessment of the National Academy of Sciences. The evaluation panels consider the importance and relative priority of projects, quality of staff, equipment needs, and finances, and the relation of the programs to the mission of NIST.

Need for Advisory and Assistance Services:

The need for advisory and assistance services stems from the NIST role in dealing with the private sector, professional organizations, and the public sector. Inputs must be obtained from consultants who can bring their individual expertise to bear and help NIST in assessing its program plans to meet the needs of its customers. The alternative to utilizing these services is to make no attempt to have expertise from sources outside NIST and risk degradation of the working and professional relationship with those in the business of using the products and services offered by NIST.

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations	Appropriation
Annualized CR, 2018	101	100	\$151,961	\$158,733	\$151,961
Less: Unobligated balance from prior year	0	0	0	(8,368)	0
Plus: Unobligated balance from start of year	0	0	0	1,596	0
2019 Adjustments to base:					
Adjustments:					
Other Changes:					
Plus: Inflationary/Adjustments to base	0	0	271	271	271
Less: Estimated recoveries 2019	0	0	0	0	0
Less: Unobligated balance rescission	0	0	(2,000)	0	0
2019 Base	101	100	150,232	152,232	152,232
Less: 2019 Program changes	(81)	(80)	(137,138)	(137,138)	(137,138)
2019 Estimate	20	20	13,094	15,094	15,094

Comparison by activity/subactivity with totals by activity

		2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Technology innovation program											
Technology innovation program	Pos./Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	\$155	0	0	0	0	0	0	0	0
Hollings manufacturing extension partnership											
Hollings manufacturing extension partnership	Pos./Approp	81	128,000	81	\$127,131	81	\$127,331	0	0	(81)	(\$127,331)
	FTE/Obl.	74	143,773	80	133,114	80	127,331	0	0	(80)	(127,331)
Manufacturing USA											
Manufacturing USA	Pos./Approp	20	25,000	20	24,830	20	24,901	20	\$15,094	0	(9,807)
	FTE/Obl.	20	46,961	20	25,552	20	24,901	20	15,094	0	(9,807)
Baldrige performance excellence program											
Baldrige performance excellence program	Pos./Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	67	0	0	0	0	0	0
TOTALS	Pos./Approp	101	153,000	101	151,961	101	152,232	20	15,094	(81)	(137,138)
	FTE/Obl.	94	190,889	100	158,733	100	152,232	20	15,094	(80)	(137,138)
Adjustments for:											
Recoveries *			(4,418)		0		(404)		(404)		0
Refunds			(596)		0		0		0		0
Unobligated balance, start of year			(43,243)		(8,368)		(1,596)		(1,596)		0
Unobligated balance, end of year			8,368		1,596		0		0		0
Unobligated balance adjustment (transfer to CRF)			4,000		0		0		0		0
Budget Authority			155,000		151,961		150,232		13,094		(137,138)
Adjustments for:											
Offset for recoveries of prior year obligations per P.L. 115-31*			(2,000)		0		0		0		0
Unobligated balance rescission			0		0		2,000		2,000		0
Appropriation			153,000		151,961		152,232		15,094		(137,138)

*Of the total recoveries (\$6,418K), \$2M is presented as an offset between Budget Authority and Appropriation funding levels for the MEP program.

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Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
ADJUSTMENTS TO BASE
 (Dollar amounts in thousands)

	<u>FTE</u>	<u>Amount</u>
<u>Other Changes:</u>		
Annualization of FY 2018 pay raise.....	...	\$66
2019 Pay increase and related costs.....	...	0
Annualization of positions financed in FY 2018.....	0	0
Change in compensable days	57
Personnel benefits:		
Civil Service Retirement System (CSRS).....	...	(13)
Federal Employees' Retirement System (FERS).....	...	25
Thrift Savings Plan (TSP).....	...	4
Federal Insurance Contribution Act (FICA) - OASDI.....	...	13
Health insurance.....	...	33
Employees' Compensation Fund.....	...	4
Rental Payments to GSA.....	...	0
Travel and transportation of persons:		
Mileage.....	...	0
Per diem.....	...	3
Communications, utilities, and miscellaneous charges:		
Postage.....	...	0
Electricity rate increase.....	...	6
Natural gas rate decrease.....	...	(4)
General pricing level adjustment.....	...	77
Total, Adjustments to base.....	0	271

**Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services**

APPROPRIATION ACCOUNT: Industrial Technology Services

The FY 2019 budget request for Industrial Technology Services is \$15.1 million, \$136.9 million below the FY 2018 Annualized Continuing Resolution level. The account funds two activities/subactivities: Hollings Manufacturing Extension Partnership and Manufacturing USA.

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
 (Dollar amounts in thousands)

Activity: Technology innovation program
 Subactivity: Technology innovation program

Line Item	2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Technology innovation program										
	Pos./Approp	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	\$155	0	0	0	0	0	0	0

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
 (Dollar amounts in thousands)

Activity: Hollings manufacturing extension partnership
 Subactivity: Hollings manufacturing extension partnership

Line Item	2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease Over 2019 Base		
	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	
Hollings manufacturing extension partnership	Pos./Approp	81	\$128,000	81	\$127,131	81	\$127,331	0	0	(81)	(\$127,331)
	FTE/Obl.	74	143,773	80	133,114	80	127,331	0	0	(80)	(127,331)

**Department of Commerce
National Institute of Standards and Technology
Hollings Manufacturing Extension Partnership
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

Activity: Hollings Manufacturing Extension Partnership Program
Subactivity: Hollings Manufacturing Extension Partnership Program

Goal Statement

The Hollings Manufacturing Extension Partnership Program (MEP) is a Federal-state-industry partnership providing U.S. manufacturers access to technologies, resources, and industry experts. The MEP program consists of Manufacturing Extension Partnership Centers located across the country working directly with their local manufacturing communities to strengthen the competitiveness of our Nation's domestic manufacturing base. Funding for the MEP centers is a cost-sharing arrangement consisting of support from the Federal government, non-Federal sources including state and local government/entities and fees charged to the manufacturing clients for services provided by the MEP centers.

Base Program

MEP primarily aids small and medium-sized U.S. manufacturers through its 51 centers in every U.S. State and Puerto Rico, through the delivery of services such as product development, tools and resources for expansion, improved processes and best practices, and workforce development. MEP also provides technical assistance in adopting advanced manufacturing technologies, addressing emerging manufacturing needs, understanding foreign manufacturing and compliance issues, information concerning cybersecurity of supply chains, and transferring technology from NIST Laboratories and other Federal research organizations.

In 1988, Congress passed the Omnibus Trade and Competitiveness Act 1988 (P.L. 100-418), and created a program within NIST to assist U.S. manufacturing through cooperative efforts. The statute was amended in the America COMPETES Acts of 2007 and 2010 and MEP was reauthorized through the American Innovation and Competitiveness Act (P.L. 114-329), signed into law in January 2017. MEP centers act as the go-to experts who promote business growth and connect manufacturers to public and private resources essential for increased competitiveness and profitability.

Statement of Operating Objectives

In FY 2018 MEP has advanced the following initiatives:

- Supported a projected 9,652 client firms, including 1,300 rural and 2,200 very small manufacturers. These clients will not receive in-depth technical assistance from MEP centers in FY 2019.
- Provided a combined total of \$6.1 million in emergency funding to Florida, Georgia, Louisiana, Texas, and Puerto Rico for assessments of manufacturers in Federal Emergency Management Agency’s designated counties impacted by hurricanes in late FY 2017 and early FY 2018.
- Provided cybersecurity awareness and training to several hundred small U.S. manufacturers. The agency published NIST Handbook 162 *"NIST MEP Cybersecurity Self-Assessment Handbook For Assessing NIST SP 800-171 Security Requirements in Response to DFARS Cybersecurity Requirements"* as a resource for MEP centers to use when providing assistance to domestic manufacturers relating to cybersecurity risk management. The Handbook was deployed by MEP centers to help the Department of Defense (DOD) suppliers assess their cybersecurity practices against the NIST SP 800-171 Security Requirements in response to the stipulations contained in DFARS that apply to DOD contracts and went into effect December 31, 2017.
- Continued collaborating with the DOD Office of Economic Adjustment in 23 states across the country to provide supply chain service to small manufacturers impacted by DOD program changes.

Explanation and Justification

Summary of Resources (Dollars in Thousands)

	FY 2017 Actual		FY 2018 Annualized CR		FY 2019 Request	
	Personnel	Amount	Personnel	Amount	Personnel	Amount
Pos./Approp.	81	\$128,000	81	\$127,131	0	0
FTE/Obl.	74	143,773	80	133,114	0	0

**Department of Commerce
National Institute of Standards and Technology
Hollings Manufacturing Extension Partnership
PROGRAM CHANGE FOR 2019**
(Dollar amounts in thousands)

		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Hollings Manufacturing Partnership Program	Pos/BA	81	\$127,331	0	0	(81)	(\$127,331)
	FTE/Obl.	80	127,331	0	0	(80)	(127,331)

Hollings Manufacturing Extension Partnership Program (-81 Positions, -\$127.3 million) - The FY 2019 budget eliminates Federal funding for NIST MEP. Should additional resources be needed to effectuate the wind-down of the program, NIST will use recoveries from prior-year obligations and unobligated balances within the Industrial Technology Services (ITS) appropriation account.

The FY 2019 budget request for NIST proposes to end Federal funding for MEP. MEP centers are operated by academic/educational institutions in 17 States, state agencies in eight states, and nonprofit organizations in 25 states and Puerto Rico. MEP centers receive funding under five-year cooperative agreements with Federal/non-Federal cost share; no Federal center funding will be provided in FY 2019 and centers will be required to change to an entirely self-supporting basis.

The proposed reduction will eliminate \$110.0 million in funding to the MEP centers, \$4.7 million in contracts and other support (non-labor), and \$12.6 million in labor and benefits, and a 100 percent reduction of NIST MEP Federal employees who support and administer the MEP program. The reduction will also eliminate 1,300 non-Federal technical experts in the 51 state-based organizations that operate the MEP program, and affect over 2,500 partners in all centers and nearly 600 field offices. Approximately 9,600 client firms will need to find services elsewhere, and 25 states with clients in primarily rural areas may not be able to provide alternative services.

Performance Measures	2019	2020	2021	2022	2023
Number of firms receiving in-depth technical assistance from MEP Centers	0	0	0	0	0
Percentage of MEP clients receiving in-depth technical assistance that increase their competitiveness	0	0	0	0	0

**Department of Commerce
National Institute of Standards and Technology
Hollings Manufacturing Extension Partnership
PROGRAM CHANGE PERSONNEL DETAIL**

Activity: Hollings Manufacturing Extension Partnership Program
Subactivity: Hollings Manufacturing Extension Partnership Program
Program Change: Hollings Manufacturing Extension Partnership Program

<u>Title</u>	<u>Grade</u>	<u>Number</u>	<u>Annual Salary</u>	<u>Total Salaries</u>
Executive Management	SES	(2)	\$184,367	(\$368,734)
Executive Management	ZA V	(1)	165,367	(165,367)
Scientist/Engineer	ZP V	(1)	165,367	(165,367)
Scientist/Engineer	ZP IV	(1)	140,621	(140,621)
Management and Program Analyst	ZA V	(2)	165,367	(330,734)
Management and Program Analyst	ZA IV	(4)	140,621	(562,484)
Management and Program Analyst	ZA III	(12)	103,320	
Management and Program Analyst	ZA II	(4)	73,572	(294,288)
Information Technology Specialist	ZP IV	(4)	140,621	(562,484)
Information Technology Specialist	ZP III	(7)	103,320	(723,240)
Economist	ZP V	(1)	165,367	(165,367)
Economist	ZP IV	(2)	140,621	(281,242)
Industrial Specialist	ZA V	(3)	165,367	(496,101)
Industrial Specialist	ZA IV	(20)	140,621	
Industrial Specialist	ZA III	(3)	103,320	(309,960)
Administrative Support	ZS V	(2)	82,138	(164,276)
Administrative Support	ZS IV	(3)	67,371	(202,113)
Administrative Support	ZS IV	(2)	63,055	(126,110)
Administrative Support	ZS III	(7)	57,042	(399,294)
Total		<u>(81)</u>		<u>(9,510,042)</u>

Total full-time permanent (Positions)	(81)	(\$9,510,042)
2019 pay Adjustment (0.0%)		<u>0</u>
		(9,510,042)

Personnel Data

Full-time Equivalent Employment:

Full-time permanent	(71)
Other than full-time permanent	<u>(9)</u>
Total	(80)

Authorized Positions:

Full-time permanent	(72)
Other than full-time permanent	<u>(9)</u>
Total	(81)

Department of Commerce
National Institute of Standards and Technology
Hollings Manufacturing Extension Partnership
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Hollings Manufacturing Extension Partnership Program
Subactivity: Hollings Manufacturing Extension Partnership Program

Object Class	2019 Increase/Decrease
11.1 Full-time permanent compensation	(\$9,510)
11.3 Other than full-time permanent	0
11.5 Other personnel compensation	0
11.8 Special personnel services payments	0
11.9 Total personnel compensation	(9,510)
12.1 Civilian personnel benefits	(3,135)
13 Benefits for former personnel	0
21 Travel and transportation of persons	(486)
22 Transportation of things	(8)
23 Rent, communications, and utilities	0
23.1 Rental payments to GSA	0
23.2 Rental payments to others	0
23.3 Communications, utilities, and misc. charges	(711)
24 Printing and reproduction	(10)
25 Other contractual services	0
25.1 Advisory and assistance services	0
25.2 Other services from non-Federal sources	(1,754)
25.3 Other goods and services from Federal sources	(988)
25.4 Operation and maintenance of facilities	0
25.5 Research and development contracts	0
25.6 Medicare care	0
25.7 Operation and maintenance of equipment	(316)
25.8 Subsistence and support of persons	0
26 Supplies and materials	(195)
31 Equipment	(253)
32 Lands and structures	0
33 Investments and loans	0
41 Grants, subsidies and contributions	(109,965)
99.9 Total obligations	(127,331)

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
 (Dollar amounts in thousands)

Activity: Manufacturing USA
 Subactivity: Manufacturing USA

Line Item	2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base		
	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	
Manufacturing USA	Pos./Approp	20	\$25,000	20	\$24,830	20	\$24,901	20	\$15,094	0	(\$9,807)
	FTE/Obl.	20	46,961	20	25,552	20	24,901	20	15,094	0	(9,807)

**Department of Commerce
National Institute of Standards and Technology
Manufacturing USA
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

Activity: Manufacturing USA
Subactivity: Manufacturing USA

Goal Statement

The United States leads the world in research and innovation yet too often these discoveries are developed and manufactured in other nations. The primary goal of the Manufacturing USA program is to enable U.S. manufacturers to rapidly scale up discoveries to create the advanced manufacturing products and processes benefitting entire industry sectors. Workforce training in these new and advanced technology areas, including for veterans entering the manufacturing workforce, is also a major goal.

Base Program

The request provides funds for Federal investment in the Manufacturing USA program which serves to increase U.S. global competitiveness by creation of an effective public-private manufacturing research infrastructure for U.S. industry and academia to solve industry-relevant problems. Manufacturing USA consists of institutes, stood up with short-term Federal funds (five-year) plus matching non-Federal funds, eventually moving to no core Federal funds. The linked institutes for manufacturing innovation have common goals, but unique technical concentrations which can benefit an entire industry sector. In an institute, industry, academia, and government partners leverage existing resources, collaborate, and co-invest to nurture manufacturing innovation and accelerate commercialization. As sustainable manufacturing innovation hubs, the institutes create, showcase, and deploy new capabilities, new products, and new processes that an entire industry sector can use to improve commercial production. They build workforce skills at all levels and enhance manufacturing capabilities in companies large and small. Institutes draw together the best talents and capabilities from all the partners to build the proving grounds where innovations flourish and help advance American domestic manufacturing. The request includes \$10.0 million in discretionary funds for the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) as well as up to \$5.0 million for coordination of the network of manufacturing chemical and biological sciences. Development of applications is left to the private sector which now have tools (manufacturing processes) to actually make their products.

Many more accomplishments and industry impacts can be found at: <https://www.manufacturingusa.com/>

Statement of Operating Objectives

The FY 2017 enacted appropriations bill provided \$25.0 million in discretionary funds. The FY 2018 Annualized Continuing Resolution level provided roughly the same continuing level of funding. This program and funding is part of government-wide efforts to strengthen public-private efforts in the U.S. advanced manufacturing sector.

As part of its efforts to revitalize U.S. manufacturing, NIST proposed and Congress authorized a network of manufacturing innovation institutes where researchers, companies, universities, community colleges, and entrepreneurs can come together to develop new manufacturing technologies with broad applications. These institutes can also train the workforce, including returning veterans, needed to work in advanced manufacturing industries. The primary goal is to ensure that American innovations and inventions, currently going off-shore for production, would be scaled up from the lab-scale experiments to industrial scale in the U.S. by developing new manufacturing processes to be used by entire industry sectors.

Each institute in the Manufacturing USA network has a unique technology focus with the objective of creating self-sustaining regional manufacturing hubs having national impact. The institutes help support an ecosystem of manufacturing activity in regions of the U.S. The manufacturing innovation institutes support manufacturing technology commercialization by helping to bridge the gap from the laboratory to the market and address core gaps in scaling the manufacturing process technologies.

Explanation and Justification

Summary of Resources (Dollars in Thousands)

	FY 2017 Enacted		FY 2018 Annualized CR		FY 2019 Request	
	Personnel	Amount	Personnel	Amount	Personnel	Amount
Pos./Approp.	20	\$25,000	20	\$24,830	20	\$15,094
FTE/Obl.	20	25,000	20	24,830	20	15,094

Department of Commerce
National Institute of Standards and Technology
Manufacturing USA
PROGRAM CHANGES FOR 2019
(Dollar amounts in thousands)

		2019 Base		2019 Estimate		Decrease from 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Manufacturing USA	Pos/BA	20	\$24,901	20	\$15,094	0	(\$9,807)
	FTE/Obl.	20	24,901	20	15,094	0	(9,807)

Manufacturing USA (0 Positions, -\$9.8 million) - The FY 2019 funding is \$15.1 million for the Manufacturing USA program: \$10.0 million to maintain support for the NIIMBL institute and \$5.1 million for coordination of the network of manufacturing institutes. With this level NIST will be able to fund the NIIMBL institute at the planned level of \$70.0 million for the five-year start-up period, and provide network support for all institutes in the network, including those funded by other agencies. With the base level of \$15.1 million, NIST will not award a second institute from the open-topic competition. The multi-year funding stream to complete the planned \$70.0 million total for NIIMBL is \$20.0 million annually in FY 2016 and FY 2017, and would be \$10.0 million annually in FY 2018, FY 2019, and FY 2020.

Department of Commerce
National Institute of Standards and Technology
Manufacturing USA
PROGRAM CHANGE DETAIL BY OBJECT CLASS
 (Direct Obligations amounts in thousands)

Activity: Manufacturing USA
 Subactivity: Manufacturing USA

Object Class	2019 Increase/Decrease
11.1 Full-time permanent compensation	0
11.3 Other than full-time permanent	0
11.5 Other personnel compensation	0
11.8 Special personnel services payments	0
11.9 Total personnel compensation	0
12.1 Civilian personnel benefits	0
13 Benefits for former personnel	0
21 Travel and transportation of persons	(\$8)
22 Transportation of things	0
23 Rent, communications, and utilities	0
23.1 Rental payments to GSA	0
23.2 Rental payments to others	0
23.3 Communications, utilities, and misc. charges	(92)
24 Printing and reproduction	0
25 Other contractual services	0
25.1 Advisory and assistance services	0
25.2 Other services from non-Federal sources	(47)
25.3 Other goods and services from Federal sources	(15)
25.4 Operation and maintenance of facilities	0
25.5 Research and development contracts	0
25.6 Medicare care	0
25.7 Operation and maintenance of equipment	(9)
25.8 Subsistence and support of persons	0
26 Supplies and materials	(7)
31 Equipment	(10)
32 Lands and structures	0
33 Investments and loans	0
41 Grants, subsidies and contributions	(9,619)
99.9 Total obligations	(9,807)

**Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS**
(Dollar amounts in thousands)

Activity: Baldrige performance excellence program
Subactivity: Baldrige performance excellence program

Line Item		2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease Over 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Baldrige performance excellence program	Pos./Approp FTE/Obl.	0	0	0	0	0	0	0	0	0	0
		0	0	0	\$67	0	0	0	0	0	0

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**Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
SUMMARY OF REQUIREMENTS BY OBJECT CLASS**
(Dollar amounts in thousands)

Object Class	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/Decrease from 2019 Base
11 Personnel compensation					
11.1 Full-time permanent	\$10,208	\$10,916	\$11,005	\$2,420	(\$8,585)
11.3 Other than full-time permanent	945	960	940	170	(770)
11.5 Other personnel compensation	228	228	228	46	(182)
11.9 Total personnel compensation	<u>11,381</u>	<u>12,104</u>	<u>12,173</u>	<u>2,636</u>	<u>(9,537)</u>
12.1 Civilian personnel benefits	3,613	3,884	3,953	865	(3,088)
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	554	554	557	63	(494)
22 Transportation of things	15	15	15	7	(8)
23.1 Rental payments to GSA	7	7	8	8	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Communications, utilities, and miscellaneous charges	912	911	915	112	(803)
24 Printing and reproduction	23	23	23	13	(10)
25.1 Advisory and assistance services	846	301	301	301	0
25.2 Other services	4,769	6,758	2,692	871	(1,821)
25.3 Purchases of goods and services from government accounts	1,551	1,551	1,558	555	(1,003)
25.5 Research and development contracts	3	3	3	3	0
25.7 Operation and maintenance of equipment	377	377	383	58	(325)
26 Supplies and materials	268	269	273	71	(202)
31 Equipment	378	378	384	121	(263)
32 Land and structures	0	0	0	0	0
41 Grants, subsidies, and contributions	166,191	131,598	128,994	9,410	(119,584)
99 Total Obligations	<u>190,888</u>	<u>158,733</u>	<u>152,232</u>	<u>15,094</u>	<u>(137,138)</u>

Object Class	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/Decrease from 2019 Base
99 Total Obligations	\$190,888	\$158,733	\$152,232	\$15,094	(\$137,138)
Less Prior Year Recoveries*	(4,418)	0	(404)	(404)	0
Less Prior Year Refunds	(596)	0	0	0	0
Less Prior Year Unobligated Balance	(43,242)	(8,368)	(1,596)	(1,596)	0
Plus Unobligated Balance End of Year	8,368	1,596	0	0	0
Unobligated TIP balance, transfer to CRF	4,000	0	0	0	0
Total Budget Authority	155,000	151,961	150,232	13,094	(137,138)
Offset or recoveries of prior year obligations (P.L. 115-31)*	(2,000)	0	0	0	0
Plus Unobligated Balance Rescission	0	0	2,000	2,000	0
Appropriation	153,000	151,961	152,232	15,094	(137,138)

*Of the total recoveries (\$6,418K), \$2M is presented as an offset between Budget Authority and Appropriation funding levels for the MEP program.

Personnel Data

Full-time equivalent employment:

Full-time permanent	83	89	89	18	(71)
Other than full-time permanent	11	11	11	2	(9)
Total	94	100	100	20	(80)

Authorized Positions:

Full-time permanent	90	90	90	18	(72)
Other than full-time permanent	11	11	11	2	(9)
Total	101	101	101	20	(81)

**Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
APPROPRIATION LANGUAGE AND CODE CITATIONS**

1. For necessary expenses of the Industrial Technology Services appropriation of the National Institute of Standards and Technology,

15 U.S.C. 271 et seq.
15 U.S.C. 272(b)(1) and (b)(4)
15 U.S.C. 278b
15 U.S.C. 278k
15 U.S.C. 278l
15 U.S.C. 278n
15 U.S.C. 278r
15 U.S.C. 7506(a)(2)

15 U.S.C. 271 et seq. provides NIST's organic authorities.

15 U.S.C. 272(b)(1) authorizes the Secretary, through the Director of NIST, to assist industry in the development of technology and procedures needed to improve quality, to modernize manufacturing processes, to ensure product reliability, manufacturability, functionality, and cost-effectiveness, and to facilitate more rapid commercialization, especially by small- and medium-sized companies throughout the United States, of products based on new scientific discoveries in fields such as automation, electronics, advanced materials, biotechnology, and optical technologies.

15 U.S.C. 272(b)(4) authorizes the Secretary, through the Director of NIST, to enter into contracts, including cooperative research and development arrangements and grants and cooperative agreements, in furtherance of the purposes of the NIST Act.

15 U.S.C. 278b provides for a Working Capital Fund to support NIST activities.

15 U.S.C. 278k directs the Secretary, through the Director of NIST, to provide assistance for the creation of Regional Centers for the Transfer of Manufacturing Technology.

15 U.S.C. 278l provides authority for technical assistance to State technology programs.

15 U.S.C. 278n established the Advanced Technology Program within NIST to assist U.S. businesses in applying generic technology and research results to commercialize scientific discoveries and refine manufacturing technologies. Public Law 110- 69 signed on August 9, 2007 has now abolished the Advanced Technology Program (ATP).

15 U.S.C. 7506(a)(2) instructs the NIST Director to utilize the Manufacturing Extension Partnership program to the extent possible to ensure that basic research on issues related to the development and manufacture of nanotechnology, including metrology; reliability and quality assurance; processes control; and manufacturing best practices reaches small- and medium-sized manufacturing companies.

2. \$15,094,000 is provided for the Manufacturing USA program to remain available until expended.
3. Public Law 110-69, America Competes Act, 121 Stat 572, enacted August 9, 2007 reauthorized the Industrial Technology Services appropriation through 2010. In addition, it eliminated the Advanced Technology Program (ATP) and established the Technology Innovation Program (TIP) which provides grants to eligible companies or joint ventures whose proposed technology has strong potential to address critical national needs. It also amended 15 U.S.C. 3711 by changing the name of the National Medal of Technology from "Technology Medal" to "Technology and Innovation Medal".
4. Public Law 111-358, America Competes Reauthorization Act, 2010, 124 Stat 3982, enacted January 4, 2011 reauthorized the Industrial Technology Services appropriation through 2013 to include the Manufacturing Extension Partnership Program (MEP) and the Malcolm Baldrige National Quality Award program. In addition, authorization is provided for an Innovative Services Initiative to assist small and medium-sized manufacturers within the MEP program.
5. Public Law 112-55, Consolidated and Further Continuing Appropriations Act, 2012, 125 Stat 552, enacted November 18, 2011 did not contain funding for the Technology Innovation Program (TIP) and the Baldrige Performance Excellence Program (BPEP).
6. Public Law 113-235, Consolidated and Further Continuing Appropriations Act, 2015, 128 Stat 2130, enacted December 16, 2014 amends 15 U.S.C. 271 et seq by establishing the Network for Manufacturing Innovation Program within the Industrial Technology Services appropriation to facilitate access to capital-intensive infrastructure in order to transition innovative technologies into scalable, cost-effective, and high-performing manufacturing capabilities thereby stimulating U.S. leadership in advanced manufacturing research, innovation, and technology. As part of the program, the Secretary shall establish a network of centers for manufacturing innovation. Funding for the program is as follows: "to the extent provided for in advance by appropriations Acts the

Secretary may use not to exceed \$5,000,000 for each of the fiscal years 2015 through 2024 to carry out this section from amounts appropriated to the Institute for Industrial Technical Services” and, “to the extent provided for in advance by appropriations Acts, the Secretary of Energy may transfer to the Institute not to exceed \$250,000,000 for the period encompassing fiscal years 2015 through 2024 from amounts appropriated for advanced manufacturing research and development within the Energy Efficiency and Renewable Energy account for the Department of Energy.”

7. Public Law 114-113, Consolidated Appropriations Act, 2016, enacted on December 18, 2015 did not contain funding for the Advanced Manufacturing Technology Consortia. The accompanying Explanatory Statement contained language which moved the program into the National Network for Manufacturing Innovation as follows: “The agreement also merges the activities of the Advanced Manufacturing Technology Consortia (AMTech) into NNMI (National Network for Manufacturing Innovation).”

**Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
ADVISORY AND ASSISTANCE SERVICES
(Obligations in thousands of dollars)**

	<u>FY 2017</u> <u>Actual</u>	<u>FY 2018</u> <u>Annualized CR</u>	<u>FY 2019</u> <u>Estimate</u>
Consulting Services			
Management and professional support services	\$496	\$151	\$152
Studies, analyses, and evaluations	350	150	150
Engineering and technical services	<u>0</u>	<u>0</u>	<u>0</u>
Total	846	301	302

Significant Activities

Advisory and assistance services funded by the Industrial Technology Services appropriation are used to conduct evaluations of the programmatic outcomes, service delivery efficiency, and internal infrastructure requirements of the MEP Program.

Need for Advisory and Assistance Services

The need for advisory and assistance services stems from the role of NIST's extramural programs with its outside partners and small businesses to relate to the private sector, professional organizations, and the public sector. Inputs must be obtained from consultants who can bring their individual expertise to bear and help NIST in assessing its program plans to meet the needs of its customers. The alternative to utilizing these services is to make no attempt to have expertise from sources outside NIST and risk having a poorer working and professional relationship with those in the business of using the products and services offered by NIST. These services provide for economic assessment and external evaluation of NIST's extramural programs.

**Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)**

	Positions	FTE	Budget Authority	Direct Obligations	Appropriation
Annualized CR, 2018	116	110	\$108,260	\$154,982	\$108,260
Less: Unobligated balance from prior year	0	0	0	(46,722)	0
2019 Adjustments to base:					
Plus: Inflationary/Adjustments to base	0	0	586	586	586
2019 Base	116	110	108,846	108,846	108,846
Less: FY 2019 Program changes	0	0	(68,297)	(68,297)	(68,297)
2019 Estimate	116	110	40,549	40,549	40,549

**Comparison by activity/subactivity
with totals by activity**

		2017		2018		2019		2019		Increase/Decrease	
		Actual		Annualized CR		Base		Estimate		Over 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and major renovations											
Construction and major renovations	Pos/Approp	116	\$109,000	116	\$108,260	116	\$108,846	116	\$40,549	0	(\$68,297)
	FTE/Obl.	83	90,915	110	154,982	110	108,846	110	40,549	0	(68,297)
Adjustments for:											
Prior year recoveries			(1,293)		0		0		0		0
Prior year refunds			(30)		0		0		0		0
Unobligated balance, start of year			(27,314)		(46,722)		0		0		0
Unobligated balance, end of year			46,722		0		0		0		0
Financing from transfers:											
Transfers to other accounts (+)			0		0		0		0		0
Appropriation			109,000		108,260		108,846		40,549		(68,297)

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM AND PERFORMANCE: REIMBURSABLE OBLIGATIONS
 (Dollar amounts in thousands)

Comparison by activity/subactivity	2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease Over 2019 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Construction and major renovations Safety, Capacity, Maintenance and Major Repairs	0	\$907	0	\$885	0	0	0	0	0	0

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
SUMMARY OF FINANCING
(Dollar amounts in thousands)

	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/Decrease Over 2019 Base
Total Obligations	\$91,822	\$155,867	\$108,846	\$40,549	(\$68,297)
Financing:					
Offsetting collections from:					
Federal funds	0	0	0	0	0
Non-Federal sources	(885)	0	0	0	0
Total offsetting collections	(885)	0	0	0	0
Adjustments for:					
Prior year recoveries (Direct)	(1,293)	0	0	0	0
Prior year recoveries (Reimbursable)	(5)				
Prior year refunds (Direct)	(30)				
Unobligated balance, start of year (Direct)	(27,314)	(46,722)	0	0	0
Unobligated balance, start of year (Reimbursable)	(902)	(885)	0	0	0
Unobligated balance, end of year (Direct)	46,722	0	0	0	0
Unobligated balance, end of year (Reimbursable)	885	0	0	0	0
Unobligated balance, transfer from ITS appropriation	0	0	0	0	0
Budget Authority/Appropriation	109,000	108,260	108,846	40,549	(68,297)

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Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
ADJUSTMENTS TO BASE
(Dollar amounts in thousands)

	<u>FTE</u>	<u>Amount</u>
<u>Other Changes:</u>		
Annualization of FY 2018 pay raise.....	...	\$64
2019 Pay increase and related costs.....	...	0
Annualization of positions financed in FY 2018.....	0	0
Change in compensable days.....	...	48
Personnel benefits:		
Civil Service Retirement System (CSRS).....	...	(11)
Federal Employees' Retirement System (FERS).....	...	21
Thrift Savings Plan (TSP).....	...	3
Federal Insurance Contribution Act (FICA) - OASDI.....	...	11
Health insurance.....	...	28
Employees' Compensation Fund.....	...	3
Travel and transportation of persons:		
Mileage.....	...	0
Per diem.....	...	0
Communications, utilities, and miscellaneous charges:		
Postage.....	...	0
Electricity rate increase.....	...	3
Natural gas rate decrease.....	...	(1)
General pricing level adjustment.....	...	417
Total, Adjustments to Base.....	0	586

**Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)**

Activity: Construction and major renovations
Subactivity: Construction and major renovations

Line Item		2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease Over 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and major renovations	Pos/Approp	8	\$60,000	0	\$60,000	0	\$60,000	0	0	0	(\$60,000)
	FTE/Obl.	6	40,865	0	82,948	0	60,000	0	0	0	(60,000)
Safety, Capacity, Maintenance and Major Repairs	Pos/Approp	107	49,000	116	48,260	116	48,846	116	\$40,549	0	(8,297)
	FTE/Obl.	77	49,961	110	71,161	110	48,846	110	40,549	0	(8,297)
External Projects	Pos/Approp	1	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	89	0	873	0	0	0	0	0	0
Total	Pos/Approp	116	109,000	116	108,260	116	108,846	116	40,549	0	(68,297)
	FTE/Obl.	83	90,915	110	154,982	110	108,846	110	40,549	0	(68,297)

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM AND PERFORMANCE: REIMBURSABLE OBLIGATIONS
 (Dollar amounts in thousands)

Activity: Construction and major renovations
 Subactivity: Construction and major renovations

Line Item		2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease Over 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and major renovations	Pos/Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0	0	0	0	0
Safety, Capacity, Maintenance and Major Repairs	Pos/Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	\$902	0	\$885	0	0	0	0	0	0
External Projects	Pos/Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0	0	0	0	0
Total	Pos/Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	902	0	885	0	0	0	0	0	0

**Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

Activity: Construction and Major Renovations
Subactivity: Construction and Major Renovations

Goal Statement

The goal of Construction of Research Facilities (CRF) is to provide the facilities and infrastructure that enable the scientists and researchers to fulfill NIST's mission to promote innovation and industrial competitiveness through measurement science, standards, and technology.

Base Program

The CRF appropriation funds construction activities, including maintenance, repair, improvements, and major renovation of facilities occupied or used by NIST in Gaithersburg, Maryland; Boulder and Fort Collins, Colorado; and Kauai, Hawaii to meet current and future advancement in measurement science, standards, and technology to promote innovation and industrial competitiveness for the Nation.

In the 1950s and 1960s, recognizing the need to invest in science and technology, the U.S. government built state-of-the-art scientific facilities to support the research mission of NIST (then the National Bureau of Standards). More than half a century later, the aging and deteriorating buildings and infrastructure threaten NIST's ability to meet its mission – "To promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life." While some improvements have been made, the current state of facilities remains a serious impediment to NIST's ability to conduct advanced measurement science and research.

Examples of critical facility and infrastructure investments to support the needs of these modern research institutions include:

- Replace aging underground site utility distribution systems that are failing;
- Replace aging, obsolete, failed mechanical systems, to include heating and cooling coils, chillers, condenser units, exhaust fans, condensate receivers, vacuum pumps, steam traps;

- Replace failing heating, ventilation, and air conditioning control systems from 1960's pneumatic with current-day direct digital to address building supply/return/exhaust air rebalancing issues;
- Replace roofs;
- Refurbish elevators;
- Replace motor control centers, transformers, switchgear, network protectors, buss ducts, panels, UPS systems, fire alarm systems, variable frequency drives for which parts are no longer available;
- Upgrade electrical distribution systems to accommodate current and expanding research capacity requirements;
- Address building envelope exterior and interior architectural systems' degradations – energy inefficient and/or leaking windows and doors, rollup doors, below grade water infiltration through foundation cracks, and worn out ceilings and flooring;
- Address leaks and deterioration of underground potable water, sewer, electrical feeder, and compressed air systems;
- Abate asbestos; and
- Repair deteriorating road, parking lot, and sidewalk surfaces.

Statement of Operating Objectives

Facilities that can maintain stringent environmental conditions are essential to the capabilities of NIST laboratories. NIST measurement capabilities must be maintained at the highest levels of precision and accuracy to meet the increasing requirements of their users. In addition, all facilities must be compliant with various health and safety regulations. Other major considerations are to increase the capacity of the facilities, to improve access for people with disabilities, and to safeguard the utility infrastructure of existing buildings.

NIST relies on Safety, Capacity, Maintenance, and Major Repairs (SCMMR) funding to maintain and upgrade facilities at a level necessary to carry out NIST's and DOC's mission. For years, NIST's SCMMR funding has been below the minimum value for maintaining its facilities and well below the funding required to improve "facilities in a declining state."² As a result of a constrained fiscal environment (enacted SCMMR funds), NIST facilities are not in compliance with DOC's Facility Condition Index (FCI) recommendations. More specifically, since 2011, the FCI values for the NIST Gaithersburg and Boulder mission-dependent facilities have drastically declined from 85 to 70 (Gaithersburg) and 88 to 71 (Boulder), which is well below DOC's recommended 80.³ During the same time period, the FCI values for the mission-critical (research-specific) facilities have drastically declined from 85 to 70 (Gaithersburg) and 84 to 72 (Boulder), which is well below DOC's recommended 90.³ NIST's current facilities backlog includes over \$100 million in major utility system projects. Numerous major utility infrastructure systems are currently in critical condition, creating risks of catastrophic failure of entire laboratory buildings if supplemental funding is not provided to fund these large utility projects.

² NRC. 1990. *Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings*. Washington, D.C.: National Academy Press.

³ U.S. Department of Commerce Real Property Management Manual dated August 2014, Paragraph 4.4.3 Building Conditions (Page 38).

The declining condition of the facilities when compared to the SCMMR funding provided for maintaining the facilities shows a strong justification for increasing the SCMMR funding in excess of the National Research Council (NRC) guidelines over several years until the facilities can be brought back above the minimum FCI's established by DOC.

Example objectives of SCMMR are to:

- Continue repairs/replacements of utility systems, exhaust and air filtration systems, mechanical-electrical systems, and site alarm fire safety systems that are failing at an accelerated rate because they are over 40 to 50 years old;
- Continue site utility infrastructure upgrades and repairs, to include underground electrical, chilled water, steam, condensate and natural gas distribution;
- Continue site infrastructure upgrades and repairs, to include roads, loading docks, pedestrian walk areas, and storm water drainage;
- Enable or maintain building environmental conditions required for meeting scientific requirements;
- Continue the repair and upgrade of facilities that have a high impact on staff and visitor safety;
- Continue abatement of hazardous materials from site buildings and structures;
- Continue facilities modifications to comply with the Access to Federal Buildings Act, the Architectural Barriers Act, and the Americans with Disabilities Act;
- Continue to reduce the backlog of deferred maintenance projects including major renovation projects; and
- Intensify targeted energy conservation, water efficiency, and building system upgrades to facilitate meeting sustainability requirements stipulated in Executive Order 13693.

Multi-Year Budget Information (\$ in millions)

Major Cost Categories	FY 2017 and Prior	FY 2018	FY 2019	Cost to Complete
Building 1 Renovation (B1R) Design and Limited Renovation of Building 3	\$12.0			
B1R Exterior Renovations	14.9			
B1R Wing 3	15.0			
B1R Wing 6	15.7			
B1R Swing Space	3.9			
B3R	18.0			
B1R Wing 4, Wing 5 and Limited Center Spine ⁽¹⁾	22.0	\$10.0	0	\$209.0
Building 245 Modernization ⁽²⁾	122.0	60.0	0	160.0
General Purpose Laboratories Modernization ⁽³⁾				
Boulder Modernization (Wing 1, Wing 2 and Remaining Center Spine) ⁽³⁾				

(1) Will be completed with existing SCMMR as well as future funding requests in FY 2020, FY 2023 and beyond within the Construction and Major Renovations (CMR) line item.

(2) Will be completed with CMR funding requests.

(3) Future projects that will be submitted as CMR funding requests.

Explanation and Justification

Summary of Resources (Dollars in Thousands)

	FY 2017 Actual		FY 2018 Annualized CR		FY 2019 Request	
	Personnel	Amount	Personnel	Amount	Personnel	Amount
Pos./Approp.	116	\$109,000	116	\$108,260	116	\$40,549
FTE/Obl.	83	90,915	110	154,982	110	40,549

Construction of Research Facilities (Total Funding: \$40.549 million and 116 Positions)

With SCMMR base funding, NIST will prioritize its efforts to maintain, repair, improve and upgrade its facilities to address its highest priority SCMMR projects. If major facilities-related emergency situations arise, previously planned facilities work is reprioritized as appropriate.

No other private sector, or government entity has the capability, capacity, or mission to provide the types of services as those provided by NIST.

**Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGES FOR 2019
(Dollar amounts in thousands)**

		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>
Construction and major renovations	Pos./BA	0	\$60,000	0	0	0	(\$60,000)
	FTE/Obl.	0	60,000	0	0	0	(60,000)

Delay of the Building 245 Modernization (0 Positions, -\$60.0 million) – This request acknowledges a reduction of \$60 million in FY 2019 and stops the funding for the renovation and modernization efforts of the Radiation Physics Building (Building 245), a critical research facility on NIST's Gaithersburg, Maryland campus for one year. The funding through FY 2018 provides a complete and useable B/C Wing addition; D Wing addition; waterproofing, interior renovations and HVAC upgrades in the existing D Wing; and to begin A Wing hazardous material characterization. The B/C Wing addition is estimated to be complete in the third quarter of FY 2019. The remaining construction under contract is estimated to be fully complete in the fourth quarter of FY 2020. When funding resumes, NIST will begin the characterization and remediation of hazardous materials and renovation and modernization of laboratories and offices within the original areas of the Radiation Physics Building. The characterization and remediation of hazardous materials includes the removal of asbestos in floor tiles, adhesive, pipe insulation and caulking; removal of materials containing lead in paint on doors and windows; and testing for and removal of radiation contaminated materials.

Based on funding provided in prior years and anticipated FY 2018 funding, the Building 245 Modernization project will result in a multi-year work stoppage in FY 2020. Remaining work would require a new procurement for services that further delays the project by a minimum of two years. Previous and anticipated FY 2018 funds will result in additions to the building increasing the building size by roughly one third and allowing 30 percent of the existing laboratories to be relocated into these extensions. Minor amounts of remediation and water proofing will take place in the existing building. At the end of current and projected FY 2018 funding, the Radiation Physics Building will not have renovations to 70 percent of existing laboratories, including none of the low radiation background laboratories housing some of the most sensitive research. Utility systems in the existing building will not be upgraded and will continue to be at risk. Existing offices, staff support and facility support spaces will also not be renovated. Structural and waterproofing degradation in the existing building will continue to accelerate and put major radiation safety systems and research in jeopardy.

Exhibit 15

**Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)**

Activity: Construction and major renovations
Subactivity: Construction and major renovations

Object Class	2019 Increase/Decrease
11.1 Full-time permanent compensation	0
11.3 Other than full-time permanent	0
11.5 Other personnel compensation	0
11.8 Special personnel services payments	0
11.9 Total personnel compensation	0
12.1 Civilian personnel benefits	0
13 Benefits for former personnel	0
21 Travel and transportation of persons	0
22 Transportation of things	0
23 Rent, communications, and utilities	0
23.1 Rental payments to GSA	0
23.2 Rental payments to others	0
23.3 Communications, utilities, and misc. charges	0
24 Printing and reproduction	0
25 Other contractual services	0
25.1 Advisory and assistance services	0
25.2 Other services from non-Federal sources	0
25.3 Other goods and services from Federal sources	0
25.4 Operation and maintenance of facilities	0
25.5 Research and development contracts	0
25.6 Medicare care	0
25.7 Operation and maintenance of equipment	0
25.8 Subsistence and support of persons	0
26 Supplies and materials	0
31 Equipment	0
32 Lands and structures	(\$60,000)
33 Investments and loans	0
41 Grants, subsidies and contributions	0
99.9 Total obligations	(60,000)

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGES FOR 2019
(Dollar amounts in thousands)

		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>
Safety, Capacity, Maintenance, and Major Repairs	Pos./BA	116	\$48,846	116	\$40,549	0	(\$10,000)
	FTE/Obl.	110	48,846	110	40,549	0	(10,000)

Building 1 Renovation (0 Positions, -\$10.0 million) – This request acknowledges a reduction of \$10 million in FY 2019 and stops the funding for the efforts to renovate Building 1, the main research facility on NIST's Boulder, Colorado campus for one year. The funding through FY 2018 provides for a design-services contractor to develop the initial design documents (35 percent requirements) and completion of the Historic Preservation Act requirements in coordination with the Colorado State Historic Preservation Officer in addition to some hazardous material characterization and remediation. This scope of work will be complete in the fourth quarter of FY 2019. When funding resumes, NIST will begin the contracting process to procure a design-build contractor to develop the full design of Wing 5 and a construction management contractor that will assist NIST in the oversight and design of the construction of Wing 5 renovations.

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
 (Direct Obligations amounts in thousands)

Activity: Construction and major renovations
 Subactivity: Construction and major renovations

Object Class	2019 Increase/Decrease
11.1	0
11.3	0
11.5	0
11.8	0
11.9	0
12.1	0
13	0
21	0
22	0
23	0
23.1	0
23.2	0
23.3	0
24	0
25	0
25.1	0
25.2	0
25.3	0
25.4	0
25.5	0
25.6	0
25.7	0
25.8	0
26	0
31	0
32	(\$10,000)
33	0
41	0
99.9	(10,000)

**Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGES FOR 2019
(Dollar amounts in thousands)**

		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>	<u>Personnel</u>	<u>Amount</u>
Safety, Capacity, Maintenance, and Major Repairs	Pos./BA	116	\$48,846	116	\$40,549	0	\$1,703
	FTE/Obl.	110	48,846	110	40,549	0	1,703

Safety, Capacity, Maintenance and Major Repairs base (0 Positions, +\$1.7 million) – This request will be utilized to reduce deficiencies of NIST facilities by directing the funding towards the highest priority needs. To start reducing the facilities deficiencies, NIST would need funding in excess of four percent of its Current Replacement Value, or \$121 million annually.⁴

	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Performance Measures:	Impact of the program change is described in the narrative above.				
Cost and Benefits:					
Direct Obligations:					
Uncapitalized	1,703	1,735	1,770	1,805	1,841
Budget Authority	1,703	1,735	1,770	1,805	1,841
Outlays	341	858	1,386	1,667	1,786
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Benefits, in dollars

⁴ NRC. 1990. Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings. Washington, D.C.: National Academy Press.

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Construction and major renovations
Subactivity: Construction and major renovations

Object Class	2019 Increase/Decrease
11.1 Full-time permanent compensation	0
11.3 Other than full-time permanent	0
11.5 Other personnel compensation	0
11.8 Special personnel services payments	0
11.9 Total personnel compensation	0
12.1 Civilian personnel benefits	0
13 Benefits for former personnel	0
21 Travel and transportation of persons	\$1
22 Transportation of things	0
23 Rent, communications, and utilities	0
23.1 Rental payments to GSA	0
23.2 Rental payments to others	0
23.3 Communications, utilities, and misc. charges	45
24 Printing and reproduction	0
25 Other contractual services	0
25.1 Advisory and assistance services	0
25.2 Other services from non-Federal sources	1,637
25.3 Other goods and services from Federal sources	8
25.4 Operation and maintenance of facilities	0
25.5 Research and development contracts	0
25.6 Medicare care	0
25.7 Operation and maintenance of equipment	4
25.8 Subsistence and support of persons	0
26 Supplies and materials	3
31 Equipment	5
32 Lands and structures	0
33 Investments and loans	0
41 Grants, subsidies and contributions	0
99.9 Total obligations	1.703

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/Decrease from 2019 Base
11 Personnel compensation					
11.1 Full-time permanent	\$7,378	\$10,026	\$10,115	\$10,115	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	270	270	270	270	0
11.9 Total personnel compensation	7,648	10,296	10,385	10,385	0
12.1 Civilian personnel benefits	2,431	3,305	3,360	3,360	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	44	44	44	45	\$1
22 Transportation of things	21	21	21	21	0
23.1 Rental payments to GSA	5	5	5	5	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Communications, utilities, and miscellaneous charges	38	38	40	85	45
24 Printing and reproduction	17	17	17	17	0
25.1 Advisory and assistance services	0	0	0	0	0
25.2 Other services	20,985	27,363	15,032	16,669	1,637
25.3 Purchases of goods and services from government accounts	7,828	7,828	7,962	7,970	8
25.5 Research and development contracts	0	0	0	0	0
25.7 Operation and maintenance of equipment	534	534	543	547	4
26 Supplies and materials	1,089	1,089	1,108	1,111	3
31 Equipment	323	1,473	329	334	5
32 Land and structures	49,951	102,270	70,000	0	(70,000)
41 Grants, subsidies, and contributions	0	699	0	0	0
43 Interest and dividends	1	0	0	0	0
99 Total Obligations	90,915	154,982	108,846	40,549	(68,297)

Object Class		2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/Decrease from 2019 Base
99	Total Obligations	\$90,915	\$154,982	\$108,846	\$40,549	(\$68,297)
	Less Prior Year Recoveries	(1,293)	0	0	0	0
	Less Prior Year Refunds	(30)	0	0	0	0
	Less Prior Year Unobligated Balance	(23,314)	(46,722)	0	0	0
	Plus Unobligated Balance End of Year	46,722	0	0	0	0
	Unobligated Balance Adjustment (transfer from ITS)	(4,000)	0	0	0	0
	Total Budget Authority/Appropriation	109,000	108,260	108,846	40,549	(68,297)
	Plus Transfers from Other Accounts	0	0	0	0	0
	Appropriation	109,000	108,260	108,846	40,549	(68,297)

Personnel Data

Full-time equivalent employment:

Full-time permanent	83	110	110	110	0
Other than full-time permanent	0	0	0	0	0
Total	83	110	110	110	0

Authorized Positions:

Full-time permanent	116	116	116	116	0
Other than full-time permanent	0	0	0	0	0
Total	116	116	116	116	0

**Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
APPROPRIATION LANGUAGE AND CODE CITATIONS**

1. For construction of new research facilities, including architectural and engineering design, and for renovation and maintenance of existing facilities, not otherwise provided for the National Institute of Standards and Technology, as authorized by 15 U.S.C. 278c-278e.

15 U.S.C. 278c authorizes that the Secretary of Commerce to acquire land for such field sites as are necessary for the proper and efficient conduct of the activities authorized.

15 U.S.C. 278d authorizes that the Secretary of Commerce to undertake such construction of buildings and other facilities and to make such improvements to existing buildings, grounds, and other facilities as are necessary for the proper and efficient conduct of authorized activities.

15 U.S.C. 278e provides that in the performance of the functions of the National Institute of Standards and Technology the Secretary of Commerce is authorized to undertake: the care, maintenance, protection, repair, and alteration of Institute buildings and other plant facilities, equipment, and property.

2. \$40,549,000 to remain available until expended.
3. Public Law 110-69, America Competes Act, 121 Stat 572, passed August 9, 2007 reauthorizes the Construction of Research Facilities appropriation through 2010. It also provided for the Retention of Fees to the Construction of Research Facilities account. "The Director is authorized to retain all building use and depreciation surcharge fees collected pursuant to OMB Circular A-25. Such fees shall be collected and credited to the Construction of Research Facilities Appropriation Account for use in maintenance and repair of the Institute's existing facilities". Public Law 111-358, America Competes Reauthorization Act, 2010, 124 Stat 3982, passed January 4, 2011, reauthorized the Construction of Research Facilities appropriation through 2013.
4. Public Law 111-5, American Recovery and Reinvestment Act of 2009 appropriated \$360,000,000 to the Construction of Research Facilities appropriation from FY 2009 to FY 2010.

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
ADVISORY AND ASSISTANCE SERVICES
(Obligations in thousands of dollars)

	<u>FY 2017</u> <u>Actual</u>	<u>FY 2018</u> <u>Annualized CR</u>	<u>FY 2019</u> <u>Estimate</u>
Consulting Services			
Management and professional support services	0	0	0
Studies, analyses, and evaluations	0	0	0
Engineering and technical services	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	0

Significant Activities

Professional support and engineering and technical services are obtained when required to support the construction and major repairs and renovations of NIST's physical infrastructures in Gaithersburg, Maryland, and Boulder, Colorado. Strategies and action plans are also developed to further ensure structural building safety when the need arises.

Need for Advisory and Assistance Services

NIST uses outside professional support and engineering and technical services whenever necessary expertise is not available in-house to ensure the safety of NIST staff and visitors. At the time of this budget print there is no projected need for advisory and assistance services.

Working
Capital Fund

Department of Commerce
National Institute of Standards and Technology
Working Capital Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
Annualized CR, 2018	700	700	0	0
Adjustment	0	0	0	0
2019 Base	700	700	0	0
Transfer from STRS program changes for equipment investments	0	0	0	0
2019 Estimate	700	700	0	0

Department of Commerce
National Institute of Standards and Technology
Working Capital Fund
SUMMARY OF REIMBURSABLE OBLIGATIONS
(Dollar amounts in thousands)

	2017		2018		2019		2019		Increase/Decrease	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Comparison by activity:										
Laboratory programs										
WCF transfer		0		0		0		0		0
Reimbursables	634	\$140,852	650	\$152,341	650	\$136,171	650	\$136,171	0	0
WCF investments	0	(27,503)	0	8,265	0	0	0	0	0	0
Subtotal	634	113,349	650	160,606	650	136,171	650	136,171	0	0
Corporate services										
WCF transfer		0		0		0		0		0
Reimbursables	0	4,927	0	7,008	0	7,078	0	7,078	0	0
WCF investments	0	42	0	(17)	0	0	0	0	0	0
Subtotal	0	4,969	0	6,991	0	7,078	0	7,078	0	0
Standards coordination and special programs										
WCF transfer		0		0		0		0		0
Reimbursables	29	7,703	31	5,654	31	5,281	31	5,281	0	0
WCF investments	0	(238)	0	(245)	0	0	0	0	0	0
Subtotal	29	7,465	31	5,409	31	5,281	31	5,281	0	0
Manufacturing USA										
WCF transfer		0		0		0		0		0
Reimbursables	0	0	0	0	0	0	0	0	0	0
WCF investments	0	(4)	0	(6)	0	0	0	0	0	0
Subtotal	0	(4)	0	(6)	0	0	0	0	0	0
Hollings manufacturing extension partnership										
WCF transfer		0		0		0		0		0
Reimbursables	0	89	0	32	0	0	0	0	0	0
WCF investments	0	(5)	0	(8)	0	0	0	0	0	0
Subtotal	0	84	0	24	0	0	0	0	0	0

	2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
<u>Comparison by activity:</u>										
Baldrige performance excellence program										
WCF transfer		0		0		0		0		0
Reimbursables	18	1,174	19	1,000	19	1,000	19	1,000	0	0
WCF investments	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Subtotal	18	1,174	19	1,000	19	1,000	19	1,000	0	0
<hr/>										
Total, NIST Reimbursable Services										
WCF transfer	0	0	0	0	0	0	0	0	0	0
Reimbursables	681	154,745	700	166,035	700	149,530	700	149,530	0	0
WCF investments	<u>0</u>	<u>(27,708)</u>	<u>0</u>	<u>7,989</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Grand Total	681	127,037	700	174,024	700	149,530	700	149,530	0	0

**Department of Commerce
National Institute of Standards and Technology
Working Capital Fund
SUMMARY OF FINANCING
(Dollar amounts in thousands)**

	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/Decrease from 2019 Base
Total Obligations	\$127,037	\$174,024	\$149,530	\$149,530	0
Offsetting collections from:					
Federal funds	(79,298)	(105,569)	(89,330)	(89,330)	0
Non-Federal sources	(66,009)	(68,455)	(60,200)	(60,200)	0
Unobligated balance, start of year	(90,168)	(117,090)	(117,090)	(117,090)	0
Unobligated balance, end of year	117,090	117,090	117,090	117,090	0
Change in uncollected customer payments - Federal	(8,652)	0	0	0	0
Budget Authority	0	0	0	0	0
Financing:					
Transfer from other accounts	0	0	0	0	0
Appropriation	0	0	0	0	0

Department of Commerce
National Institute of Standards and Technology
Working Capital Fund
PROGRAM AND PERFORMANCE: REIMBURSABLE OBLIGATIONS
(Dollar amounts in thousands)

NIST Reimbursable Services

Comparison by activity		2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratory programs	Pos./BA	648	\$113,349	648	\$160,606	648	\$136,171	648	\$136,171	0	0
	FTE/Obl.	634	113,349	650	160,606	650	136,171	650	136,171	0	0
Corporate services	Pos./BA	0	4,969	0	6,991	0	7,078	0	7,078	0	0
	FTE/Obl.	0	4,969	0	6,991	0	7,078	0	7,078	0	0
Standards coordination and special programs	Pos./BA	32	7,465	32	5,409	32	5,281	32	5,281	0	0
	FTE/Obl.	29	7,465	31	5,409	31	5,281	31	5,281	0	0
Manufacturing USA	Pos./BA	0	(4)	0	(6)	0	0	0	0	0	0
	FTE/Obl.	0	(4)	0	(6)	0	0	0	0	0	0
Hollings manufacturing extension partnership	Pos./BA	0	84	0	24	0	0	0	0	0	0
	FTE/Obl.	0	84	0	24	0	0	0	0	0	0
Baldrige performance excellence program	Pos./BA	20	1,174	20	1,000	20	1,000	20	1,000	0	0
	FTE/Obl.	18	1,174	19	1,000	19	1,000	19	1,000	0	0
WCF investments Subtotal	Pos./BA	700	127,037	700	174,024	700	149,530	700	149,530	0	0
	FTE/Obl.	681	127,037	700	174,024	700	149,530	700	149,530	0	0

**Department of Commerce
National Institute of Standards and Technology
Working Capital Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

This Working Capital Fund (WCF) reflects the full-time equivalent employment and reimbursable obligations associated with the reimbursable work performed by NIST for other agencies and the public, and WCF investments. NIST's reimbursable services consist of technical work performed for other Federal agencies, state and local governments, and the private sector, including calibrations and special tests, advisory services, the sale of Standard Reference Materials and Baldrige Performance Excellence Program fees. The unique measurement and standards expertise developed with appropriated funding gives NIST the capability to perform these services on a reimbursable basis. NIST accepts other agency work based on an established set of criteria which include: (1) the need for traceability of measurements to national standards; (2) the need for work which cannot or will not be addressed by the private sector; (3) work supported by legislation that authorizes or mandates certain services; (4) work which would result in an unavoidable conflict of interest if carried out by the private sector or regulatory agencies; and (5) requests by the private sector for NIST action or services.

Department of Commerce
National Institute of Standards and Technology
Working Capital Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/Decrease from 2019 Base
11 Personnel compensation					
11.1 Full-time permanent	\$56,758	\$58,038	\$58,313	\$58,313	0
11.3 Other than full-time permanent	5,699	5,699	5,699	5,699	0
11.5 Other personnel compensation	977	977	977	977	0
11.9 Total personnel compensation	63,434	64,714	64,989	64,989	0
12.1 Civilian personnel benefits	20,372	20,573	20,648	20,648	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	1,259	3,595	2,407	2,407	0
22 Transportation of things	208	594	398	398	0
23.1 Rental payments to GSA	47	52	52	52	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Communications, utilities, and miscellaneous charges	4,393	5,414	4,894	4,894	0
24 Printing and reproduction	139	397	266	266	0
25.1 Advisory and assistance services	1,795	1,942	1,480	1,480	0
25.2 Other services	9,353	26,715	16,568	16,568	0
25.3 Purchases of goods and services from Government accounts	6,019	8,232	7,107	7,107	0
25.5 Research and development contracts	706	2,017	1,351	1,351	0
25.7 Operation and maintenance of equipment	1,088	3,108	2,081	2,081	0
26 Supplies and materials	8,925	23,937	16,305	16,305	0
31 Equipment	7,439	7,439	7,439	7,439	0
32 Land and structures	0	0	0	0	0
41 Grants, subsidies, and contributions	1,854	5,295	3,545	3,545	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	6	0	0	0	0
99 Total Obligations	127,037	174,024	149,530	149,530	0

<u>Personnel Data</u>	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/Decrease from 2019 Base
Full-time equivalent employment:					
Full-time permanent	597	616	616	616	0
Other than full-time permanent	84	84	84	84	0
Total	681	700	700	700	0
Authorized Positions:					
Full-time permanent	616	616	616	616	0
Other than full-time permanent	84	84	84	84	0
Total	700	700	700	700	0

**Department of Commerce
National Institute of Standards and Technology
Working Capital Fund
ADVISORY AND ASSISTANCE SERVICES
(Obligations in thousands of dollars)**

	<u>FY 2017</u> <u>Actual</u>	<u>FY 2018</u> <u>Annualized CR</u>	<u>FY 2019</u> <u>Estimate</u>
Consulting Services			
Management and professional support services	\$1,048	\$1,202	\$737
Studies, analyses, and evaluations	745	740	743
Engineering and technical services	<u>2</u>	<u>0</u>	<u>0</u>
Total.....	1,795	1,942	1,480

Significant Activities

Advisory and assistance services funded by the Working Capital Fund represent services funded by reimbursable funds in support of reimbursable work conducted at NIST.

Need for Advisory and Assistance Services

Advisory and Assistance services have been necessary to obtain additional expertise for conducting activities like the technical evaluation of the World Trade Center collapses, for example.

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**Department of Commerce
National Institute of Standards and Technology
NIST Public Safety Communications Research Fund
SUMMARY OF RESOURCE REQUIREMENTS - MANDATORY
(Dollar amounts in thousands)**

	Positions	FTE	Budget Authority	Direct Obligations	Appropriation
Annualized CR, 2018	0	0	0	0	0
2019 Adjustments to base	0	0	0	0	0
2019 Base Request/Estimate	0	0	0	0	0

		2017 Estimate		2018 Annualized CR		2019 Base		2019 Estimate		Increase/ (Decrease) Over 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Comparison by activity/subactivity with totals by activity:											
NIST public safety communications research fund		0	0	0	0	0	0	0	0	0	0
	Pos/Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0	0	0	0	0
Budget Authority/Appropriation - Mandatory Account											
	Pos/Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0	0	0	0	0

Note: The budgetary resources from offsetting collections for the NIST Public Safety Communications Research Fund will obligate over several fiscal years.

Department of Commerce
National Institute of Standards and Technology
NIST Public Safety Communications Research Fund
PROGRAM AND PERFORMANCE: REIMBURSABLE OBLIGATIONS
 (Dollar amounts in thousands)

Comparison by activity/subactivity:	2017 Actual		2018 Annualized CR		2019 Estimate	
	FTE	Amount	FTE	Amount	FTE	Amount
NIST public safety communications research fund	78	\$49,755	78	\$56,700	78	\$56,900

Note: The budgetary resources from offsetting collections for the NIST Public Safety Communications Research Fund will obligate over several fiscal years.

Department of Commerce
National Institute of Standards and Technology
NIST Public Safety Communications Research Fund
SUMMARY OF FINANCING - MANDATORY
(Dollar amounts in thousands)

	2017 Actual	2018 Annualized CR	2019 Estimate
Total Obligations	\$49,755	\$56,700	\$56,900
Offsetting collections from:			
Unobligated balance from offsetting collections, start of year	(275,341)	0	0
Unobligated balance from offsetting collections, end of year	(13,600)	0	0
Adjustments for:			
Recoveries	(55)		
Unobligated balance, start of year (Mandatory)		(239,241)	(182,541)
Unobligated balance from offsetting collections, end of year	239,241	182,541	125,641
Budget Authority/Appropriation - Mandatory Account	0	0	0

Note: The budgetary resources from offsetting collections for the NIST Public Safety Communications Research Fund will obligate over several fiscal years.

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Department of Commerce
National Institute of Standards and Technology
NIST Public Safety Communications Research Fund
PROGRAM AND PERFORMANCE: MANDATORY
(Dollar amounts in thousands)

Activity: NIST Public Safety Communications Research Fund
Subactivity: NIST Public Safety Communications Research Fund

Line Item		2017 Estimate		2018 Annualized CR		2019 Estimate	
		Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount
NIST public safety communications research fund	Pos/Approp	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0
Total	Pos/Approp	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0

Note: The budgetary resources from offsetting collections for the NIST Public Safety Communications Research Fund will obligate over several fiscal years.

**Department of Commerce
National Institute of Standards and Technology
NIST Public Safety Communications Research Fund
PROGRAM AND PERFORMANCE: MANDATORY
(Dollar amounts in thousands)**

Activity: NIST Public Safety Communications Research Fund
Subactivity: NIST Public Safety Communications Research Fund

Line Item		2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NIST public safety communications research fund	Pos/Approp	78	0	78	0	78	0	78	0	0	0
	FTE/Obl.	78	\$49,755	78	\$56,700	78	\$56,900	78	\$56,900	0	0
Total	Pos/Approp	78	0	78	0	78	0	78	0	0	0
	FTE/Obl.	78	49,755	78	56,700	78	56,900	78	56,900	0	0

**Department of Commerce
National Institute of Standards and Technology
Mandatory Account: NIST Public Safety Communications Research Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

Activity: NIST Public Safety Communications Research Fund
Subactivity: NIST Public Safety Communications Research Fund

There is no base funding for the program.

As part of the Middle-Class Tax Relief and Job Creation Act of 2012, NIST has one-time (non-recurring) mandatory resources through the Public Safety Communications Research Fund (PSCRF) to help develop cutting-edge wireless technologies for public safety users. The PSCRF has authorized \$300.0 million in mandatory funds from spectrum auction proceeds for NIST. In partnership with industry and public safety organizations, NIST will continue to conduct research and develop new standards, technologies and applications to advance public safety communications in support of FirstNet's efforts to build an interoperable nationwide broadband network for first responders.

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Department of Commerce
National Institute of Standards and Technology
NIST Public Safety Communications Research Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS - REIMBURSABLE OBLIGATIONS
(Dollar amounts in thousands)

Object Class	2017 Actual	2018 Annualized CR	2019 Estimate
11 Personnel compensation			
11.1 Full-time permanent	\$8,438	\$8,558	\$8,558
11.3 Other than full-time permanent	1,356	1,375	1,375
11.5 Other personnel compensation	146	33	33
11.9 Total personnel compensation	9,940	9,966	9,966
12.1 Civilian personnel benefits	3,108	3,116	3,116
13 Benefits for former personnel	0	0	0
21 Travel and transportation of persons	476	508	333
22 Transportation of things	29	21	8
23.1 Rental payments to GSA	0	0	0
23.2 Rental payments to others	0	0	0
23.3 Communications, utilities, and miscellaneous charges	533	677	827
24 Printing and reproduction	14	19	57
25.1 Advisory and assistance services	1,689	1,699	1,703
25.2 Other services	2,326	2,434	2,943
25.3 Purchases of goods and services from government accounts	2,165	2,100	2,145
25.5 Research and development contracts	585	600	1,002
25.7 Operation and maintenance of equipment	330	350	475
26 Supplies and materials	367	467	315
31 Equipment	911	5,400	3,325
32 Land and structures	0	0	0
41 Grants, subsidies, and contributions	27,281	29,343	30,685
42 Insurance claims and indemnities	0	0	0
43 Interest and dividends	1	0	0
99 Total Obligations	49,755	56,700	56,900

<u>Object Class</u>		2017 Actual	2018 Annualized CR	2019 Estimate
99	Total Obligations	\$49,755	\$56,700	\$56,900
	Adjustments for:			
	Recoveries	(55)	0	0
	Unobligated balance from offsetting collections, start of year	(275,341)	(239,241)	(182,541)
	Unobligated balance from offsetting collections, end of year	239,241	182,541	125,641
	Budgetary Resources - Mandatory Account	13,600	0	0
	Less: Offsetting collections	(13,600)	0	0
	Net Budget Authority - Mandatory Account	0	0	0

Personnel Data

	Full-time permanent:	65	65	65
	Other than full-time permanent	13	13	13
	Total	78	78	78
	Authorized Positions:			
	Full-time permanent	65	65	65
	Other than full-time permanent	13	13	13
	Total	78	78	78

Note: The NIST Public Safety Communications Research Fund will continue to obligate funds over several fiscal years.

**Department of Commerce
National Institute of Standards and Technology
NIST Public Safety Communications Research Fund
APPROPRIATION LANGUAGE AND CODE CITATIONS**

1. For necessary expenses of the National Institute of Standards and Technology,

15 U.S.C. 272; 273; 278b-j; p

15 U.S.C. 272; 273; 278b-j; p provides basic authority for the performance of the functions and activities of the National Institute of Standards and Technology, authorizes appropriations for these purposes to be provided to the general public and specific institutions, governments, firms, and individuals, and requires the notification of Congress of a reprogramming of funds that exceeds a limit specified in public law.

2. **MANDATORY ACCOUNT:** As part of the Middle-Class Tax Relief and Job Creation Act of 2012, NIST has one-time (non-recurring) mandatory resources through the Public Safety Communications Research Fund (PSCRF) to help develop cutting-edge wireless technologies for public safety users. The PSCRF contains \$300 million in mandatory funds for NIST from the spectrum auction proceeds to help industry and public safety organizations conduct research and develop new standards, technologies and applications to advance public safety communications in support of the initiative's efforts to build an interoperable nationwide broadband network for first responders. P.L. 112-96 established the Public Safety Communications Research Fund per section 6303 of the Middle-Class Tax Relief and Job Creation Act of 2012. The fund's availability extends through 2022 and began to execute in FY 2015. \$92.7 million was transferred to NIST in FY 2015. \$7.3 million was released from sequester in FY 2016, an additional \$186.4 million was transferred in FY 2016, and \$13.6 million was released from sequester in FY 2017. Currently \$239.2 million has been carried forward from FY 2017 into FY 2018 with \$46.6 million apportioned for FY 2018, and \$192.6 million apportioned for subsequent years. Additional transfers to NIST from NTIA are expected as proceeds from the spectrum auctions become available.

**Department of Commerce
National Institute of Standards and Technology
NIST Public Safety Communications Research Fund
ADVISORY AND ASSISTANCE SERVICES
(Obligations in thousands of dollars)**

	<u>FY 2017 Actual</u>	<u>FY 2018 Annualized CR</u>	<u>FY 2019 Estimate</u>
Consulting Services			
Management and professional support services	\$1,689	\$1,699	\$1,730
Studies, analyses, and evaluations	0	0	0
Engineering and technical services	<u>0</u>	<u>0</u>	<u>0</u>
Total.....	1,689	1,699	1,480

Significant Activities

Advisory and assistance services funded by one-time (non-recurring) mandatory resources through the Public Safety Communications Research Fund (PSCRF) to help develop cutting-edge wireless technologies for public safety users.

Need for Advisory and Assistance Services

Advisory and Assistance services have been necessary to obtain additional expertise to conduct research and develop new standards, technologies and applications to advance public safety communications in support of FirstNet's efforts to build an interoperable nationwide broadband network for first responders.

Summary of National Institute of Standards and Technology (NIST)

The operations of the NIST Working Capital Fund are reported in a program and financing schedule printed in the President's Budget, as well as reflected in the reimbursable amounts throughout this budget. The fund finances the initial costs of work performed by NIST and is reimbursed by applicable appropriations and advances or reimbursements from other agencies. A detailed cost accounting system is used to ensure that the actual cost of work performed for each job or task is recorded and identified with the appropriate source of financing. In addition to its function as a revolving fund, the Working Capital Fund is also used to handle annual and sick leave on an accrued basis, to acquire equipment as an investment to be recovered through amortization charges to programs, to distribute indirect costs to program as overhead, to carry the recoverable costs associated with the production of Standard Reference Materials, and to carry supply inventories until issued for program use.

The table below summarizes the total NIST program, according to the source of financing. Following this table is a summary of the NIST reimbursable program by sponsor and source of support.

Summary of Total NIST Discretionary Program

(Obligations in thousands)

Source and Use of Funds Spent	FY 2017			FY 2018			FY 2019			Approp. Requested
	Perm. Pos. ^{1/}	FTE	Oblig.	Perm. Pos. ^{1/}	FTE	Oblig.	Perm. Pos. ^{1/}	FTE	Oblig.	
Direct Funding										
Scientific and technical research and services	2,527	2,446	\$712,109	2,527	2,492	\$702,388	2,150	2,115	\$574,928	\$573,429
Industrial technology services	101	94	190,889	101	100	158,733	20	20	15,094	15,094
Construction of research facilities	116	83	90,915	116	110	154,982	116	110	40,549	40,549
Gifts and bequests	12	12	2,324	12	12	2,200 ^{3/}	12	12	2,200 ^{3/}	0
Total, direct funding	2,756	2,635	996,237	2,756	2,714	1,018,303	2,298	2,257	632,771	629,072
Reimbursable Funding and WCF Investments										
Construction of research facilities - building surcharge	0	0	907	0	0	885	0	0	0	
Research, development and supporting services:										
Federal government	422	411	95,697	422	422	105,569	422	422	89,330	
Calibrations and tests, technical and advisory services:										
Federal government	28	28	6,163	28	28	6,272	28	28	6,209	
Public and non-federal government	110	105	26,459	110	110	26,927	110	110	26,653	
Subtotal, Services	138	133	32,622	138	138	33,199	138	138	32,862	
National Voluntary Laboratory Accreditation Program	25	24	4,259	25	25	4,243	25	25	4,246	
Standard reference materials (SRMs):										
SRM Sales:										
Federal government	3	3	697	3	3	754	3	3	757	
Public and non-federal government	100	98	20,558	100	100	22,270	100	100	22,335	
Subtotal, SRM sales	103	101	21,255	103	103	23,024	103	103	23,092	
SRM investment adjustment	0	0	905	0	0	0	0	0	0	
Subtotal, SRM	103	101	22,160	103	103	23,024	103	103	23,092	
Total, Reimbursable program	688	669	155,645 ^{2/}	688	688	166,920 ^{2/}	688	688	149,530	
WCF Investments and Operating Adjustments										
WCF investments	0	0	19,401	0	0	24,972	0	0	24,972	
WCF operating adjustments	0	0	(26,432)	0	0	0	0	0	0	
Total, WCF Investments and operating adjustments	0	0	(7,031)	0	0	24,972	0	0	24,972	
Total, NIST program	3,444	3,304	1,144,851	3,444	3,402	1,210,195	2,986	2,945	807,273	
Offsetting adjustment for amortization of equipment	0	0	(20,670)	0	0	(16,983)	0	0	(24,972)	
Adjusted total, NIST program	3,444	3,304	1,124,181	3,444	3,402	1,193,212	2,986	2,945	782,301	

^{1/} Most NIST scientists and engineers are not engaged solely on one research project. Individuals may divide their time between two or more projects financed by different sources of support. Also, salary costs of many staff members are charged to an overhead account and subsequently prorated to all directly funded projects. For these reasons, it is not possible to report employment directly for any source of financing. The Permanent Positions above are statistically-derived numbers, based on the estimated work years distribution for NIST programs.

^{2/} Total reimbursable numbers are different from the next page due to inclusion of CRF reimbursable obligations.

^{3/} Estimate support from Foundation for the Malcolm Baldrige National Quality Award, Inc. to Baldrige Performance Excellence Program.

Department of Commerce
National Institute of Standards and Technology
REIMBURSABLE PROGRAM AND WORKING-CAPITAL FUND INVESTMENTS
(Dollar amounts in thousands)

	FY 2017 Actual	FY 2018 Annualized CR	FY 2019 Estimate
Department of Defense			
Air Force	\$10,667	\$8,633	\$8,858
Army	263	495	550
Navy	773	1,173	1,050
Other, Department of Defense	19,777	19,612	18,942
Subtotal, Department of Defense	<u>31,480</u>	<u>29,913</u>	<u>29,400</u>
Department of Commerce	21,528	23,458	21,292
Department of Energy	2,432	3,830	2,830
Dept. of Health & Human Services	5,023	5,384	4,875
Dept. of Homeland Security	15,091	20,683	12,644
Department of Justice	5,633	6,132	4,650
Department of Transportation	1,334	759	541
Department of the Treasury	16	11	0
Department of Veterans Affairs	144	150	150
Environmental Protection Agency	103	150	150
General Services Administration	8	8	8
National Aeronautics & Space Admin.	4,410	3,275	3,275
National Science Foundation	2,838	2,788	2,794
Nuclear Regulatory Commission	2,971	3,000	3,000
Other	2,686	6,028	3,721
Subtotal, Other Agency	<u>95,697</u>	<u>105,569</u>	<u>89,330</u>
Calibrations & Testing	7,799	7,632	7,582
Technical & Advisory Services	29,082	29,810	29,526
Standard Reference Materials	22,160	23,024	23,092
Subtotal, Other Reimbursables	<u>59,041</u>	<u>60,466</u>	<u>60,200</u>
Total, Reimbursable Program	154,738	166,035	149,530
Equipment Investments	19,401	24,972	24,972
IE Amortization	(20,670)	(16,983)	(24,972)
WCF Operating Adjustments	(26,432)	0	0
Total, WCF Investments	<u>(27,701)</u>	<u>7,989</u>	<u>0</u>
Total, Reimbursable Program and WCF Investments	127,037	174,024	149,530

Department of Commerce
National Institute of Standards and Technology
PERIODICALS, PAMPHLETS, AND AUDIOVISUAL SERVICES
(Obligations in thousands)

	<u>2016</u> <u>Actual</u>	<u>2017</u> <u>Actual</u>	<u>2018</u> <u>Annualized CR</u>	<u>2019</u> <u>President's Budget</u>
Periodicals	0.0	0.0	0.0	0.0
Pamphlets	\$6.0	\$13.0	\$10.0	\$10.0
Audiovisuals	51.0	58.0	90.0	70.0
Total	57.0	68.0	100.0	80.0

NIST produces one periodical a year, *The Journal of Research of the National Institute of Standards and Technology*. The final paper production was issued in January 2012 and the periodical is now issued electronically. The *Journal of Research of the National Institute of Standards and Technology* reports NIST research and development in metrology and related fields of physical science, engineering, applied mathematics, statistics, biotechnology, and information technology.

NIST produces a small number of printed products to be distributed at conferences where NIST exhibits. These products include postcards with images and a link back to the NIST website, a two-sided periodic table with more information about NIST science, and metric conversion cards.

NIST's audiovisual products are mostly short (under 5 minute) videos created to highlight NIST's science, staff and/or history. These products are mainly distributed via the NIST website and social media channels and shared at conferences where NIST is exhibiting. Video costs are estimated to be higher in FY 2018 because of NIST's leadership role in redefining the kilogram and implement a revised international system of measurement.

**Department of Commerce
National Institute of Standards and Technology
AVERAGE SALARY**

	<u>2017 Estimate</u>	<u>2018 Estimate</u>	<u>2019 Estimate</u>
Average ES salary	\$181,912	\$185,368	\$185,368
Average scientific and professional	184,476	187,981	187,981
Average career path salary	115,858	118,059	118,059
Average salary of ungraded positions	60,794	61,949	61,949

FY 2018 average salaries reflect a 1.9 percent pay raise and FY 2019 average salaries reflects a pay freeze with 0.0 percent pay raise.

FY 2019 Performance Planning Backup

MISSION STATEMENT

NIST's Mission is *To promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.*

OVERVIEW

Founded in 1901, NIST is “industry’s national lab.” The three key elements of the NIST mission – measurement science, standards, and technology – define NIST’s unique and inherently governmental role. NIST leads the world in measurement science, creating the experimental and theoretical tools – methods, metrics, instruments, and data – that enable innovation. NIST provides technical leadership to the development of standards, disseminating *measurement standards* and providing technical expertise to further the development of *documentary standards* that enable comparison, ensure interoperability, and support commerce. NIST’s intramural research programs and extramural programs that support manufacturers drive technology innovation through knowledge dissemination and public-private partnerships that bridge the gap between discovery and the marketplace. Recognizing the government’s role in these efforts, the Nation’s founders included in the Constitution the Federal government’s power to “fix the Standard of Weight and Measures.” Congress established the National Bureau of Standards (renamed NIST in 1988) in 1901 to fulfill that role, and the National Bureau of Standards/NIST has been a part of the Department of Commerce since the Department’s founding in 1903. As a National Metrology Institute, NIST is responsible for the dissemination of the fundamental units of measurement, the basis of international trade and commerce, and scientific progress.

ORGANIZATIONAL STRUCTURE

NIST ORGANIZATION CHART

NIST Director / Undersecretary of Commerce
for Standards and Technology

Associate Director for
Laboratory Programs

Laboratory Programs

- Center for Nanoscale Science and Technology
- Communications Technology Laboratory
- Engineering Laboratory
- Information Technology Laboratory
- Material Measurement Laboratory
- NIST Center for Neutron Research
- Physical Measurement Laboratory

Staff Offices

- Standards Coordination
- Special Programs

Associate Director of
Industry & Innovation
Services

**Industry & Innovation
Services**

- Baldrige Performance Excellence Program
- Hollings Manufacturing Extension Partnership
- Office of Advanced Manufacturing

Staff Offices

- Technology Partnerships

Associate Director
of Management
Resources

Management Resources

- Office of Acquisition and Agreements Management
- Office of Safety, Health and Environment
- Office of Financial Resource Management
- Office of Human Resources Management
- Office of Information Systems Management
- Office of Facilities and Property Management

Staff Offices

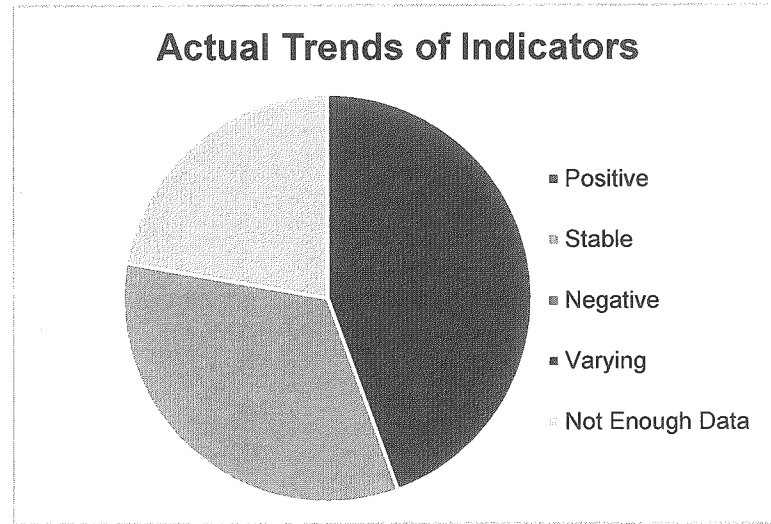
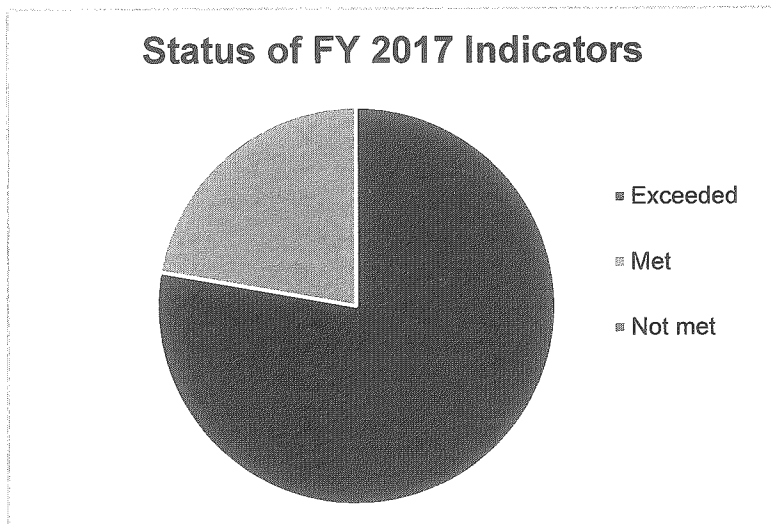
- Civil Rights & Diversity
- Information Services
- Emergency Services Office
- Fabrication Technology

Chief of Staff

- Executive Officer for Administration Management and Organization Office
- Program Coordination Office
- Public Affairs Office
- International and Academic Affairs Office
- Congressional and Legislative Affairs Office
- Human Subjects Protection Office

SUMMARY OF PERFORMANCE

Bureau Summary



In FY 2017, seven (78%) of NIST's indicators exceeded their targets and two (22%) met their targets. Seven indicators had trends. Of those seven, four (57%) indicators had positive trends and three (43%) had stable trends.

Summary of FY 2017 Indicator Performance

Indicator Name	Target	Actual	Status	Trend
Dollar amount of co-investment by non-Federal sources in DOC-supported Manufacturing USA institutes	\$6M	\$8.89M	Exceeded	Not enough data
Number of businesses using NIST research facilities	325	442	Exceeded	Stable
Relative citation impact of NIST-authored publications	1.6	1.66	Exceeded	Stable
Number of critical infrastructure sectors with work products integrating the Cybersecurity Framework	14	16	Exceeded	Positive

Number of public safety communications stakeholder R&D roadmaps	3	3	Met	Positive
Number of firms receiving in-depth technical assistance from MEP centers	9187	8,927	Met	Stable
Percentage of MEP clients receiving in-depth technical assistance that increase their competitiveness	64%	65.2%	Exceeded	Positive
Number of MEP centers partnering with skills training providers (eg, community colleges) to link manufacturing firms with skills training resources	48	49	Exceeded	Positive
Number of communities working with NIST to pilot the Community Resilience Planning Guide	6	8	Exceeded	Not enough data

Detailed Indicator Plans and Performance

Current / Recurring Indicators

Indicator	Dollar amount of co-investment by non-Federal sources in DOC-supported Manufacturing USA institutes							
Category	Key							
Type	Outcome							
Description	This indicator reflects how well the focus area of the Manufacturing USA (formerly National Network for Manufacturing Innovation) Institutes matches a real national need and is intended to measure the extent to which the industrial partners perceive that they are receiving value from the existence of the Institute. Non-Federal partners dedicate resources when they believe that there will be economic benefit. Non-Federal sources include industry partners of all sizes, state and local governments, economic development entities, institutions of higher education, private organizations and individuals. Investment includes cash and in-kind resources provided.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target						\$6M	\$15M	\$29M
Actual					\$0	\$8.89M		
Status					Met	Exceeded		
Trend	Not enough data to determine trend							
Explanation (if not met in 2017)	NOT APPLICABLE							

Actions to be taken / Future Plans	NIST will continue to support its role coordinating the Manufacturing USA Program by overseeing the planning, management, coordination and congressional reporting of the Manufacturing USA Program, convening and supporting the network of institutes, providing shared services and promoting best practices to identify and address challenges and opportunities that span technology areas and cut across agency missions, and managing Commerce-sponsored manufacturing innovation institutes selected through a competitive process on topics proposed by industry. NIST will continue to effectively manage and find opportunities to collaborate with the Commerce-sponsored manufacturing institute, the National Institute for Innovation in Manufacturing Biopharmaceuticals.
Adjustments to targets	None
Notes	None
Information Gaps	None

Indicator	Number of businesses using NIST research facilities							
Category	Key							
Type	Intermediate Outcome							
Description	This indicator reflects the value, relevance, and usefulness of NIST research facilities to industry users. NIST research facilities are unique capabilities that can be leveraged through partnerships with businesses, especially manufacturers, to accelerate discovery and commercialization of innovative products. This indicator counts the number of Cooperative Research and Development Agreements between industry and NIST laboratories, as well as the number of industrial institutions that use the NIST user facilities (NIST Center for Neutron Research and the Center for Nanoscale Science and Technology).							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target			215	225	275	325	325	300
Actual			514	444	435	442		
Status			Exceeded	Exceeded	Exceeded	Exceeded		
Trend	Negative							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	Starting in FY 2018, CRADAs that are a part of the National Cybersecurity Center of Excellence will not be counted in this indicator, since they will be reflected in the new NCCoE partner indicator. Furthermore, NIST anticipates that budget cuts in 2019 are likely to decrease the number of NIST facilities available for partnerships.							

	NIST will work with stakeholders across its programs to ensure NIST's research programs and capabilities are well-matched to their needs. Where appropriate, NIST will seek to increase access to its unique capabilities and cultivate partnerships that will increase the dissemination and impact of NIST's measurement science and standards work. Specifically, NIST's programs in advanced communications for the public safety sector will target partnerships that expand their reach.
Adjustments to targets	None
Notes	None
Information Gaps	Data for industry use of NIST user facilities not yet final for full FY17. May not include all instances of industry use of NIST research facilities indirectly through support of academic research.

Indicator	Relative citation impact of NIST-authored publications							
Category	Key							
Type	Outcome							
Description	This indicator demonstrates that NIST consistently produces useful and relevant scientific and technical publications and is outcome-oriented. The "relative citation impact" indicator is the ratio of the average number of citations per publication (citation rate) for all NIST publications in a year to the average expected citation rate for similar publications in a large group of peer institutions in the world. Publications typically lag by a minimum of two years due to the time needed for research, writing, journal peer review, and publication processes. The average for U.S. institutions is about 1.3.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target	1.1	1.1	1.5	1.5	1.5	1.6	1.6	1.3
Actual	1.31	1.58	1.53	1.7	1.8	1.66		
Status	Exceeded	Exceeded	Exceeded	Exceeded	Exceeded	Exceeded		
Trend	Positive							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	None							
Adjustments to targets	The target was decreased because cuts to the Laboratory Programs in FY 2019 are likely to decrease scientific output.							
Notes	* The FY 2016 actual for this measure is the most volatile and likely to change. Actuals for FY 2011 – FY2015 have been updated to reflect most recent data available.							
Information Gaps	Due to the ever-changing nature of research and publication, and continual updating of the dataset used to generate these metrics, the actuals for any given year are subject to change. Most recent datum is most likely to change. Calendar year 2017 data only includes publications in the Web of Science as of October 31, and is likely missing hundreds of documents published in 2017.							

Proposed New Indicators

Using the table below, state any proposed new indicators including any information about indicators they may be replacing.

Indicator	Number of companies and organizations exposed to NCCOE produced cybersecurity practice guides and other products.							
Category	Key							
Type	Intermediate Outcome							
Description	This indicator seeks to demonstrate that awareness of NCCoE work products is increasing among companies and organizations. It also demonstrates value perceived by users and stakeholders in NCCoE's work products, since exposure mechanisms are voluntary. Companies and organizations exposed to NCCoE products may include technology partners and CRADA collaborators, Community of Interest participants, and other entities.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target							5500	6000
Actual								
Status								
Trend	New indicator - not enough data							

Explanation (if not met in 2017)	NOT APPLICABLE
Actions to be taken / Future Plans	None
Adjustments to targets	NOT APPLICABLE SINCE IT IS A NEW INDICATOR
Notes	None
Information Gaps	This indicator does not capture adoption of NCCoE work products as this is primarily based only on anecdotal information today.
Reason for New Indicator	The NCCOE is a critical component of NIST's efforts to strengthen the Nation's cybersecurity. It is a collaborative hub where industry organizations, government agencies, and academic institutions work together to address businesses' most pressing cybersecurity challenges. This public-private partnership enables the creation of practical cybersecurity solutions for specific industries or broad, cross-sector technology challenges. This indicator will provide insight into NIST's success in providing relevant products for the Nation.
Indicator(s) being replaced	None

Indicator	International adoption of NIST Quantum SI standards							
Category	Key							
Type	Outcome							
Description	<p>Since 1999, the international body that governs weights and measures has been planning to revise the International System of Units so that all SI base units are defined in terms of physical constants of the universe. Because of NIST's international leadership and world-class research, that plan will be a reality in 2019. That change, along with NIST's existing expertise in quantum science and engineering, will open the floodgates of new and improved measurement approaches. This indicator shows acceptance of NIST's metrological approach and the utility of NIST research by counting new devices and technologies, developed through NIST research, commercialized and used.</p>							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target							3	4
Actual								
Status								
Trend	New indicator – not enough data.							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	Indicator is on-track.							
Adjustments to targets	NOT APPLICABLE SINCE IT IS A NEW INDICATOR							
Notes	Indicator shows cumulative count of devices commercialized, in process of commercialization through CRADAs or patent licenses, and embedded in national and international laboratories.							
Information Gaps	None							
Reason for New Indicator	In May 2019, the SI will be redefined with units based on fundamental constants of nature. NIST's role in this transition from a classical to a quantum definition will be one of leadership. NIST will explore the foundational limits of the Quantum SI by integrating efforts in fundamental research, applied research and dissemination of the SI units. NIST's goal is to develop Quantum SI standards and sensors for mainstream US industry, and disruptively change the classical dissemination modality.							
Indicator(s) being replaced	Not applicable.							

Indicator	Number of resources derived from the Cybersecurity Framework.							
Category	Key							
Type	Intermediate Outcome							
Description	This indicator seeks to demonstrate that use of the Cybersecurity Framework is increasing, and that guidance and other tools are being developed and made publicly available to help organizations use the Framework to understand, manage, and communicate cybersecurity risk. Cybersecurity Framework Resources may be developed by any organization, including industry, academia, government, and non-government organizations. These resources may include, but are not limited to, implementation guides, mappings, case studies, educational materials, example profiles, online informative references, and Framework document templates.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target							70	80
Actual								
Status								
Trend	New indicator - not enough data							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	In spring 2018, NIST plans to launch Online Informative References to which will transition Framework informative references into an online format. This will enable expansion of informative references and industry resources by providing a standardized process and format for other organizations (ex, standards bodies, industry) to express the relationship of their resources to the Framework. It will also allow users to search and select the most appropriate references to meet their needs.							
Adjustments to targets	NOT APPLICABLE SINCE IT IS A NEW INDICATOR							
Notes	None							
Information Gaps	Use of the Cybersecurity Framework outside of the Federal Government is voluntary. This indicator is dependent on publicly available Cybersecurity Framework Resources. Resources not issued publicly may result in an information gap.							
Reason for New Indicator	The Cybersecurity Framework is aimed at helping any organization – regardless of sector, size, degree of cybersecurity risk, or cybersecurity sophistication – to understand, manage, and communicate cybersecurity risks. Organizations have unique risks – different threats, different vulnerabilities, different risk tolerances – and how they implement the practices in the Framework will vary. An increasing number and diversity of resources available to help organizations use the Cybersecurity Framework is an indicator of a healthy ecosystem, and will provide insight into NIST’s success in providing relevant products for the Nation.							
Indicator(s) being replaced	None							

Indicator	Cumulative number of collaborators on NCCoE projects							
Category	Key							
Type	Intermediate Outcome							
Description	This indicator demonstrates that NCCoE work products are valuable to industry. Companies that participate in NCCoE projects partner with NIST through Technology Partnerships, Cooperative Research and Development Agreements, and Interagency Agreements. These partnerships are in-depth, active collaborations. The outputs of these projects become publicly available to the whole community in work products like NIST Special Publications, fact sheets, and demos.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target							123	140
Actual								
Status								
Trend	New indicator - not enough data							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	None							
Adjustments to targets	NOT APPLICABLE SINCE IT IS A NEW INDICATOR							
Notes	None							
Information Gaps	This indicator does not capture adoption of NCCoE work products as this is primarily based only on anecdotal information today.							
Reason for New Indicator	The NCCoE is a critical component of NIST's efforts to strengthen the Nation's cybersecurity. It is a collaborative hub where industry organizations, government agencies, and academic institutions work together to address businesses' most pressing cybersecurity challenges. This public-private partnership enables the creation of practical cybersecurity solutions for specific industries or broad, cross-sector technology challenges. This indicator will provide insight into NIST's success in providing relevant products for the Nation.							
Indicator(s) being replaced	None							

Other Indicators

Using the table below, state any additional indicators that do not have targets (actuals only)

Non Recurring Indicators

Enter any indicators that you are discontinuing in either FY 2018 or FY 2019.

Indicator	Number of firms receiving in-depth technical assistance from MEP centers							
Category	Key							
Type	Intermediate Outcome							
Description	Number of client firms receiving services from MEP centers where those services were substantial and essential and therefore could reasonably be assumed to have directly or entirely led to the impacts reported through the MEP client survey.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target			8340	8750	8986	9187	9,487	Discontinued
Actual	7614	8140	8353	8419	8921	8927		
Status			Exceeded	Met	Met	Met		
Trend	Positive							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	None							
Adjustments to targets	None							
Notes	None							
Information Gaps	Clients in Puerto Rico in Q3 2017 were not surveyed due to Hurricane issues.							
Justification for elimination	NIST will retire this indicator in 2019 since the President's Request discontinues Federal funds for the MEP program.							

Indicator	Percentage of MEP clients receiving in-depth technical assistance that increase their competitiveness							
Category	Key							
Type	Outcome							
Description	Percentage of MEP clients receiving in-depth technical assistance that reported increasing sales, reducing costs, or making new investments as a result of the services received.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target			60%	62%	63%	64%	65%	Discontinued
Actual	61%	59%	58%	56%	59.7%	65.2%		
Status			Met	Met	Met	Exceeded		
Trend	Varying							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	None							
Adjustments to targets	None							
Notes	None							
Information Gaps	None							
Justification for elimination	NIST will retire this indicator in 2019 since the President's Request discontinues Federal funds for the MEP program.							

Indicator								
Number of critical infrastructure sectors with work products integrating the Cybersecurity Framework								
Category	Key							
Type	Intermediate Outcome							
Description	This indicator demonstrates that NIST consistently produces useful and relevant cybersecurity publications and reference materials that organizations representing or participating in a diverse set of the sixteen total critical infrastructure sectors can use. The Cybersecurity Framework may be cited in professional journals; international/national/industry standards, guidelines, and practices; sector-specific Federal agency guidance to industry; and commercial/government-off-the-shelf software.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target			10	12	13	14	Discontinued	
Actual			9	12	16	16		
Status			Met	Met	Exceeded	Exceeded		
Trend	Positive							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	NIST will continue to work with stakeholders to refine and improve the Framework and support its implementation by critical infrastructure sectors, as well as other sectors.							
Adjustments to targets	None							
Notes	None							
Information Gaps	None							
Justification for elimination	NIST will discontinue this indicator in 2018 because it has fulfilled the general target of ensuring use of the Cybersecurity Framework by all 16 critical infrastructure sectors as defined in originating executive order.							

Indicator	Number of Public safety communications stakeholder R&D roadmaps							
Category	Supporting (non-Strategic Plan)							
Type	Intermediate Outcome							
Description	This indicator demonstrates significant milestones and the value of NIST's convening and technical roles in advanced communications related to communications for public safety. NIST will receive funds starting in 2015 from the 2012 Middle Class Tax Relief act to perform R&D that supports FirstNet, the broadband first responder communications network. In addition to legislatively-mandated R&D topics, NIST has worked with stakeholders to prioritize additional critical R&D topics. From this prioritization, and working closely stakeholders, NIST will develop an R&D roadmap for each topic.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target				1	2	3	Discontinued	
Actual				1	2	3		
Status				Met	Met	Met		
Trend	Positive							
Explanation (if not met in 2017)	NOT APPLICABLE FOR OMB SUBMISSION							
Actions to be taken / Future Plans	NIST will continue to engage with stakeholders to make progress against the R&D roadmaps through a combination of intramural research and extramural grants, contracts, prizes, and challenges. In addition, NIST continues to discuss future R&D needs to fulfill the communications needs of the public safety community and revise plans as appropriate.							
Adjustments to targets	None							
Notes	None							
Information Gaps	None							
Justification for elimination	NIST will retire this indicator in 2018 because it will have completed roadmaps on the most significant research areas facing public safety communications.							

Indicator	Number of MEP centers partnering with skills training providers (e.g., community colleges) to link manufacturing firms with skills training resources							
Category	Key							
Type	Output							
Description	This indicator reflects the number of MEP centers involved in activities supporting the development of a workforce with industry-aligned skills. MEP is working with partners throughout the national network of centers to provide the tools, services, and connections necessary to develop a workforce with industry-aligned skills.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target			50	55	53	48	49	Discontinued
Actual			54	54	53	49		
Status			Met	Met	Met	Exceeded		
Trend	Stable							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	N/A							
Adjustments to targets	None							
Notes	MEP Centers currently partnered with a 1) workforce investment board, 2) community college, 3) technical college, 4) university, or 5) state workforce agency are included in this count. The FY 2017 target represents 96% of the MEP system partnering with a workforce development organization.							
Information Gaps	None							
Justification for elimination	NIST will retire this indicator in 2019 since the President's Request discontinues Federal funds for the MEP program.							

Indicator	Number of Communities Working with NIST to Pilot the <i>Community Resilience Planning Guide</i>							
Category	Supporting (non-Strategic Plan)							
Type	Intermediate Outcome							
Description	This indicator demonstrates that NIST consistently produces useful and relevant community resilience guidance and training materials that local governments can use to develop their long-term resilience plans. Communities that use the Community Resilience Planning Guide can strengthen resilience and improve their ability to continue or restore vital services in a more timely way, and to build back better after damaging events. That makes them better prepared for future events and more attractive to businesses and residents alike.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target					3	6	7	Discontinued
Actual					3	8		
Status					Met	Exceeded		
Trend	Not enough data to determine trend.							
Explanation (if not met in 2017)	NOT APPLICABLE							
Actions to be taken / Future Plans	NIST published the Community Resilience Planning Guide, Version 1 in September 2015 and will revise and update the Guide in future years. NIST will publish training materials (Guide Briefs) and host online user forums to support the effective use of the Community Resilience Planning Guide. NIST will maintain a relationship with communities that use the NIST community resilience guidance documents to identify opportunities to improve or develop new guidance and tools, and develop success stories that can be shared with other communities. Success stories for early adopters can illustrate how the resilience guidance can be implemented, identify strengths and weaknesses in the process, and its benefits.							
Adjustments to targets	None							
Notes	The term "community" refers to a place that is designated by geographical boundaries and functions under the jurisdiction of a governance structure, such as a town, city, or county.							
Information Gaps	This indicator measures the number of communities piloting the Guide. Since the Community Resilience Planning Guide is freely available for download, the indicator may only capture communities that self-disclose usage of the Guide.							
Justification for elimination	NIST published the Community Resilience Planning Guide, Version 1 in September 2015 and will revise and update the Guide in future years. NIST's efforts to pilot the Guide with select communities provided valuable insights to future research directions and useful products to support community resilience, which will be the focus of NIST's efforts going forward.							

Resource Requirements Table

(Budget Authority in \$M)

	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Annualized CR	FY 2019 Base	Increase/ Decrease	FY 2019 Request
Direct	758.4	774.9	852.5	869.9	970.0	959.9	951.5	949.2	(320.6)	628.6
Reimbursable	171.7	173.5	162.6	156.4	171.7	184.3	174.9	149.5	-	149.5
Total	930.1	948.4	1,015.1	1,026.3	1,141.7	1,144.2	1,126.4	1,098.7	(320.6)	778.1
Total Positions	3,142	3,106	3,209	3,255	3,336	3,444	3,444	3,444	(458)	2,986

* Table excludes Public Safety Communications Research Fund (mandatory appropriation).

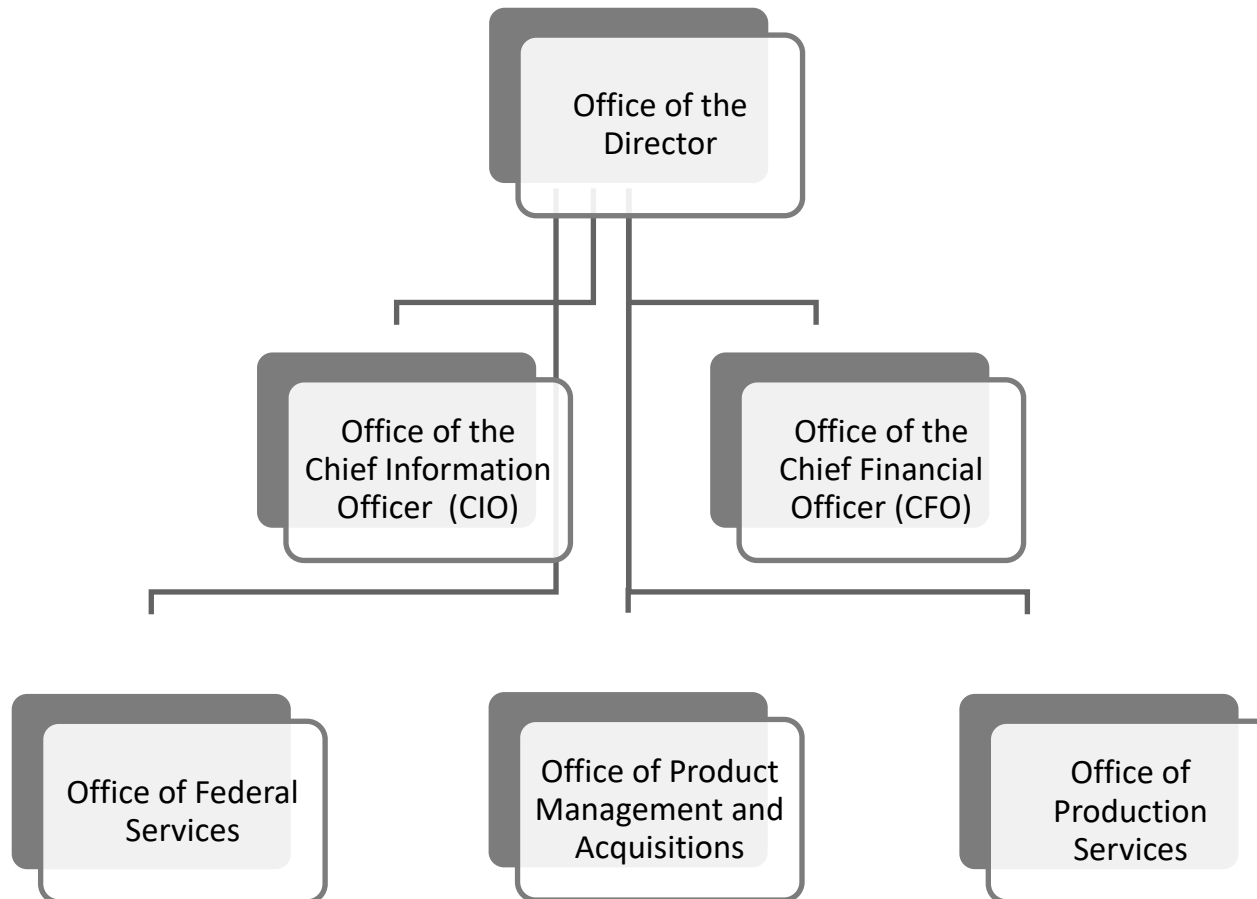
**DEPARTMENT OF COMMERCE
 NATIONAL TECHNICAL INFORMATION SERVICE
 NTIS Revolving Fund
 Budget Estimates, Fiscal Year 2019
 President's Submission**

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**U.S Department of Commerce
National Technical Information Service**



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**Department Of Commerce
National Technical Information Service
NTIS Revolving Fund
Budget Estimates, Fiscal Year 2019
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

General Statement

Goals of the Program

The National Technical Information Service (NTIS) promotes the data priorities of the Department of Commerce (DOC) and other federal agencies, including open access, open data, providing information and data services to the public, industry, and other federal agencies in ways that enable American innovation and economic growth. NTIS serves as a center of excellence that delivers trusted data networks through agile partnerships with the private sector which enable new and improved data products and services.

Statement of Objectives

NTIS supports the entire data delivery pipeline for creating unique platforms to access, analyze, and use data; combining data in new ways to enable innovative products and services; and delivering better data services to businesses, communities, and citizens. NTIS provides services using modern data science, engineering, and best practices which are essential to rapidly executing projects requiring high levels of innovation and creativity. NTIS is a self-supporting agency without federal discretionary appropriations and recovers its operating costs from fees and the use of its Public Enterprise Revolving Fund.

NTIS provides data services within four key elements:

- Data Discovery and Usability (e.g., data cataloging and inventories, data capture and storage, search engine optimization, interactive query management, customer analytics, user experience design of data portals, usability testing, user analytics).
- Data Interoperability and Standards (e.g., user interfaces for data portals, data cleansing and standards, metadata practices, developer platforms with suite of application program interface tools).
- Data Analytics and Forecasting (e.g., comparative/predictive data analytics, forecasting, statistical methods, computer science and machine learning methods, geospatial analysis, data visualization).
- Data Infrastructure and Security (e.g., data delivery services for access anytime, anywhere; enterprise data management; data delivery business models; software development life cycle; cybersecurity; cloud-based data solutions; assistive technologies; data collection services).

NTIS leverages its unique capabilities and authorities to partner with the private sector to rapidly execute projects requiring the

use of modern data science, engineering, and best practices. Critical to success of these projects is the ability to use advanced software development processes, specifically:

- Agile and collaborative development process to support frequent software releases and risk reduction;
- DevOps process to tightly integrate software development with quality assurance, deployment, and operations while also supporting frequent releases and risk reduction; and,
- Life cycle approach to software development (plan, code, build, test, release, deploy, and operate). NTIS services include a permanent repository and clearinghouse for scientific, technical, engineering, and business information which includes more than three million publications covering more than 350 subject areas. Today, NTIS receives federal agency reports electronically, attaches robust metadata to these reports and ensures that the documents remain available to the public even if individual agencies remove them from their websites. NTIS's online database also presents this metadata and the full text of reports in a form that enables access across the internet. As a result, scientists, engineers, and other customers looking for federal reports and data get much better results from the search engines than would be possible without NTIS efforts. In addition, NTIS is often the only current source for many reports issued prior to 1995. NTIS received these reports from federal agencies in paper copy and has archived them on microfiche. A recent Government Accountability Office report found that in some subject areas up to 45 percent of the collection of three million publications on more than 350 subjects is exclusively available from NTIS.

As technology has evolved, projects related to online data and services have generated an increasing share of the agency's operating revenues. NTIS strongly supports the Department's commitment to make data easier for business, government, taxpayers, and communities to access, analyze, and use federal data assets. NTIS will evolve, and its service portfolio will continue to grow by supporting the entire data delivery pipeline with a focus on increasing access to data, combining data in new value-added ways, and delivering improved services and products.

Summary of Performance and Resources

NTIS continues to make substantial improvements in its data access programs, assisting other federal agencies in disseminating information to the American public. NTIS will continue to provide access to the NTRL, Social Security Administration (SSA) Limited Access Death Master File (LADMF), and the Drug Enforcement Agency (DEA) Drug Registry File.

NTIS plans to obligate \$145,500,000 of earned revenue in FY 2019.

(Dollar amounts in thousands)

	FY 2017	FY 2018	FY 2019
National Technical Information Service: Reimbursement from offsetting collections:			
Information clearinghouse program	\$158,282	\$170,000	\$145,500
Total, NTIS	\$158,282	\$170,000	\$145,500

Note: Reimbursable Budget Authority, receipt and obligation data are estimates. Actuals will vary depending on products and services sold.

**Department of Commerce
National Technical Information Service
NTIS Revolving Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)**

	Positions	FTE	Budget Authority	Direct Obligations
2018 Annualized CR	0	0	0	0
Plus 2019 Adjustments to base:				
less: Obligations from prior years	0	0	0	0
2019 Base	0	0	0	0
Plus: 2019 Program Changes	0	0	0	0
2019 Estimate	0	0	0	0

		2017 Annualized CR		2018 Annualized CR		2019 Base		2019 Estimate		Increase/(Decrease over 2019 Base)	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Comparison by activity/subactivity:											
National Technical Information Service: Organization, Preservation Access to Technical Information	Pos./BA	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0	0	0	0	0
TOTALS	Pos./BA	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0	0	0	0	0
Adjustments for:											
Recoveries		0	0	0	0	0	0	0	0	0	0
Unobligated balance, start of year		0	0	0	0	0	0	0	0	0	0
Unobligated balance transferred		0	0	0	0	0	0	0	0	0	0
Unobligated balance, end of year		0	0	0	0	0	0	0	0	0	0
Unobligated balance expiring		0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
Financing from transfers:		0	0	0	0	0	0	0	0	0	0
Transfer from other accounts (-)		0	0	0	0	0	0	0	0	0	0
Transfer to other accounts (+)		0	0	0	0	0	0	0	0	0	0
Appropriation		0	0	0	0	0	0	0	0	0	0

Department of Commerce
National Technical Information Service
NTIS Revolving Fund
SUMMARY OF REIMBURSABLE OBLIGATIONS
(Dollar amounts in thousands)

Activity: National Technical Information Service
Subactivity: Information Clearinghouse Program

Line Item	2017 Actual		2018 Annualized CR		2019 Base		2019 Estimate		Increase/Decrease from 2019 Base	
	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Technical Information Service: Information Clearinghouse Program	Pos/Approp FTE/Obl.	99 0	150 0	150 \$170,000	150 150	0 \$145,500	150 150	0 \$145,500	0 0	0 0
Total	Pos/Approp FTE/Obl.	99 158,282	150 170,000	150 170,000	150 150	0 145,500	150 150	0 145,500	0 0	0 0

Department of Commerce
National Technical Information Service
NTIS Revolving Fund
SUMMARY OF FINANCING
(Dollar amounts in thousands)

	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/ (Decrease) Over 2019
Total Obligations	\$158,282	\$170,000	\$145,500	\$170,000	0
Offsetting collections from:					
Federal funds	(157,963)	(148,207)	(123,707)	(123,707)	0
Trust funds	0	0	0	0	0
Non-Federal sources	(6,818)	(13,800)	(8,532)	(8,532)	0
Recoveries	0	0	0	0	0
Unobligated balance, start of year	(6,618)	(7,954)	(7,954)	(7,954)	0
Unobligated balance transferred	0	0	0	0	0
Unobligated balance, end of year	0	0	0	0	0
Budget Authority	0	0	0	0	0
Financing:					
Transfer from other accounts (-)	0	0	0	0	0
Transfer to other accounts (+)	0	0	0	0	0
Appropriation	0	0	0	0	0

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**Department of Commerce
National Technical Information Service NTIS Revolving Fund
NTIS Revolving Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE**

Activity: National Technical Information Service

Subactivity: Information Clearinghouse Program

Goal Statement

The goal for the National Technical Information Service is to continue to operate on a self-supporting reimbursable basis for FY 2019, which will include estimated obligations of \$145,500 and 150 FTE.

Base Program

NTIS' basic authority is to operate a permanent clearinghouse of scientific and technical information, codified as chapter 23 of Title 15 of the United States Code (15 U.S.C. 1151-1157). This chapter also established NTIS' authority to charge fees for its products and services and to recover all costs through such fees "to the extent feasible".

Statement of Operating Objectives

All activities are funded through the NTIS Revolving Fund, without direct appropriation. NTIS' objectives are to (a) create unique data platforms that make it easier for the public, industry, and other federal agencies to access, analyze, and use data; (b) combine data in new ways to enable the delivery of innovative products and services; and (c) deliver better data services to businesses, communities, and citizens. These objectives are focused on supporting Department and federal data priorities, including open access and open data. This work requires collaborating with federal agencies, partnering with the private sector, delivering modern information and data services, and disseminating federally-funded scientific, technical and related information. NTIS will meet its objectives in the most cost-effective and efficient manner possible while ensuring strong governance and stewardship of its unique mission and authorities.

NTIS released the Public Access National Technical Reports Library (NTRL) permitting the American public free access to the electronic scientific and technical reports in its repository, which collects and catalogues approximately 450,000 scientific and

technical reports annually that are added to its permanent collection.

Explanation and Justification

NTIS continues to make substantial progress in improving its service to the public by establishing and maintaining data programs that assist other federal agencies in effectively disseminating information to the American public. A representative set of national data programs that NTIS will continue to provide to the American public includes: NTIS Database; Social Security Administration (SSA) Limited Access Death Master File (DMF); and, Drug Enforcement Agency (DEA) Drug Registry File.

Total Budget Authority

	FY 2017 Actual	FY2018 Annualized CR	FY2019 Estimate
Direct	\$ -	\$ -	\$ -
Reimbursable	\$ 158.30	\$ 170.00	\$ 145.50
Total	\$ 158.30	\$ 170.00	\$ 145.50

Positions	99	150	150
Civilian Full-Time Equivalent Employment - Reimbursable	99	150	150

Department of Commerce
National Technical Information Service
NTIS Revolving Fund - Reimbursable Obligations
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	2017	2018	2019	2019	Increase/ (Decrease)
	Actual	Annualized CR	Base	Estimate	Over2019 Base
11.1 Full-time permanent (Compensation)	\$ 9,344	\$ 13,970	\$ 11,450	\$ 11,450	0
11.3 Other than full-time permanent	0	477	400	\$ 400	0
11.5 Other personnel compensation	166	116	116	\$ 116	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	9,510	14,563	11,966	11,966	0
12.1 Civilian personnel benefits	3,631	4,875	4,725	\$ 4,725	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	72	200	200	\$ 200	0
22 Transportation of things	430	3,250	2,750	\$ 3,250	0
23.1 Rental payments to GSA	2,136	1,950	1,950	\$ 1,950	0
23.2 Rental payments to others	4	1,000	1,000	\$ 1,000	0
23.3 Communications, utilities and miscellaneous charges	289	1,800	1,800	\$ 1,800	0
24 Printing and reproduction	0	4,000	1,500	\$ 4,000	0
25.1 Consulting services	0	100	250	\$ 100	0
25.2 Other services	141,410	131,112	112,359	\$ 112,359	0
25.3 Purchases of goods and services from Government accounts	42	1,500	1,500	\$ 1,500	0
25.4 Operation of GOCOs	0	0	0	0	0
25.5 Research and development contracts	0	0	0	0	0
25.7 Operation and Maintenance of Equipment	550	500	500	\$ 500	0
26 Supplies and materials	208	3,000	3,000	\$ 3,000	0
31 Equipment	0	2,000	2,000	\$ 2,000	0

Department of Commerce
National Technical Information Service
NTIS Revolving Fund - Reimbursable Obligations
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	2017 Actual	2018 Annualized CR	2019 Base	2019 Estimate	Increase/ (Decrease) over 2019 Base
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	158,282	170,000	145,500	145,500	0
Earned Revenue/Reimbursable Obligations	158,282	170,000	145,500	145,500	0
Total Obligations	158,282	170,000	145,500	145,500	0
Personnel Data					
Full-Time equivalent Employment:					
Full-time permanent	99	140	140	140	0
Other than full-time permanent	0	10	10	10	0
Total	99	150	150	150	0
Authorized Positions:					
Full-time permanent	190	190	190	190	0
Other than full-time permanent	10	10	10	10	0
Total	200	200	200	200	0

**DEPARTMENT OF COMMERCE
 NATIONAL TECHNICAL INFORMATION SERVICE
 NTIS Revolving Fund
 CONSULTING AND RELATED SERVICES
 (Obligations in thousands)**

	<u>2017 Actual</u>	<u>2018 Annualized CR</u>	<u>2019 Estimate</u>
Consulting Services.....	\$0	\$500	\$100
Management and professional services.....	0	0	250
Special studies and analysis	0	0	0
Management and Support Services for research and development	<u>0</u>	<u>0</u>	<u>0</u>
 Total.....	 \$0	 \$500	 \$250

**Department of Commerce
National Technical Information Service
NTIS Revolving Fund
PERIODICALS, PAMPHLETS, AND AUDIOVISUAL PRODUCTS
(Obligations in thousands)**

	<u>2017 Actual</u>	<u>2018 Annualized CR</u>	<u>2019 Estimate</u>
Periodicals	\$1	\$2	\$2
Pamphlets	0	0	0
Audiovisuals	<u>0</u>	<u>0</u>	<u>0</u>
Total	\$1	\$2	\$2

**Department of Commerce
National Technical Information Service
AVERAGE SALARY**

	<u>2017 Actual</u>	<u>2018 Annualized CR</u>	<u>2019 Estimate</u>
Average GS/GM Grade	12	11	12
Average GS/GM Salary	\$107,404	\$102,058	\$103,658

FY 2018 average salaries reflect a 1.9 percent pay raise and FY 2019 average salaries reflects a pay freeze with 0.0 percent pay raise.

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FY 2019 Performance Planning Backup
(National Technical Information Service)

MISSION STATEMENT

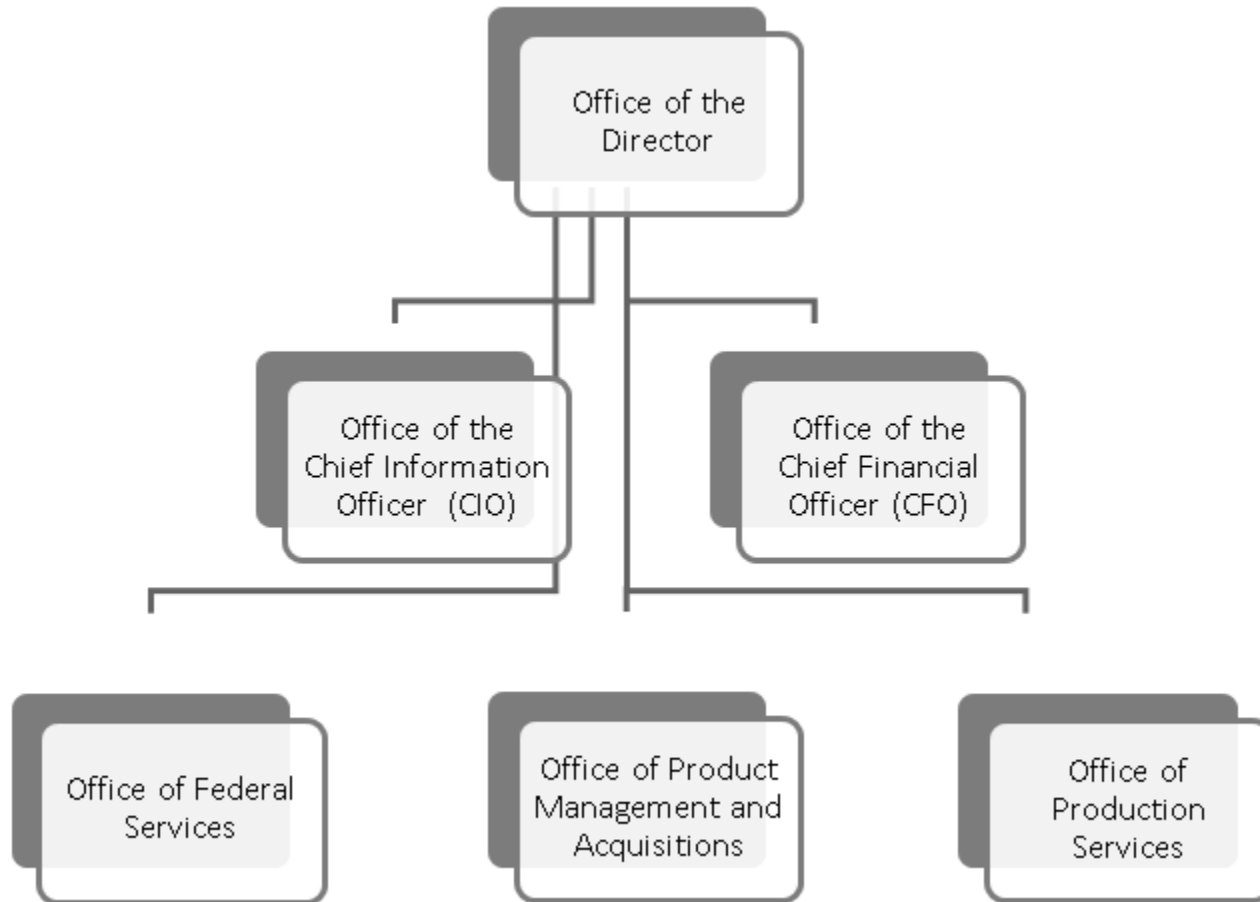
The National Technical Information Service (NTIS) promotes the data priorities of the Department of Commerce (DOC) and other federal agencies, including open access, open data, providing information and data services to the public, industry, and other federal agencies in ways that enable American innovation and economic growth. NTIS serves as a center of excellence that delivers trusted data networks through agile partnerships with the private sector which enable new and improved data products and services.

OVERVIEW

NTIS provides data services to business, communities, and citizens using modern data science, engineering, and best practices which are essential to rapidly executing projects requiring high levels of innovation and creativity.

ORGANIZATIONAL STRUCTURE

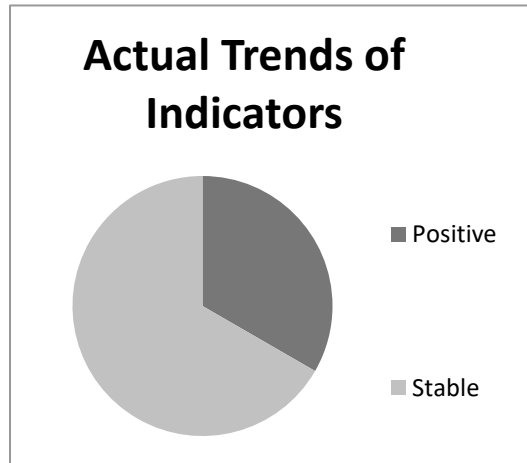
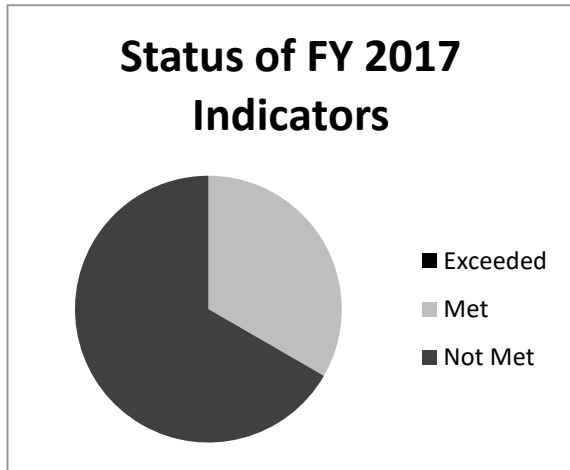
NTIS is a self-supporting agency without federal discretionary appropriations and recovers its operating costs from fees and the use of its Public Enterprise Revolving Fund.



Summary of Performance

NTIS met the target for one of the three indicators, but didn't meet the target for the two. One Indicators has a positive trend while the other two are stable.

Current / Recurring Indicators



Indicator	Number of Updated Items Available							
Category	Supporting (non-Strategic Plan)							
Type	Output							
Description	The number of information items available to the public includes scientific, technical, and engineering information products added to the permanent collection, as well as items made available through online electronic subscriptions. A continuous expansion and refinement effort, to acquire new scientific and technical products, is reflected in future targets							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target	875,000	892,500	910,350	430,000	440,750	451,769	463,063	474,640
Actual	978,871	987,866	648,299	519,091	44,371	16,809		
Status	Exceeded	Exceeded	Exceeded	Exceeded	Not Met	Not Met		
Trend	Positive							
Explanation (if not met in 2017)	This measure needs to be revised/changed. NTIS no longer has these products.							
Actions to be taken / Future Plans	Will need to revise this measure going forward. Federal Research (FEDRIP) was most of this measure and has since been discontinued							
Adjustments to targets	Need to revise targets going forward. FEDRIP was most of this measure and was discontinued							
Notes	Will be gathering data to create the benchmarks for responsiveness for providing DMF and DEA revision going forward							
Information Gaps	None							

Indicator	Number of Information Products Disseminated (Annual)							
Category	Supporting (non-Strategic Plan)							
Type	Output							
Description	This measure represents the volume of information disseminated to the public and includes compact disks, diskettes, tapes, online subscriptions, electronic document downloads, web site pages, as well as traditional paper products. NTIS recently deployed its new Next Generation 2.0 website and has initiated the use of Social Media technology as part of its Outreach and Education activities to further the success of this goal.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target	48,878,000	50,875,560	51,893,071	52,910,932	53,900,000	54,900,000	55,900,000	56,900,000
Actual	54,592,481	68,938,571	51,901,102	48,794,579	1,089,730	102,855		
Status	Exceeded	Exceeded	Exceeded	Exceeded	Not Met	Not Met		
Trend	Positive							
Explanation (if not met in 2017)	This measure needs to be revised/changed							

Actions to be taken / Future Plans	Will need to revise this measure as NTIS evolves with the new Data Mission
Adjustments to targets	Need to revise targets as NTIS evolves with the new Data Mission State
Notes	
Information Gaps	None

Indicator	Customer Satisfaction							
Category	Supporting (non-Strategic Plan)							
Type	Customer Service							
Description	This measure represents the percentage of NTIS customers that are satisfied with the quality of their order, the ease of order placement, and the timely fulfillment of that order. NTIS' continual efforts to maintain and possibly improve this very high rate of customer satisfaction are essential to the success of NTIS' performance and mission to collect and disseminate scientific and business-related information.							
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target	95-98%	95-98%	95-98%	95-98%	95-98%	95-98%	95-98%	95-98%
Actual	99.4%	98.5%	98.3%	97.5%	97.5%	97.5%		
Status	Met	Met	Met	Met	Met	Met		
Trend	Targets have remained stable							
Explanation (if not met in 2017)	None							
Actions to be taken / Future Plans	None							
Adjustments to targets	None							
Notes	None							
Information Gaps	None							

Resource Requirements Table

(Budget Authority in \$M)

	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Actual	FY 2017 Enacted	FY 2018 Estimate	FY 2019 Base	Increase / Decrease	FY 2019 Request
Total Budget Authority										
Direct										
Reimbursable	\$65.5	\$66.0	\$66.5	\$175.2	\$183.6	\$158.3	\$170.0	\$145.5	\$0	\$145.5
Total										
Total Positions	150	150	150	150	150	99	150	150	0	150