NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

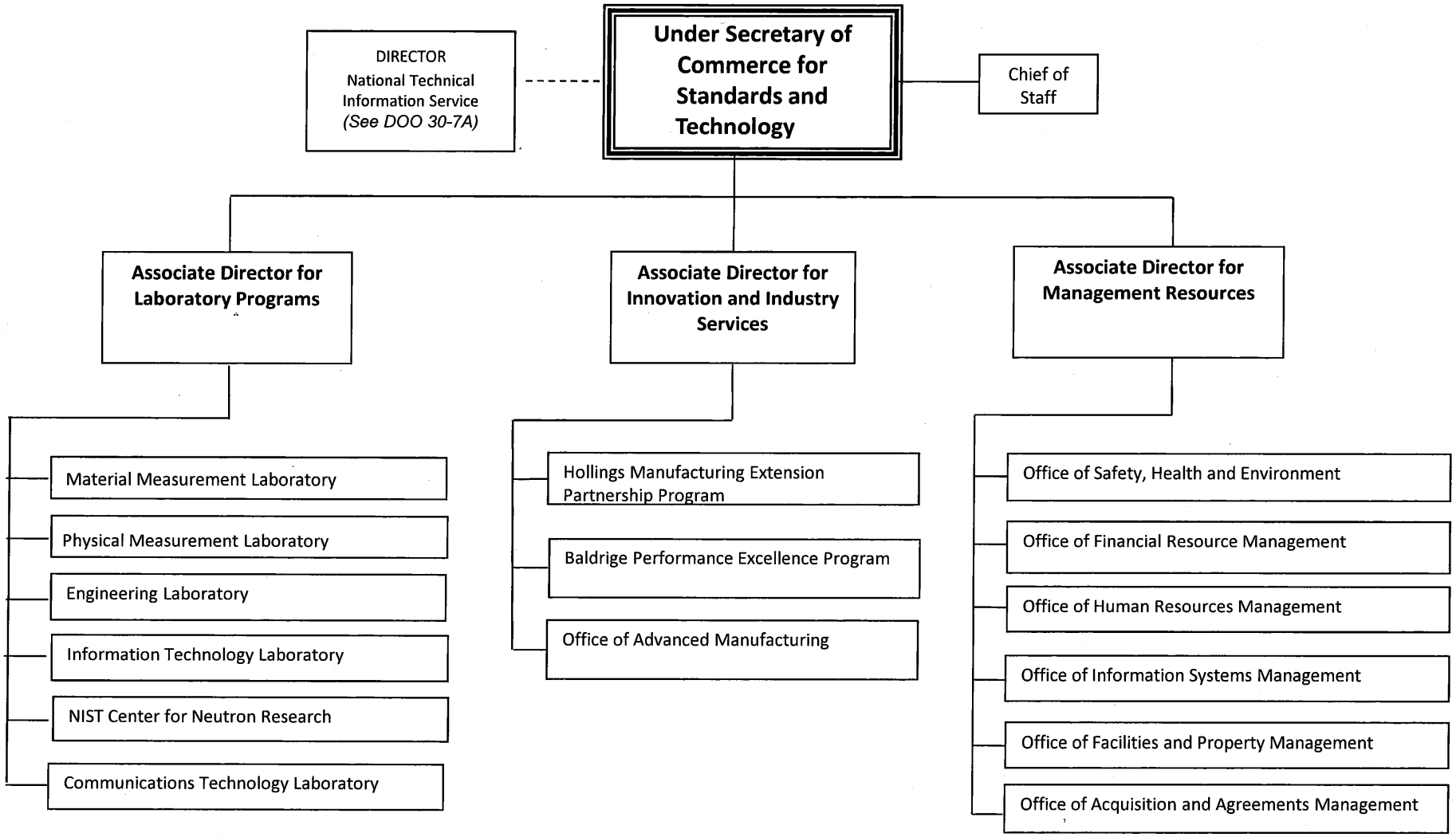
NATIONAL TECHNICAL INFORMATION SERVICE

FISCAL YEAR 2020 BUDGET SUBMISSION TO CONGRESS

DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
Budget Estimates, Fiscal Year 2020
Congressional Submission

Table of Contents

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



*Structure approved through OMB and Congress; revised DOO in clearance.

[This page left blank intentionally.]

Department of Commerce
National Institute of Standards and Technology
Budget Estimates, Fiscal Year 2020

Executive Summary

The FY 2020 budget request is $686.8 million, a reduction of $298.7 million or 30 percent from an FY 2019 enacted level. Significant reductions in FY 2020 includes: $139.8 million in the Industrial Technology Services (ITS) appropriations account (including the proposed elimination of the Hollings Manufacturing Extension Partnership Program (MEP), $112.8 million in the Scientific and Technical Research and Services (STRS) appropriations account, and $46.1 million in the Construction of Research Facilities (CRF) appropriations account.

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.

The FY 2020 discretionary budget request for NIST includes three appropriation accounts.

1. Scientific and Technical Research and Services (STRS): FY 2020 budget request for STRS is $611.7 million, a reduction of $112.8 million or 16 percent from the FY 2019 enacted level. 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. Within the request levels, the budget includes funding for new efforts in the areas of quantum information science (+$10 million), microelectronics (+$10 million), and artificial intelligence (+$8 million).

2. Industrial Technology Services (ITS): The FY 2020 budget request is $15.2 million, a reduction of $139.8 million or 90 percent from the FY 2019 enacted level. The request funds the Manufacturing USA program. 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. Federal funding for the MEP is eliminated.

3. Construction of Research Facilities: The FY 2020 budget request for CRF is $59.9 million, $46.1 million or 44 percent below the FY 2019 enacted level. The request provides funds for basic maintenance of NIST's current facilities. In addition, the FY 2020 budget request proposes: (1) to create a Federal Capital Revolving Fund (FCRF) to fund large-dollar, Federally-owned, civilian real property capital projects; and (2) provide specific budget enforcement rules for the FCRF that would allow it to function, in effect, like State and local government capital budgets. The FCRF will be housed in the General Services Administration (GSA). This proposal incorporates principles that are central to the success of capital budgeting at the State and local level -- a limit on total funding for capital investment, annual decisions on the allocation of funding for capital projects, and spreading the acquisition cost over 15 years in the discretionary operating budgets of agencies that purchase the assets.

   The FY 2020 budget request proposes to use the FCRF concept to fund the renovation of NIST's Building 1 in Boulder, Colorado, estimated $288 million. In accordance with the principles and design of the FCRF, the FY 2020 requests appropriations language designating NIST's renovation as a project to be funded out of the FCRF along with 1/15 of the purchase price, or $19.2 million, for the first-year repayment back to the FCRF. This estimate to complete Building 1 was formulated before receiving the FY 2019 enacted appropriation and therefore this funding requirement will need to be updated to reflect the complete renovation of Building 1.

   NIST is in the pre-award phase to have a contractor develop a 20-year Implementation Plan for the Gaithersburg and Boulder Master plans per the direction of Senate Report 115-275. It is projected that the Implementation Plan will be finalized in FY 2021. In the interim, NIST will gladly provide updates on the progress on the development of the plan.

Appropriation	(Dollar amounts in millions) FY 2018 Enacted		FY 2019 Enacted		FY 2020 Request		Change from FY 2019 Enacted Level	
	Positions	Amount	Positions	Amount	Positions	Amount	Positions	Amount
Scientific and Technical Research and Services	2,557	$724.5	2,557	$724.5	2,136	$611.7	(421)	($112.8)
Industrial Technology Services	101	155.0	99	155.0	18	15.2	(81)	(139.8)
Construction of Research Facilities	116	319.0	116	106.0	116	59.9	0	(46.1)
Working Capital Fund	686	0.0	686	0.0	686	0.0	0	0.0
TOTAL DISCRETIONARY RESOURCES	**3,460**	**1,198.5**	**3,458**	**985.5**	**2,956**	**686.8**	**(502)**	**(298.7)**

Exhibit 4A

Department of Commerce
National Institute of Standards and Technology
FY 2020 PROGRAM INCREASES / DECREASES / TERMINATIONS
(Dollar amounts in thousands)
(By Appropriation, Largest to Smallest)

Increases

Page No. in CJ	Appropriations	Budget Program	Title of Increase	Positions	Budget Authority
NIST-116	CRF	Construction and Major Renovations	GSA Federal Capital Revolving Fund Annual Payments Increase	0	19,200
NIST-31	STRS	Laboratory Programs	Quantum Information Science Research and Applications for Industry	3	10,000
NIST-35	STRS	Laboratory Programs	Measurement Science for Microelectronics	11	10,000
NIST-39	STRS	Laboratory Programs	Securing our Future in Artificial Intelligence	12	8,000
Subtotal, Increases				26	47,200

Decreases

Page No. in CJ	Appropriation	Budget Program	Title of Decrease	Positions	Budget Authority
NIST-25	STRS	Laboratory Programs	Laboaratory Programs Reduction	(416)	(117,041)
NIST-118	CRF	Safety, Capacity, Maintenance and Major Repairs	Safety, Capacity, Maintenance and Major Repairs Decrease	0	(34,814)
NIST-57	STRS	Standards Coordination and Special Programs	Standards Coordination and Special Programs Reduction	(25)	(34,366)
NIST-120	CRF	Construction and Major Renovations	Building 1 Renovation Decrease	0	(31,000)
NIST-46	STRS	Corporate Services	Corporate Services Reduction	(6)	(5,802)
Subtotal, Decreases				(447)	(223,023)

Terminations

Page No. in CJ	Appropriation	Budget Program	Title of Termination	Positions	Budget Authority
NIST-82	ITS	Hollings Manufacturing Extension Partnership	Hollings Manufacturing Extension Partnership	(81)	(140,512)
Subtotal, Terminations				(81)	(140,512)

Exhibit 5

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	Appro-priation
Enacted, 2019	2,557	2,464	$727,250	$756,735	$724,500
Less: Unobligated balance from prior year	0	0	0	(29,485)	0
Less: Transfers from DoJ	0	0	(1,500)	(1,500)	0
Less: Transfer from EAC	0	0	(1,250)	(1,250)	0
2020 Adjustments to base:					
Plus: Inflationary adjustments to base	0	0	16,428	16,428	16,428
2020 Base Request	2,557	2,464	740,928	740,928	740,928
Less: 2020 Program changes	(421)	(428)	(129,209)	(129,209)	(129,209)
Plus: Transfer from EAC			1,499	1,499	0
2020 Estimate	2,136	2,036	613,218	613,218	611,719

Comparison by activity/subactivity with totals by activity		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease over 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Measurement Science, Services, and Programs											
Laboratory Programs	Pos./Approp	2,313	$628,016	2,313	$628,131	2,313	$642,724	1,923	$553,683	(390)	($89,041)
	FTE/Obl.	2,141	622,174	2,243	646,796	2,243	642,724	1,846	555,182	(397)	(87,542)
Corporate Services	Pos./Approp	45	17,311	45	17,300	45	17,765	39	11,963	(6)	(5,802)
	FTE/Obl.	39	17,323	41	17,303	41	17,765	35	11,963	(6)	(5,802)
Standards Coordination and Special Programs	Pos./Approp	199	79,173	199	79,069	199	80,439	174	46,073	(25)	(34,366)
	FTE/Obl.	171	74,617	180	92,636	180	80,439	155	46,073	(25)	(34,366)
TOTALS	Pos./Approp	2,557	724,500	2,557	724,500	2,557	740,928	2,136	611,719	(421)	(129,209)
	FTE/Obl.	2,351	714,114	2,464	756,735	2,464	740,928	2,036	613,218	(428)	(127,710)

Exhibit 5

	2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease over 2020 Base	
	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Adjustments for:										
Recoveries		($5,892)		0		0		0		0
Refunds		(80)		0		0		0		0
Unobligated balance, start of year		(10,213)		($29,485)		0		0		0
Unobligated balance, end of year		29,485		0		0		0		0
Unobligated balance, expired account		86		0		0		0		0
Budget Authority		727,500		727,250		$740,928		$613,218		($127,710)
Financing from transfers:										
Transfers from DoJ for OLES		(1,500)		(1,500)		0		0		0
Transfer from Election Assistance Commission		(1,500)		(1,250)		0		(1,499)		(1,499)
Appropriation		724,500		724,500		740,928		611,719		(129,209)

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	2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Measurement Science, Services, and Programs										
Laboratory Programs	0	0	0	0	0	0	0	0	0	0
Total	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)

	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
Total Obligations	$714,114	$756,735	$740,928	$613,218	($127,710)
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	(5,972)	0	0	0	0
Unobligated balance, start of year	(10,213)	(29,485)	0	0	0
Unobligated balance, end of year	29,485	0	0	0	0
Unobligated balance, expired	86	0	0	0	0
Budget Authority	727,500	727,250	740,928	613,218	(127,710)
Financing:					
Transfer to other accounts (+)	0	0	0	0	0
Transfers from other accounts (-)	(3,000) [1/]	(2,750) [1/]	0	(1,499) [1/]	(1,499)
Appropriation	724,500	724,500	740,928	611,719	(129,209)

[1/] Transfers of $1,500K from EAC and $1,500K from DOJ in FY 2018; transfers of of $1,250K from EAC and $1,500K from DOJ in FY 2019; and planned transfer of $1,499K from EAC in FY 2020.

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

	Perm. Pos.	FTE	Amount
Other Changes:			
FY 2019 pay raise	...	...	$5,799
2020 Pay increase and related costs	...	...	0
Change in compensable days	...	...	1,438
Annualization of positions financed in FY 2019	0	0	0
Personnel benefits:			
Civil Service Retirement System (CSRS)	...	...	(256)
Federal Employees' Retirement System (FERS)	...	...	7,369
Thrift Savings Plan (TSP)	...	...	73
Federal Insurance Contribution Act (FICA) - OASDI	...	...	481
Health insurance	...	...	166
Employees' Compensation Fund	...	...	(122)
Travel and transportation of persons:			
Mileage	...	...	16
Per Diem	...	...	192
Rental Payments to GSA	...	...	3
Communications, utilities, and miscellaneous charges:			
Postage	...	...	1
Electricity rate increase	...	...	50
Natural gas rate decrease	...	...	(108)
Other services:			
Working Capital Fund (Departmental Management)	...	...	910
Commerce Business Systems (CBS)	...	...	200
NARA storage costs	...	...	16
Scientific journal subscriptions	...	...	200
General pricing level adjustment	...	...	0
Total, adjustments to base	0	0	16,428

[This page left blank intentionally.]

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: Measurement Science, Services, and Programs
Subactivity: Laboratory Programs

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease over 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Strategic and Emerging	Pos./Approp	35	$11,827	35	$18,457	35	$18,679	35	$18,679	0	0
Research Initiative Fund	FTE/Obl.	32	18,183	34	22,418	34	18,679	34	18,679	0	0
National Measurement and	Pos./Approp	1,991	551,134	1,991	547,261	1,991	559,855	1,616	475,814	(375)	($84,041)
Standards Laboratories	FTE/Obl.	1,845	539,409	1,933	560,678	1,933	559,855	1,551	477,313	(382)	(82,542)
User Facilities	Pos./Approp	191	51,919	191	50,317	191	51,494	176	46,494	(15)	(5,000)
	FTE/Obl.	176	51,885	184	50,576	184	51,494	169	46,494	(15)	(5,000)
Postdoctoral Research	Pos./Approp	96	13,136	96	12,096	96	12,696	96	12,696	0	0
Associateship Program	FTE/Obl.	88	12,697	92	13,124	92	12,696	92	12,696	0	0
Total	Pos./Approp	2,313	628,016	2,313	628,131	2,313	642,724	1,923	553,683	(390)	(89,041)
	FTE/Obl.	2,141	622,174	2,243	646,796	2,243	642,724	1,846	555,182	(397)	(87,542)

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

Activity: Measurement Science, Services, and 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 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; and
- 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 performing its metrology mission. 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 47:1.[1] That is, for every tax dollar invested in NIST, almost $50 of value is created in the economy annually.

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:

- Cybersecurity: In 2018, NIST released version 1.1 of its popular Framework for Improving Critical Infrastructure Cybersecurity, more widely known as the Cybersecurity Framework. The framework was developed with a focus on industries vital to national

[1] https://www.nist.gov/director/summary-nist-laboratory-economic-impact-studies

and economic security, including energy, banking, communications and the defense industrial base. It has since proven flexible enough to be adopted voluntarily by large and small companies and organizations across all industry sectors, as well as by Federal, state and local governments. The changes to the framework are based on feedback collected through public calls for comments and questions received by team members, and workshops held in 2016 and 2017. Two drafts of Version 1.1 were circulated for public comment to assist NIST in comprehensively addressing stakeholder inputs.

- Opioids Epidemic: Researchers at the National Institute of Standards and Technology developed screening techniques to help protect the people on the front lines (from first responders to evidence examiners) in the battle against opioids from lethal exposure to synthetic opioids. The NIST method can detect trace amounts of synthetic opioids, easily identifying the presence of fentanyl in concentrations as low as 0.1%. The NIST method can also distinguish between most of the 16 different analogues of fentanyl, which would be a major benefit to first responders trying to keep up with what is being seen in their communities.

- Strengthening Cryptography: In April 2018, scientists at NIST developed a method for generating numbers guaranteed to be random by quantum mechanics. Described in the April 12, 2018 issue of *Nature*, the experimental technique surpasses all previous methods for ensuring the unpredictability of its random numbers and may enhance security and trust in cryptographic systems. The new quantum-based method is part of an ongoing effort to enhance NIST's public randomness beacon, which broadcasts random bits for applications such as secure multiparty computation.

- Spectrum Sharing: Since 2015, Federal Communications Commission (FCC) rules have been in place that pave the way for commercial wireless users to employ the commonly called "3.5 Gigahertz Band" when not needed for its current primary use, offshore radar operations by the U.S. Navy. Long Term Evolution (LTE) equipment vendors and service providers such as AT&T, Google, Nokia, Qualcomm, Sony, and Verizon have been eager to access this band because it will expand product markets and give end users better coverage and higher data rate speeds in a variety of environments where service is traditionally weak. NIST has played a major role in the development of standards, test procedures and certification tools that will allow service providers and other potential users to prove that they can operate in the 3.5 GHz Band under FCC regulations and assure the Navy that the band can be successfully shared without interference.

- Advanced Bioscience: NIST is developing the building blocks for bioscience by making high quality reference data and standardized materials available to enable confidence in gene sequencing and drug design through collaborative partnerships such as the Consortium for the Advancement of Genome Editing, announced in early 2018. NIST works with industry experts to develop international standards and hosts the Standards Coordinating Body, focused on accelerating regenerative medicine therapies.

- Quantum Industry Scientists: Building the Quantum Industry Scientists at NIST have made continual breakthroughs this past year in the measurement and control of quantum systems. To enable the U.S. to fully capture the benefits of this transformational technology NIST is establishing the Quantum Economic Development Consortium (QEDC) in partnership with SRI International. The Consortia consists of over 50 interested industry members ranging from large corporations like IBM and AT&T to the companies developing the emerging technology applications like Rigetti and IonQ. The QEDC will support precompetitive R&D such as quantum device design and prototyping; coordinate public and private investments; determine workforce needs; build out the research infrastructure needed to grow this industry.

- Redefining the Kilogram and the International System of Weights and Measures: On November 16, 2018 in Versailles, France after decades of groundbreaking laboratory work by NIST and our colleagues in other metrology institutes, the world's scientific and technical community unanimously voted to redefine the Kilogram and three other base units of the International System of Units (SI) so that all SI units are now entirely based upon fundamental constants of nature and quantum-enabled realizations. A key benefit of the redefined SI will be improved scalability for measurements. When you use physical objects to measure things, accuracy decreases at sizes much smaller or larger than your standard. A pharmaceutical company, for example, may need to measure chemicals for research on new drugs in quantities that are a million times smaller than a standard kilogram. The new definition of the kilogram will allow much better measurements of these small masses allowing for more effective control of processes and ultimately improving innovation.

- Quantum Based Measurements: Working as part of the NIST-on-a-Chip program scientists at NIST have made significant strides in applying quantum science breakthroughs to advanced metrology. The NIST-on-a-Chip program is aimed at creating prototypes for small, inexpensive, low-power and easily manufactured quantum-based sensors, that can ultimately be mass produced and supplied to industry thereby eliminating the need for costly and complex calibration chains. One example of this work is a chip-scale device for measuring important quantities such as length. The device works by using a laser to probe atoms to generate infrared light at a precise wavelength. The prototype device demonstrates that these sensors could be mass- produced like semiconductors, using silicon materials and traditional chip-manufacturing techniques making advanced measurements available to a much broader suite of applications.

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 2020

NIST Laboratory Research Priorities

Throughout its history, NIST has provided new industries with foundational measurement tools that enhance reproducibility, interoperability, and reliability to accelerate innovation, adoption, and impact. With input from academia and industry, NIST has identified four technical opportunities that are likely to significantly affect America's economy in the coming decades. NIST's ability to provide a strong and independent technical foundation for these areas may determine the future of U.S. leadership. This budget request maintains our focus on developing capabilities in each of these areas:

- *Quantum Science:* NIST's world-leading expertise in quantum science, conducted with academic and industry partners, is furthering the development of new quantum measurement technologies upon which U.S. companies can build new businesses and services.
- *Artificial Intelligence (AI) and Data Science:* NIST is developing measurements and data that address the performance and reliability of AI systems to accelerate their widespread adoption and enable the nation to realize the potential economic, societal, and innovation benefits that AI systems offer.
- *Engineering Biology:* NIST is enabling the design and manufacture of biological systems -- for products such as high-value pharmaceuticals and commodity chemicals -- by developing advanced measurement capabilities from the molecular to the cellular system scale.
- *Internet of Things:* NIST is leveraging its expertise in advanced communications, manufacturing systems, cybersecurity and more to develop testing tools, best practices, and standards that support the widespread deployment of safe and reliable internet of things technologies and applications.

NIST's research supports the development of technical standards that are crucial to drive innovation and applications. Over 400 NIST staff participate in international standards activities as technical experts and in leadership roles. Standards underpin every aspect of our daily lives, from enabling communication technologies such as Bluetooth and WiFi to ensuring the safety of devices such as pacemakers and step ladders. They promote confidence in the performance of products and enable international trade. The standards leadership and expertise provided by NIST is an essential element of a broader U.S. effort to lead in the emerging technologies that will define the 21st century economy.

Explanation and Justification

Line Item		2018 Actual		2019 Enacted		2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratory Programs	Pos./BA	2,313	$628,016	2,313	$628,131	2,313	$642,724
	FTE/Obl	2,141	622,174	2,243	646,796	2,243	642,724

Laboratory Programs (FY 2020 Request by Program Area shown below. Total Funding: $642.7 million and 2,313 Positions)

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

Exploratory Measurement Science ($62.1 million) – NIST's mission requires deep expertise in a broad range of disciplines. To best position NIST to support U.S. technological interests well into the future, it is essential that NIST maintain a portfolio of exploratory measurement science research programs. NIST invests in higher-risk and potentially transformative measurement science research to stay on the cutting edge of science and technology trends.

Advanced Manufacturing and Material Measurements ($134.9 million) – NIST has partnered with the U.S. manufacturing sector for more than a century and has a proven track record of delivering the tools and technical expertise that existing manufacturers and aspiring start-ups need. NIST's Advanced Manufacturing and Material Measurements activities provide industry with precision measurement technologies, tests, protocols, trusted systems, and world-class scientific and engineering knowledge through targeted research across a broad portfolio—including advanced materials development, advanced sensing, biomanufacturing, and smart manufacturing systems. NIST's efforts support the Administration's "Strategy for American Leadership in Advanced Manufacturing" by enabling the development of a strong U.S. manufacturing base that is essential to our economic and national security.

Fundamental Measurement, Quantum Science, and Measurement Dissemination ($170.0 million) – The NIST Laboratory Programs work at the frontiers of measurement science to ensure the U.S. system of measurements is firmly grounded on sound scientific and technical principles. NIST determines the definitive methods for nearly every kind of measurement employed in commerce and research, provides NIST-traceable calibrations, and disseminates standards and best practices throughout the nation. The NIST laboratories address increasingly complex measurement challenges as new technologies develop and evolve. NIST's measurement research and services remain central to innovation, productivity, trade, national security, and public safety.

Advanced Communications, Networks, and Scientific Data Systems ($65.3 million) – NIST's Advanced Communications, Networks, and Scientific Data Systems activities enable secure, reliable, high-speed wireless and wireline communications critical to U.S. economic competitiveness, safety, and security. NIST measurement science research and support for the development of standards accelerates the deployment of next-generation communication technologies, including 5G, a term used to describe future wireless networks that will be faster and more reliable. These technologies will be necessary for self-driving cars, internet of things (IoT) applications, drones, and future AI systems. NIST is committed to solving the measurement and deployment challenges of these fast-moving fields to help the U.S. achieve and maintain global leadership in these areas.

Cybersecurity and Privacy ($79.4 million) – NIST is the Department of Commerce lead agency on Cybersecurity issues. NIST's Cybersecurity and Privacy activities strengthen the security of our digital world through a portfolio bridging foundational and applied cybersecurity research, and through the development of publicly available standards and technical guidance. NIST's sustained outreach supports the effective application of standards and best practices enabling the adoption of practical cybersecurity and privacy. Through internal research and collaboration with the private sector, academia, standards development organizations, other government agencies, and national, and international stakeholders, NIST addresses the nation's current and future measurement science needs and is responsive to Congressional mandates and Executive Orders.

Health and Biological Systems Measurements ($18.4 million) – NIST is paving the way for a vibrant U.S. biotechnology market by developing measurements that enable the reproducibility of biomedical research results to ensure the efficacy and safety of treatments and ultimately increase confidence in clinical decisions. As a non-regulatory agency, NIST partners with industry and other government agencies to provide measurement science and standards that are essential for health and bioscience innovations. NIST's programs range from supporting underlying technologies and measurements for precision medicine and medical imaging to accelerating understanding in synthetic biology and genomics. New and improved measurement capabilities provide the basis for industries to harness this information for future medical technologies.

Physical Infrastructure and Resilience ($61.4 million) – NIST's Physical Infrastructure and Resilience activities support the safety, interoperability, and resilience of the nation's infrastructure at the component, structure, and system levels. NIST's research supports the development of building codes that make the built environment healthier for occupants, more resilient against hazards, and safer for both residents and first responders. In collaboration with policy makers, building officials, and planning groups, NIST produces guides to help communities integrate resilience into their economic development, zoning, mitigation, and other local planning activities that impact buildings, public utilities, and infrastructure systems.

NIST User Facilities ($51.2 million) – NIST operates two unique and valuable user facilities that provide U.S. scientists with access to cutting-edge expertise and capabilities to perform innovative research beyond the reach of the user's own laboratory. The NIST Center for Neutron Research (NCNR) features world-class neutron instrumentation and expertise in the development and application

of neutron measurement technologies. The Center for Nanoscale Science and Technology (CNST) provides users rapid access to state-of-the-art tools needed to fabricate and characterize nanoscale structures, devices, and materials.

The ongoing research and development work outlined above are performed by 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.

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, and
  - 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, and
- 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, and
  - 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 conducts research on the composition, structure, and

properties of industrial, biological, and environmental materials and processes. MML developed tools such as reference measurement procedures, certified reference materials, and critically evaluated data and best-practice guides used by U.S. industry to assure measurement quality and improve process efficiency. This work improves U.S. competitiveness in an increasingly challenging global environment. 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, and
- 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 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 expanded this capability in 2017 with the installation of an NCNR-developed energy-dispersive detector that has dramatically improved the ability to understand complex structures and structure-property relationships. This is transforming new materials development and discovery which is particularly useful for emerging technologies
  - 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, and

- 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, and
  - 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 2020
(Dollar amounts in thousands)

	2020 Base		2020 Estimate		Decrease from 2020 Base	
	Personnel	Amount	Personnel	Amount	Personnel	Amount
Pos/BA	2,313	$642,724	1,897	$525,683	(416)	($117,041)
FTE/Obl.	2,243	642,724	1,827	527,183	(416)	(115,541)

Laboratory Programs Reduction (-$117,041, -416 FTE/-416 Positions) - To meet the funding levels proposed in the FY 2020 request and support the Administration's stated priorities in quantum information science, artificial intelligence, cybersecurity, 5G communications and support for advanced semiconductor and microelectronics metrology NIST reevaluated the reductions previously proposed by the Administration to ensure that NIST could continue to provide the broadest portfolio of measurement science standards possible, while preserving and increasing efforts relevant to quantum science, artificial intelligence, and microelectronics. To accomplish this NIST will have to make substantial reductions to its current R&D and program portfolio that impact work in advanced materials, physical infrastructure and resilience, and areas across NIST. The funding for the NIST laboratory programs will be reduced by $117.0 million and this budget proposes the elimination of 416 employees. Of those employees, over 400 come from NIST's scientific workforce, a more than 17 percent reduction in scientists and engineers. The request for laboratory programs is approximately an 18 percent reduction. The proposed reductions affect the following mission functions and programmatic areas summarized below:

Advanced Manufacturing and Material Measurements (-$37.5 million, -178 Positions) – To support the priorities outlined in the President's FY 2020 request NIST will reduce its total spending focused on advanced manufacturing and material measurements from $134.9 million to $97.4 million, a 27.8% reduction. NIST will continue to support research and metrology activities in support of advanced manufacturing and materials science that support the development of next-generation quantum systems and microelectronics, where cutting-edge metrology is essential. In addition, NIST will prioritize the application and development of measurements and standards that promote the application of artificial intelligence-based solutions to challenges in materials science and advanced manufacturing. NIST will terminate a significant portion of its materials research portfolio focused on structural materials challenges that includes work on materials integrity and reliability testing (e.g., for bridges and pipelines), body armor testing, trace materials detection (including work supporting detection of explosives and synthetic opioids). NIST will also stop work on materials issues relevant to energy and environmental applications such as the development of thermoelectric materials, and a grants programs for the recycling and reuse of plastics. NIST will no longer be able to support the dissemination of multiple standard reference materials and standard reference data set in support of materials

development and testing (including the Charpy impact standard and the thermophysical properties program). NIST will also cease operation of its beam-lines at the Brookhaven National Laboratory ending a decades-long partnership and investment in leading-edge materials characterization instruments.

Fundamental Measurement, Quantum Science, and Measurement Dissemination (-$17.8 million, -73 Positions) – The FY 2020 request will reduce NIST's spending in areas of core metrology and measurement dissemination from $170.0 million to $152.2 million, a 10.5% reduction. To accommodate work focused on advancing quantum science and transforming how NIST disseminates measurements through the NIST-on-A-Chip program, NIST must discontinue several measurement service and dissemination activities that are currently provided to our stakeholders in industry, government and academia. Where possible NIST has looked to discontinue services where there are similar services available from other countries or providers, however, even with other providers available the level of uncertainty in measurement comparability across the world will increase. NIST will stop or reduce measurements and calibrations including: radio frequency calibration services that support customers in communications and defense; UV calibrations that support customers from semiconductor tool manufacturers to the aerospace industry; production and dissemination of the atomic spectral database; gas and fluid metrology supporting customers in energy extraction and transportation; and a reduction in the provision of certain time and frequency related services. NIST would also stop several activities focused on the development of nanoscale imaging and fabrication tools where the applications are not focused on advanced electronics or materials manufacturing applications. NIST will also be unable to maintain its current presence and contributions the area of international legal metrology.

Advanced Communications, Networks, and Scientific Data Systems (-$37.33 million, -108 Positions) – The FY 2020 request will reduce NIST spending in advanced communications, networks, and scientific data systems from $65.3 million to $27.8 million, a 57.3% reduction. NIST is working to focus and build its capabilities to support the development of measurements and standards to further the development and deployment of artificial intelligence-based technologies and services. To accomplish this and continue to address priorities around 5G communications, spectrum sharing, and cybersecurity, NIST will have to eliminate programs addressing a number of IT and data challenges -- including measurements and standards work addressing topics of: internet infrastructure protection, cloud computing, medical record interoperability, voting technologies, data visualization, and smart grid and cyber physical systems interoperability.

Health and Biological Systems Measurements (-$3.0 million, -0 Positions) – The FY 2020 budget request will reduce NIST's spending on health and biological science measurements not related to biomanufacturing from

$18.3 million to a proposed level of $15.3 million, a 16.4 percent 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. To reduce overall operational costs, NIST will consolidate its research efforts at its campus in Gaithersburg, MD and end its support for the Joint Institute for Metrology in Biology (JIMB) which is a partnership with the Stanford Linear Accelerator Center (SLAC) and Stanford University to develop advanced measurements capabilities for the growing synthetic biology industry.

Physical Infrastructure and Resilience (-$16.41 million, -42 Positions) – The FY 2020 request will reduce efforts supporting physical infrastructure and resilience from $61.4 million to $44.9 million, a 26.7 percent 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, including work in fire research. However, NIST will eliminate work on developing and deploying advances in science and technology to markedly improve building energy efficiency and occupant safety in the U.S. This includes elimination of work at the Net-zero energy, high-performance building facility, as well as embedded intelligence in building control and operation. NIST will also eliminate funding for the Disaster Resilience Research Grants Program and the Fire Research Grants Program.

NIST User Facilities (-$5.0 million, -15 Positions) – The FY 2020 request will reduce the funding available to support NIST's user facility efforts from $51.1 million to $46.1 million a 9.7 percent reduction. NIST's user facilities, the NIST Center for Neutron Research (NCNR) and the Center for Nanoscale Science and Technology's nanofabrication facility annually 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, quantum science, energy, medicine, and other critical technology areas. To meet the funding levels outlined in the President's FY 2020 budget request, NIST will make operational adjustments and reduce user services at the NCNR. These include ceasing operation of two neutron scattering instruments, the withdrawal of three instruments from the user program, a stoppage of planning for a replacement reactor, and reduction in funding for reactor maintenance. These closures will result in the loss of 200 research participants annually, a significant reduction in scientific productivity, and a potential increase in unscheduled reactor shutdowns which cost on average of a $140,000 a day.

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

Activity: Measurement Science, Services, and Programs
Subactivity: Laboratory Programs
Program Change: Laboratory Programs Reduction

Title		Grade	Number	Annual Salary	Total Salaries
Scientist/Engineer		ZP V	(70)	$137,350	($9,614,499)
Scientist/Engineer		ZP IV	(140)	117,134	(16,398,767)
Scientist/Engineer		ZP III	(42)	83,097	(3,490,091)
Scientist/Engineer		ZP II	(10)	57,301	(573,014)
Management and Program Analyst		ZA IV	(25)	117,134	(2,928,351)
Management and Program Analyst		ZA III	(58)	83,097	(4,819,650)
Management and Program Analyst		ZA III	(4)	83,097	(332,390)
Engineering Technician		ZT V	(2)	98,812	(197,625)
Engineering Technician		ZT IV	(10)	83,097	(830,974)
Engineering Technician		ZT III	(15)	63,103	(946,539)
Administrative Support		ZS V	(2)	63,103	(126,205)
Administrative Support		ZS IV	(3)	51,879	(155,638)
Administrative Support		ZS III	(31)	42,155	(1,306,805)
Administrative Support		ZS III	(2)	42,155	(84,310)
Administrative Support		ZS I	(2)	27,596	(55,191)
Total			(416)		(41,860,050)
Less lapse	0.00%		(0)		(0)
Total full-time permanent (FTE)			(416)		(41,860,050)
2020 pay Adjustment (0.0%)					0
					(41,860,050)

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	(416)
Total FTE	(416)
Authorized Positions	
Full-time permanent	(416)
Total Positions	(416)

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: Measurement Science, Services, and Programs
Subactivity: Laboratory Programs

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11.1	Full-time permanent compensation	$243,232	$257,835	$262,869	$221,009	($41,860)
11.3	Other than full-time permanent	22,098	22,655	23,098	23,098	0
11.5	Other personnel compensation	6,756	6,756	6,756	6,756	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	272,086	287,246	292,723	250,863	(41,860)
12.1	Civilian personnel benefits	82,174	87,918	97,164	84,861	(12,303)
13	Benefits for former personnel	165	165	165	165	0
21	Travel and transportation of persons	9,965	9,965	10,173	9,129	(1,044)
22	Transportation of things	684	684	684	547	(137)
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	173	173	188	188	0
23.2	Rental payments to others	1,925	1,964	2,001	2001	0
23.3	Communications, utilities, and misc. charges	12,635	12,635	12,578	5,397	(7,181)
24	Printing and reproduction	405	405	405	405	0
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	1,857	2,387	2,387	2,288	(99)
25.2	Other services from non-Federal sources	24,527	27,773	7,449	1,657	(5,792)
25.3	Other goods and services from Federal sources	37,678	37,596	38,722	34,379	(4,343)
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	41,810	41,810	41,810	23,831	(17,979)
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,208	12,208	12,208	11,649	(559)
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	24,022	24,022	24,222	18,989	(5,233)
31	Equipment	35,058	35,058	35,058	28,016	(7,042)
32	Lands and structures	355	355	355	355	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	64,432	64,432	64,432	50,963	(13,469)
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	15	0	0	0	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	622,174	646,796	642,724	525,683	(117,041)

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
PROGRAM CHANGES FOR 2020
(Dollar amounts in thousands)

		2020 Base		2020 Estimate		Increase from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratory Programs –	Pos/BA	5	$30,300	8	$40,300	3	$10,000
Quantum Information Science	FTE/Obl.	4	30,300	6	40,300	2	10,000

Quantum Information Science Research and Applications for Industry (+$10,000, +2 FTE/+3 Positions) - This funding will increase funding for quantum focused research at NIST to a total of $40.3 million. With the additional funding NIST will prioritize efforts to establish and support an industry consortium to accelerate quantum-related research and applications, in fulfillment of the White House National Strategic Overview for Quantum Information Science. Continued U.S. leadership in quantum technology is critical for both national security and future U.S. economic competitiveness. The recent achievements by other nations, like China's significant advances in quantum communications, adds urgency to the issue. An international race to claim quantum supremacy has begun, with countries across the globe striving to create the first working true quantum computer and reap the rewards in medicine, manufacturing, and defense. The additional funds would enable NIST to expand the newly formed U.S. Quantum Economic Development Consortium (QED-C) with additional participants from industry, academia, and government. This consortium provides a forum for technical exchanges and discussions to establish a mutual understanding of U.S. Quantum Information Science (QIS) Industry's trajectory, opportunities, and projected needs (e.g., for workforce, standards, and road-mapping). Furthermore, the consortium will also provide a venue for joint public-private funding to address infrastructure and critical technology gaps, and key pre-competitive research and development. These partnerships between industry, academia, and government will accelerate QIS research and development, facilitate and improve technology transfer from government research laboratories and in the process, help address both the imminent need for a greatly expanded and diverse quantum workforce. Partnerships will remain critical to achieving the large-scale desired impact. The requested funds will enable NIST to expand its existing joint institutes with the University of Maryland-College Park and the University of Colorado-Boulder, and potentially additional academic research-focused partnerships that could materialize an entirely new mechanism for NIST to engineer quantum science breakthroughs into functional quantum devices. Program elements will fast-track the application of quantum science, leverage advances in quantum technology for standards and measurements, and provide U.S. leadership in fundamental research into quantum phenomena. Funds are requested to support QED-C operations and to support R&D through the QED-C as well as to support NIST staff engagement with research groups funded by QED-C and interagency coordination, as required by the National Quantum Initiative Program.

Exhibit 13

Performance Measures	2020	2021	2022	2023	2024
Quantum science and technology applications with increase	2	4	5	8	10
Quantum science and technology applications without increase	1	2	2	4	5

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

Activity: Measurement Science, Services, and Programs
Subactivity: Laboratory Programs
Program Change: Quantum Information Science Research and Applications for Industry

Full-time permanent

Title		Grade	Number	Annual Salary	Total Salaries
Physicist		ZP V	1	$137,350	$137,350
Physicist		ZP IV	1	117,134	117,134
Administrative Specialist		ZA III	1	83,097	83,097
Total			3		337,581
Less lapse	25.00%		(1)		(84,395)
Total full-time permanent (FTE)			2		253,186
2020 pay Adjustment (0.0%)					0
					253,186

Personnel Data Summary

Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions	
Full-time permanent	3
Total Positions	3

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: Measurement Science, Services, and Programs
Subactivity: Laboratory Programs

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase from 2020 Base
11.1	Full-time permanent compensation	$767	$767	$767	$1,020	$253
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	767	767	767	1,020	253
12.1	Civilian personnel benefits	224	224	224	298	74
13	Benefits of former personnel	0	0	0	0	0
21	Travel and transportation of persons	52	52	52	69	17
22	Transportation of things	18	18	18	24	6
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	3,488	3,488	3,488	4,639	1,151
24	Printing and reproduction	24	24	24	32	8
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	4,912	4,912	4,912	6,533	1,621
25.3	Other goods and services from Federal sources	451	451	451	600	149
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	12,102	12,102	12,102	16,096	3,994
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	133	133	133	177	44
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	342	342	342	455	113
31	Equipment	212	212	212	282	70
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	7,575	7,575	7,575	10,075	2,500
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
99.9	Total obligations	30,300	30,300	30,300	40,300	10,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
PROGRAM CHANGES FOR 2020
(Dollar amounts in thousands)

		2020 Base		2020 Estimate		Increase from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratory Programs -	Pos/BA	54	$22,500	65	$32,500	11	$10,000
Microelectronics	FTE/Obl.	54	22,500	62	32,500	8	10,000

Measurement Science for Microelectronics (+10,000, +8 FTE/+11 Positions) - This request will ensure the U.S. as the world leader in developing and manufacturing leading edge microelectronics by supporting advances and breakthroughs in measurement science, standards, and material characterization by NIST that will accelerate the underlying R&D for the design, development, and manufacturability of next generation microelectronics. Access to trusted and assured microelectronics is an Administration priority for both national and economic security. Microelectronics are the building blocks of every technology-based priority including artificial intelligence, cybersecurity, biomedical technology, autonomous vehicles, quantum computing, and the technical, financial, and energy infrastructure on which the U.S. relies. All Federal agencies with a role from basic research to economic and national security applications are needed to support the effort to enhance the underlying R&D for next generation microelectronics, secure supply chains, enhance security, and work collaboratively across government to close gaps in national capabilities. Microelectronics has been and will be the enabler for U.S. technical innovation, national security, and economic growth. Today, overseas competitors are challenging our leadership in microelectronics technology and production with a goal towards making the U.S. dependent on competitor nations. The consequences of this are severe; no longer would we have access to trusted and assured microelectronics for our national and economic security and military. The requested funds will enable NIST to develop and deliver materials characterization, standards, and analytical tools needed by industry for advancing microelectronics. For example, compact photonic integrated circuits (PICs) are becoming increasingly important as the front line of the communications bottleneck moves from long-distance to on-chip communication. Test and measurement equipment advances have not kept pace with this evolving technology and there is a critical need for a photonic probe station that enables optical interrogation of PICs in the same way the current probe stations are used to diagnose, debug and test conventional systems. NIST will establish a program to determine the relevant approaches for photonic circuits and leverage our internal nanophotonic program to correlate device dimensions with performance and disseminate results and best practices to industry. The funds will be allocated across a microelectronics program addressing measurement science for new semiconductor materials and next generation devices; and 3-dimensional and photonics integration. NIST will solicit industry input about the greatest microelectronics measurement needs through workshops.

Performance Measures	2020	2021	2022	2023	2024
Microelectronic measurement methods with increase	4	5	5	6	8
Microelectronic measurement methods without increase	2	2	2	2	2

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

Activity: Measurement Science, Services, and Programs
Subactivity: Laboratory Programs
Program Change: Measurement Science for Microelectronics

Full-time permanent

Title		Grade	Number	Annual Salary	Total Salaries
Physicist		ZP V	2	$137,350	$274,700
Physicist		ZP IV	2	117,134	234,268
Physicist		ZP III	2	83,097	166,195
Mechanical Engineer		ZP IV	1	117,134	117,134
Electronics Engineer		ZP III	2	83,097	166,195
Administrative Support Specialist		ZA II	1	57,301	57,301
Administrative/ Technical Support		ZA II	1	57,301	57,301
Total			11		1,073,095
Less lapse	25.00%		(3)		(268,274)
Total full-time permanent (FTE)			8		804,821
2020 pay Adjustment (0.0%)					0
					804,821

Personnel Data Summary

Full-time Equivalent Employment (FTE)	
Full-time permanent	8
Total FTE	8
Authorized Positions	
Full-time permanent	11
Total Positions	11

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: Measurement Science, Services, and Programs
Subactivity: Laboratory Programs

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase from 2020 Base
11.1	Full-time permanent compensation	$3,350	$3,350	$3,350	$4,155	$805
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	3,350	3,350	3,350	4,155	805
12.1	Civilian personnel benefits	985	985	985	1,222	237
13	Benefits of former personnel	0	0	0	0	0
21	Travel and transportation of persons	82	82	82	103	21
22	Transportation of things	30	30	30	42	12
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	2,418	2,418	2,418	3,540	1,122
24	Printing and reproduction	35	35	35	45	10
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	5	5	5	10	5
25.2	Other services from non-Federal sources	3,298	3,298	3,298	4,017	719
25.3	Other goods and services from Federal sources	324	324	324	480	156
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1,200	1,200	1,200	2,400	1,200
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	93	93	93	136	43
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	502	502	502	603	101
31	Equipment	3,678	3,678	3,678	5,247	1,569
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,500	6,500	6,500	10,500	4,000
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
99.9	Total obligations	22,500	22,500	22,500	32,500	10,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
PROGRAM CHANGES FOR 2020
(Dollar amounts in thousands)

		2020 Base		2020 Estimate		Increase from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratory Programs -	Pos/BA	3	$16,000	15	$24,000	12	$8,000
Artificial Intelligence (AI)	FTE/Obl.	2	16,000	11	24,000	9	8,000

Securing our Future in Artificial Intelligence (+$8,000, +9 FTE/+12 Positions) - This request will expand ongoing research and measurement science efforts to promote adoption of AI in technologies in the marketplace. This investment will bring NIST's AI focused spending to $24 million and will allow NIST to expand its technical capabilities and build research infrastructure for AI data and standards development. Advances in AI promise transformative technologies and scientific breakthroughs that will improve our lives in a myriad of ways such as driverless cars, smart buildings, automated health diagnostics, and improved security monitoring. Companies, governments, and policy makers around the globe are seeking answers that can provide greater confidence in AI technologies, which are expected to have a $14 trillion cross-industry impact by 2035, according to a report by Accenture. The economic impacts of poorly designed or implemented AI and data systems could be devastating to our Nation, as skepticism and distrust may cause the U.S. to neglect the potential advantages and lose out on the economic gains from AI. Agreed-upon measures for AI systems and methods for assessing performance are lacking and must originate from a neutral and reputable source. NIST has the expertise, impartiality, and credibility required to rigorously develop these needed tools. The requested investment will accelerate the widespread adoption of AI technologies and enable the Nation to realize the potential economic, societal, and innovation benefits that AI systems offer, while securing our international leadership position, including in international standardization. NIST will develop resources for users of AI to train and test AI systems, model AI behavior, and compare systems. NIST will also apply AI solutions to its laboratory programs to leverage learning algorithms for research in advanced materials, robotics, and more. NIST will grow technical capabilities by hiring new positions to update NIST competencies with the latest AI techniques and develop the rigorous scientific testing necessary for trustworthy and safe AI. Expertise includes computer science disciplines as well as applied areas in robotics and materials science where AI is driving new technology deployments, materials discovery, and advanced manufacturing. NIST will establish trust and confidence in AI by creating datasets, testing procedures, and other measurement and benchmarking tools that allow AI developers and users to assess the performance of their systems. The request provides funds for NIST to accelerate the pace of AI research by working with academia and the broader AI community in generating datasets and building an infrastructure to make AI data available. The request also supports NIST's role in providing standards leadership and expertise that is essential for the U.S. to reap the economic benefits of emerging technologies such as AI.

Performance Measures	2020	2021	2022	2023	2024
Data sets, test procedures and standards with increase	3	5	8	10	15
Data sets, test procedures and standards without increase	1	1	2	5	5

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

Activity: Measurement Science, Services, and Programs
Subactivity: Laboratory Programs
Program Change: Securing our Future in Artificial Intelligence

Full-time permanent

Title		Grade	Number	Annual Salary	Total Salaries
Computer Scientist		ZP V	1	$137,350	$137,350
Computer Scientist		ZP IV	2	117,134	234,268
Computer Scientist		ZP III	2	83,097	166,195
Data Engineer		ZP III	1	83,097	83,097
Statistician		ZP IV	2	117,134	234,268
Mechanical Engineer		ZP IV	1	117,134	117,134
Administrator		ZA IV	1	117,134	117,134
Materials Engineer		ZP IV	1	117,134	117,134
Administrative/ Technical Support		ZA II	1	57,301	57,301
Total			12		1,263,882
Less lapse	25.00%		(3)		(315,971)
Total full-time permanent (FTE)			9		947,911
2020 pay Adjustment (0.0%)					0
					947,911

Personnel Data Summary

Full-time Equivalent Employment (FTE)	
Full-time permanent	9
Total FTE	9
Authorized Positions	
Full-time permanent	12
Total Positions	12

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: Measurement Science, Services, and Programs
Subactivity: Laboratory Programs

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase from 2020 Base
11.1	Full-time permanent compensation	$207	$207	$207	$1,155	$948
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	207	207	207	1,155	948
12.1	Civilian personnel benefits	62	62	62	341	279
13	Benefits of former personnel	0	0	0	0	0
21	Travel and transportation of persons	74	74	74	89	15
22	Transportation of things	30	30	30	37	7
23	Rent, communications, and utilities	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	1,841	1,841	1,841	2,734	893
24	Printing and reproduction	32	32	32	44	12
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	5	5	5	5	0
25.2	Other services from non-Federal sources	2,938	2,938	2,938	4,896	1,958
25.3	Other goods and services from Federal sources	249	249	249	458	209
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1,200	1,200	1,200	1,700	500
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	70	70	70	104	34
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	380	380	380	470	90
31	Equipment	3,912	3,912	3,912	4,967	1,055
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	5000	5000	5000	7000	2,000
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
99.9	Total obligations	16,000	16,000	16,000	24,000	8,000

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: Measurement Science, Services, and Programs
Subactivity: Corporate Services

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease over 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Corporate Services	Pos./Approp	45	$17,311	45	$17,300	45	$17,765	39	$11,963	(6)	($5,802)
	FTE/Obl.	39	17,323	41	17,303	41	17,765	35	11,963	(6)	(5,802)
Total	Pos./Approp	45	17,311	45	17,300	45	17,765	39	11,963	(6)	(5,802)
	FTE/Obl.	39	17,323	41	17,303	41	17,765	35	11,963	(6)	(5,802)

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

Activity: Measurement Science, Services, and Programs
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 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.

Statement of Operating Objectives

In FY 2020, the Corporate Services will focus on the following items:

- Provide reliable, high-capacity networks to enable NIST laboratories and programs to meet mission-specific needs for large scale data transfer and analyses, disseminate NIST results to the public, and collaborate productively with NIST partners;
- Refresh equipment nearing end-of-life that is currently part of NIST's IT infrastructure; and
- Provide reliable financial and administrative systems to users at NIST and smaller DOC bureaus, while streamlining business processes and improving transparency for our users.

Explanation and Justification

Line Item		2018 Actual		2019 Enacted		2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Corporate Services	Pos./BA	45	$17,311	45	$17,300	45	$17,765
	FTE/Obl	39	17,323	41	17,303	41	17,765

Corporate Services (Total Funding: $17.7 million and 45 Positions)

Computer Support - This effort ensures that NIST's IT infrastructure advances at a pace consistent with the accelerating requirements associated with NIST's scientific and technical leadership. NIST maintains a Network Roadmap that defines a phased, prioritized approach for upgrading the network and maintaining performance consistent with NIST mission requirements. This roadmap addresses the following critical issues:

- Existing networks were not designed to transfer the volumes of data that NIST's mission supporting American corporate leadership requires;
- A significant and growing portion of NIST's network infrastructure has reached end-of-life, creating the risk of prolonged network outages; and
- Network and network security infrastructure upgrades are needed to host NIST services in cloud infrastructure.

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. NIST's business systems are an integral part of DOC's vision for consolidation and modernization. For FY 2020, NIST will enhance the capabilities of its business systems in conjunction with the Department's roadmap for modernization and integration and will also support the development of a DOC architecture that transitions core systems to a Department-wide solution.

The base funding requested of $17.7 million for Corporate Services supports the following ongoing mission functions and programmatic areas which are also described in more detail in the Laboratory Programs section of this budget request:

- *Exploratory Measurement Science ($1.6 million)*
- *Advanced Manufacturing and Material Measurements ($3.6 million)*
- *Fundamental Measurement, Quantum Science, and Measurement Dissemination ($5.4 million)*
- *Advanced Communications, Networks, and Scientific Data Systems ($1.7 million)*
- *Physical Infrastructure and Resilience ($1.6 million)*
- *Cybersecurity and Privacy ($2.0 million)*
- *Health and Biological Systems and Measurements ($0.5 million)*
- *NIST User Facilities ($1.3 million)*

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM CHANGES FOR 2020
(Dollar amounts in thousands)

		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Corporate Services	Pos/BA	45	$17,765	39	$11,963	(6)	($5,802)
	FTE/Obl.	41	17,765	35	11,963	(6)	(5,802)

Corporate Services Programmatic Decrease (-$5,802, -6 FTE/-6 Positions) – 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 32 percent, a reduction of $5.8 million dollars. NIST relies on central technology (IT) support to provide secure, centrally managed IT infrastructure resources which leads to improved measurement methods, standards advance, reference data, and research results benefiting numerous sectors of the U.S. economy.

In support of this mission, NIST maintains a Network Roadmap which is a phased, prioritized approach for upgrading the network and maintaining performance consistent with its mission requirements. NIST will reduce its plans to purchase contractual support to install only the most critically-needed IT infrastructure improvements to upgrade its network capacity to enable large-scale data transfers.

To preserve its support to the core programs in our Laboratories, NIST will also reduce staff and funding levels of contractual services that support NIST's business systems which are an integral part of DOC's vision for consolidation and modernization of its business systems.

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

Activity: Measurement Science, Services, and Programs
Subactivity: Corporate Services
Program Change: Corporate Services Reduction

Full-time permanent

Title		Grade	Number	Annual Salary	Total Salaries
Information Technology Specialist		ZA V	(1)	$137,350	($137,350)
Information Technology Specialist		ZA IV	(3)	117,134	(351,402)
Management and Program Analyst		ZA IV	(1)	117,134	(117,134)
Management and Program Analyst		ZA III	(1)	83,097	(83,097)
Total			(6)		(688,983)
Less lapse	0.00%		(0)		(0)
Total full-time permanent (FTE)			(6)		(688,983)
2020 pay Adjustment (0.0%)					(0)
					(688,983)

Personnel Data Summary

Full-time Equivalent Employment (FTE)	
Full-time permanent	(6)
Total FTE	(6)
Authorized Positions	
Full-time permanent	(6)
Total Positions	(6)

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: Measurement Science, Services, and Programs
Subactivity: Corporate Services

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11.1	Full-time permanent compensation	$3,778	$3,832	$3,850	$3,161	($689)
11.3	Other than full-time permanent	343	348	350	350	0
11.5	Other personnel compensation	105	105	105	105	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	4,226	4,285	4,305	3,616	(689)
12.1	Civilian personnel benefits	1,264	1,282	1,300	1,097	(203)
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	107	107	107	106	(1)
22	Transportation of things	33	33	33	33	0
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	1,413	1,413	1,413	1,412	(1)
24	Printing and reproduction	36	36	36	36	0
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	8,100	8,003	8,427	5,194	(3,233)
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	150	150	150	0	(150)
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	433	433	433	408	(25)
31	Equipment	1,544	1,544	1,544	44	(1,500)
32	Lands and structures	17	17	17	17	0
33	Investments and loans	0	0	0	0	0
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
99.9	Total obligations	17,323	17,303	17,765	11,963	(5,802)

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: Measurement Science, Services, and Programs
Subactivity: Standards Coordination and Special Programs *

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease over 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Standards Coordination	Pos./Approp	199	$79,173	199	$79,069	199	$80,439	174	$46,073	(25)	($34,366)
and Special Programs	FTE/Obl.	171	74,617	180	92,636	180	80,439	155	46,073	(25)	(34,366)
Total	Pos./Approp	199	79,173	199	79,069	199	80,439	174	46,073	(25)	(34,366)
	FTE/Obl.	171	74,617	180	92,636	180	80,439	155	46,073	(25)	(34,366)

* Includes Baldridge Performance Excellence Program (BPEP) funded at $2.2 million.

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

Activity: Measurement Science, Services, and 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 houses cross-cutting NIST activities managed by the Associate Director for Laboratory Programs (ADLP) that deal with select R&D programs, documentary standards coordination and policy development.

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 are highlighted below.

   - 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 2020 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 2020 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 are highlighted below.

   - 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 with 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.

Examples of Accomplishments

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.

- The Center for Risk-based Community Resilience, a NIST-funded Center of Excellence launched a longitudinal field study of Lumberton, NC, a community hit hard by Hurricane Matthew, which triggered flooding of the nearby Lumber River. The field study included about 20 researchers who interviewed 180 homeowners and completed close to 500 damage surveys to determine various impacts of the hurricane. The data gathered from this effort will be critical in helping the Center create a reliable model that can provide communities with practical recommendations on steps they can take to improve their resilience prior to an event occurring.
- The Center for Hierarchical Materials Design (CHIMaD), a NIST-funded Center of Excellence involving Northwestern University, University of Chicago, and Argonne National Labs has created a Materials Data Facility (MDF). The Materials Data Facility (MDF) is set of data services built specifically to support materials science researchers. MDF consists of two synergistic services, data publication and data discovery (in development). The production-ready data publication service offers a scalable repository where materials scientists can publish, preserve, and share research data. The repository provides a focal point for the materials community, enabling publication and discovery of materials data of all sizes. The MDF is a pilot project funded by NIST, and serves as the first pilot community of the National Data Service, and is a key piece of the Material Genome Initiative Infrastructure that will help researchers speed the time of material's discovery.
- 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 coordinating the Federal partners to develop common U.S. Government (USG) positions in key standard development areas including the Internet of Things and Artificial Intelligence.
- 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. NIST's National Voluntary Laboratory Accreditation Program (NVLAP) conducted an evaluation of the asbestos proficiency testing program that supports the asbestos accreditation program. Improvements identified from NIST's assessment recommendations and refined analytical method will reduce test result uncertainty and improve the efficiency of laboratory testing in accredited laboratories.

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 free, fair and reciprocal trade relations, SCO experts will contribute to, and support the Office of the U.S. Trade Representative (USTR) in their negotiation or re-negotiation of trade agreements through 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 Cybersecurity Standardization 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.

Baldrige Performance Excellence Program (BPEP) - Despite the tremendous progress toward self-sufficiency, funding is necessary to sustain and enhance the Baldrige Performance Excellence Program, a highly leveraged public-private partnership that defines, recognizes, and fosters excellence in manufacturing, service, small business, health care, education, and nonprofit organizations. NIST will use $2.2 million in funds to partner with industry to update the nationally recognized and globally emulated Baldrige Excellence Framework, a leadership and management guide and the standard of organization-wide excellence; to manage and improve the Baldrige Award process, which identifies role-model organizations and recognizes them with a Presidential award; to enhance outreach to foster national competitiveness through the use of the framework in business, healthcare, education, and nonprofits; and share the best practices and lessons learned of those role-model organizations. Funds will also support educational programs offered to leaders and senior executives; enable the continued non-financial support of the nationwide network of state and regional Baldrige-based programs, which exponentially expand the fostering of improvement and excellence among U.S. organizations; and the program's cybersecurity excellence initiative.

Explanation and Justification

Line Item		2018 Actual		2019 Enacted		2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Standards Coordination and Special Programs	Pos./BA	199	$79,173	199	$79,069	199	$80,439
	FTE/Obl	171	74,617	180	92,636	180	80,439

Standards Coordination and Special Programs (Total Funding: $80.4 million and 199 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 of 1995 (P.L. 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 primarily aligned with the NIST Laboratory work described in the Fundamental Measurement, Quantum Science, and Measurement Dissemination portfolio with an emphasis on measurement dissemination related activities.

The base funding request of $80.4 million for NIST's Standards Coordination and Special Programs supports the following ongoing mission functions and programmatic areas, which are also described in more detail in the Laboratory Programs section of this budget request:

- *Fundamental Measurement, Quantum Science, and Measurement Dissemination ($47.9 million)*
- *Exploratory Measurement Science ($4.6 million)*
- *Advanced Manufacturing and Material Measurements ($12.7 million)*
- *Advanced Communications, Networks, and Scientific Data Systems ($3.2 million)*
- *Cybersecurity and Privacy ($3.3 million)*
- *Physical Infrastructure and Resilience ($5.4 million)*
- *Health and biological systems measurements ($1.1 million)*

Additionally, this Activity/Subactivity funds the Baldrige Performance Excellence Program at $2.2 million.

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
PROGRAM CHANGES FOR 2020
(Dollar amounts in thousands)

		2020 Base		2020 Estimate		Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Standards Coordination and Special Programs	Pos/BA	199	$80,439	174	$46,073	(25)	($34,366)
	FTE/Obl.	180	80,439	155	46,073	(25)	(34,366)

Standards Coordination and Special Programs Reduction (-$34,366, -25 FTE/-25 Positions) – 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 42 percent, a reduction of $34.366 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 take on those responsibilities. Specific details of the reductions are outlined in detail below.

Office of Special Programs (-$14.866 million, -25 Positions) – The Office of Special Programs manages selected cross NIST programs, and certain extramural focused activities. In order to ensure that NIST has the necessary resources to support the research priorities identified in the President's Budget request and ensure that NIST has sufficient resources to support its core metrology research and services, NIST 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.

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 that supports test-beds in urban environments to 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) NIST will no longer support a centrally managed forensic science research program, rather 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; and

(3) NIST will also reduce support for the operation of the Organization of Scientific Area Committees (OSAC) program that was established 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 (-$4.5 million, -0 Positions) – The Standards Coordination Office provides standards policy coordination across the U.S. government, standards conformity assessment activities, and resources and tools that help U.S. stakeholders navigate the complex international standards landscape. The FY 2020 budget would reduce the funding of the Standards Coordination Office by $4.5 million. These reductions will eliminate grants and contracts for standards education and training related activities targeted at integrating standards content into undergraduate and graduate curricula 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 provided to other Federal partners to develop and improve technology transfer tools, processes, and support services.

NIST Center of Excellence Program (-$15.0 million, -0 Positions) – 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 areas. Currently, NIST supports three Centers of Excellence in Advanced Materials, Community Resilience, and Forensic Science. To meet the requested funding levels for FY 2020 and be able to support the priority investments in quantum science, Artificial Intelligence (AI), and advanced microelectronics while maintaining a forward-looking core capability in measurement science, NIST proposes to eliminate all funding for the Center of Excellence Program.

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

Activity: Measurement Science, Services, and Programs
Subactivity: Standards Coordination and Special Programs
Program Change: Standards Coordination and Special Programs Reduction

Full-time permanent

Title		Grade	Number	Annual Salary	Total Salaries
Scientist/Engineer		ZP V	(3)	$137,350	($412,050)
Scientist/Engineer		ZP IV	(4)	117,134	(468,536)
Scientist/Engineer		ZP III	(4)	83,097	(332,390)
Management and Program Analyst		ZA IV	(4)	117,134	(468,536)
Management and Program Analyst		ZA III	(4)	83,097	(332,390)
Management and Program Analyst		ZA II	(2)	57,301	(114,603)
Administrative Support Assistant		ZS IV	(2)	51,879	(103,759)
Administrative Support Assistant		ZS III	(2)	42,155	(84,310)
Total			(25)		(2,316,573)
Less lapse	0.00%		(0)		(0)
Total full-time permanent (FTE)			(25)		(2,316,573)
2020 pay Adjustment (0.0%)					0
					(2,316,573)

Personnel Data Summary

Full-time Equivalent Employment (FTE)	
Full-time permanent	(25)
Total FTE	(25)
Authorized Positions	
Full-time permanent	(25)
Total Positions	(25)

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: Measurement Science, Services, and Programs
Subactivity: Standards Coordination and Special Programs

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Decrease from 2020 Base
11.1	Full-time permanent compensation	$18,572	$18,837	$18,926	$16,609	($2,317)
11.3	Other than full-time permanent	1,687	1,711	1,719	1,719	0
11.5	Other personnel compensation	516	516	516	516	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	20,775	21,064	21,161	18,844	(2,317)
12.1	Civilian personnel benefits	6,235	6,324	6,414	5,733	(681)
13	Benefits of former personnel	0	0		0	0
21	Travel and transportation of persons	1,731	1,731	1,731	1,693	(38)
22	Transportation of things	70	70	70	68	(2)
23	Rent, communications, utilities	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	4,004	4,004	4,004	2,856	(1,148)
24	Printing and reproduction	57	57	57	54	(3)
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	9,958	27,599	15,215	14,738	(477)
25.3	Other goods and services from Federal sources	164	164	164	0	(164)
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	197	197	197	0	(197)
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	56	56	56	0	(56)
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,122	1,122	1,122	987	(135)
31	Equipment	972	972	972	824	(148)
32	Lands and structures	49	49	49	49	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	29,227	29,227	29,227	227	(29,000)
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
99.9	Total obligations	74,617	92,636	80,439	46,073	(34,366)

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	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$265,582	$280,504	$285,645	$242,785	($42,860)
11.3	Other than full-time permanent	24,128	24,714	25,167	25,167	0
11.5	Other personnel compensation	7,377	7,377	7,377	7,377	0
11.9	**Total personnel compensation**	297,087	312,595	318,189	275,329	(42,860)
12.1	Civilian personnel benefits	89,673	95,524	104,878	92,282	(12,596)
13	Benefits for former personnel	165	165	165	165	0
21	Travel and transportation of persons	11,803	11,803	12,011	10,983	(1,028)
22	Transportation of things	787	787	787	673	(114)
23.1	Rental payments to GSA	173	173	188	188	0
23.2	Rental payments to others	1,925	1,964	2,001	2,001	0
23.3	Communications, utilities, and miscellaneous charges	18,052	18,052	17,995	12,831	(5,164)
24	Printing and reproduction	498	498	498	525	27
25.1	Advisory and assistance services	1,857	2,387	2,387	2,293	(94)
25.2	Other services	42,585	63,375	31,091	27,384	(3,707)
25.3	Purchases of goods and services from government accounts	37,842	37,760	38,886	34,893	(3,993)
25.5	Research and development contracts	42,007	42,007	42,007	29,525	(12,482)
25.7	Operation and maintenance of equipment	12,414	12,414	12,414	11,770	(644)
26	Supplies and materials	25,577	25,577	25,777	20,688	(5,089)
31	Equipment	37,574	37,574	37,574	31,577	(5,997)
32	Land and structures	421	421	421	421	0
41	Grants, subsidies, and contributions	93,659	93,659	93,659	59,690	(33,969)
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	15	0	0	0	0
99	Total Obligations	714,114	756,735	740,928	613,218	(127,710)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
99	Total Obligations	$714,114	$756,735	$740,928	$613,218	($127,710)
	Less Prior Year Recoveries	(5,892)	(29,485)	0	0	0
	Less Prior Year Refunds	(80)				
	Less Prior Year Unobligated Balance	(10,213)	0	0	0	0
	Plus Unobligated Balance, End of Year	29,485				
	Plus Unobligated Balance, Expired	86				
	Total Budget Authority	727,500	727,250	740,928	613,218	(127,710)
	Transfer to NIST Working Capital Fund	0	0	0	0	0
	Transfer from Election Assistance Commission	(1,500)	(1,250)	0	(1,499)	(1,499)
	Transfers from DoJ for Office of Law Enforcement Standards	(1,500)	(1,500)	0	0	0
	Appropriation	724,500	724,500	740,928	611,719	(129,209)
	Personnel Data					
	Full-time Equivalent Employment:					
	Full-time permanent	2,078	2,191	2,191	1,763	(428)
	Other than full-time permanent	273	273	273	273	0
	Total	2,351	2,464	2,464	2,036	(428)
	Authorized Positions:					
	Full-time permanent	2,481	2,481	2,481	2,060	(421)
	Other than full-time permanent	76	76	76	76	0
	Total	2,557	2,557	2,557	2,136	(421)

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
Activity/Subactivity: Laboratory Programs
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease Over 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$243,232	$257,835	$262,869	$223,015	($39,854)
11.3	Other than full-time permanent	22,098	22,655	23,098	23,098	0
11.5	Other personnel compensation	6,756	6,756	6,756	6,756	0
11.9	**Total personnel compensation**	272,086	287,246	292,723	252,869	(39,854)
12.1	Civilian personnel benefits	82,174	87,918	97,164	85,452	(11,712)
13	Benefits for former personnel	165	165	165	165	0
21	Travel and transportation of persons	9,965	9,965	10,173	9,184	(989)
22	Transportation of things	684	684	684	572	(112)
23.1	Rental payments to GSA	173	173	188	188	0
23.2	Rental payments to others	1,925	1,964	2,001	2,001	0
23.3	Communications, utilities, and miscellaneous charges	12,635	12,635	12,578	8,563	(4,015)
24	Printing and reproduction	405	405	405	435	30
25.1	Advisory and assistance services	1,857	2,387	2,387	2,293	(94)
25.2	Other services	24,527	27,773	7,449	7,452	3
25.3	Purchases of goods and services from government accounts	37,678	37,596	38,722	34,893	(3,829)
25.5	Research and development contracts	41,810	41,810	41,810	29,525	(12,285)
25.7	Operation and maintenance of equipment	12,208	12,208	12,208	11,770	(438)
26	Supplies and materials	24,022	24,022	24,222	19,293	(4,929)
31	Equipment	35,058	35,058	35,058	30,709	(4,349)
32	Land and structures	355	355	355	355	0
41	Grants, subsidies, and contributions	64,432	64,432	64,432	59,463	(4,969)
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	15	0	0	0	0
99	Total Obligations	622,174	646,796	642,724	555,182	(87,542)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease Over 2020 Base
99	Total Obligations	$622,174	$646,796	$642,724	$555,182	($87,542)
	Less Prior Year Recoveries	(4,967)	0	0	0	0
	Less Prior Year Refunds	80	0	0	0	0
	Less Prior Year Unobligated Balance	(5,098)	(17,415)	0	0	0
	Plus Unobligated Balance End of Year	17,415	0	0	0	0
	Unobligated TIP balance, transfer to CRF	(88)	0	0	0	0
	Total Budget Authority	629,516	629,381	642,724	555,182	(87,542)
	Plus Unobligated Balance Rescission	0	0	0	0	0
	Offset or recoveries of prior year obligations (P.L. 115-31)	0	0	0	0	0
	Less transfer from Election Assistance Commission	(1,500)	(1,250)	0	(1,499)	(1,499)
	Less transfer from DoJ for Office of Law Enforcement Standards	0	0	0	0	0
	Appropriation	628,016	628,131	642,724	553,683	(89,041)
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	1,892	1,994	1,994	1,597	(397)
	Other than full-time permanent	249	249	249	249	0
	Total	2,141	2,243	2,243	1,846	(397)
	Authorized Positions:					
	Full-time permanent	2,244	2,244	2,244	1,854	(390)
	Other than full-time permanent	69	69	69	69	0
	Total	2,313	2,313	2,313	1,923	(390)

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
Activity/Subactivity: Corporate Services
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease Over 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$3,778	$3,832	$3,850	$3,161	($689)
11.3	Other than full-time permanent	343	348	350	350	0
11.5	Other personnel compensation	105	105	105	105	0
11.9	**Total personnel compensation**	4,226	4,285	4,305	3,616	(689)
12.1	Civilian personnel benefits	1,264	1,282	1,300	1,097	(203)
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	107	107	107	106	(1)
22	Transportation of things	33	33	33	33	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	1,413	1,413	1,413	1,412	(1)
24	Printing and reproduction	36	36	36	36	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services	8,100	8,003	8,427	5,194	(3,233)
25.3	Purchases of goods and services from government accounts	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	150	150	150	0	(150)
26	Supplies and materials	433	433	433	408	(25)
31	Equipment	1,544	1,544	1,544	44	(1,500)
32	Land and structures	17	17	17	17	0
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
99	Total Obligations	17,323	17,303	17,765	11,963	(5,802)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease Over 2020 Base
99	Total Obligations	$17,323	$17,303	$17,765	$11,963	($5,802)
	Less Prior Year Recoveries	(15)	0	0	0	0
	Less Prior Year Refunds	(80)	0	0	0	0
	Less Prior Year Unobligated Balance	(7)	(3)	0	0	0
	Plus Unobligated Balance End of Year	3	0	0	0	0
	Unobligated TIP balance, transfer to CRF	87	0	0	0	0
	Total Budget Authority	17,311	17,300	17,765	11,963	(5,802)
	Plus Unobligated Balance Rescission	0	0	0	0	0
	Offset or recoveries of prior year obligations (P.L. 115-31)	0	0	0	0	0
	Less transfer from Election Assistance Commission	0	0	0	0	0
	Less transfer from DoJ for Office of Law Enforcement Standards	0	0	0	0	0
	Appropriation	17,311	17,300	17,765	11,963	(5,802)

Personnel Data

Full-time equivalent employment:					
Full-time permanent	35	37	37	31	(6)
Other than full-time permanent	4	4	4	4	0
Total	39	41	41	35	(6)
Authorized Positions:					
Full-time permanent	44	44	44	38	(6)
Other than full-time permanent	1	1	1	1	0
Total	45	45	45	39	(6)

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research Services
Activity/Subactivity: Standards Coordination and Special Programs
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease Over 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$18,572	$18,837	$18,926	$16,609	($2,317)
11.3	Other than full-time permanent	1,687	1,711	1,719	1,719	0
11.5	Other personnel compensation	516	516	516	516	0
11.9	**Total personnel compensation**	20,775	21,064	21,161	18,844	(2,317)
12.1	Civilian personnel benefits	6,235	6,324	6,414	5,733	(681)
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	1,731	1,731	1,731	1,693	(38)
22	Transportation of things	70	70	70	68	(2)
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	4,004	4,004	4,004	2,856	(1,148)
24	Printing and reproduction	57	57	57	54	(3)
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services	9,958	27,599	15,215	14,738	(477)
25.3	Purchases of goods and services from government accounts	164	164	164	0	(164)
25.5	Research and development contracts	197	197	197	0	(197)
25.7	Operation and maintenance of equipment	56	56	56	0	(56)
26	Supplies and materials	1,122	1,122	1,122	987	(135)
31	Equipment	972	972	972	824	(148)
32	Land and structures	49	49	49	49	0
41	Grants, subsidies, and contributions	29,227	29,227	29,227	227	(29,000)
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
99	Total Obligations	74,617	92,636	80,439	46,073	(34,366)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease Over 2020 Base
99	Total Obligations	$74,617	$92,636	$80,439	$46,073	($34,366)
	Less Prior Year Recoveries	(910)	0	0	0	0
	Less Prior Year Unobligated Balance	(5,108)	(12,067)	0	0	0
	Plus Unobligated Balance End of Year	12,067	0	0	0	0
	Total Budget Authority	80,673	80,569	80,439	46,073	(34,366)
	Less transfer from Election Assistance Commission	0	0	0	0	0
	Less transfer from DoJ for Office of Law Enforcement Standards	(1,500)	(1,500)	0	0	0
	Appropriation	79,173	79,069	80,439	46,073	(34,366)
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	151	160	160	135	(25)
	Other than full-time permanent	20	20	20	20	0
	Total	171	180	180	155	(25)
	Authorized Positions:					
	Full-time permanent	193	193	193	168	(25)
	Other than full-time permanent	6	6	6	6	0
	Total	199	199	199	174	(25)

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. $611,719,000, 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, made available funding to include $20,000,000 via transfer 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)

	FY 2018 Actual	FY 2019 Enacted	FY 2020 Estimate
Consulting Services			
Management and professional support services	$825	$1,209	$1,165
Studies, analyses, and evaluations	1,002	1,178	1,128
Engineering and technical services	30	0	0
Total	1,857	2,387	2,293

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	Appro-priation
Enacted, 2019	99	96	$153,000	$161,506	$155,000
Less: Unobligated balance from prior year	0	0	0	(8,506)	0
Plus: Restoration of unobligated balances rescission	0	0	2,000	2,000	0
2020 Adjustments to Base					
Plus: Inflationary adjustments to base	0	0	684	684	684
2020 Base	99	96	155,684	155,684	155,684
Less: 2020 Program changes	(81)	(80)	(140,512)	(140,512)	(140,512)
2020 Estimate	18	16	15,172	15,172	15,172

Comparison by activity with totals by activity		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 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	0
	FTE/Obl.	0	$25	0	0	0	0	0	0	0	0
Hollings Manufacturing Extension Partnership	Pos./Approp	81	140,000	81	$140,000	81	$140,512	0	0	(81)	($140,512)
	FTE/Obl.	69	142,203	80	146,122	80	140,512	0	0	(80)	(140,512)
Manufacturing USA	Pos/Approp	20	15,000	18	$15,000	18	$15,172	18	$15,172	0	0
	FTE/Obl.	16	15,383	16	15,384	16	15,172	16	15,172	0	0
Baldrige Performance Excellence Program	Pos./Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	69	0	0	0	0	0	0	0	0
TOTALS	Pos./Approp	101	155,000	99	155,000	99	155,684	18	15,172	(81)	(140,512)
	FTE/Obl.	85	157,680	96	161,506	96	155,684	16	15,172	(80)	(140,512)
Adjustments for											
Recoveries			(2,811)		0		0		0		0
Refunds			(7)		0		0		0		0
Unobligated balance, start of year			(8,368)		(8,506)		0		0		0
Unobligated balance, end of year			8,506		0		0		0		0
Budget Authority			155,000		153,000		155,684		15,172		(140,512)
Adjustments for											
Plus restoration of unobligated balances rescission			0		2,000		0		0		0
Appropriation			155,000		155,000		155,684		15,172		(140,512)

[This page left blank intentionally.]

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

	Perm. Pos.	FTE	Amount
Other Changes:			
FY 2019 pay raise	...	...	$237
2020 Pay increase and related costs	...	...	0
Changes in compensable days	...	...	60
Annualization of positions financed in FY 2019	0	0	
Personnel benefits:			
Civil Service Retirement System (CSRS)	...	...	(9)
Federal Employees' Retirement System (FERS)	...	...	306
Thrift Savings Plan (TSP)	...	...	3
Federal Insurance Contribution Act (FICA) - OASDI	...	...	20
Health insurance	...	...	7
Employees' Compensation Fund	...	...	(4)
Travel and transportation of persons:			
Mileage	...	...	1
Per diem	...	...	64
Rental Payments to GSA	...	...	0
Communications, utilities, and miscellaneous charges:			
Postage	...	...	0
Electricity rate increase	...	...	1
Natural gas rate decrease	...	...	(2)
General pricing level adjustment	...	...	0
Total, adjustments to base	0	0	684

[This page left blank intentionally.]

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

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 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	0
	FTE/Obl.	0	$25	0	0	0	0	0	0	0	0

[This page left blank intentionally.]

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

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Hollings Manufacturing	Pos./Approp	81	$140,000	81	$140,000	81	$140,512	0	0	(81)	($140,512)
Extension Partnership	FTE/Obl.	69	142,203	80	146,122	80	140,512	0	0	(80)	(140,512)

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Hollings Manufacturing Extension Partnership Program

Goal Statement

The Hollings Manufacturing Extension Partnership Program (MEP) is a national network of Federal-state-industry partnerships 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.

Base Program

The MEP primarily aids small- and medium-sized U.S. manufacturers through its 51 centers in every U.S. State and Puerto Rico, using a networked partnership approach to deliver services such as product and market development using tools and resources for improved processes and best practices, supply chain management, growth services, and workforce development. NIST MEP also provides technical assistance in food safety best practices, accelerating the adoption of advanced manufacturing technologies, addressing emerging manufacturing needs, understanding foreign manufacturing and compliance issues, advising on cybersecurity of supply chains, and transferring technology from NIST Labs and other Federal research organizations. Last year, MEP centers interacted with 27,707 manufacturers, leading to $15.9 billion in new and retained sales, $1.7 billion in cost savings, $4 billion in new client investments and helped create and retain more than 122,000 jobs.

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. For thirty years, MEP centers have acted as the go-to experts who promote business growth and connect manufacturers to public

and private resources essential for increased competitiveness and profitability. Since 1988, MEP has worked with 94,033 manufacturers, leading to $111.3 billion in sales, $18.8 billion in cost savings, and has helped create and retain 985,317 jobs.

Statement of Operating Objectives

In FY 2019, MEP advanced the initiatives highlighted below.

- Supported a 9,897 client firms, including 1,333 rural and 2,255 very small manufacturers. These clients will not receive in-depth technical assistance from MEP centers in FY 2020.
- Continued the shift toward centers delivering to MEP clients more innovation service projects such as digital manufacturing and advanced robotics. As of FY 2018, more than 1 in 5 projects are innovation-related.
- Increasing the share of smaller clients that receive MEP services. In FY 2018 over 52 percent of all completed projects were done with manufacturing clients with less than 50 employees.
- Executed an Interagency Agreement during with the Office of the Secretary of Defense to provide awareness and technical assistance to small defense manufacturers relating to their implementation of adequate cybersecurity to protect controlled unclassified information in defense contracts. 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 Defense program changes and the increased demand for cybersecurity projects, services, and training in that supply chain.
- Established a memorandum of agreement with the Food and Drug Administration to recognize MEP centers across the Nation as local resources to provide assistance to small U.S. food processors relating to food safety practices, especially implementation of requirements of the Food Safety Modernization Act (FSMA). In addition, provided about $3.4 million in multi-year funding in FY 2018 to the MEP National Network™ to address FSMA requirements through training, technical assistance, and safety in food and beverage manufacturing by small- and medium-sized manufacturers.

Explanation and Justification

Line Item		2018 Actual		2019 Enacted		2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Hollings Manufacturing Extension Partnership	Pos./BA	81	$140,000	81	$140,000	81	$140,512
	FTE/Obl	69	142,203	80	146,122	80	140,512

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM CHANGES FOR 2020
(Dollar amounts in thousands)

		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Hollings Manufacturing Extension Partnership Program	Pos/BA	81	$140,512	0	0	(81)	($140,512)
	FTE/Obl.	80	140,512	0	0	(80)	(140,512)

Hollings Manufacturing Extension Partnership Program (-$140,512, -80 FTE/-81 Positions) - The FY 2020 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 appropriation account.

The FY 2020 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 8 states, and nonprofit organizations in 26 states. MEP centers receive funding under five-year cooperative agreements with Federal / non-Federal cost share; no Federal center funding will be provided in FY 2020 and centers will be required to change to an entirely self-supporting basis.

The proposed reduction of $140.5 million will eliminate $120.0 million in funding to the MEP centers, approximately $6.1 million in contracts and other support (non-labor), and $14.4 million for a 100 percent reduction of NIST MEP Federal employees who support and administer the MEP program. The reduction will also eliminate over 1,300 non-Federal technical experts in the 51 organizations that operate the MEP program through the centers and affect over 2,500 partners in all centers and nearly 400 field offices. Almost 9,900 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.

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

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

Title	Grade	Number	Annual Salary	Total Salaries
Executive Management	SES	(2)	$202,300	($404,600)
Executive Management	ZA V	(1)	181,590	(181,590)
Scientist/Engineer	ZP V	(1)	181,590	(181,590)
Scientist/Engineer	ZP IV	(1)	154,616	(154,616)
Management and Program Analyst	ZA V	(2)	181,590	(363,180)
Management and Program Analyst	ZA IV	(4)	154,616	(618,464)
Management and Program Analyst	ZA III	(12)	113,958	(1,367,496)
Management and Program Analyst	ZA II	(4)	81,533	(326,132)
Information Technology Specialist	ZP IV	(4)	169,944	(679,776)
Information Technology Specialist	ZP III	(7)	125,220	(876,540)
Economist	ZP V	(1)	181,573	(181,573)
Economist	ZP IV	(2)	169,944	(339,888)
Industrial Specialist	ZA V	(3)	181,590	(544,770)
Industrial Specialist	ZA IV	(20)	154,616	(3,092,320)
Industrial Specialist	ZA III	(3)	125,220	(375,660)
Administrative Support	ZS V	(2)	90,870	(181,740)
Administrative Support	ZS IV	(3)	74,774	(224,322)
Administrative Support	ZS IV	(2)	70,069	(140,138)
Administrative Support	ZS III	(7)	63,515	(444,605)
Total		(81)		(10,679,000)

Total full-time permanent (Positions)	(81)	($10,679,000)
2020 pay Adjustment (0.0%)		0
		(10,679,000)

Personnel Data Summary

Full-time Equivalent Employment (FTE)	
Full-time permanent	(80)
Total FTE	(80)
Authorized Positions	
Full-time permanent	(81)
Total Positions	(81)

Exhibit 15

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

Activity: Hollings Manufacturing Extension Partnership Program

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11.1	Full-time permanent compensation	$8,116	$9,629	$9,804	0	($9,804)
11.3	Other than full-time permanent	684	690	703	0	(703)
11.5	Other personnel compensation	172	172	172	0	(172)
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	8,972	10,491	10,679	0	(10,679)
12.1	Civilian personnel benefits	2,911	3,401	3,720	0	(3,720)
13	Benefits for former personnel	5	5	5	0	(5)
21	Travel and transportation of persons	439	442	449	0	(449)
22	Transportation of things	34	34	34	0	(34)
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	7	7	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	626	630	629	0	(629)
24	Printing and reproduction	6	6	6	0	(6)
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	546	153	160	0	(160)
25.2	Other services from non-Federal sources	4,491	4,066	3,218	0	(3,218)
25.3	Other goods and services from Federal sources	964	968	968	0	(968)
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	290	295	295	0	(295)
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	149	152	152	0	(152)
31	Equipment	193	197	197	0	(197)
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	122,750	125,275	120.00	0	(120,000)
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
99.9	Total obligations	142,203	146,122	140,512	0	(140,512)

[This page left blank intentionally.]

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

Activity: Manufacturing USA

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Manufacturing USA	Pos./Approp	20	$15,000	18	$15,000	18	$15,172	18	$15,172	0	0
	FTE/Obl.	16	15,383	16	15,384	16	15,172	16	15,172	0	0

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Manufacturing USA

Goal Statement

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. Another major goal is workforce training in these new and advanced technology areas, including veterans entering the manufacturing workforce.

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 industry-led institutes with one-time Federal start-up funding plus matching non-Federal funds over a five to seven-year period, after which Institutes are self-sustaining. The institutes form a network for manufacturing innovation which have common goals, but unique technical concentrations that 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. While the institutes provide a network for stakeholders to leverage existing resources, collaborate, and co-invest -- the development of commercial applications is left to the private sector which now have tools (manufacturing processes) to make their products. The request includes $15.2 million in discretionary funds to continue the committed start-up funding for the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) as well as coordination of the network of Manufacturing USA institutes, currently standing at 14 institutes.

Accomplishments and industry impacts can be found at: https://www.manufacturingusa.com/.

Statement of Operating Objectives

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 also train the workforce, including returning veterans, needed to work in advanced manufacturing industries. The primary objective is to ensure that American innovations and inventions, currently going off-shore for production, would be scaled up from the lab experiments to an industrial level 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 that have national impact. The institutes help support an ecosystem of manufacturing activity in regions of the U.S. The Manufacturing USA 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

Line Item		2018 Actual		2019 Enacted		2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Manufacturing USA	Pos./BA	20	$15,000	18	$15,000	18	$15,172
	FTE/Obl	16	15,383	16	15,384	16	15,172

The FY 2020 base funding is $15.2 million for the Manufacturing USA program: about $10 million to maintain support for the NIIMBL institute and $5.0 million for coordination of the network of manufacturing institutes. With this level NIST will be able to fund the last year of 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 $15.2 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 about $10.0 million annually in FY 2018, FY 2019, and FY 2020.

[This page left blank intentionally.]

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

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Baldrige Performance Excellence Program	Pos./Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	$69	0	0	0	0	0	0	0	0

[This page left blank intentionally.]

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

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$10,274	$11,805	$12,017	$2,213	($9,804)
11.3	Other than full-time permanent	866	862	878	175	(703)
11.5	Other personnel compensation	219	218	218	46	(172)
11.9	**Total personnel compensation**	11,359	12,885	13,113	2,434	(10,679)
12.1	Civilian personnel benefits	3,606	4,114	4,506	786	(3,720)
13	Benefits for former personnel	6	6	6	1	(5)
21	Travel and transportation of persons	552	555	620	171	(449)
22	Transportation of things	41	41	41	7	(34)
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	765	769	768	139	(629)
24	Printing and reproduction	17	17	17	11	(6)
25.1	Advisory and assistance services	827	574	631	471	(160)
25.2	Other services	5,131	4,644	3,355	137	(3,218)
25.3	Purchases of goods and services from government accounts	1,152	1,161	1,161	193	(968)
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	362	368	368	73	(295)
26	Supplies and materials	284	289	289	137	(152)
31	Equipment	256	262	262	65	(197)
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	133,315	135,814	130,539	10,539	(120,000)
99	Total Obligations	157,680	161,506	155,684	15,172	(140,512)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
99	Total Obligations	$157,680	$161,506	$155,684	$15,172	($140,512)
	Less prior year recoveries	(2,811)	0	0	0	0
	Less prior year refunds	(7)	0	0	0	0
	Less prior year unobligated balance	(8,368)	(8,506)	0	0	0
	Plus unobligated balance end of year	8,506	0	0	0	0
	Total Budget Authority	155,000	153,000	155,684	15,172	(140,512)
	Plus restoration of unobligated balances rescission	0	2,000	0	0	0
	Total Appropriation	155,000	155,000	155,684	15,172	(140,512)
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	75	86	86	14	(72)
	Other than full-time permanent	10	10	10	2	(8)
	Total	85	96	96	16	(80)
	Authorized Positions:					
	Full-time permanent	91	89	89	16	(73)
	Other than full-time permanent	10	10	10	2	(8)
	Total	101	99	99	18	(81)

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
Activity/Subactivity/Line Item: Hollings Manufacturing Extension Partnership
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$8,116	$9,629	$9,804	0	($9,804)
11.3	Other than full-time permanent	684	690	703	0	(703)
11.5	Other personnel compensation	172	172	172	0	(172)
11.9	**Total personnel compensation**	8,972	10,491	10,679	0	(10,679)
12.1	Civilian personnel benefits	2,911	3,401	3,720	0	(3,720)
13	Benefits for former personnel	5	5	5	0	(5)
21	Travel and transportation of persons	439	442	449	0	(449)
22	Transportation of things	34	34	34	0	(34)
23.1	Rental payments to GSA	7	7	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	626	630	629	0	(629)
24	Printing and reproduction	6	6	6	0	(6)
25.1	Advisory and assistance services	546	153	160	0	(160)
25.2	Other services	4,491	4,066	3,218	0	(3,218)
25.3	Purchases of goods and services from government accounts	964	968	968	0	(968)
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	290	295	295	0	(295)
26	Supplies and materials	149	152	152	0	(152)
31	Equipment	193	197	197	0	(197)
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	122,570	125,275	120,000	0	(120,000)
99	Total Obligations	142,203	146,122	140,512	0	(140,512)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
99	Total Obligations	$142,203	$146,122	$140,512	0	($140,512)
	Less prior year recoveries	(2,678)	0	0	0	0
	Less prior year refunds	(7)	0	0	0	0
	Less prior year unobligated balance	(5,983)	(6,465)	0	0	0
	Plus unobligated balance end of year	6,465	0	0	0	0
	Total Budget Authority	140,000	139,657	140,512	0	(140,512)
	Plus restoration of unobligated balances rescission	0	343	0	0	0
	Total Appropriation	140,000	140,000	140,512	0	(140,512)
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	61	72	72	0	(72)
	Other than full-time permanent	8	8	8	0	(8)
	Total	69	80	80	0	(80)
	Authorized Positions:					
	Full-time permanent	73	73	73	0	(73)
	Other than full-time permanent	8	8	8	0	(8)
	Total	81	81	81	0	(81)

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
Activity/Subactivity/Line Item: Manufacturing USA
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$2,158	$2,176	$2,213	$2,213	0
11.3	Other than full-time permanent	171	172	175	175	0
11.5	Other personnel compensation	46	46	46	46	0
11.9	**Total personnel compensation**	2,375	2,394	2,434	2,434	0
12.1	Civilian personnel benefits	692	713	786	786	0
13	Benefits for former personnel	1	1	1	1	0
21	Travel and transportation of persons	113	113	171	171	0
22	Transportation of things	7	7	7	7	0
23.1	Rental payments to GSA	0	0	8	8	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	138	139	139	139	0
24	Printing and reproduction	11	11	11	11	0
25.1	Advisory and assistance services	281	421	471	471	0
25.2	Other services	562	578	137	137	0
25.3	Purchases of goods and services from government accounts	188	193	193	193	0
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	72	73	73	73	0
26	Supplies and materials	135	137	137	137	0
31	Equipment	63	65	65	65	0
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	10,745	10,539	10,539	10,539	0
99	Total Obligations	15,383	15,384	15,172	15,172	0

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
99	Total Obligations	$15,383	$15,384	$15,172	$15,172	0
	Less prior year recoveries	(45)	0	0	0	0
	Less prior year unobligated balance	(722)	(384)	0	0	0
	Plus unobligated balance end of year	384	0	0	0	0
	Total Budget Authority/Appropriation	15,000	15,000	15,172	15,172	0
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	14	14	14	14	0
	Other than full-time permanent	2	2	2	2	0
	Total	16	16	16	16	0
	Authorized Positions:					
	Full-time permanent	16	16	16	16	0
	Other than full-time permanent	2	2	2	2	0
	Total	18	18	18	18	0

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. $15,172,000 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)

	FY 2018 Actual	FY 2019 Enacted	FY 2020 Estimate
Consulting Services			
Management and professional support services	$577	$174	$21
Studies, analyses, and evaluations	250	0	250
Engineering and technical services	0	400	200
Total	827	574	471

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	Appro-priation
Enacted, 2019	116	110	$106,000	$371,821	$106,000
Less: Unobligated balance from prior year	0	0	0	(265,821)	0
2020 Adjustments to Base					
Plus: Inflationary adjustments to base	0	0	504	504	504
2020 Base	116	110	106,504	106,504	106,504
Less: 2020 Program changes	0	0	(46,614)	(46,614)	(46,614)
2020 Estimate	116	110	59,890	59,890	59,890

Comparison by activity/subactivity with totals by activity		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and Major Renovations											
Construction and Major	Pos/Approp	116	$319,000	116	$106,000	116	$106,504	116	$59,890	0	($46,614)
Renovations	FTE/Obl.	100	105,046	110	371,821	110	106,504	110	59,890	0	(46,614)
Adjustments for											
Recoveries			(5,073)		0		0		0		0
Refunds			(72)		0		0		0		0
Unobligated balance, start of year			(46,722)		(265,821)		0		0		0
Unobligated balance, end of year			265,821		0		0		0		0
Budget Authority/Appropriation			319,000		106,000		106,504		59,890		(46,614)

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		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and Major Renovations											
Safety, Capacity, Maintenance and	Pos/Approp	0	0	0	0	0	0	0	0	0	0
Major Repairs	FTE/Obl.	0	$885	0	$906	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)

	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
Total Obligations	$105,931	$372,727	$106,504	$59,890	($46,614)
Offsetting collections from:					
Non-Federal sources	(906)	0	0	0	0
Total offsetting collections	(906)	0	0	0	0
Recoveries (Direct)	(5,073)	0	0	0	0
Refunds (Direct)	(72)	0	0	0	0
Unobligated balance, start of year (Direct)	(46,722)	(265,821)	0	0	0
Unobligated balance, start of year (Reimbursable)	(885)	(906)	0	0	0
Unobligated balance, end of year (Direct)	265,821	0	0	0	0
Unobligated balance, end of year (Reimbursable)	906	0	0	0	0
Budget Authority/Appropriation	319,000	106,000	106,504	59,890	(46,614)

[This page left blank intentionally.]

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

	Perm. Pos.	FTE	Amount
Other Changes:			
FY 2019 pay raise	...	...	$196
2020 Pay increase and related costs	...	...	0
Changes in compensable days	...	...	49
Annualization of positions financed in FY 2019	0	0	
Personnel benefits:			
Civil Service Retirement System (CSRS)	...	...	(9)
Federal Employees' Retirement System (FERS)	...	...	249
Thrift Savings Plan (TSP)	...	...	2
Federal Insurance Contribution Act (FICA) - OASDI	...	...	17
Health insurance	...	...	6
Employees' Compensation Fund	...	...	(6)
Travel and transportation of persons:			
Mileage	...	...	0
Per diem	...	...	0
Communications, utilities, and miscellaneous charges:			
Postage	...	...	0
Electricity rate increase	...	...	1
Natural gas rate decrease	...	...	(1)
General pricing level adjustment	...	...	0
Total, adjustments to base	0	0	504

[This page left blank intentionally.]

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

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and Major Renovations	Pos/Approp	8	$255,000	0	$31,000	0	$31,000	0	$19,200	0	($11,800)
	FTE/Obl.	7	59,154	0	250,084	0	31,000	0	19,200	0	(11,800)
Safety, Capacity, Maintenance and Major Repairs	Pos/Approp	108	64,000	116	75,000	116	$75,504	116	$40,690	0	(34,814)
	FTE/Obl.	93	45,892	110	120,863	110	75,504	110	40,690	0	(34,814)
External Projects	Pos/Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	874	0	0	0	0	0	0
Total	Pos/Approp	116	319,000	116	106,000	116	106,504	116	59,890	0	(46,614)
	FTE/Obl.	100	105,046	110	371,821	110	106,504	110	59,890	0	(46,614)

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

Comparison by activity/subactivity		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 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	$885	0	$906	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	885	0	906	0	0	0	0	0	0

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

Activity: Construction and Major Renovations

Goal Statement

The goal of Construction of Research Facilities (CRF) funding is to provide the facilities and infrastructure that enable scientists and researchers to fulfill NIST's 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."

Base Program

The CRF appropriation funds construction activities, including maintenance, repairs, improvements, and major renovations 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. While some improvements have been made, the current state of facilities and infrastructure remain a serious impediment to NIST's ability to conduct advanced measurement science and research. This is primarily due occasional funding of major construction projects but without a sustained level of annual operations and maintenance funding, nor additional funding to maintain the new buildings or building additions.

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, and 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, worn out ceilings and flooring, and lack of insulation in exterior walls;
- 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 environmental (temperature, relative humidity, and air quality) 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. Facilities that can maintain environmental conditions would eliminate lost productivity for researchers who currently spend their valuable time recalibrating scientific instruments, increase their efficiency and effectiveness and maximize time for mission-related activities. 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. The NIST's campuses in Boulder and Gaithersburg have utility distribution systems and infrastructure that needs to be maintained and replaced as equipment exceeds its useful life and parts become obsolete or facilities could fail, and work would cease. For decades, NIST's SCMMR funding has been below the estimated value for maintaining its facilities and well below the funding required to improve "facilities in a declining state."[2]

[2] National Research Council. 1990. Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings. Washington, D.C.: National Academy Press.

NIST's current facilities backlog includes over $300 million in major utility infrastructure projects. Numerous major utility infrastructure systems are currently in critical condition, creating risks of catastrophic failure of entire laboratory buildings. The Gaithersburg campus is currently losing over 50,000 gallons of water per day in the steam system due primarily to degrading pipes. A large portion of the water being lost is potentially undermining the electrical distribution system to the south campus creating a potential for loss for steam and power to this end of campus which houses some of the most sensitive research at NIST. A recent water main failure in Gaithersburg led to the closure of laboratories in four buildings for five days due to the loss of water. Mechanical failures in Gaithersburg led to evacuating roughly 60 staff for two to three years until a project can be implemented to replace the systems in the spaces since the space is now non-occupiable. In Boulder, there have been three unplanned power outages in the last year due to the $12 million campus high-speed electrical switch which is failing and will no longer be supported by the manufacturer after 2019. In Boulder, one of the research facilities was without restroom capacity for months while emergency temporary repairs were made to the building's sanitary sewer system.

As a result of a constrained fiscal environment for NIST's SCMMR program, NIST facilities are not in compliance with DOC's Facility Condition Index (FCI) recommendations.[3] More specifically, 65 percent of NIST's facilities have not been renovated or newly constructed in the last 20 years and therefore those facilities have seen a dramatic drop in FCI values over the last several years. Of these facilities, the overall FCI value for mission-critical facilities has declined to 81 in Gaithersburg and 75 in Boulder, which is well below DOC's recommended 90. The FCI values for NIST's mission-dependent facilities are also similarly below the DOC recommended minimum value. The declining condition of the facilities shows a strong justification for increasing the SCMMR funding in excess of the National Research Council 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:

- Develop a utility infrastructure specific replacement program that will:
    - 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 50 years old;
    - Continue site utility infrastructure upgrades and repairs, to include underground electrical, chilled water, steam, condensate and natural gas distribution systems; and,
    - 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;

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

- 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 2018 and Prior	FY 2019	FY 2020	FY 2021	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)	72.0	$31.0			
Remaining Components of Building 1: Wing 1, Wing 2, and Headhouse (2)					
Building 245 Modernization	327.0				

(1) Will be completed with the GSA Federal Capital Revolving Fund (FCRF). These dollars do not include funds for Furniture, Fixtures and Equipment (FF&E).

(2) Wing 1, Wing 2 and a portion of the Headhouse will be completed with the GSA FCRF. The original estimate to complete Building 1 was formulated before receiving the FY 2019 enacted appropriation and therefore this funding does not cover the complete renovation of Building 1. These dollars do not include funds for FF&E.

Explanation and Justification

Line Item		2018 Actual		2019 Enacted		2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and Major Renovations	Pos./BA	116	$319,000	116	$106,000	116	$106,504
	FTE/Obl	100	105,046	110	371,821	110	106,504

Construction of Research Facilities (Total Funding: $106.5 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.

NIST Campus - Implementation Plan

NIST is in the pre-award phase to have a contractor develop a 20-year Implementation Plan for the Gaithersburg and Boulder Master plans. This combined plan will include timing, phasing, and budget estimates for each project. After the contract is awarded, the contractor will conduct a lengthy analysis, develop an implementation plan, and then present this plan to NIST leadership for review and approval. It is projected that the Implementation Plan will be finalized in FY 2021. In the interim, NIST will gladly provide updates on the progress on the development of the plan.[4]

[4] S.Rept. 115-275, page 25 – "The Committee is supportive of meeting NIST's physical infrastructure needs and directs it to develop an implementation plan for each of its master plans. The implementation plan shall be submitted with the fiscal year 2020 budget submission and shall include timing and phasing of projects along with current and projected budget estimates for each of the projects identified."

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGES FOR 2020
(Dollar amounts in thousands)

		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and major renovations	Pos/BA	0	$0	0	$19,200	0	$19,200
	FTE/Obl.	0	0	0	19,200	0	19,200

GSA Federal Capital Revolving Fund annual payments increase ($19,200, 0 FTE/0 Positions) - The 2020 budget request proposes: (1) to create a Federal Capital Revolving Fund (FCRF) to fund large-dollar, Federally-owned, civilian real property capital projects; and (2) provide specific budget enforcement rules for the FCRF that would allow it to function, in effect, like State and local government capital budgets. The FCRF will be housed in the General Services Administration (GSA). This proposal incorporates principles that are central to the success of capital budgeting at the State and local level -- a limit on total funding for capital investment, annual decisions on the allocation of funding for capital projects, and spreading the acquisition cost over 15 years in the discretionary operating budgets of agencies that purchase the assets.

The 2020 Budget proposes to use the FCRF concept to fund the renovation of NIST's Building 1 in Boulder, Colorado, estimated at $288.0 million, not including furniture, fixtures and equipment. In accordance with the principles and design of the FCRF, the 2020 budget requests appropriations language designating NIST's renovation as a project to be funded out of the FCRF along with 1/15 of the purchase price, or $19.2 million, for the first-year repayment back to the FCRF. The original estimate to complete Building 1 was formulated before receiving the FY 2019 enacted appropriation and therefore this funding requirement will need to be updated to reflect the complete renovation of Building 1.

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

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11.1	Full-time permanent compensation	$9,311	$10,312	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	469	469	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	9,780	10,781	0	0	0
12.1	Civilian personnel benefits	2,942	3,283	0	0	0
13	Benefits for former personnel	6	6	0	0	0
21	Travel and transportation of persons	39	39	0	0	0
22	Transportation of things	13	13	0	0	0
23	Rent, communications, and utilities					
23.1	Rental payments to GSA	4	4	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	79	81	0	0	0
24	Printing and reproduction	7	7	0	0	0
25	Other contractual services					
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	17,891	98,124	0	0	0
25.3	Other goods and services from Federal sources	2,185	2,319	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	765	774	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,877	1,896	0	0	0
31	Equipment	349	355	0	0	0
32	Lands and structures	69,109	253,440	0	$19,200	$19,200
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	699	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
99.9	Total obligations	105,046	371,821	0	19,200	19,200

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGES FOR 2020
(Dollar amounts in thousands)

		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Safety, Capacity, Maintenance and Major Repairs	Pos/BA	116	$75,504	116	$40,690	0	($34,814)
	FTE/Obl.	110	75,504	110	40,690	0	(34,814)

Safety, Capacity, Maintenance and Major Repairs reduction (-$34,814, 0 FTE/0 Positions) - At the FY 2020 reduced base funding level, NIST would defer SCMMR projects from FY 2020 to FY 2021 to include critical site and facility infrastructure projects necessary for routine facility operations. The request of $40.7 million will only fund $35.0 million in annual fixed costs for salaries, recurring contracts, capital asset management, and planning/support costs and $5.7 million for emergency projects without the flexibility to plan for more than a couple of additional projects. Funds will be applied to the highest priority emergency maintenance and repair projects; however, with this level of funding, the NIST deferred maintenance backlog is expected to increase.

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

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11.1	Full-time permanent compensation	$9.311	$10.312	$10.500	$10.500	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	469	469	469	469	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	9,780	10,781	10,969	10,969	0
12.1	Civilian personnel benefits	2,942	3,283	3,599	3,599	0
13	Benefits for former personnel	6	6	6	6	0
21	Travel and transportation of persons	39	39	39	39	0
22	Transportation of things	13	13	13	13	0
23	Rent, communications, and utilities					
23.1	Rental payments to GSA	4	4	4	4	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	79	81	81	81	0
24	Printing and reproduction	7	7	7	7	0
25	Other contractual services					
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	17,891	98,124	55,442	20,628	($34,814)
25.3	Other goods and services from Federal sources	2,185	2,319	2,319	2,319	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	765	774	774	774	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,877	1,896	1,896	1,896	0
31	Equipment	349	355	355	355	0
32	Lands and structures	69,109	253,440	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	699	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
99.9	Total obligations	105,046	371,821	75,504	40,690	(34,814)

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGES FOR 2020
(Dollar amounts in thousands)

		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and major renovations	Pos/BA	0	$31,000	0	$0	0	($31,000)
	FTE/Obl.	0	31,000	0	0	0	(31,000)

Building 1 Renovation decrease (-$31,000, 0 FTE/0 Positions) - NIST requests a decrease in the amount off $31.0 million to reflect the one-time construction drop out for the Building 1 renovation project.

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

	Object Class *	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11.1	Full-time permanent compensation	$9.311	$10.312	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	469	469	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	9,780	10,781	0	0	0
12.1	Civilian personnel benefits	2,942	3,283	0	0	0
13	Benefits for former personnel	6	6	0	0	0
21	Travel and transportation of persons	39	39	0	0	0
22	Transportation of things	13	13	0	0	0
23	Rent, communications, and utilities					
23.1	Rental payments to GSA	4	4	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	79	81	0	0	0
24	Printing and reproduction	7	7	0	0	0
25	Other contractual services					
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	17,891	98,124	0	0	0
25.3	Other goods and services from Federal sources	2,185	2,319	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	765	774	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,877	1,896	0	0	0
31	Equipment	349	355	0	0	0
32	Lands and structures	69,109	253,440	$31,000	0	($31,000)
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	699	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
99.9	Total obligations	105,046	371,821	31,000	0	(31,000)

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	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/(Decrease) from 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$9,311	$10,312	$10,500	$10,500	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	469	469	469	469	0
11.9	**Total personnel compensation**	9,780	10,781	10,969	10,969	0
12.1	Civilian personnel benefits	2,942	3,283	3,599	3,599	0
13	Benefits for former personnel	6	6	6	6	0
21	Travel and transportation of persons	39	39	39	39	0
22	Transportation of things	13	13	13	13	0
23.1	Rental payments to GSA	4	4	4	4	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	79	81	81	81	0
24	Printing and reproduction	7	7	7	7	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services	17,891	98,124	55,442	20,628	($34,814)
25.3	Purchases of goods and services from government accounts	2,185	2,319	2,319	2,319	0
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	765	774	774	774	0
26	Supplies and materials	1,877	1,896	1,896	1,896	0
31	Equipment	349	355	355	355	0
32	Land and structures	69,109	253,440	31,000	19,200	(11,800)
41	Grants, subsidies, and contributions	0	699	0	0	0
99	Total Obligations	105,046	371,821	106,504	59,890	(46,614)

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/(Decrease) from 2020 Base
99	Total Obligations	$105,046	$371,821	$106,504	$59,890	($46,614)
	Less prior year recoveries	(5,073)	0	0	0	0
	Less prior year refunds	(72)	0	0	0	0
	Less prior year unobligated balance	(46,722)	(265,821)	0	0	0
	Plus unobligated balance end of year	265,821	0	0	0	0
	Total Budget Authority/Appropriation	319,000	106,000	106,504	59,890	(46,614)

Personnel Data

Full-time equivalent employment:					
Full-time permanent	100	110	110	110	0
Other than full-time permanent	0	0	0	0	0
Total	100	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. $59,890 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.

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

	FY 2018 Actual	FY 2019 Enacted	FY 2020 Estimate
Consulting Services			
Management and professional support services	$0	$0	$0
Studies, analyses, and evaluations	0	0	0
Engineering and technical services	0	0	0
Total	0	0	0

Significant Activities

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.

[This page left blank intentionally.]

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
Enacted, 2019	686	686	0	0
Reduction in transfers from prior STRS program changes	0	0	0	0
2020 Base	686	686	0	0
Transfer from STRS program changes for equipment investments	0	0	0	0
2020 Estimate	686	686	0	0

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

Comparison by activity/subactivity	2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Laboratory Programs										
WCF transfer		0		0		0		0		0
Reimbursables	596	$144,003	625	$146,261	625	$138,931	625	$138,931	0	0
WCF investments	0	2,007	0	12,014	0	0	0	0	0	0
Subtotal	596	146,010 [2/]	625	158,275	625	138,931	625	138,931	0	0
Corporate Services										
WCF transfer		0		0		0		0		0
Reimbursables	19	5,000	20	4,814	20	4,904	20	4,904	0	0
WCF investments	0	(50)	0	(3,341)	0	0	0	0	0	0
Subtotal	19	4,950	20	1,473	20	4,904	20	4,904	0	0
Standards Coordination and Special Programs [1/]										
WCF transfer		0		0		0		0		0
Reimbursables	39	12,170	41	6,605	41	6,348	41	6,348	0	0
WCF investments	0	(259)	0	143	0	0	0	0	0	0
Subtotal	39	11,911 [2/]	41	6,748	41	6,348	41	6,348	0	0
Manufacturing USA										
WCF transfer		0		0		0		0		0
Reimbursables	0	0	0	416	0	0	0	0	0	0
WCF investments	0	772	0	29	0	0	0	0	0	0
Subtotal	0	772	0	445	0	0	0	0	0	0
Hollings Manufacturing Extension Partnership										
WCF transfer		0		0		0		0		0
Reimbursables	0	0	0	1,480	0	0	0	0	0	0
WCF investments	0	(15)	0	121	0	0	0	0	0	0
Subtotal	0	(15)	0	1,601	0	0	0	0	0	0

	2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Total, NIST Reimbursable Services										
WCF transfer	0	0	0	0	0	0	0	0	0	0
Reimbursables	654	$161,173	686	$159,576	686	$150,183	686	$150,183	0	0
WCF investments	0	2,455	0	8,966	0	0	0	0	0	0
Grand Total	654	163,628	686	168,542	686	150,183	686	150,183	0	0

[1/] Includes Baldrige Performance Excellence Program (BPEP).

[2/] Numbers differ from the MAX PY due to a $3.57M adjustment of obligation sponsored by NSF from Standards Coordination and Special Programs to Laboratory Programs.

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

	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
Total Obligations	$163,628	$168,542	$150,183	$150,183	0
Offsetting collections from:					
Federal funds	(120,711)	(100,024)	(91,963)	(91,963)	0
Non-Federal sources	(48,994)	(68,518)	(58,220)	(58,220)	0
Unobligated balance, start of year	(117,090)	(133,548)	(133,548)	(133,548)	0
Unobligated balance, end of year	133,548	133,548	133,548	133,548	0
Change in uncollected customer payments - Federal	(10,381)	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)

Activity: NIST Reimbursable Services

Comparison by activity/subactivity		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratory Programs	Pos./BA	625	$146,010 [2/]	625	$158,275	625	$138,931	625	$138,931	0	0
	FTE/Obl.	596	146,010 [2/]	625	158,275	625	138,931	625	138,931	0	0
Corporate Services	Pos./BA	20	4,950	20	1,473 [3/]	20	4,904	20	4,904	0	0
	FTE/Obl.	19	4,950	20	1,473 [3/]	20	4,904	20	4,904	0	0
Standards Coordination	Pos./BA	41	11,911 [2/]	41	6,748	41	6,348	41	6,348	0	0
and Special Programs [1/]	FTE/Obl.	39	11,911 [2/]	41	6,748	41	6,348	41	6,348	0	0
Manufacturing USA	Pos./BA	0	772	0	445	0	0	0	0	0	0
	FTE/Obl.	0	772	0	445	0	0	0	0	0	0
Hollings Manufacturing	Pos./BA	0	(15)	0	1,601	0	0	0	0	0	0
Extension Partnership	FTE/Obl.	0	(15)	0	1,601	0	0	0	0	0	0
WCF investments	Pos./BA	686	163,628	686	168,542	686	150,183	686	150,183	0	0
Total	FTE/Obl.	654	163,628	686	168,542	686	150,183	686	150,183	0	0

[1/] Includes Baldrige Performance Excellence Program (BPEP).
[2/] Numbers differ from the MAX PY due to a $3.57M adjustment of obligation sponsored by NSF from Standards Coordination and Special Programs to Laboratory Programs.
[3/] Amount is netted with Invested Equipment amortization repayment; the obligation is not really dropping in FY 2019 in this activity.

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

Activity: NIST Working Capital Fund

There is no base funding for the program.

This Working Capital Fund (WCF) reflects the full-time equivalent (FTE) 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 (SRMs) and Baldrige Performance Excellence Program (BPEP) 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	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$51,361	$51,361	$51,361	$51,361	0
11.3	Other than full-time permanent	4,675	4,675	4,675	4,675	0
11.5	Other personnel compensation	624	624	624	624	0
11.9	**Total personnel compensation**	56,660	56,660	56,660	56,660	0
12.1	Civilian personnel benefits	17,246	17,272	17,226	17,226	0
13	Benefits for former personnel	34	34	34	34	0
21	Travel and transportation of persons	1,380	1,624	1,125	1,125	0
22	Transportation of things	392	432	299	299	0
23.1	Rental payments to GSA	45	45	48	48	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	4,125	4,232	4,031	4,031	0
24	Printing and reproduction	232	259	180	180	0
25.1	Advisory and assistance services	1,341	1,499	1,251	1,251	0
25.2	Other services	21,125	22,938	15,881	15,881	0
25.3	Purchases of goods and services from Government accounts	6,778	7,009	6,278	6,278	0
25.5	Research and development contracts	9,191	9,328	6,458	6,458	0
25.7	Operation and maintenance of equipment	5,076	5,287	3,661	3,661	0
26	Supplies and materials	10,921	12,488	8,916	8,916	0
31	Equipment	25,210	25,210	25,210	25,210	0
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	3,866	4,225	2,925	2,925	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	6	0	0	0	0
99	Total Obligations	163,628	168,542	150,183	150,183	0

Personnel Data	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
Full-time equivalent employment:					
Full-time permanent	580	612	612	612	0
Other than full-time permanent	74	74	74	74	0
Total	654	686	686	686	0
Authorized Positions:					
Full-time permanent	612	612	612	612	0
Other than full-time permanent	74	74	74	74	0
Total	686	686	686	686	0

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

	FY 2018 Actual	FY 2019 Enacted	FY 2020 Estimate
Consulting Services			
Management and professional support services	$41	$44	$46
Studies, analyses, and evaluations	1,300	1,455	1,205
Engineering and technical services	0	0	0
Total	1,341	1,499	1,251

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 Department of Defense in its Manufacturing Innovation Institutes, for example.

[This page left blank intentionally.]

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	Appro-priation
Enacted, 2019	0	0	0	0	0
2020 Adjustments to Base	0	0	0	0	0
2020 Base/Estimate	0	0	0	0	0

Comparison by activity/subactivity with totals by activity		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/(Decrease) from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NIST Public Safety Communications Research Fund	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		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		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/(Decrease) from 2020 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.	88	$44,389	78	$56,900	78	$50,300	78	$50,300	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
SUMMARY OF FINANCING - MANDATORY
(Dollar amounts in thousands)

	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
Total Obligations	$44,389	$56,900	$50,300	$50,300	0
Adjustments for:					
Recoveries	(237)				
Refunds	(18)				
Unobligated balance, start of year (Mandatory)	(239,241)	(195,107)	(138,207)	(138,207)	0
Unobligated balance from offsetting collections, end of year	195,107	138,207	87,907	87,907	0
Budget Authority/Appropriation - Mandatory Account	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.

[This page left blank intentionally.]

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

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NIST Public Safety Communications Research Fund	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: MANDATORY
(Dollar amounts in thousands)

Activity: NIST Public Safety Communications Research Fund

Comparison by activity/subactivity		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/(Decrease) from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NIST Public Safety Communications	Pos/Approp	78	0	78	0	78	0	78	0	0	0
Research Fund	FTE/Obl.	88	$44,389	78	$56,900	78	$50,300	78	$50,300	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

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.

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	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
11	Personnel compensation					
11.1	Full-time permanent	$10,028	$8,558	$8,652	$8,652	0
11.3	Other than full-time permanent	1,485	1,375	1,390	1,390	0
11.5	Other personnel compensation	188	33	33	33	0
11.9	**Total personnel compensation**	11,701	9,966	10,075	10,075	0
12.1	Civilian personnel benefits	3,504	3,116	2,961	2,961	0
13	Benefits for former personnel	7	0	0	0	0
21	Travel and transportation of persons	717	333	378	378	0
22	Transportation of things	29	8	44	44	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	797	827	1,056	1,056	0
24	Printing and reproduction	16	57	41	41	0
25.1	Advisory and assistance services	3,592	1,677	1,678	1,678	0
25.2	Other services	2,148	2,969	3,842	3,842	0
25.3	Purchases of goods and services from government accounts	1,306	2,145	4,152	4,152	0
25.5	Research and development contracts	1,935	1,002	1,504	1,504	0
25.7	Operation and maintenance of equipment	391	475	864	864	0
26	Supplies and materials	485	315	424	424	0
31	Equipment	3,889	3,325	2,182	2,182	0
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	13,871	30,685	21,099	21,099	0
99	Total Obligations	44,389	56,900	50,300	50,300	0

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/Decrease from 2020 Base
99	Total Obligations	$44,389	$56,900	$50,300	$50,300	0
	Adjustments for:					
	Recoveries	(237)	0	0	0	0
	Refunds of prior year paid obligations	(18)				
	Unobligated balance from offsetting collections, start of year	(239,241)	(195,107)	(138,207)	(138,207)	0
	Unobligated balance from offsetting collections, end of year	195,107	138,207	87,907	87,907	0
	Appropriation	0	0	0	0	0
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent:	73	66	66	66	0
	Other than full-time permanent	15	12	12	12	0
	Total	88	78	78	78	0
	Authorized Positions:					
	Full-time permanent	63	66	66	66	0
	Other than full-time permanent	15	12	12	12	0
	Total	78	78	78	78	0

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
WIRELESS INNOVATION 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: Wireless Innovation (WIN) Fund: As part of the National Wireless Initiative included in the American Jobs Act, NIST also has resources through the Wireless Innovation (WIN) Fund to help develop cutting-edge wireless technologies for public safety users. The WIN Fund 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. $92.7M was transferred to NIST in FY 2015. $7.3M was released from sequester in FY 2016, an additional $186.4M was transferred in FY 2016, and $13.6M was released from sequester in FY 2017. Currently WIN has $239.3M in total resources with $56.7M available for obligation in FY 2018, and $182.6M 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)

	FY 2018 Actual	FY 2019 Enacted	FY 2020 Estimate
Consulting Services			
Management and professional support services	$3,592	$1,677	$1,678
Studies, analyses, and evaluations	0	0	0
Engineering and technical services	0	0	0
Total	3,592	1,677	1,678

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.

[This page left blank intentionally.]

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 programs 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)

	FY 2018			FY 2019			FY 2020			
Source and Use of Funds Spent	Perm. Pos. [1]	FTE	Oblig.	Perm. Pos. [1]	FTE	Oblig.	Perm. Pos. [1]	FTE	Oblig.	Approp. Requested
Direct Funding										
Scientific and technical research and services	2,557	2,351	$714,114	2,557	2,464	$756,735	2,136	2,036	$613,218	$611,719
Industrial technology services	101	85	157,680	99	96	161,506	18	16	15,172	15,172
Construction of research facilities	116	100	105,046	116	110	371,821	116	110	59,890	59,890
Gifts and bequests	1	1	327 [3]	0	0	0	0	0	0	0
Total, direct funding	2,775	2,537	977,167	2,772	2,670	1,290,062	2,270	2,162	688,280	686,781
Reimbursable Funding and WCF Investments										
Construction of research facilities - building surcharge	0	0	885	0	0	906	0	0	0	
Research, development and supporting services:										
Federal government	424	404	104,080	424	424	100,024	424	424	91,963	
Calibrations and tests, technical and advisory services:										
Federal government	33	31	8,284	33	33	7,997	33	33	7,896	
Public and non-federal government	97	93	25,052	98	98	24,185	98	98	23,878	
Subtotal, Services	130	124	33,336	131	131	32,182	131	131	31,774	
National Voluntary Laboratory Accreditation Program	24	23	4,431	24	24	4,225	24	24	4,325	
Standard reference materials (SRMs):										
SRM Sales:										
Federal government	5	5	1,025	5	5	1,101	5	5	1,053	
Public and non-federal government	102	97	20,511	102	102	22,044	102	102	21,068	
Subtotal, SRM sales	107	102	21,536	107	107	23,145	107	107	22,121	
SRM investment adjustment	0	0	(1,434)	0	0	0	0	0	0	
Subtotal, SRM	107	102	20,102	107	107	23,145	107	107	22,121	
Total, Reimbursable program	685	653	162,834 [2]	686	686	160,482 [2]	686	686	150,183	
WCF Investments and Operating Adjustments										
WCF investments	0	0	17,700	0	0	31,778	0	0	31,778	
WCF operating adjustments	0	0	3,686	0	0	0	0	0	0	
Total, WCF Investments and operating adjustments	0	0	21,386	0	0	31,778	0	0	31,778	
Total, NIST program	3,460	3,190	1,161,387	3,458	3,356	1,482,322	2,956	2,848	870,241	
Offsetting adjustment for amortization of equipment	0	0	(19,707)	0	0	(22,812)	0	0	(31,778)	
Adjusted total, NIST program	3,460	3,190	1,141,680	3,458	3,356	1,459,510	2,956	2,848	838,463	

[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] 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 2018 Actual	FY 2019 Enacted	FY 2020 Estimate
Department of Defense			
Air Force	$7,385	$9,589	$8,649
Army	1,110	1,065	1,310
Navy	953	1,050	910
Other, Department of Defense	19,260	21,362	16,332
Subtotal, Department of Defense	28,708	33,066	27,201
Department of Commerce	20,787	21,681	21,542
Department of Energy	3,505	3,451	3,130
Dept. of Health & Human Services	5,785	4,900	4,025
Dept. of Homeland Security	20,033	12,737	12,203
Dept. of Housing & Urban Development	84	0	0
Department of the Interior	0	55	40
Department of Justice	5,744	6,271	8,047
Department of Transportation	704	1,114	750
Department of the Treasury	527	258	0
Department of Veterans Affairs	88	150	150
Environmental Protection Agency	49	50	50
General Services Administration	910	9	9
National Aeronautics & Space Admin.	5,081	4,412	4,410
National Science Foundation	3,567	2,794	2,500
Nuclear Regulatory Commission	3,623	3,400	3,400
Other	4,885	5,676	4,506
Subtotal, Other Agency	104,080	100,024	91,963

Department of Commerce

National Institute of Standards and Technology

REIMBURSABLE PROGRAM AND WORKING CAPITAL FUND INVESTMENTS

(Dollar amounts in thousands)

	FY 2018 Actual	FY 2019 Enacted	FY 2020 Estimate
Calibrations & Testing	7,014	6,915	6,800
Technical & Advisory Services	30,753	29,492	29,299
Standard Reference Materials	20,102	23,145	22,121
Subtotal, Other Reimbursables	57,869	59,552	58,220
Total, Reimbursable Program	161,949	159,576	150,183
Equipment Investments	17,700	31,778	31,778
IE Amortization	(19,707)	(22,812)	(31,778)
WCF Operating Adjustments	3,686	0	0
Total, WCF Investments	1,679	8,966	0
Total, Reimbursable Program and WCF Investments	163,628	168,542	150,183

Department of Commerce
National Institute of Standards and Technology
PERIODICALS, PAMPHLETS, AND AUDIOVISUAL PRODUCTS

	2017 Actual	2018 Actual	2019 Enacted	2020 Estimate
Periodicals	0.0	0.0	0.0	0.0
Pamphlets	$13.0	$10.0	$10.0	$10.0
Audiovisuals	58.0	90.0	70.0	75.0
Total	68.0	100.0	80.0	85.0

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 FY18 because of NIST's leadership role in an effort to redefine the kilogram and implement a revised international system of measurement.

Department of Commerce
National Institute of Standards and Technology
AVERAGE SALARY

	2018 Actual	2019 Enacted	2020 Estimate
Average ES salary	$184,301	$187,803	$187,803
Average scientific and professional	186,490	190,033	190,033
Average career path salary	119,395	121,664	121,664
Average salary of ungraded positions	61,277	62,441	62,441

FY 2018 average salaries reflect a 1.9 percent pay raise, FY 2019 average salaries reflect a 1.9 percent pay raise, and FY 2020 average salaries reflect a 0.0 percent pay raise.

[This page left blank intentionally.]

FY2020 ANNUAL PERFORMANCE PLAN / FY2018 REPORT (APPR) BACKUP

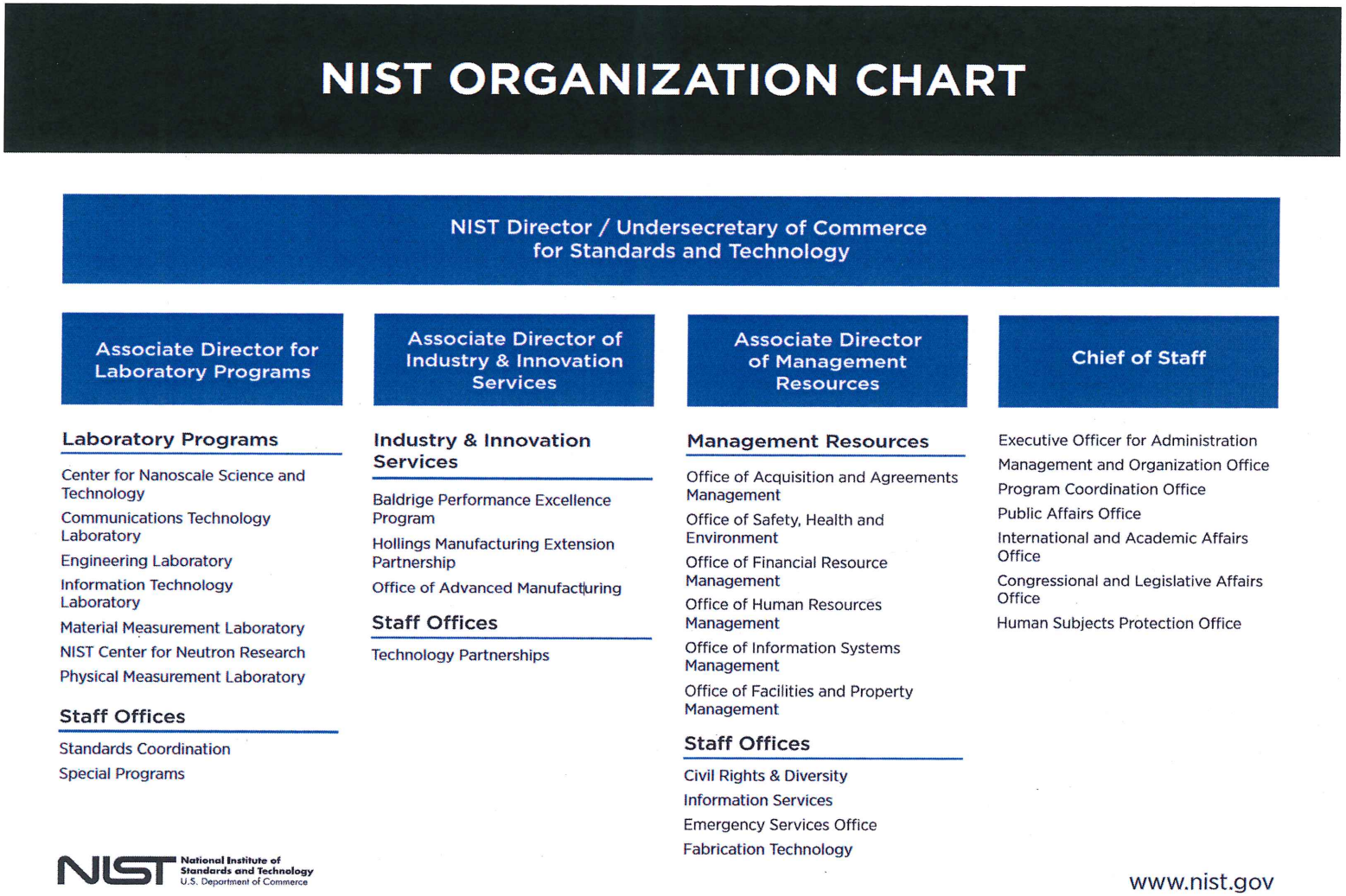
OVERVIEW

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.

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.*

ORGANIZATIONAL STRUCTURE



CROSS-AGENCY PRIORITY GOALS

Lab-to-Market

The President's Management Agenda identifies "Improving the Transfer of Federally-Funded Technologies from Lab-to-Market" as one of Cross Agency Priority (CAP) goals, led jointly by the Department of Commerce (DOC) and the Office of Science and Technology Policy (OSTP). To achieve this CAP goal, in March 2018 the NIST Director launched the Return on Investment Initiative (ROI), an extensive stakeholder engagement and feedback process to determine necessary changes in technology transfer authorities and programs to produce additional economic, security, and societal benefits of the Nation's investment in research and development.

A full report on the stakeholder engagement process and recommended actions supporting the L2M CAP goal will be published in FY 2019, with implementation activities taking place from FY 2019-2021. The milestones and metrics for the CAP goal implementation will be developed by February 2019 using stakeholder feedback obtained through the ROI effort, via an interagency process spearheaded by the National Science and Technology Council's Lab-to-Market subcommittee. The progress on implementation of CAP goal activities, including associated metrics and milestones, is reported on performance.gov on a quarterly basis[1].

STRATEGIC GOAL(S) AND OBJECTIVE(S)

Strategic Goal	Objective Number	Objective Name	Role
Accelerate American Leadership	1.2	Advance Innovation	**Lead**
Accelerate American Leadership	1.3	Strengthen Intellectual Property Protection	Contributor
Enhance Job Creation	2.2	Reduce and Streamline Regulations	Contributor

[1] FY 2018 Q2 Action Plan available at https://www.performance.gov/CAP/action_plans/FY2018_Q2_Lab_to_Market.pdf

Enhance Job Creation	2.3	Strengthen Domestic Commerce and the U.S. Industrial Base	Contributor
Enhance Job Creation	2.4	Increase U.S. Exports	Contributor
Strengthen U.S. Economic and National Security	3.2	Enhance the Nation's Cybersecurity	**Lead**
Strengthen U.S. Economic and National Security	3.3	Reduce Extreme Weather Impacts	Contributor
Strengthen U.S. Economic and National Security	3.4	Deploy Public Safety Broadband	Contributor
Deliver Customer-Centric Service Excellence	5.1	Engage Commerce Employees	Contributor
Deliver Customer-Centric Service Excellence	5.2	Accelerate Information Technology Modernization	Contributor
Deliver Customer-Centric Service Excellence	5.3	Consolidate Functions for Cost Savings	Contributor

TRACKING PROGRESS ON STRATEGIC OBJECTIVES

To ensure its research programs are aligned with national needs, NIST continually collects information on major national issues, shifting trends in science and technology, and the performance of internal operational processes 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.

NIST will work with its standing advisory bodies – including the Visiting Committee on Advanced Technology and other program-specific advisory committees – and assessments by the National Research Council to ensure it is addressing the Nation's most pressing issues and with the highest-quality work. In addition, NIST is pursuing economic assessments in key technology areas to evaluate both the impact of NIST's past participation of in those sectors and the potential impact of NIST's future participation.

Finally, NIST is examining the demographics of NIST's customers and collaborators to understand how to best deliver value to stakeholders.

PLANNED ACTIONS FOR ACHIEVING FY 2020 PERFORMANCE TARGETS

- To ensure international adoption of NIST Quantum SI standards, NIST will pursue a multi-pronged approach to support the redefinition of the International System of Units, and to develop Quantum SI standards and sensors for US industry and national and international research. NIST will support research efforts to apply fundamental physics to measurement, the development of practical Quantum SI devices, and dissemination of those technologies.

- 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 cybersecurity, artificial intelligence, community resilience, and in advanced communications for the public safety sector will target partnerships that expand their reach.

- NIST continually seeks ways to maximize the relevance and quality of its scientific research and the dissemination of those results. To ensure achievement of its targets for citation impact, the NIST will continue to improve the efficiency and effectiveness of operations and facilities supporting its scientific research. In addition, NIST scientists will continue to reach out to stakeholder communities to ensure they are addressing the most critical measurement science and standards issues, and will therefore see high citation indices for their research.

- 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 Biology.

- NIST's NCCoE will continue to focus on existing projects that address cybersecurity challenges impacting businesses, or that address broad technology gaps that affect many sectors and organizations. NCCoE will also increase activity in several focus areas including consumer, energy, financial services, government, healthcare, identity management, IoT, transportation, and others.

AGENCY PRIORITY GOALS

N/A

DETAILED INDICATOR PLANS AND PERFORMANCE

Current / Recurring Indicators

Strategic Goal	**Goal 1: Accelerate American Leadership**							
Objective #	**1.2 Advance Innovation**							
Indicator	International adoption of NIST Quantum SI Standards							
Category	Strategic Plan							
Type	Outcome							
Description	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.							
	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Target						3	4	5
Actual						3		
Status						Met		
Trend	New indicator – not enough data							
Explanation (if not met in FY PY	Not Applicable							
Actions to be taken to correct not meeting target	Indicator is on-track							
Adjustments to targets	Not Applicable							
Action(s) to achieve FY 2020 target	NIST is prioritizing investment of discretionary resources in NIST-on-A-Chip research efforts which target the development of Quantum standards.							
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							

Strategic Goal	**Goal 1: Accelerate American Leadership**							
Objective #	**1.2 Advance Innovation**							
Indicator	Relative citation impact of NIST-authored publications							
Category	Strategic Plan							
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.							
	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Target	1.1	1.5	1.5	1.5	1.6	1.6	1.3	1.3
Actual	1.58	1.53	1.7	1.8	1.66	1.62		
Status	Exceeded	Exceeded	Exceeded	Exceeded	Exceeded	Exceeded		
Trend	Stable							
Explanation (if not met in FY PY	Not Applicable							
Actions to be taken to correct not meeting target	None							
Adjustments to targets	None							
Action(s) to achieve FY 2020 target	NIST continually seeks ways to maximize the relevance and quality of its scientific research and the dissemination of those results. To ensure achievement of its targets for citation impact, the NIST will continue to improve the efficiency and effectiveness of operations and facilities supporting its scientific research. In addition, NIST scientists will continue to reach out to stakeholder communities to ensure they are addressing the most critical measurement science and standards issues, and will therefore see high citation indices for their research.							
Notes	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 US institutions is about 1.3. * 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.

Strategic Goal	**Goal 1: Accelerate American Leadership**							
Objective #	**1.2 Advance Innovation**							
Indicator	Number of businesses using NIST research facilities							
Category	Strategic Plan							
Type	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 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Target		215	225	275	325	325	325	300
Actual		514	444	435	442	450		
Status		Exceeded	Exceeded	Exceeded	Exceeded	Exceeded		
Trend	Negative							
Explanation (if not met in FY PY	Not applicable							
Actions to be taken to correct not meeting target	None							
Adjustments to targets	None							
Action(s) to achieve FY 2020 target	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.							
Notes	None							
Information Gaps	Data may not include all instances of industry use of NIST research facilities indirectly through support of academic research.							

Strategic Goal	**Goal 1: Accelerate American Leadership**							
Objective #	**1.2 Advance Innovation**							
Indicator	Dollar amount of co-investment by non-federal sources in DOC-supported Manufacturing USA Institutes							
Category	Supporting							
Type	Outcome							
Description	This indicator reflects how well the focus area of the Manufacturing USA 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 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Target					$6M	$15M	$29M	$29M
Actual				$0M	$8.89M	$28.2M		
Status				Met	Exceeded	Exceeded		
Trend	Positive							
Explanation (if not met in FY PY	Not applicable							
Actions to be taken to correct not meeting target	None							
Adjustments to targets	None							
Action(s) to achieve FY 2020 target	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 Biology.							
Notes	None							
Information Gaps	None							

Strategic Goal	**Goal 3: Strengthen U.S. Economic and National Security**							
Objective #	**3.2 – Enhance the Nation's Cybersecurity**							
Indicator	Number of companies and organizations exposed to NCCOE produced Cybersecurity practice guides and other products							
Category	Strategic Plan							
Type	Contextual, Customer Service, Efficiency, Input, Intermediate Outcome, Process, Outcome, or Output – See A-11, 200-22 for definitions							
Description	**[DO NOT EXCEED 4 LINES OF TEXT]** Describe the indicator including how the indicator reflects the bureau's program. This text should be standard description used across documents. If there are significant changes to description as a result of additional funding in a given year or other drivers, those changes should be described in "Notes" block below. If a technical indicator requires more than 4 lines, continue description in "Notes" block.							
	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Target						5500	6000	6000
Actual						7,710		
Status						Exceeded		
Trend	New indicator – not enough data							
Explanation (if not met in FY PY	Not applicable							
Actions to be taken to correct not meeting target	None							
Adjustments to targets	Not applicable as this is a new indicator							
Action(s) to achieve FY 2020 target	NIST's NCCoE will continue to focus on existing projects that address cybersecurity challenges impacting businesses, or that address broad technology gaps that affect many sectors and organizations. NCCoE will also increase activity in several focus areas including consumer, energy, financial services, government, healthcare, identity management, IoT, transportation, and others.							
Notes	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.							
Information Gaps	This indicator does not capture adoption of NCCoE work products as this is primarily based only on anecdotal information today.							

Strategic Goal	**Goal 3: Strengthen U.S. Economic and National Security**							
Objective #	**3.2 – Enhance the Nation's Cybersecurity**							
Indicator	Number of resources derived from the Cybersecurity Framework							
Category	Strategic Plan							
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, etc.							
	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Target						70	80	80
Actual						94		
Status						Exceeded		
Trend	New indicator not enough data							
Explanation (if not met in FY PY	Not applicable							
Actions to be taken to correct not meeting target	Not applicable since it is a new indicator							
Adjustments to targets	Not applicable since it is a new indicator							
Action(s) to achieve FY 2020 target	NIST has launched Online Informative Reference which will provide a standardized format and process for other organizations to express the relationship of their resources to the Framework allowing users to search and select the most appropriate reference model to meet their needs.							
Notes	None							
Information Gaps	Use of the Cybersecurity Framework outside of the Federal Government is voluntary. This indicator is dependent upon publicly available Cybersecurity Framework Resources not issued publicly may result in an information gap.							

Strategic Goal	**Goal 3: Strengthen U.S. Economic and National Security**							
Objective #	**3.2 – Enhance the Nation's Cybersecurity**							
Indicator	Cumulative Number of Collaborators on NCCoE projects							
Category	Strategic Plan							
Type	Intermediate Outcome							
Description	This indicator demonstrates that NCCoE work products are available 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 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Target						123	140	140
Actual						176		
Status						Exceeded		
Trend	New indicator – not enough data							
Explanation (if not met in FY PY	Not applicable							
Actions to be taken to correct not meeting target	None							
Adjustments to targets	Not applicable since this is a new indicator							
Action(s) to achieve FY 2020 target	State any actions the bureau will take to ensure achievement of the FY 2020 target.							
Notes	State how many years for which you have data, especially if you have it going further back than FY PY-5. If you have actual data for any given year but not target data, state why (e.g., baseline established, indicator not used prior to…., etc.) If you do not have targets for FY 20CY or FY 20BY, state why. Include any additional information needed to further explain the indicator.							
Information Gaps	This indicator does not capture adoption of NCCoE work products as this is primarily based only on anecdotal information today.							

RESOURCE REQUIREMENTS TABLE

Past Funding from FY 2013 to FY 2017

	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual
Goal 2: Innovation					
Total Budget Authority					
Direct	759.0	835.0	847.6	948.7	925.5
Reimbursable	173.5	162.5	156.4	171.7	184.1
Total	932.5	997.5	1,004.0	1,120.4	1,109.6
Positions	3,075	3,173	3,215	3,300	3,388
Goal 3: Environment					
Total Budget Authority					
Direct	15.9	17.5	22.3	21.3	34.4
Reimbursable	-	0.1	-	-	0.2
Total	15.9	17.6	22.3	21.3	34.6
Positions	31	36	40	36	56

NIST Total

Total Budget Authority					
Direct	774.9	852.5	869.9	970.0	959.9
Reimbursable	173.5	162.6	156.4	171.7	184.3
Total	948.4	1,015.1	1,026.3	1,141.7	1,144.2
Total Positions	3,106	3,209	3,255	3,336	3,444

Funding from FY 2018 to FY 2020

	FY 2018 Actual	FY 2019 Enacted	FY 2020 Base	Increase/ Decrease	FY 2020 Request
Strategic Goal 1: Accelerate American Leadership					
Total Budget Authority					
Direct	927.3	714.1	728.2	(161.1)	567.1
Reimbursable	158.9	163.8	145.5	-	145.5
Total	1,086.2	877.9	873.7	(161.1)	712.6
Positions	3,187	3,185	3,185	(408)	2,777
Strategic Goal 2: Enhance Job Creation					
Total Budget Authority					
Direct	174.6	172.6	175.3	(144.0)	31.3
Reimbursable	-	-	-	-	-
Total	174.6	172.6	175.3	(144.0)	31.3
Positions	132	132	132	(81)	51
Strategic Goal 3: Strengthen U.S. Economic and National Security					
Total Budget Authority					
Direct	99.6	99.6	99.6	(9.7)	89.9
Reimbursable	4.7	4.7	4.7	-	4.7
Total	104.3	104.3	104.3	(9.7)	94.6
Positions	141	141	141	(13)	128

NIST Total

Total Budget Authority					
Direct	1,201.5	986.3	1,003.1	(314.8)	688.3
Reimbursable	163.6	168.5	150.2	-	150.2
Total	1,365.1	1,154.8	1,153.3	(314.8)	838.5
Total Positions	3,460	3,458	3,458	(502)	2,956

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

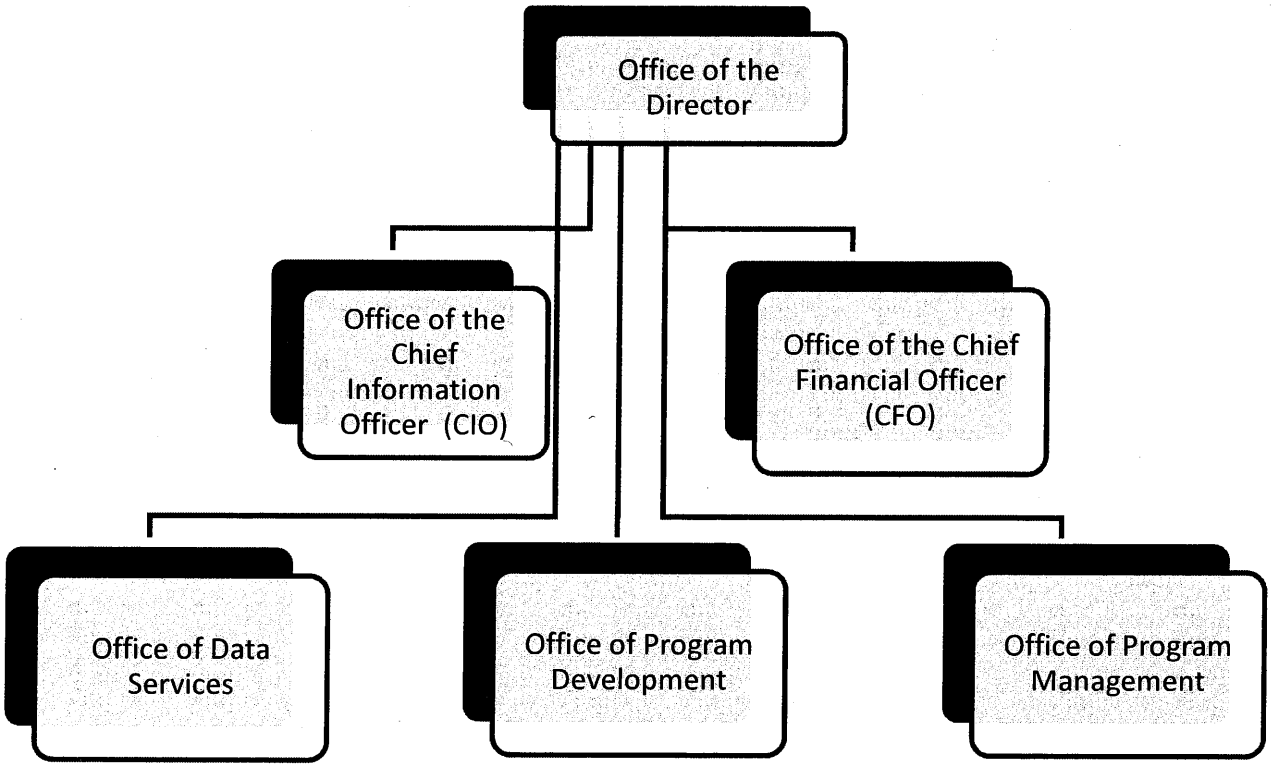
DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
NTIS Revolving Fund
Budget Estimates, Fiscal Year 2020
President's Submission

Table of Contents

(This page left blank intentionally)

Exhibit 2

U.S Department of Commerce
National Technical Information Service



Note: Approved and effective September 30, 2018

(This page left blank intentionally)

Department of Commerce

National Technical Information Service

NTIS Revolving Fund

Budget Estimates, Fiscal Year 2020

Executive Summary

National Technical Information Service (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 RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
Enacted, 2019	0	0	0	0
Plus 2020 Adjustments to Base	0	0	0	0
Less: Obligations from prior years	0	0	0	0
2019 Base Request	0	0	0	0
Plus 2019 program changes	0	0	0	0
2020 Estimate	0	0	0	0

		2018 Actual		2019 President's Budget		2020 Base		2020 Estimate		Increase/(Decrease over 2020 Base	
Comparison by activity/subactivity:		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Technical Information Service											
Organization, Preservation and Public	Pos./BA	0	0	0	0	0	0	0	0	0	0
Access to Technical Information	FTE/Obl.	0	0	0	0	0	0	0	0	0	0
Total	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: Information Clearinghouse Program

Line Item		2018 Actual		2019 Enacted		2020 Base		2020 Estimate		Increase/Decrease from 2020 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Technical Information Service:	Pos/Approp	63	0	150	0	75	0	75	0	0	0
Information Clearinghouse Program	FTE/Obl.	77	$128,949	150	$145,500	75	$110,000	75	$110,000	0	0
Total	Pos/Approp	63	0	150	0	75	0	75	0	0	0
	FTE/Obl.	77	128,949	150	145,500	75	110,000	75	110,000	0	0

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

	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/ Decrease/ over 2020 Base
Total Obligations	128,949	145,500	110,000	110,000	0
Offsetting collections from:					
Federal funds	(100,814)	(146,522)	(105,000)	(105,000)	0
Trust funds	0	0	0	0	0
Non-Federal sources	(5,474)	(5,474)	(5,000)	(5,000)	0
Recoveries	0	0	0	0	0
Unobligated balance, start of year	(6,618)	(12,031)	(18,527)	(18,527)	0
Unobligated balance transferred	0	0	0	0	0
Unobligated balance, end of year	12,031	18,527	18,527	18,527	0
Unobligated balance expiring	0	0	0	0	0
Budget Authority	0	0	0	0	0
Financing:					
Transfer from other accounts (-)	0	0	0	0	
Transfer to other accounts (+)	0	0	0	0	
Appropriation	0	0	0	0	0

(This page left blank intentionally)

Department of Commerce

National Technical Information Service NTIS Revolving Fund

NTIS Revolving Fund

JUSTIFICATION OF PROGRAM AND PERFORMANCE

Activity: Information Clearinghouse Program

Goal 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.

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 on October 1, 2016, 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 Limited Access Death Master File; and, Drug Enforcement Agency Drug Registry File.

Total Budget Authority

	FY 2018 Actual	FY2019 Enacted	FY2020 Estimate
Direct	$ -	$ -	$ -
Reimbursable	$ 128.95	$ 145.50	$ 110.00
Total	$ 128.95	$ 145.50	$ 110.00
Positions	63	150	75
Civilian Full-Time Equivalent Employment - Reimbursable	77	150	75

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

	Object Class	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/ (Decrease) over 2020 Base
11.1	Full-time permanent (Compensation)	$ 7,313	$ 11,450	$ 7,575	$ 7,575	0
11.3	Other than full-time permanent	30	400	150	$ 150	0
11.5	Other personnel compensation	119	116	125	$ 125	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	7,462	11,966	7,850	7,850	0
12.1	Civilian personnel benefits	2,462	4,725	2,905	$ 2,905	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	200	75	$ 75	0
22	Transportation of things	222	2,750	250	$ 250	0
23.1	Rental payments to GSA	1,216	1,950	2,000	$ 2,000	0
23.2	Rental payments to others	2	1,000	50	$ 50	0
23.3	Communications, utilities and miscellaneous charges	126	1,800	1,800	$ 1,800	0
24	Printing and reproduction	2	1,500	4	$ 4	0
25.1	Consulting services	0	250	100	$ 100	0
25.2	Other services	111,568	112,359	88,216	$ 88,216	0
25.3	Purchases of goods and services from Government accts	3,620	1,500	3,750	$ 3,750	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	1,812	500	500	$ 500	0
26	Supplies and materials	202	3,000	500	$ 500	0
31	Equipment	255	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	2018 Actual	2019 Enacted	2020 Base	2020 Estimate	Increase/ (Decrease) over 2020 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	128,949	145,500	110,000	110,000	0
	Earned Revenue/Reimbursable Obligations	128,949	145,500	110,000	110,000	0
	Total Obligations	128,949	145,500	110,000	110,000	0
Personnel Data						
Full-Time equivalent Employment:						
	Full-time permanent	62	145	70	70	0
	Other than full-time permanent	1	5	5	5	0
	Total	63	150	75	75	0
Authorized Positions:						
	Full-time permanent	76	145	70	70	0
	Other than full-time permanent	1	5	5	5	0
	Total	77	150	75	75	0

Department of Commerce
National Technical Information Service
NTIS Revolving Fund
CONSULTING AND RELATED SERVICES
(Dollar amounts in thousands)

	2018 Actual	2019 Enacted	2020 Estimate
Consulting Services	$ -	$ -	$ -
Management and professional services	$ -	$ 250	$ 100
Special studies and analysis	$ -	$ -	$ -
Management & Support Services for research and development	$ -	$ -	$ -
Total	$ -	$ 250	$ 100

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

	2018 Actual	2019 Enacted	2020 Estimate
Periodicals	$ -	$ 2	$ 1
Pamphlets	$ -	$ -	$ -
Audiovisuals	$ -	$ -	$ -
Total	$ -	$ 2	$ 1

Department of Commerce
National Technical Information Service
NTIS Revolving Fund
AVERAGE GRADE AND SALARIES
(Dollar amounts in thousands)

	2018 Actual	2019 Enacted	2020 Estimate
Average GS/GM Grade	12	12	12
Average GS/GM Salary	$ 111,170	$ 103,658	$ 113,132

(This page left blank intentionally)

ANNUAL PERFORMANCE PLAN / REPORT (APPR) BACKUP

NATIONAL TECHNICAL INFORMATION SERVICE

1) Summary

i) Overview

As a trusted Fed-to-Fed advisor, The National Technical Information Service (NTIS) helps other Federal Agencies leverage data science to accomplish mission outcomes that matter most to citizens. NTIS performs the heavy-lifting for Federal programs by facilitating private-sector partnerships, interagency knowledge-sharing, and a Design Thinking methodology – both informing program goals and clarifying underlying data-centric challenges. Given the rapid pace of technology advancements, NTIS advises Agencies on how to improve their data collection, analyses, and dissemination processes. During this innovation process, NTIS routinely helps Agencies evaluate emerging technologies like blockchain, machine learning, natural language processing, etc.

At NTIS, we are viewing the convergence of data innovation challenges and a need to scale the government's capabilities to serve the American public more efficiently and effectively. To address these challenges, we are excited and honored to help Agencies benefit from our 31 partners – who are some of the brightest data science minds in our nation. Moreover, NTIS is pleased to be managing a growing portfolio, which will serve as benchmarks for future data science innovation across the Federal landscape for the benefit of our nation.

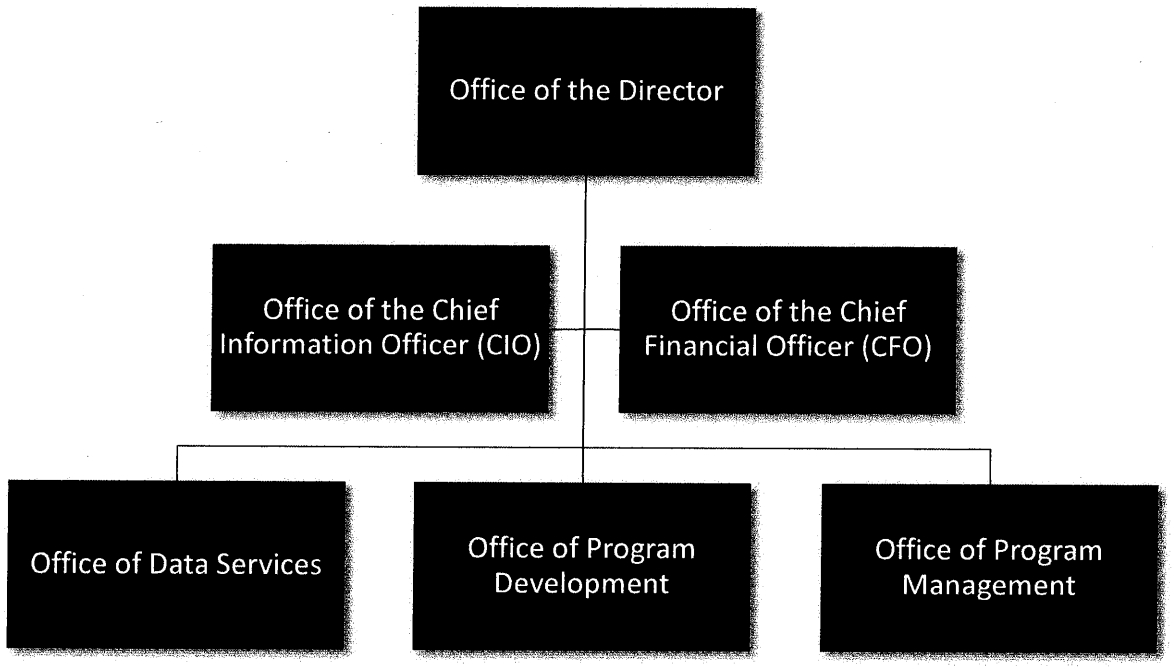
ii) Mission statement

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 science solutions through partnerships with the private-sector, which enable new and improved data products and services.

iii) Organizational structure

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

Organization Chart



Note: Approved and effective September 30, 2018

iv) Cross-Agency Priority (CAP) Goals

Leveraging Data as a Strategic Asset (CAP Goal 2)

NTIS's data-centric mission has contributed to Cross-Agency Priority Goal 2, Leveraging Data as a Strategic Asset, by helping Federal programs scale their capacity quickly through NTIS' joint venture partners who include some of the brightest data science minds in the nation.

- At U.S. Citizenship and Immigration Services, NTIS worked with the agency to improve verification of employment eligibility through enhanced data analytics. This ultimately led to decreasing the time it takes employers to enroll in E-Verify and improve timeliness of data collection and quality. Results: Achieved 30% decrease in case status verification. Employer time to enroll decreased by 46%.

- At Health and Human Services (HHS) Office of the Inspector General (OIG), NTIS partnered in a multi-year effort to enhance the OIG's ability to protect the integrity of HHS programs as well as the health and welfare of program beneficiaries, which involves over a one trillion-dollar portfolio.

- Within Food and Drug Administration (FDA), NTIS is partnered to help the FDA provide enhanced real-time interaction with health care practitioners who are involved in public health events and the emergency medical countermeasures, as well as to provide FDA with better oversight of the drug supply chain.

- At Office of Personnel Management, NTIS is working with the USAJOBS team to improve job alignment and the candidate selection processes for the Federal civilian workforce.

v) Strategic Goal(s) and Objective(s) –

Goal 1 – Accelerate American Leadership
Strategic Objective 1.2 – Advance Innovation

- The President's Management Agenda (PMA), as cited in OMB's Memorandum (M-18-23), prioritizes reducing the burden of low-value activities and redirecting resources to accomplishing mission outcomes that matter most to citizens. As a Fed-to-Fed advisor involving data science, NTIS will continue contributing to these reforms by designing innovative data science solutions, which not only harness private-sector expertise, but often by introducing highly-efficient, scalable capabilities.

- NTIS will deliver these high-value solutions by working closely with both private-sector partners and other Federal Agencies to: streamline data access and interoperability, leverage new technologies, launch shared service platforms, and incorporate process automation technologies.

- Moreover, NTIS will advance Federal data priorities through (1) efficient data structures: combining data from disparate sources; migrating siloed, legacy Federal data; and improving data interoperability, and through (2) effective data-insights: delivering data-insights, analytical tools, and evidence-based reporting capabilities that inform program management, fiscal planning, policy oversight, and mission outcomes.

- NTIS will improve citizen services; reduce fraud, waste, and abuse; and maximize return on taxpayer investments via efficient Federal data-driven services.

  These innovative data-centric accomplishments will be achieved through partnerships with the private-sector, which leverages their cutting-edge data expertise, to help Federal programs accomplish mission outcomes.

vii) Progress update for Strategic Objectives
In FY 2017, NTIS divested from its older mission activities and transitioned to mission priorities using its joint venture authority, which allows a new fee-for-service model. Congress approved NTIS's reorganization that will take effect in FY 2019. All previous indicators will now be non-recurring.

viii) Planned Actions for Achieving Strategic Objectives and FY 2020 Performance
Beginning in FY 2019, new indicators will be established and provided in the Congressional Budget Submission.

2) Summary of Performance

In FY 2018, NTIS discontinued prior performance indicators and new ones were being developed.

3) Detailed Indicator Plans and Performance

i) Proposed new indicators

Strategic Goal	Accelerate American Leadership							
Objective #	1.2 Advance Innovation							
Indicator	Number of new public-private projects (or Government – Industry projects) entered into under the Joint Venture (JV) Authority per year							
Category	Supporting							
Type	Output							
Description	The indicator measures the number of new projects between NTIS' Joint Venture Partners (JVPs) and Federal, State, and Local Agencies that were facilitated by NTIS in a given year. These public-private projects show the trend of both investments in technology development and building new connections throughout the supply chain. NTIS delivers benefit to the public by advancing Federal data priorities, promoting economic growth, and enabling operational excellence.							
	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20
Target						5	5	6
Actual						10		
Status						Exceeded		
Trend	New Indicator – not enough data.							
Action(s) to achieve FY	Increase outreach to Federal Government Agencies.							

2020 target	
Notes	None
Information Gaps	Preliminary target based on current project activities
Reason for new indicator	Congressional Reorganization
Indicator(s) being replaced	None

Strategic Goal	Enhance Job Creation
Objective #	2.2 Reduce and Streamline Regulations
Indicator	Yearly average number of days required to complete public-private projects (or Government – Industry projects) entered into under the Joint Venture (JV) Authority
Category	Supporting
Type	Output
Description	The indicator measures the average number of days required by NTIS to fully execute the agreements on a per project basis between NTIS' Joint Venture Partners (JVPs) and Federal, State, and Local Agencies on a yearly basis. The lower the number of days required to fully execute a Joint Venture Authority agreement between NTIS, its' Joint Venture Partners, and Federal, State, and Local Agencies, the more investments made by the Federal Government in technology.

	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20
Target						120	110	100
Actual						157		
Status						Not Met		
Trend	New Indicator – not enough data.							
Action(s) to achieve FY 2020 target	Introduction to automated workflows, develop reusable templates, and standardized package offerings incorporating terms of service agreements							
Notes	None							
Information Gaps	Preliminary target based on current project activities							
Reason for new indicator	Congressional Reorganization							
Indicator(s) being replaced	None							

Strategic Goal	Enhance Job Creation
Objective #	2.3 Strengthen Domestic Commerce and the U.S. Industrial Base
Indicator	Total investment by the Federal Government on new public-private projects (or Government – Industry projects) entered into under the Joint Venture (JV) Authority per year

Category	Supporting							
Type	Output							
Description	The indicator measures the value, in U.S. Dollars, of all new project agreements between NTIS' Joint Venture Partners (JVPs) and Federal Agencies facilitated by NTIS in a given year. By tracking the obligated values, this indicator shows the actual Federal Government investment in technology and data analytics development.							
	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20
Target						$ 2.5M	$3.0M	$3.0M
Actual						$9.2M		
Status						Exceeded		
Trend	New Indicator – not enough data.							
Action(s) to achieve FY 2020 target	Increase Data Science Data Portfolio based on Joint Venture Authority.							
Notes	None							
Information Gaps	Preliminary target based on current project activities							
Reason for new indicator	Congressional Reorganization							
Indicator(s) being replaced	None							

Strategic Goal	Fulfill Constitutional Requirements and Support Economic Activity							
Objective #	4.2 Provide Accurate Data to Support Economic Activity							
Indicator	Total investment by the Federal Government on new public-private projects (or Government – Industry projects) entered into under the Joint Venture (JV) Authority per year							
Category	Supporting							
Type	Output							
Description	The indicator measures the value, in U.S. Dollars, of all new project agreements between NTIS' Joint Venture Partners (JVPs) and Federal Agencies facilitated by NTIS in a given year. By tracking the obligated values, this indicator shows the actual Federal Government investment in technology and data analytics development.							
	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20
Target						$ 2.5M	$3.0M	$3.0M
Actual						$9.2M		
Status						Exceeded		
Trend	New Indicator – not enough data.							
Action(s) to achieve FY 2020 target	Increase Data Science Data Portfolio based on Joint Venture Authority.							
Notes								
Information Gaps	Preliminary target based on current project activities							

Reason for new indicator	Congressional Reorganization
Indicator(s) being replaced	None

ii) Non-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 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Target	892,500	910,350	430,000	440,750	451,769	463,063	474,640	
Actual	978,871	648,299	519,091	44,371	16,809	0		
Status	Exceeded	Exceeded	Exceeded	Not Met	Not Met	Discontinued	Discontinued	Discontinued
Trend	Positive							
Explanation (if not met in 2018)	For FY2018 this target is non-recurring and is being discontinued due to Congressional Reorganization							

Actions to be taken / Future Plans	
Adjustments to targets	
Notes	
Information Gaps	

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 it 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 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY2020
Target	50,875,560	51,893,071	52,910,932	53,900,000	54,900,000	55,900,000	56,900,000	
Actual	68,938,571	51,901,102	48,794,579	1,089,730	102,855	0		
Status	Exceeded	Exceeded	Not Met	Not Met	Not Met	Discontinued	Discontinued	Discontinued
Trend								

Explanation (if not met in 2018)	For FY2018 this target is non-recurring and is being discontinued due to Congressional Reorganization
Actions to be taken / Future Plans	
Adjustments to targets	
Notes	
Information Gaps	

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 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Target	95-98%	95-98%	95-98%	95-98%	95-98%	95-98%	95-98%	
Actual	98.5%	98.3%	97.5%	97.5%	97.5%	0		
Status	Met	Met	Met	Met	Met	Discontinued	Discontinued	Discontinued

Trend	Targets have remained stable
Explanation (if not met in 2018)	For FY2018 this target is non-recurring and is being discontinued due to Congressional Reorganization
Actions to be taken / Future Plans	
Adjustments to targets	
Notes	
Information Gaps	None

4) Resource Requirements Tables

Past Funding from FY 2013 to FY 2017

	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual
Total Budget Authority					
Direct					
Reimbursable	$66.0	$66.5	$175.2	$183.6	$158.3
Total					
Total Positions	150	150	150	150	99

Funding from FY 2018 to FY 2020

	FY 2018 Actual	FY 2019 Enacted	FY 2020 Base	Increase / Decrease	FY 2020 Request
Total Budget Authority	$128.9	$145.5	$110.0	0	$110.0
Direct					
Reimbursable					
Total					
Total Positions	77	150	75	0	75