NATIONAL INSTITUTE
OF STANDARDS AND TECHNOLOGY

NATIONAL TECHNICAL INFORMATION SERVICE

FISCAL YEAR 2023
BUDGET SUBMISSION TO CONGRESS

DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
Budget Estimates, Fiscal Year 2023
Congressional Submission

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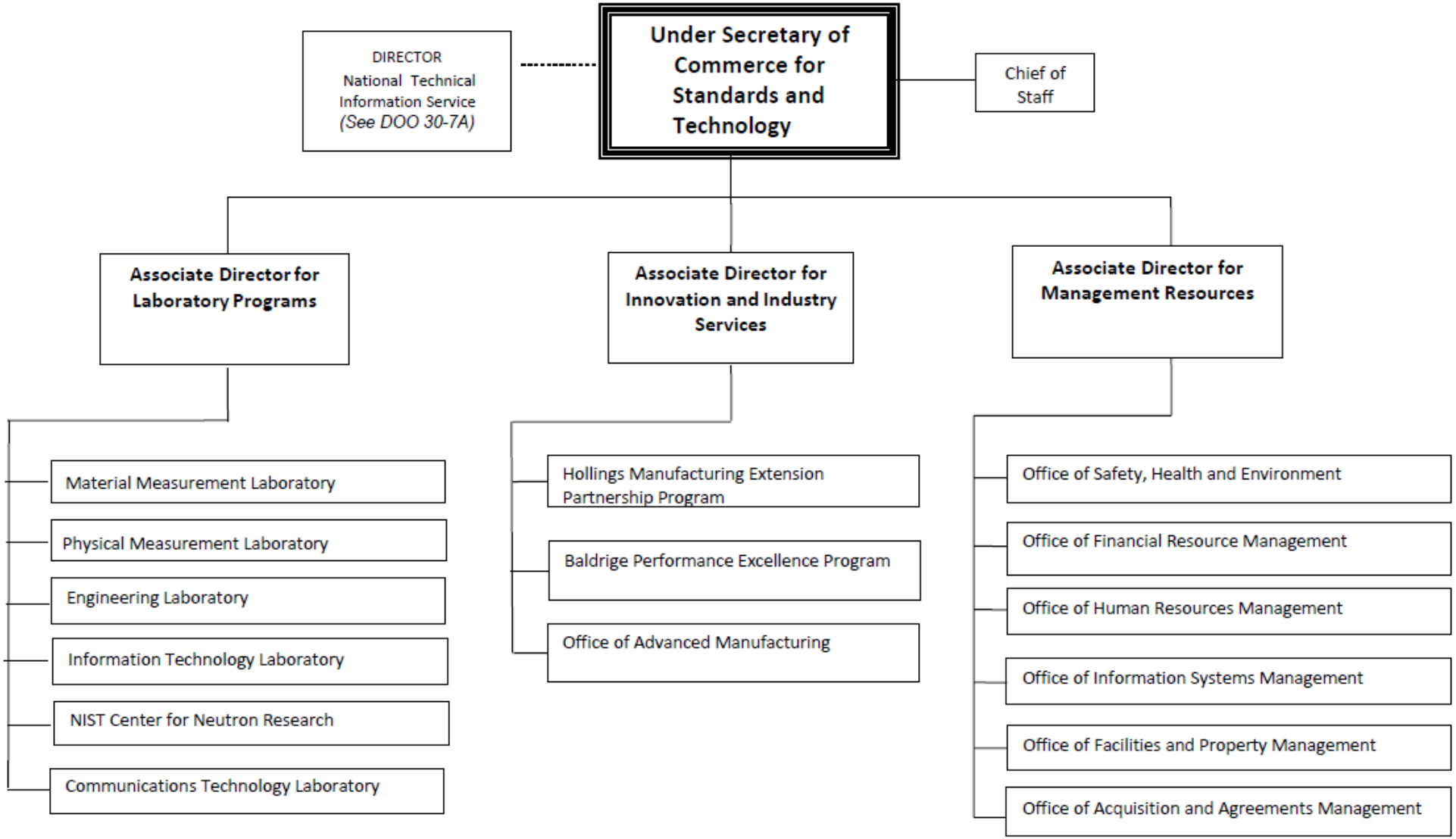
Exhibit 2

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



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Department of Commerce
National Institute of Standards and Technology
Budget Estimates, Fiscal Year 2023

Executive Summary

The total FY 2023 discretionary budget request is $1,467.549 million, an increase of $433.049 million from the FY 2022 Annualized Continuing Resolution (CR) level. The FY 2023 discretionary request for NIST is summarized below by appropriation account.

1. Scientific and Technical Research and Services (STRS):

FY 2022 Annualized Continuing Resolution (Funding ($ in thousands))	**$788,000**
Inflationary Adjustments	**44,166**
STRS Program Increases Total	**142,780**
Climate and Energy Measurements, Tools, and Testbeds	*20,000*
Cybersecurity – Supply Chain, 5G and Beyond, and Identity Management	*18,000*
Quantum Information Science, Engineering, and Metrology	*15,000*
Artificial Intelligence (AI)-Centric Challenges	*15,000*
Supporting the American Bioeconomy/Measurements for the Bioeconomy	*14,000*
Advanced Communications Research and Standards	*12,000*
NCNR Controls and Corrective Actions	*10,000*
Public Communications Research and Advanced Technology Accelerator	*10,000*
Measurement Service Modernization	*8,000*
Measurements and Data to Enable the Circular Economy	*5,000*
iEdison System - Federal Inventions and Patent Applications	*2,000*
Standards for Critical and Emerging Technologies	*8,000*
Strengthening Equity and Diversity in the NIST Workforce	*5,780*
Total STRS FY 2023 Request	**974,946**

2. Industrial Technology Services (ITS):

FY 2022 Annualized Continuing Resolution (Funding ($ in thousands))	**$166,500**
Inflationary Adjustments	**1,321**
Manufacturing Extension Partnership (MEP) Program Increase	**124,190**
Manufacturing USA (Mfg. USA) Program Increase	**80,307**
Total ITS FY 2023 Request	**372,318**

3. Construction of Research Facilities (CRF):

FY 2022 Annualized Continuing Resolution (Funding ($ in thousands))	**$80,000**
Inflationary Adjustments	**3,447**
CRF Program Increase	**36,838**
Total CRF FY 2023 Request	**120,285**

Performance:

For current GPRA targets please see the FY 2023/2021 Annual Performance Plan and Report.

Adjustments:

Inflationary Adjustments

NIST's base includes a total of $48.934 million to account for the full funding requirement for inflationary adjustments to current programs for NIST's activities. This includes inflationary increases for labor and non-labor activities.

Department of Commerce
National Institute of Standards and Technology
FY 2023 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-125	Industrial Technology Services	Hollings Manufacturing Extension Partnership	Hollings Manufacturing Extension Partnership Program	58	$124,190
NIST-134	Industrial Technology Services	Manufacturing USA	Fund Additional DOC Manufacturing USA Institutes	2	80,307
NIST-164	Construction of Research Facilities	Safety, Capacity, Maintenance and Major Repairs	Repair and Revitalization of NIST Facilities	0	42,933
NIST-25	Scientific and Technical Research and Services	Laboratory Programs	Climate and Energy Measurements, Tools and Testbeds	37	20,000
NIST-30	Scientific and Technical Research and Services	Laboratory Programs	Cybersecurity – Supply Chain, 5G and Beyond, and Identity Management	28	18,000
NIST-35	Scientific and Technical Research and Services	Laboratory Programs	Quantum Information Science, Engineering, and Metrology	19	15,000
NIST-40	Scientific and Technical Research and Services	Laboratory Programs	Artificial Intelligence (AI)-Centric Challenges	16	15,000
NIST-45	Scientific and Technical Research and Services	Laboratory Programs	Supporting the American Bioeconomy/ Measurements for the Bioeconomy	27	14,000
NIST-50	Scientific and Technical Research and Services	Laboratory Programs	Advanced Communications Research and Standards	28	11,750
NIST-55	Scientific and Technical Research and Services	Laboratory Programs	NCNR Controls and Corrective Actions	10	10,000

NIST-60	Scientific and Technical Research and Services	Laboratory Programs	Public Communications Research and Advanced Technology Accelerator	20	$10,000
NIST-65	Scientific and Technical Research and Services	Laboratory Programs	Measurement Service Modernization	11	8,000
NIST-90	Scientific and Technical Research and Services	Standards Coordination and Special Programs	Standards for Critical and Emerging Technologies	9	8,000
NIST-95	Scientific and Technical Research and Services	Standards Coordination and Special Programs	Strengthening Equity and Diversity in the NIST Workforce	16	5,780
NIST-70	Scientific and Technical Research and Services	Laboratory Programs	Measurements and Data to Enable the Circular Economy	9	5,000
NIST-74	Scientific and Technical Research and Services	Laboratory Programs	iEdison System - Federal Inventions and Patent Applications	0	2,000
NIST-100	Scientific and Technical Research and Services	Standards Coordination and Special Programs	Advanced Communications Research and Standards	1	250
	Total, Increases			291	390,210

Decreases

Page No In CJ	Appropriations	Budget Program	Title of Decrease	Positions	Budget Authority
NIST-162	Construction of Research Facilities	Construction and major Renovations	FY 2021 Studies Decrease	0	($6,095)
	Total, Decreases			0	(6,095)

Terminations

Page No In CJ	Appropriations	Budget Program	Title of Termination	Positions	Budget Authority
N/A					
	Total, Terminations				

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
Annualized CR, 2022	2,634	2,520	$813,000	$839,214	$810,000
Less: Disaster Relief Supplemental Appropriation Act			(22,000)	(22,000)	(22,000)
Less: Unobligated balance from prior year	0	0	0	(26,214)	0
Less: Transfer from DoJ	0	0	(1,500)	(1,500)	0
Less: Transfer from EAC	0	0	(1,500)	(1,500)	0
Plus: Positions from PSCRF	18	18	0	0	0
2023 Adjustments to Base					
Annualization of positions financed in FY 2022	0	0	0	0	0
Plus: Inflationary adjustments to base	0	0	44,166	44,166	44,166
2023 Base	2,652	2,538	832,166	832,166	832,166
Plus: 2023 Program changes	231	173	142,780	142,780	142,780
Plus: Transfer from DoJ	0	0	1,500	1,500	0
Plus: Transfer from EAC	0	0	0	0	0
2023 Estimate	2,883	2,711	976,446	976,446	974,946

Comparison by activity/subactivity with totals by activity		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease over 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Measurement Science, Services, and Programs											
Laboratory Programs	Pos./Approp	2,395	$687,139	2,392	$708,665 [1/]	2,410	$726,660	2,615	$855,410	205	$128,750
	FTE/Obl.	2,161	694,213	2,289	728,642 [1/]	2,307	726,660	2,460	855,410	153	128,750
Corporate Services	Pos./Approp	32	17,460	32	17,460	32	18,434	32	18,434	0	0
	FTE/Obl.	29	17,466	31	17,460	31	18,434	31	18,434	0	0
Standards Coordination and Special Programs	Pos./Approp	210	83,401	210	83,875	210	87,072	236	101,102	26	14,030
	FTE/Obl.	188	90,359	200	93,112	200	87,072	220	102,602	20	15,530
CARES Act (P.L. 116-136) - Laboratory Programs	Pos./Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	4	1,580	0	0	0	0	0	0	0	0
TOTALS	Pos./Approp	2,637	788,000	2,634	810,000 [1/]	2,652	832,166	2,883	974,946	231	142,780
	FTE/Obl.	2,382	803,618	2,520	839,214 [1/]	2,538	832,166	2,711	976,446	173	144,280

Exhibit 5

	2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease over 2023 Base	
	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Adjustments for:										
Recoveries		($4,741)		0		0		0		0
Refunds		(109)		0		0		0		0
Unobligated balance, start of year		(34,027)		($26,214)		0		0		0
Unobligated balance, end of year		26,214		0		0		0		0
Unobligated balance, expired account		45		0		0		0		0
Budget Authority		791,000		$813,000		$832,166		$976,446		$144,280
Financing from transfers:										
Unobligated balance rescission		0		0		0		0		
Transfers from DoJ for OLES (-)		(1,500)		(1,500)		0		(1,500)		(1,500)
Transfer from Election Assistance Commission (-)		(1,500)		(1,500)		0		0		0
Transfers to other accounts (+)		0		0						
Appropriation		788,000		810,000 [1/]		832,166		974,946		142,780

[1/] Including enacted FY 2022 $22M for Surfside building investigation from Disaster Relief Supplemental Appropriations Act.

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
Transfer	...	...	0
Adjustment - Technical labor from PSCRF ended in FY 2022	18	18	0
Financing	...	...	0
Other Changes:			
FY 2022 pay increase and related costs	...	...	$12,124
FY 2023 pay increase and related costs	...	...	15,492
Change in compensable days	...	...	(1,560)
Annualization of positions financed in FY 2022	0	0	
Awards	...	...	3,072
Personnel benefits:			
Civil Service Retirement System (CSRS)	...	...	(160)
Federal Employees' Retirement System (FERS)	...	...	396
Thrift Savings Plan (TSP)	...	...	(1,766)
Federal Insurance Contribution Act (FICA)	...	...	422
Health insurance	...	...	675
Employees' Compensation Fund	...	...	(305)
Travel and transportation of persons:			
Mileage	...	...	4
Per Diem	...	...	33
Rental Payments to GSA including FIT costs	...	...	59
Communications, utilities, and miscellaneous charges:			
Postage	...	...	2
HCHB Electricity	...	...	0
HCHB Water/Sewer	...	...	0
Electricity rate	...	...	(165)
Natural gas rate	...	...	309
Other services:			
Working Capital Fund (Departmental Management)	...	...	4,364
Commerce Business Systems (CBS)	...	...	422
Commerce Enterprise Services	...	...	(622)
Commerce Enterprise Infrastructure	...	...	2,421
Continuous Diagnostics and Mitigation Charges	...	...	331
NARA storage costs	...	...	1
General pricing level adjustment	...	...	8,617
Subtotal, Other Changes	18	18	44,166
Total, Adjustments to base	18	18	44,166

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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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease over 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Strategic and Emerging	Pos./Approp	42	$14,251	42	$13,776	42	$14,457	42	$16,457	0	$2,000
Research Initiative Fund	FTE/Obl.	38	16,807	42	14,652	42	14,457	42	16,457	0	2,000
National Measurement and	Pos./Approp	2,068	605,459	2,065	627,461 [2/]	2,083	640,135	2,276	753,885	193	113,750
Standards Laboratories	FTE/Obl.	1,869	612,474 [1/]	1,976	642,573 [2/]	1,994	640,135	2,138	753,885	144	113,750
User Facilities	Pos./Approp	206	53,807	206	53,806	206	56,743	218	69,743	12	13,000
	FTE/Obl.	187	56,020	196	53,806	196	56,743	205	69,743	9	13,000
Postdoctoral Research	Pos./Approp	79	13,622	79	13,622	79	15,325	79	15,325	0	0
Associateship Program	FTE/Obl.	71	10,492	75	17,611	75	15,325	75	15,325	0	0
Total	Pos./Approp	2,395	687,139	2,392	708,665 [2/]	2,410	726,660	2,615	855,410	205	128,750
	FTE/Obl.	2,165	695,793 [1/]	2,289	728,642 [2/]	2,307	726,660	2,460	855,410	153	128,750

[1/] Numbers include supplemental CARES ACT carryover for COVID-19 related expenses.
[2/] Including enacted FY 2022 $22M for Surfside building investigation from Disaster Relief Supplemental Appropriations Act.

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 the NIST 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 the economy ranging from the accuracy of airplane altimeters, to the reliability of clinical measurements, to the strength of the encryption technologies that protect 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 fill this role. This makes NIST a National Metrology Institute, responsible for the dissemination of the fundamental units of measurement, the basis of international trade and commerce, and enabling scientific progress.

A clear example of the fundamental and institutional 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.

There is no other private sector, or government entity with the 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 and Privacy: NIST has delivered on its many responsibilities under the President's Executive Order on Improving the Nation's Cybersecurity (14028) to help enhance software supply chain security, engaging with stakeholders through multiple workshops and calls for papers. NIST released software supply chain security and integrity resources, including an updated Secure Software Development Framework. Announced at a 2021 White House Cybersecurity Summit, NIST launched its National Initiative to Improve Cybersecurity in Supply Chains (NIICS), focused on the development and management of hardware and services throughout the supply chain. In February 2022, NIST initiated a request for information on the NIICS and a potential update to the widely-used NIST Cybersecurity Framework to address the changing cybersecurity risk landscape. In response to high-profile ransomware attacks, NIST released a set of resources providing tips and tactics, a Cybersecurity Framework Profile, and companion quick start guide to help organizations manage the risk of ransomware events. NIST also released Cybersecurity Framework profiles tailored to positioning, navigation, and timing (PNT) services and election infrastructure, in collaboration with state election officials, the Election Assistance Commission, and the Department of Homeland Security.

NIST launched the *NIST Privacy Workforce Public Working Group* to bring practitioners together to address the need for skilled privacy professionals. The group will create a workforce taxonomy aligned with the NIST Privacy Framework, modeled after the popular Cybersecurity Framework, and the NIST *National Initiative for Cybersecurity Education Workforce Framework for Cybersecurity*. The NIST Cybersecurity for Internet of Things (IoT) program issued non-regulatory guidance documents defining IoT cybersecurity requirements for Federal agencies and IoT device manufacturers. The foundational documents offer recommendations to address challenges raised in the IoT Cybersecurity Improvement Act of 2020.

- Quantum Information Science: In February 2022, researchers at JILA, a joint institute of NIST and the University of Colorado Boulder, published the results that measured Albert Einstein's theory of general relativity, or more specifically, the effect called time dilation, at the smallest scale ever, showing that two tiny atomic clocks, separated by just a millimeter or the width of a sharp pencil tip, tick at different rates. This work suggests how to make atomic clocks 50 times more precise than today's best designs and offer a route to perhaps revealing how relativity and gravity interact with quantum mechanics, a major quandary in physics. In a different effort, researchers at JILA published work on comparison of three clocks based on different atoms, and the first to link the most advanced atomic clocks in different locations over the air. These atomic clock comparisons place the scientific community one step closer to meeting the guidelines for redefinition of the second.

- Strengthening Cryptography: Current cryptographic algorithms rely on the fact that conventional computers have difficulty with factoring large numbers, which will no longer be the case when quantum computers enter the scene. The possibility of quantum computing necessitates different mathematical tools to protect our information from quantum and conventional attacks. With these impending challenges in mind, NIST launched the multi-year Post-Quantum Cryptography (PQC) Standardization project to identify quantum-resistant public-key cryptographic algorithms. Following the announcement of Round 3 candidates, in June 2021, NIST held the Third PQC Standardization Conference, a virtual event, where each submission team of the 15 finalists and alternates were invited to present an update on their algorithms.

- Artificial Intelligence (AI): NIST is developing the vocabulary and measurements needed for the technical requirements of trustworthy AI. NIST has launched an open and collaborative process to develop the AI Risk Management Framework to manage risks to individuals, organizations, and society associated with AI. NIST has engaged stakeholders in the process via multiple workshops and opportunities for public comment.

- Prior to this effort's launch, NIST convened experts via two related workshops in 2021 on Explainable AI and on AI Measurement and Evaluation. With NIST's leadership, in 2021 the Interagency Standards Policy Committee established a new AI subcommittee to bring together standards executives and practitioners from across government to discuss challenges and opportunities in AI standardization. NIST is also managing the member nomination process for the National Artificial Intelligence Advisory Committee, established by the Secretary of Commerce to advise the President and the National AI Initiative Office on topics related to AI. In 2021, NIST released for comment a report on trust and AI, exploring the potential to measure trust in AI technology, and draft publication, *A Proposal for Identifying and Managing Bias in Artificial Intelligence*, proposing an approach for identifying and managing bias throughout the lifecycle of an AI process.

NIST laboratories continue to make progress exploiting AI to advance measurement science in areas such as advanced communications, manufacturing robotics, and materials science.

- Bioscience: In March 2021, NIST announced they had built a synthetic cell that grows and divides normally, working in collaboration with the J. Craig Venter Institute and the MIT Center for Bits and Atoms. The researchers identified seven genes that are key to ensuring the cells grow and divide in uniform shapes and sizes, a major advance in the field of engineering biology focused on harnessing the fundamental design rules of life. NIST co-led a team in the Telomere-to Telomere (T2T) Consortium, which completed the last seven percent of the human genome in July 2021 by decoding missing information and correcting errors from previous version, providing a new understanding of our DNA.

- Resilience: NIST's resilience research focuses on the impact of hazards on buildings and communities and on post-disaster studies to help improve standards, codes, and practices for buildings and infrastructure systems. NIST researchers investigated the conditions leading up to the deadliest California wildfire and in February 2021 published a report identifying where more research is needed to improve safety and reduce structural losses. The report offers a detailed look at how a large and deadly fire advances. In June 2021, the American Society of Civil Engineers released for public feedback an update to the 2016 standard for minimum design loads for buildings and other structures that includes first-of-a-kind tornado hazard maps based on NIST research. Once finalized, this will provide tornado-prone regions with the guidance to design new buildings to better weather future tornadoes.

- Advanced Communications: NIST is helping to build the crucial measurement infrastructure for emerging wireless systems for 5G and beyond by developing new measurement methods and analysis tools and data. Recently NIST expanded its suite of state-of-the-art testbeds to include a new 5G Coexistence Testbed that provides Federal agencies, academia, and industry with rare access to the newest generation of end-to-end 5G New Radio mm-Wave technology. In April 2021, NIST entered a new public-private partnership with the National Science Foundation, industry, Federal agencies, and the research community to accelerate research on Resilient and Intelligent Next-Generation Systems (RINGS). The RINGS program will bring $40 million in funding to multidisciplinary collaborative projects for emerging Next Generation wireless communications. Supporting the development of measurement-based approaches for authenticating 5G hardware, NIST held the virtual Securing the 5G Supply Chain Workshop May 18-19, 2021. Feedback from this workshop will inform a NIST special report on strategic planning, guide new research, and foster interagency and industrial partnerships.

- Manufacturing: NIST is working with industry and universities to develop essential measurement capabilities and forge precompetitive collaborations that help U.S. manufacturers overcome shared technical obstacles. As the field of additive manufacturing matures, transitioning to more useful applications of the technology depends on measurements and standards. In December 2020, NIST awarded nearly four million dollars in grants to the Georgia Tech Research Corporation, University of Texas at El Paso, Purdue University, and Northeastern University to help accelerate the adoption of new measurement methods and standards in metals-based additive manufacturing (MBAM) and in November 2021 announced a Notice of Funding Opportunity to further accelerate the adoption of MBAM.

This small subset of recent accomplishments is representative of the diverse nature of scientific needs satisfied by NIST 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 2023

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 five strategic focus areas that will best position NIST to drive innovation in support of America's economic security in the coming decades:

- *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*: 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 to consumers.
- *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. NIST will continue to play a significant role to support the U.S. bioeconomy through building next generation measurement science (biometrology) capabilities and engineering biology laboratories for accelerating responsible biotechnology innovations.
- *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.

- *Climate*: NIST laboratories generate the measurements and research to address climate change in impactful areas from climate measurements and modeling of greenhouse gas emissions to research and tools to build more resilient communities and alternative energy infrastructure.

NIST has prioritized the work of its laboratories with these emerging technology areas, in addition to focusing on continuing priorities around cybersecurity, advanced communications, and advanced manufacturing.

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 Wi-Fi to ensuring the safety of devices such as pacemakers and step ladders.

NIST efforts 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		2021 Actual		2022 Annualized CR		2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratory Programs	Pos./BA	2,395	$687,139	2,392	$708,665	2,410	$726,660
	FTE/Obl	2,161	694,213	2,289	728,642	2,307	726,660

Laboratory Programs (FY 2023 Request by Program Area shown below. Total Funding: $726.660 million and 2,410 Positions)

The FY 2023 base budget request is at the same programmatic level as the FY 2022 Annualized Continuing Resolution (CR) level, adjusted for inflation. NIST Laboratory Programs focus on the following mission functions and programmatic areas:

Exploratory Measurement Science ($72.5 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 maintains a portfolio of exploratory measurement science research programs. This portfolio includes investing in higher-risk and potentially transformative projects selected in a competitive internal process and the NIST National Research Council Postdoctoral Research Associateship Program that brings researchers of exceptional promise to NIST. NIST invests in higher-risk and potentially transformative measurement science research to stay on the cutting edge of science and technology trends. NIST's exploratory research accelerates innovation in emerging areas. For example, as part of the Innovations in Measurement Science program NIST just launched a project to develop ultrasensitive calibrated cryogenic microwave measurements that will be essential for understanding, designing, testing, and scaling the microwave circuits that surround, initialize, control, couple, and readout qubits.

Advanced Manufacturing and Material Measurements ($122.2 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 Executive Order on Ensuring the Future Is Made in All of America by All of America's Workers 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 ($202.6 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. Quantum science is a top strategic priority for NIST. A recognized world leader in the field of quantum science and technology, NIST plays a central role in the National Quantum Initiative and is developing critical measurement capabilities necessary for the U.S. to win the race for quantum leadership. This research, combined with NIST's expertise in advanced materials, nanofabrication, and microelectronics, and our network of joint institutes (JILA and Joint Quantum Institute) and the Quantum Economic Development Consortium make NIST a true hub of quantum innovation. In FY 2023, NIST will continue to focus a portion of its quantum research portfolio on Quantum Network Grand Challenge. The goal of the challenge is to demonstrate the ability to transmit quantum information between multiple quantum devices and sensors securely and efficiently, as the full economic and security benefit of quantum technologies is dependent upon the ability to do so.

Advanced Communications, Networks, and Scientific Data Systems ($76.5 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 and National Public Safety Broadband Network. These technologies will be necessary for self-driving cars, internet of things (IoT) applications, drones, future AI systems, and public safety with enhanced capabilities. 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. For example, in the area of Artificial Intelligence, NIST is working to identify and quantify trustworthy and responsible AI in technical terms and to develop tools and guidance so that designers, developers, and evaluators can ensure that the attributes of accuracy, explainability, privacy, reliability, robustness, safety, security (resilience), and harmful bias mitigation are addressed in future AI products.

Cybersecurity and Privacy ($80.6 million) – NIST is the DOC lead agency on Cybersecurity issues. NIST's Cybersecurity and Privacy activities strengthen the security of our digital world through a portfolio that bridges foundational and applied cybersecurity research, and through the development of publicly available frameworks, standards, and technical guidance documents. For example, NIST's work in reducing the cybersecurity risk of global supply chains is critical as the U.S. is recovering from the COVID-19 pandemic. 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. For example, the Executive Order on Improving the Nation's Cybersecurity charges NIST and multiple other agencies with enhancing the security of the software supply chain.

Health and Biological Systems Measurements ($35.5 million) – NIST is paving the way for a vibrant U.S. biotechnology market by advancing and developing measurement science, standards, data, and technology to accelerate the development, manufacturing, and regulatory approval of innovative, high-quality biologic medicines. As a non-regulatory agency, NIST provides a solid foundation of measurement assurance that enables innovations in health and bioscience: Medical researchers and manufacturers of diagnostics and treatments use NIST research, calibrations, and standards development leadership to be able to efficiently develop new products, meet regulatory requirements, and ensure efficacy and safety of treatments. NIST's programs range from supporting underlying technologies and measurements for precision medicine and medical imaging to accelerating understanding in synthetic biology and genomics. A goal of the synthetic biology program at NIST is to harness the power of complex biological systems (primarily cells) predictably and safely for the manufacture of advanced therapeutics, sustainable fuels, chemical feedstocks, and advanced materials.

Physical Infrastructure and Resilience ($81.7 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 including power, transportation, water, and telecommunications. NIST's research supports the development of building codes that make the built environment healthier for occupants, more resilient against hazards and natural disasters, and safer for both residents and first responders. In collaboration with policymakers, 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. In collaboration with industry and academia, NIST performs research into novel materials, tools, instruments, and protocols to provide a technical foundation to standards and codes and to support innovation.

NIST User Facilities ($55.0 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 six 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 websites provided below:

- Communications Technology Laboratory (CTL): The Communications Technology Laboratory promotes the development and deployment of advanced communications technologies through the dissemination of high-quality measurements, data, and research supporting U.S. innovation, industrial competitiveness, and public safety. 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 on establishing vital technological foundations for the ongoing wireless revolution across the following focus areas:
  - Public Safety Communications Research – Driving innovation and conducting research that enables the development of performance-based standards for first responder communications;
  - Trusted Spectrum Testing and Sensing – Facilitating and coordinating spectrum research and related engineering capabilities while creating a trusted capability for spectrum sharing and sensing evaluations;
  - Next-Generation Communications for 5G and Beyond – Advancing measurement science for next-generation communication systems including characterizing millimeter wave (mmWave) radio channels and performance assessment;
  - Fundamental Metrology for Communications – Developing theory, measurements, and standards for the next generation of radio frequency and other technologies that will underpin the future of wireless communications; and
  - Leadership in Advanced Communication standards development – CTL's research and development underpin our standards activities with over 50 people working as part of an all of government approach to international standards engagement. CTL focuses on six core areas of Advanced Communications: Smart Infrastructure and Manufacturing, Public Safety Research, Core Networks, Spectrum Sharing, and Electromagnetics. In addition, CTL invests in public-private partnerships like the NextG Channel Model Alliance which fosters international cooperation for standards development.

  https://www.nist.gov/ctl

- Engineering Laboratory (EL): The Engineering Laboratory researches 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 major disasters help 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 combines large-scale, realistic, fire conditions, 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 focus on the following strategic goal areas:

  - Disaster-Resilient Buildings, Infrastructure, and Communities – Enabling engineering of the built environment to enhance the resilience of U.S. buildings, communities, and infrastructure to earthquakes, wind, fire, and other hazards;
  - Energy-Efficient, High-Performance Buildings – Accelerating the implementation of cost-effective, energy-efficient, grid-integrated buildings that have healthy and comfortable indoor air, reduced effects on climate change, and increased resilience through advances in measurement science and standards;
  - Advanced Manufacturing – Developing and deploying measurement science that forms the scientific and technical basis for standards and enables U.S. industry to assess and reduce the risk of investment in advanced manufacturing technologies; 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 information technology (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. ITL identifies emerging and high-priority technologies, conducts path-breaking research to advance our understanding of their limits and capabilities and potential applications, and develops security and privacy solutions that have a high impact on the U.S. critical infrastructures. 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 and Privacy – Bridging foundational and applied cybersecurity and privacy research and development and cybersecurity operations through the development of standards and technical guidance;
    - Artificial Intelligence – Leading Federal efforts in AI-related standards development and driving new developments in understanding foundational aspects of trustworthy AI;
    - Internet of Things – Cultivating trust in the IoT and foster an environment that enables innovation on a global scale through standards, guidance, and related tools;
    - Reliable Computing; and
    - Future Computing Technologies and Applications. 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 develops 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, advanced electronics, structural steels, complex fluids, and more through the development of testbeds, measurements, models, and data;
    - Energy and Climate – Research and standards to advance next-generation climate measurements, and carbon capture approaches to mitigate climate change;
    - Health Care – Enhancing technology realization in clinical diagnostics, regenerative medicine, measurement services to ensure food nutrition and safety, and driving advances to enable applications of engineering biology and biotechnology;
    - Infrastructure – Developing methods to test and predict the health of physical infrastructure from bridges and buildings and the materials used to build them, as well as fuel pipelines and water infrastructure;

- Manufacturing – Accelerating development of lightweight alloys for fuel-efficient automobiles biomanufacturing, and chemical manufacturing; as well as new measurements and standards for product sustainability and recycling to support the circular economy; and
- Safety, Security, and Forensics – Providing tools to help forensic crime laboratories validate their analytical methods and ensure accuracy in their results for DNA and biological evidence, fingerprint and pattern evidence, illicit drugs, digital evidence, ballistics, and trace evidence, developing metrologies for threat detection and protective materials.

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 typically 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 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, including:

  - 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 enhanced 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 National Science Foundation, and the private-public nSoft Consortium (established by NIST) 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. To achieve its mission, PML draws on its core capabilities to advance, realize, and disseminate the complete range of physical measurements, covering every unit of the International System of Units (SI), and thus, affecting nearly every aspect of modern life. To maintain state-of-the-art

capabilities in realizing, disseminating, and measuring these quantities, PML invests in fundamental scientific research to push the boundaries and prepare for next-generation measurement needs. This measurement expertise also helps America address key technical challenges in:

- Manufacturing – Helping industry improve efficiency by providing measurement solutions, researching new embedded standards, and facilitating the commercialization of NIST-pioneered technologies through the NIST on a Chip Program that brings world-class measurement-science technology from the lab to users anywhere and anytime;
- Energy – Enabling effective transition to solid state lighting and initiating research to support advanced electric grid, hydrogen fuel cell and rechargeable battery technologies;
- Advanced Microelectronics – NIST is a crucial partner to the U.S. microelectronics industry, working with them to understand and address technical challenges for future electronics such as 2D materials, advanced packaging, atomic-scale defects, and the application of standards;
- 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 and Services
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Climate and Energy Measurements, Tools and Testbeds	Pos/BA	99	$47,230	136	$67,230	37	$20,000
	FTE/Obl.	99	47,230	127	67,230	28	20,000

Climate and Energy Measurements, Tools and Testbeds (+$20,000, +28 FTE/+37 Positions) - This request will position NIST to provide resources to the research community, industry, and other agencies to predict, measure, and manage aspects of the changing climate. The requested funds grow NIST's expertise, adding to its cadre of scientists and engineers, increasing the research capabilities in the NIST Laboratories, and expanding public-private partnerships across the country. NIST laboratories generate the measurements and research to address climate change in areas from climate measurements and modeling of greenhouse gas emissions to research and tools to build more resilient communities and alternative energy infrastructure. Funding of $7.5 million is for new efforts focused on building resiliently for the changing climate through research supporting building codes and standards resilient to future weather extremes, as well as focused programs addressing the challenge of heating and cooling low-energy buildings, advancing indoor air quality innovations, and solar cell and energy storage technologies for net-zero energy buildings; and $3.7 million will support smart grid innovations for clean energy and climate resilience, addressing key Smart Grid advancements to support widespread adoption of electric vehicles.

NIST will work with utility partners and other stakeholders on needed measurement methods and standards to assess whether grids are appropriately resilient in the face of climate change. The resources also support NIST’s development of new electrical and timing measurements for advanced electricity meters and monitors for the electric grid. These will be needed as electricity is increasingly provided by solar and wind technologies and stored locally, and electric vehicles gain in use. Of the total request, $3.8 million will be applied to greenhouse gas measurements and standards for climate risk reduction. NIST’s Urban Dome program will expand the Northeast Corridor Testbed with public and private partners to include more locations, accelerating the development of integrated models to provide emissions information at scales useful for city and state-level mitigation efforts. The funds will support efforts to advance the modeling of anthropogenic emissions and biogenic uptake and release in

urban settings to improve the accuracy of mapping and authentication of Greenhouse Gas (GHG) emissions for cities and regions across the country. NIST will expand efforts in radiometric measurements, standards, and technology for use in miniature satellites (CubeSats) by developing new calibrations that ensure quality and accuracy of these satellite measurements, exploiting new chip-scale technologies to enable devices that are lower-cost and greater accuracy. NIST will use $5.0 million to expand efforts investigating different strategies for carbon capture and sequestration, including Direct Air Capture as well as other innovative concepts, and develop specialized neutron measurement capabilities for use by climate researchers across the Nation.

The request increases NIST's investment in its Fundamental Measurement, Quantum Science, and Measurement Dissemination portfolio by $11 million, Physical Infrastructure and Resilience by $4 million, Advanced Manufacturing and Material Measurements by $3 million, and User Facilities by $2 million.

Performance Measure: Number of new reports and innovative methods to cost-effectively ensure structural resilience of buildings and infrastructure informed by climate risk.

	2023	2024	2025	2026	2027
With increase	2	6	8	16	20
Without increase	1	2	3	3	3

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: Climate and Energy Measurements, Tools and Testbeds

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Physicist		ZP V	1	$148,019	$148,019
Computer Scientist		ZP V	1	148,019	148,019
Computer Scientist		ZP IV	2	125,838	251,676
Physicist		ZP IV	5	125,838	629,190
Electrical Engineer		ZP IV	2	125,838	251,676
Economist		ZP IV	2	125,838	251,676
Mechanical Engineer		ZP IV	3	125,838	377,514
Chemist		ZP IV	4	125,838	503,352
Electrical Engineer		ZP III	2	89,552	179,104
Physical Scientist		ZP III	3	89,552	268,656
Social Scientist		ZP III	2	89,552	179,104
Mechanical Engineer		ZP III	4	89,552	358,208
Chemist		ZP III	3	89,552	268,656
Administrative Specialist		ZA III	1	89,552	89,552
Technician		ZT III	1	68,004	68,004
Administrative Assistant		ZS III	1	45,431	45,431
Total			37		4,017,837
Less lapse	25.00%		(9)		(1,004,459)
Total full-time permanent (FTE)			28		3,013,378
2023 pay Adjustment (4.6%)					138,615
					$ 3,151,993

Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			28		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			28		
Authorized Positions					
Full-time permanent			37		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			37		

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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$282,219	$3,152
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	313,905	3,152
12.1	Civilian personnel benefits	98,689	102,373	108,064	109,102	1,038
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,747	126
22	Transportation of things	1,093	1,210	1,139	1,195	56
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	14,837	2,132
24	Printing and reproduction	342	459	361	465	104
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,056	20
25.2	Other services from non-Federal sources	55,879	57,011	27,376	28,856	1,480
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	51,318	1,176
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	39,881	1,900
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	14,278	510
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	25,429	902
31	Equipment	43,120	44,745	45,038	50,442	5,404
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	87,870	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	$695,793	$728,642	$726,660	$746,660	$20,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services (STRS)
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Cybersecurity – Supply Chain, 5G and Beyond, and Identity Management	Pos/BA	113	$81,900	141	$99,900	28	$18,000
	FTE/Obl.	113	81,900	134	99,900	21	18,000

Cybersecurity – Supply Chain, 5G and Beyond, and Identity Management (+$18,000, +21 FTE/+28 Positions) - Robust cybersecurity is essential to national and economic security and can be a market differentiator that helps U.S. industry exceed in global markets. The NIST Cybersecurity budget has been flat for several years while the threat continues to evolve, and multiple new demands have been placed on NIST. NIST requests an increase of $18 million to meet increased industry and government demands for standards, guidelines, best practices, and other cybersecurity resources. The additional funds will extend NIST cybersecurity activities to address the massively increased demand in supply chain risk management, identity and access management, privacy engineering, and workforce advancement. This funding in part will support cybersecurity efforts conducted in collaboration with industry at NIST's National Cybersecurity Center of Excellence (NCCoE). This funding will grow and strengthen fundamental and applied research in cybersecurity, cybersecurity standards, and transition to practice in these critical areas of national importance. NIST's cybersecurity efforts provide industry and government with robust technical standards and cybersecurity best practices, drive cybersecurity policy in government and industry, and convene stakeholders to develop and drive adoption of cybersecurity best practices.

Targeted cyberattacks can have swift and wide-reaching impact, as demonstrated by the temporary shutdown of the Colonial Pipeline, which provides fuel for much of the U.S. East Coast. Reports estimate that the cost of cybercrime to U.S. corporations alone reached nearly one trillion dollars in 2020.[1] The U.S government has responded to these threats and charged NIST with operating key cybersecurity initiatives under the recent Executive Order 14028 on Improving the Nation's Cybersecurity. Under Executive Order 14028, NIST has led supply chain cybersecurity efforts, including developing supply chain security guidance and the fundamental components of security labeling programs for software and internet of things devices. Additional funds will support NIST efforts stemming from this activity. This includes driving adoption of secure software development practices through NIST's Secure Software Development Framework and demonstrations of tools and practices at the NCCoE. NIST

[1] The Washington Post, The Cybersecurity 202: Global losses from cybercrime skyrocketed to nearly $1 trillion in 2020, new report finds, Dec 7, 2020.

will also further refine guidance issued under Executive Order 14028 and develop guidance addressing key risks for hardware and open source software, moving beyond the scope of the Executive Order. Funding will also support related critical NIST cybersecurity endeavors, including post quantum cryptography standardization, updating the NIST Cybersecurity Framework, launch and growth of the National Initiative for Improving Cybersecurity in Supply Chains, and digital identity guidance updates.

NIST must also carry out critical cybersecurity responsibilities under laws including the National Defense Authorization Act (NDAA) of 2021, Federal Information Security Modernization Act of 2014, Internet of Things Cybersecurity Improvement Act of 2020, NIST Small Business Cybersecurity Act, and Cybersecurity Enhancement Act of 2014. Of these funds, $7 million will be used to create a nationwide National Initiative for Cybersecurity Education (NICE) program to stimulate cybersecurity workforce partnerships, pursuant to the NDAA for 2021, organizing multiple employers to focus on developing a skilled workforce to meet industry needs within the local or regional economy. With the requested funding NIST will be able to deliver cybersecurity standards, guidelines, and other resources needed to strengthen U.S. supply chains, improve cybersecurity education, and better protect Federal agencies and economy writ large. These funds will also accelerate implementation of the layered cyber deterrence strategy outlined by the Cybersecurity Solarium Commission, specifically for NIST's role in advancing standards and the cybersecurity workforce.[2]

The request increases NIST's investment in its Cybersecurity and Privacy portfolio by $18 million.

Performance Measure: Cumulative number of NCCoE project collaborators

	2023	2024	2025	2026	2027
With increase	340	360	380	400	420
Without increase	320	325	330	335	340

[2] United States of America Cybersecurity Solarium Commission, Final Report, March 2020.

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: Cybersecurity – Supply Chain, 5G and Beyond, and Identity Management

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Manager		ZP V	2	$148,019	$296,038
Computer Scientist		ZP V	3	148,019	444,057
Computer Scientist		ZP IV	2	125,838	251,676
Computer Scientist		ZP III	1	89,552	89,552
IT Specialist		ZP V	5	148,019	740,095
IT Specialist		ZP IV	2	125,838	251,676
IT Specialist		ZP III	1	89,552	89,552
Computer Engineer		ZP V	3	148,019	444,057
Computer Engineer		ZP IV	2	125,838	251,676
Computer Engineer		ZP III	1	89,552	89,552
IT Project Manager		ZP IV	3	125,838	377,514
Administrative/technical support		ZA II	3	68,004	204,012
Total			28		3,529,457
Less lapse	25.00%		(7)		(882,364)
Total full-time permanent (FTE)			21		2,647,093
2023 pay Adjustment (4.6%)					121,766
					$2,768,859

Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			21		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			21		
Authorized Positions					
Full-time permanent			28		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			28		

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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$281,836	$2,769
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	313,522	2,769
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,976	912
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,693	72
22	Transportation of things	1,093	1,210	1,139	1,194	55
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	14,461	1,756
24	Printing and reproduction	342	459	361	395	34
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,036	0
25.2	Other services from non-Federal sources	55,879	57,011	27,376	31,798	4,422
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	57,133	6,991
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	37,981	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	14,161	393
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	24,805	278
31	Equipment	43,120	44,745	45,038	45,356	318
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	85,870	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	$695,793	$728,642	$726,660	$744,660	$18,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Quantum Information Science, Engineering, and Metrology	Pos/BA	60	$46,800	79	$61,800	19	$15,000
	FTE/Obl.	60	46,800	74	61,800	14	15,000

Quantum Information Science, Engineering, and Metrology (+$15,000, +14 FTE/+19 Positions) - NIST requests $15 million to expand the world-leading NIST quantum information science (QIS) program. Building on NIST's considerable expertise, the request will create the foundation for quantum technologies and the nascent field of quantum engineering, as well as establish the metrology to support next-generation research and future U.S. quantum industry. NIST will expand key research partnerships and capabilities, develop new quantum measurements and enabling technologies, and support a NIST quantum networking testbed. These components are needed to define robust quantum supply chains, a goal of the Quantum Economic Development Consortium (QED-C) established by NIST as part of the National Quantum Initiative (NQI). These additional investments, coupled with NIST's world-leading expertise, can transform NIST into a hub for quantum technologies and help solidify U.S. "quantum supremacy."

The request provides resources to help address a key obstacle to progress in this area: a lack of quantum engineering capabilities for U.S. researchers to create, test, and validate potential platforms more rapidly. Much of the funding ($9.5 million) will go towards quantum engineering to support creating the quantum engineering ecosystem essential to create the industrial base for this future technology, train the future workforce, and transfer NIST technological knowledge to industry. This supports the Quantum Economic Development Consortium (QED-C) whose goal is to enable and grow the U.S. quantum industry by identifying gaps in technology, standards, and workforce and to address those gaps through collaboration; and JILA (a joint institute of The University of Colorado Boulder and NIST) and Joint Quantum Institute (a joint institute of The University of Maryland and NIST) helping to train a new generation of quantum scientists. NIST will expand its quantum network testbed program that supports the National Science and Technology Council report *A Coordinated Approach to Quantum Networking Research* through the development of standards and benchmarks for future quantum technologies by establishing free-space and wired optical communication testbeds.

This funding will also initiate a coordinated effort in quantum materials design and characterization through development of a quantum materials program and new instrumentation needed for developing neutron-based measurement technologies to rapidly advance the development of new quantum materials.
Quantum breakthroughs will allow NIST to redefine how weights and measures are disseminated, improving accuracy and precision while eliminating costly and time-consuming calibration chains. Resources of $2.5 million will expand the NIST-on-a-Chip program to bring quantum-based cutting-edge measurement-science technology and expertise from the lab to real-world users in industry and mission agencies in the Federal Government. Additionally, this initiative will allow NIST to leverage and build upon its foundational successes such as the quantum logic clock, near quantum-limited amplification of weak signals, and characterization of quantum many-body systems, and the pioneering of quantum simulation. Resources of $3.0 million will be for foundational quantum science and metrology so that NIST can exploit the benefits of quantum information science for improving measurement capabilities, strengthening partnerships with quantum institutions, and supporting the quantum workforce.

The request increases NIST's investment in its Fundamental Measurement, Quantum Science, and Measurement Dissemination portfolio by $15 million.

Performance Measure: Number of standards and benchmarks from testbeds that can be used by quantum network participants.

	2023	2024	2025	2026	2027
With increase	3	6	10	15	21
Without increase	1	2	3	3	4

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, Engineering, and Metrology

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Physicist		ZP V	1	$148,019	$148,019
Electrical Engineer		ZP IV	1	125,838	125,838
Physicist		ZP IV	4	125,838	503,352
Materials Scientist		ZP IV	1	125,838	125,838
Electrical Engineer		ZP III	1	89,552	89,552
Physicist		ZP III	4	89,552	358,208
Chemist		ZP III	1	89,552	89,552
NRC Postdoctoral Fellow		ZP III	4	89,552	358,208
Administrative/technical support		ZA II	2	68,004	136,008
Total			19		1,934,575
Less lapse	25.00%		(5)		(483,644)
Total full-time permanent (FTE)			14		1,450,931
2023 pay Adjustment (4.6%)					66,743
					$1,517,674
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			14		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			14		

Authorized Positions					
Full-time permanent			19		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			19		

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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$280,585	$1,518
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	312,271	1,518
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,564	500
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,690	69
22	Transportation of things	1,093	1,210	1,139	1,193	54
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	14,242	1,537
24	Printing and reproduction	342	459	361	389	28
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,036	0
25.2	Other services from non-Federal sources	55,879	57,011	27,376	29,527	2,151
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	50,776	634
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	37,981	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	14,199	431
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	25,547	1,020
31	Equipment	43,120	44,745	45,038	47,296	2,258
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	90,670	4,800
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	$695,793	$728,642	$726,660	$741,660	$15,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services (STRS)
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Artificial Intelligence (AI) - Centric Challenges	Pos/BA	22	$30,420	38	$45,420	16	$15,000
	FTE/Obl.	22	30,420	34	45,420	12	15,000

Artificial Intelligence (AI)-Centric Challenges (+$15,000, +12 FTE/+16 Positions) – NIST requests $15 million to support new work through the NIST AI Collaborative Institute (AICI) and increase technical expertise in laboratory research efforts. With this investment, NIST will build upon its existing AI research and development (R&D) portfolio to catalyze research, trust, and innovation in AI and make progress towards solving critical AI-centric challenges, such as assessing risks including bias in facial recognition. NIST will also develop standards, performance metrics, and tools to characterize and measure the performance of AI systems.

NIST contributes to the research, standards and data required to realize the full promise of AI as a tool to enable American innovation, enhance economic security and improve our quality of life. The increase in funding of AI efforts will help NIST drive U.S. innovation and maintain international leadership in an important emerging technology area. Such investment is critical for countering those by foreign countries in AI that pose a serious threat to the competitiveness of U.S. firms and national security.

Resources of $10 million will be used to develop AI standards, performance metrics, and tools, including efforts through AICI. Working closely with experts and users from industry, academia, and government, the AICI will establish testbeds for regular benchmarking and evaluation of AI systems, consistent with the final National Security Commission on Artificial Intelligence report. The AICI is envisioned as a consortium working together to identify and address common challenges to the wide-scale deployment of trustworthy AI systems and technologies.

Resources of $5 million will be used to expand NIST research capacities to build the confidence and trust in AI systems necessary for U.S. businesses to take full advantage of transformational technologies. NIST will grow its technical staff to further its research in developing and exploiting AI use in application areas, such as resilient communications, smart manufacturing, and robotics, building and energy controls management, and advanced materials discovery and design.

The request increases NIST's investment in its Advanced Communications, Networks, and Scientific Data Systems portfolio by $15 million.

Performance Measure: Number of partnerships with relevant academic, industry, and government partners for AI R&D, and associated contributions to AI standards development.

	2023	2024	2025	2026	2027
With increase	4	8	16	20	24
Without increase	1	2	3	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: AI Centric Challenges

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Computer Scientist		ZP IV	2	$125,838	$251,676
Computer Scientist		ZP III	1	89,552	89,552
Statistician		ZP IV	.7	125,838	88,086
Applied Mathematician		ZP IV	.6	125,838	75,503
ML-AI Advanced Manufacturing Specialist		ZP IV	1	125,838	125,838
ML-AI Industrial Controls Specialist		ZP IV	1	125,838	125,838
ML-AI Materials Specialist		ZP IV	2	125,838	251,676
ML-AI Materials Specialist		ZP III	2	89,552	179,104
ML-AI Resilient Communications Specialist		ZP IV	2	125,838	251,676
ML-AI Infrastructure Specialist		ZP III	2	89,552	179,104
Administrative/technical support		ZA II	2	68,004	136,008
Total			16		1,754,061
Less lapse	25.00%		(4)		(438,515)
Total full-time permanent (FTE)			12		1,315,546
2023 pay Adjustment (4.6%)					60,515
					$1,376,061
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			12		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		

Total FTE			12		
Authorized Positions					
Full-time permanent			16		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			16		

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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$280,443	$1,376
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	312,129	1,376
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,517	453
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,660	39
22	Transportation of things	1,093	1,210	1,139	1,163	24
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	14,182	1,477
24	Printing and reproduction	342	459	361	384	23
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,036	0
25.2	Other services from non-Federal sources	55,879	57,011	27,376	28,817	1,441
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	50,476	334
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	38,981	1,000
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	14,099	331
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	24,721	194
31	Equipment	43,120	44,745	45,038	45,846	808
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	93,370	7,500
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	$695,793	$728,642	$726,660	$741,660	$15,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Supporting the American Bioeconomy/ Measurements for the Bioeconomy	Pos/BA	50	$20,500	77	$34,500	27	$14,000
	FTE/Obl.	50	20,500	70	34,500	20	14,000

Supporting the American Bioeconomy/Measurements for the Bioeconomy (+$14,000, +20 FTE/+27 Positions) - With the $14 million request, NIST will establish programs to develop measurements, data, and standards for the U.S. bioeconomy. Supporting the bioeconomy is a fundamental part of NIST's mission to promote U.S. innovation and industrial competitiveness. This investment supports recent calls to action, including Executive Order 13987 "Organizing and Mobilizing the United States Government to Provide a Unified and Effective Response to Combat COVID-19 and To Provide United States Leadership on Global Health Security" and the 2020 National Academies "Safeguarding the Bioeconomy Report." NIST efforts with these funds will support public health through development and testing of rapid detection methods for infectious diseases and evaluation of vaccines and therapeutics that may reduce viral spread.

Funding will be split into three primary focus areas: developing capabilities for engineering biology, advancing biomanufacturing processes and technologies, and merging artificial intelligence (AI) with biological data to create new measurement technologies. This expansion of NIST programs will require the addition of technical experts in cell synthesis, bioengineering, biomanufacturing and AI. For state-of-the-art synthesis and characterization of biological systems, NIST will invest in equipment for nuclear magnetic resonance, mass spectrometry, and a computing cluster. NIST will ensure continued U.S. leadership, innovation, and competitiveness in the U.S. bioeconomy by providing measurements, standards, and fundamental research for the predictive engineering of complex biological systems, including design, build, test, and modeling of entire living cells, cell components or cellular systems. NIST will accelerate industry adoption of 21st century biomanufacturing technologies, developing rapid and comprehensive process controls needed to make the bioreactor production of therapeutics more flexible, timely, and cost-effective. AI investments will support the integration and convergence of engineering biology and biomanufacturing data streams to support U.S. biotechnology industry needs. These investments will enable the promotion of the U.S. bioeconomy and improve the Nation's ability to detect and mitigate increased biosecurity risks posed by dual-use and emerging biotechnologies.

The request increases each of NIST's investments in its Advanced Manufacturing and Material Measurements portfolio by $7 million, and Health and Biological Systems Measurements portfolio by $7 million.

Performance measures: Number of well-characterized datasets and measurements for the evaluation of the effectiveness of the application of AI techniques per year after the first year and provide measurements on new or existing standards each year, as well as continue the synthesis and understanding of cellular systems.

	2023	2024	2025	2026	2027
With increase	3	6	9	12	15
Without increase	1	2	4	6	8

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: Supporting the American Bioeconomy/Measurements for the Bioeconomy

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Physical Scientist		ZP III	11	$89,552	$985,072
Physical Scientist		ZP IV	5	125,838	629,190
Data Scientist		ZP III	6	89,552	537,312
Computer Scientist		ZP IV	2	125,838	251,676
Administrative/Technical Support		ZA II	3	68,004	204,012
Total			27		2,607,262
Less lapse	25.00%		(7)		(651,816)
Total full-time permanent (FTE)			20		1,955,446
2023 pay Adjustment (4.6%)					89,951
					$ 2,045,397
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			20		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			20		
Authorized Positions					
Full-time permanent			27		
Part-time permanent			0		

Full-time temporary			0		
Part-time temporary			0		
Total Positions			27		

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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$281,112	$2,045
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	312,798	2,045
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,738	674
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,688	67
22	Transportation of things	1,093	1,210	1,139	1,193	54
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	14,102	1,397
24	Printing and reproduction	342	459	361	384	23
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	3,050	1,014
25.2	Other services from non-Federal sources	55,879	57,011	27,376	28,018	642
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	50,142	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	37,981	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	14,119	351
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	25,258	731
31	Equipment	43,120	44,745	45,038	49,040	4,002
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	88,870	3,000
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	$695,793	$728,642	$726,660	$740,660	$14,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Advanced Communications Research and Standards	Pos/BA	69	$24,930	97	$36,680	28	$11,750
	FTE/Obl.	69	24,930	90	36,680	21	11,750

Advanced Communications Research and Standards (+$11,750, +21 FTE/+28 Positions) - Secure, reliable, high-speed wireless communications are critical to the economic and national competitiveness of the U.S. advanced communications industry. They are enabling dramatic changes in how consumers, manufacturers, governments, and others provide and consume information, transact business, provide and use essential services, and shop, among other tasks. As the Federal Government's leader in fundamental research, standards, and government-academia-industry coordination for advanced communications technologies, NIST requests $11.75 million to support the ever-growing research and standards needs of America's advanced communications industry.

As the national metrology institute, NIST is uniquely positioned to develop the measurement tools and technologies that will improve spectrum utilization and enable novel spectrum sharing techniques. The budget request will allow NIST to provide the industry with much-needed fundamental measurements and data needed for the development of next-generation wireless communications systems and the improvement of optical communication technologies. NIST will conduct measurement science research and support the development of standards to accelerate the deployment of next-generation advanced communications technologies, including 5G and the Nationwide Public Safety Broadband Network, used to enhance public safety capabilities and to widely realize the promise of technologies for self-driving cars, internet of things (IoT) applications, and drones.

NIST will initiate R&D programs to provide data for future spectrum auction decisions by developing new methodologies for measurements that include a hybrid of signals, and modeling to investigate not-yet-deployed systems, e.g., 6G, and beyond. NIST will support research in standards development and NIST-led stakeholder groups related to U.S. wireless supply chain innovation, working with stakeholder groups like the NIST 5G mmWave Channel Model Alliance and the NIST Industrial Wireless Technical Working Group. NIST will expand its standards coordination, participation, and information services for advanced communications. Through these strategic investments, NIST will enhance U.S. influence in appropriate international standards development

organizations such as ISO and 3GPP. The funds will enable NIST to continue and enhance its fierce advocacy efforts for U.S. industry in stakeholder groups related to supply chain innovation, and better leverage technical and collaborative expertise through the National Advanced Spectrum and Communications Test Network, a national network of Federal, academic, and commercial facilities to provide the testing, modeling, and analyses for developing and deploying spectrum-sharing.

The request increases each of NIST's investments in its Advanced Communications, Networks, and Scientific Data Systems portfolio by $11.75 million.

Performance Measure: Number of measurement and modeling methodologies for a hybrid of radiated signals in wireless spectrums, and other associated contributions (e.g., workshops, datasets) to advanced communications standards development.

	2023	2024	2025	2026	2027
With increase	2	4	6	8	16
Without increase	1	2	2	2	3

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: Advanced Communications Research and Standards

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Spectrum Researcher		ZP III	2	$89,552	$179,104
Spectrum Researcher		ZP IV	2	125,838	251,676
Spectrum Standards Expert		ZP IV	2	125,838	251,676
Mission Critical Voice Researcher		ZP IV	2	125,838	251,676
Location-Based Srvcs Researcher		ZP IV	2	125,838	251,676
Data Analytics Researcher		ZP IV	2	125,838	251,676
Next-Gen User Interfaces Researcher		ZP IV	2	125,838	251,676
Internet of Things Researcher		ZP IV	2	125,838	251,676
Modeling and Simulation Researcher		ZP IV	2	125,838	251,676
Hybrid Signals Researcher		ZP IV	2	125,838	251,676
5G Researcher		ZP IV	2	125,838	251,676
Unmanned Aerial Vehicle Researcher		ZP IV	1	125,838	125,838
Resilient Systems Researcher		ZP IV	1	125,838	125,838
Standards Coordination Expert		ZP III	1	89,552	89,552
Administrative/Technical Support		ZA II	3	68,004	204,012
Total			28		3,241,104
Less lapse	25.00%		(7)		(810,276)
Total full-time permanent (FTE)			21		2,430,828
2023 pay Adjustment (4.6%)					111,818
					$ 2,542,646

Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			21		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			21		
Authorized Positions					
Full-time permanent			28		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			28		

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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$281,610	$2,543
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	313,296	2,543
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,901	837
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,700	79
22	Transportation of things	1,093	1,210	1,139	1,187	48
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	13,827	1,122
24	Printing and reproduction	342	459	361	393	32
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,038	2
25.2	Other services from non-Federal sources	55,879	57,011	27,376	28,301	925
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	50,524	382
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	39,481	1,500
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	14,017	249
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	25,115	588
31	Equipment	43,120	44,745	45,038	47,081	2,043
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	87,270	1,400
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	$695,793	$728,642	$726,660	$738,410	$11,750

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services (STRS)
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
NCNR Controls and Corrective Actions	Pos/BA	156	$57,167	166	$67,167	10	$10,000
	FTE/Obl.	156	57,167	163	67,167	7	10,000

NCNR Controls and Corrective Actions (+$10,000, +7 FTE/+10 Positions) - The NIST Center for Neutron Research (NCNR) is one of the Nation's premier neutron research facilities. It features world-class neutron instrumentation and expertise in the development and application of neutron measurement technologies. The NCNR typically provides 250 days of reactor operation annually, serves over 2,500 researchers from 165 organizations and labs, and accounts for nearly half of all U.S. neutron research. It is operated as a national user facility using a peer-reviewed, merit-based proposal approach to serve as a resource for U.S. industry, universities, and government agencies. The central technical component of the NCNR is its research reactor. On February 3, 2021, during restart of the reactor after a regularly scheduled maintenance period, an alert of elevated radiation levels in the reactor confinement building resulted in the staff following established procedures and immediately initiated a shutdown of the reactor. Preliminary results of an ongoing internal analysis by NIST indicate that damage to a single fuel element that was not securely latched into place caused the alert. The public was always safe, and radiation levels outside the confinement building remained well below regulatory health and safety limits. NIST notified the Nuclear Regulatory Commission (NRC) and has already begun updating its policies and procedures to ensure the deficiencies that led to the incident are addressed. The reactor has remained shut down since the incident, leaving the scientific community (industry, universities, and government) with inadequate access to U.S. neutron facilities. The shutdown of the NIST facility is impacting U.S. advances in the biosciences, chemical and condensed matter physics, geology, neutron physics, and soft mater characterization. To safely restart the research reactor and address the identified deficiencies, NIST requests an increase of $10 million; $8 million will go toward repair and upgrade of physical infrastructure including disposal of the damaged fuel, replacement of the thermal column tank, plumbing and process component upgrades, and replacement of fuel elements. A portion of the funds for physical infrastructure will go toward improving the fidelity of fuel cell latch determination equipment and tools. Resources of $2 million will increase staffing and training for reactor operations crews and their management teams, as well as additional safety oversight personnel.

If our current reactor recovery efforts are successful, the reactor will be technically ready to restart this fiscal year. The budget adjustment for the NCNR is required for sustainability of the corrective actions that we
promised to the Nuclear Regulatory Commission. Note that the NRC still must provide approval for the reactor to restart. We have not yet received that approval.

The request increases NIST's investment in its User Facilities portfolio by $10 million.

Performance Measure: Number of NIST Center for Neutron Research (NCNR) Research Participants. *

	2023	2024	2025	2026	2027
With increase	1600	2100	2500	2800	3000
Without increase**	500	400	300	200	100

* A Research Participant is any user who comes to the NCNR as well as their active collaborators, including co-proposers of approved experiments, and co-authors of publications resulting from work performed at the NCNR.

** Assumes that funding is not available to restart the reactor.

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: NCNR Controls and Corrective Actions

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Manager		ZP V	1	$148,019	$148,019
Operations Technician		ZT IV	5	89,552	447,760
Training Specialist		ZP V	2	148,019	296,038
Safety Manager		ZP IV	1	125,838	125,838
Technical Manager		ZP IV	1	125,838	125,838
Total			10		1,143,493
Less lapse	25.00%		(3)		(285,873)
Total full-time permanent (FTE)			7		857,620
2023 pay Adjustment (4.6%)					39,451
					$897,071
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			7		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			7		
Authorized Positions					

Full-time permanent			10		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			10		

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	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$279,964	$897
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	311,650	897
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,359	295
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,635	14
22	Transportation of things	1,093	1,210	1,139	1,144	5
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	13,731	1,026
24	Printing and reproduction	342	459	361	363	2
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,036	0
25.2	Other services from non-Federal sources	55,879	57,011	27,376	29,051	1,675
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	50,374	232
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	37,981	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	13,998	230
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	24,611	84
31	Equipment	43,120	44,745	45,038	50,578	5,540
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	85,870	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	$695,793	$728,642	$726,660	$736,660	$10,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base*		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Public Communications Research and Advanced Technology Accelerator	Pos/BA	0	0	20	$10,000	20	$10,000
	FTE/Obl.	0	0	15	10,000	15	10,000

*In FY 2022 the program has $46.8 million in spectrum auction receipts that will not be available for the program in FY 2023, of which about $11 million is planned to be spent on staff and related expenses.

Public Communications Research and Advanced Technology Accelerator (+$10,000, +15 FTE/+20 Positions) - NIST requests funding to continue research in advanced public safety communications technologies, technology road-mapping, and standards development. These efforts support the next-generation communications needs of the American public safety community. In addition, they inform the efforts of the First Responder Network Authority (FirstNet), as they deploy and operate the nationwide public safety broadband network for first responders across the U.S. Since 2016, NIST has used the spectrum auction proceeds provided by the Middle-Class Tax Relief and Job Creation Act of 2012 (P.L. 112-96), which expire in FY 2022, to spur cutting-edge research that has transformed the way first responders communicate and access broadband data for incident response. Advancements have been made in areas such as mission-critical voice, indoor location and tracking, security, analytics, resilient systems, and next-generation user interfaces. NIST will allocate $5 million to sustain the in-house talent needed for a long-term research and grants program in PSCR. Currently, all staff are supported by mandatory funds. At the requested funding level, NIST will be able to maintain a robust core program, however, the scope of the program will be significantly reduced from current levels of effort. This investment will enable the PSCR program to continue to advance public safety communications technologies that drive the public safety community forward. NIST requests $5 million to maintain its capability to accelerate the development and deployment of new and emerging technologies needed by the first responder community. This investment is aimed at partnerships with extramural contributors to strengthen U.S. competitiveness and business excellence in advanced communications. The program includes leveraging funding vehicles such as grants, cooperative agreements, and open innovation prize challenges. These efforts ensure that commercialized products and services supporting advanced public safety communications continue. To date, PSCR's Public Safety Innovation Accelerator Program encompasses more than 200 partnerships including award recipients, sub-awardees, and public safety partners that service an estimated 28 million people across 28 states.

This funding extends focus to critical 5G technology including millimeter-wave frequency bands, artificial intelligence for end-to-end public safety user experience, 5G Internet of Things (IoT) cybersecurity for public safety, augmented reality and virtual reality, and unmanned aircraft systems.

The request increases each of NIST's investments in its Advanced Communications, Networks, and Scientific Data Systems portfolio by $10 million.

Performance Measure: Number of new technologies or capabilities transitioned from PSCR to deployment in public safety.

	2023	2024	2025	2026	2027
With increase	2	4	6	8	10
Without increase	0	0	0	0	0

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: Public Communications Research and Advanced Technology Accelerator

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Manager		ZP V	2	$148,019	$296,038
Mission-Critical Voice Researcher		ZP IV	2	125,838	251,676
Mission-Critical Voice Researcher		ZP III	3	89,552	268,656
UI/UX Researcher		ZP IV	1	125,838	125,838
UI/UX Researcher		ZP III	2	89,552	179,104
Location-Based Services Researcher		ZP IV	1	125,838	125,838
Location-Based Services Researcher		ZP III	2	89,552	179,104
Security Researcher		ZP V	1	148,019	148,019
Lab Operations Specialist		ZP IV	1	125,838	125,838
Open Innovations Specialist		ZP IV	1	125,838	125,838
Open Innovations Specialist		ZP III	2	89,552	179,104
Administrative/Technical Support		ZA II	2	68,004	136,008
Total			20		2,141,061
Less lapse	25.00%		(5)		(535,265)
Total full-time permanent (FTE)			15		1,605,796
2023 pay Adjustment (4.6%)					73,867
					$1,679,663
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					

Total FTE			15		
Authorized Positions					
Full-time permanent			20		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			20		
Full-time permanent			15		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		

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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$280,747	$1,680
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	312,433	1,680
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,617	553
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,653	32
22	Transportation of things	1,093	1,210	1,139	1,162	23
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	13,674	969
24	Printing and reproduction	342	459	361	383	22
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,036	0
25.2	Other services from non-Federal sources	55,879	57,011	27,376	29,897	2,521
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	50,886	744
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	38,341	360
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	13,984	216
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	24,619	92
31	Equipment	43,120	44,745	45,038	45,826	788
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	87,870	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	$695,793	$728,642	$726,660	$736,660	$10,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Measurement Service Modernization	Pos/BA	60	$68,000	71	$76,000	11	$8,000
	FTE/Obl.	60	68,000	68	76,000	8	8,000

Measurement Service Modernization (+$8,000, +8 FTE/+11 Positions) - NIST request $8 million to go towards digital measurement services delivery and new reference materials development.

Measurement services are central to NIST's mission. Calibrations, proficiency testing, and producing the highest quality reference materials provide U.S. industry with the tools to increase productivity, minimize waste, and protect health and safety. Examples of critical NIST developed measurement services can be found everywhere. From instilling trust in the pumps at the gas station to ensuring the quality of the steel that forms the backbone of our buildings and bridges, NIST measurements underpin every aspect of our economy. NIST reference materials ensure the accuracy of clinical measurements from cholesterol levels to quickly determining whether someone has had a heart attack. NIST requests an increase of $8.0 million towards modernization of its measurement services. The increase will target two areas: 1) the transition to digital services delivery, 2) essential infrastructure updates including state-of-the-art instrumentation in the laboratories and modern preparation and packaging equipment to meet the evolving needs of the market. The creation of a digital metrology cloud will transform the way in which data from calibrations and reference materials will be delivered to stakeholders. Without digitization, NIST measurement services will become less accessible to the broader market, leaving U.S. industry at a significant disadvantage with respect to commerce and trade. Currently, NIST is unable to keep up with the demand for reference materials (RMs). Approximately 30 percent of our reference material inventory is on restriction with the shortfall due to the demand for new types of materials while maintaining legacy materials. There are cases where NIST restricted RMs are written into national and international standards, putting manufacturers at risk of being unable to meet the standards. With this increase in funding, NIST will be better able to meet the demand for new, more complex reference materials to support the rapidly expanding bioeconomy and materials for advanced manufacturing including semiconductors.

The request increases NIST's investment in its Fundamental Measurement, Quantum Science, and Measurement Dissemination portfolio by $8.0 million.

Performance Measures:

With Increase	2023	2024	2025	2026	2027
Number of additional reference materials and calibration services fully supported	176	184	188	192	196
Addition of Calibration and Reference Material certificates to database with	2	8	16	32	80
Addition of pivotal instrumentation/equipment infrastructure for advancing measurement services delivery	0	1	2	2	2
Without Increase					
Number of additional reference materials and calibration services fully supported	0	0	0	0	0
Addition of Calibration and Reference Material certificates to database with	0	0	0	0	0
Addition of pivotal instrumentation/equipment infrastructure for advancing measurement services delivery.	0	0	0	0	0

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 Service Modernization

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Research Chemist		ZP V	1	$148,019	$148,019
Research Physicist		ZP V	1	148,019	148,019
Computer Scientist		ZP V	1	148,019	148,019
Research Chemist		ZP IV	3	125,838	377,514
Research Physicist		ZP IV	2	125,838	251,676
Computer Scientist		ZP IV	2	125,838	251,676
Administrative/Technical Support		ZA II	1	68,004	68,004
Total			11		1,392,927
Less lapse	25.00%		(3)		(348,232)
Total full-time permanent (FTE)			8		1,044,695
2023 pay Adjustment (4.6%)					48,056
					$1,092,751
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			8		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			8		
Authorized Positions					
Full-time permanent			11		

Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$280,160	$1,093
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	311,846	1,093
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,424	360
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,641	20
22	Transportation of things	1,093	1,210	1,139	1,151	12
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	13,515	810
24	Printing and reproduction	342	459	361	373	12
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,036	0
25.2	Other services from non-Federal sources	55,879	57,011	27,376	27,931	555
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	50,321	179
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	37,981	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	14,585	817
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	24,703	176
31	Equipment	43,120	44,745	45,038	49,004	3,966
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	85,870	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	$695,793	$728,642	$726,660	$734,660	$8,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Measurements and Data to Enable the Circular Economy	Pos/BA	11	$8,500	20	$13,500	9	$5,000
	FTE/Obl.	11	8,500	18	13,500	7	5,000

Measurements and Data to Enable the Circular Economy (+$5,000, +7 FTE/+9 Positions) - NIST requests $5 million to create measurement technology and data tools to support efficient recovery, automated sorting (sortation), and complex recycling routes for plastics and other materials in our supply chains. The focal point of the investment ($4 million) is in polymer science, data, and measurements to improve identification and sorting technology for plastics using machine learning, imaging, and calibrant/reference materials fabrication. This work is critical to improving sortation of plastics for better recycling rates, improving environmental assessments and methods to support selection tools such as life cycle assessments, developing data resources such as a data registry and reference data, and new scientific methods for polymer characterization to determine polymer properties and potential pathways during recycling and remanufacturing of plastics.

This investment will support a new research effort on measurements to support the enhanced molecular design of plastics for improving the end-of-use return of these materials to the supply chain. The requested funds will enable NIST to support cross-agency work on polymer innovation, environmental impact assessments, trade negotiations, and the Environmental Protection Agency's National Strategy to improve recovery of valuable materials from the waste stream. NIST will support robust stakeholder engagement with academia, industry, and government through roundtables and other workshops to refine the understanding of challenges across the supply chain, and address these challenges through committed partnerships with leading research institutions. This effort aligns strongly with the need to support a complex manufacturing base; it also complements and enables the linear economy to bend to circularity while improving understanding of climate and other environmental outcomes. NIST requests $1.0 million to support further development of new programs for similar manufacturing and process needs in other classes of materials including electronic waste, battery, solar waste, and other waste streams (e.g., textiles or food waste).

The request increases NIST's investment in its Advanced Manufacturing and Material Measurements portfolio by $5.0 million.

Performance measure: Number of datasets available for training of machine learning algorithms, and evaluation of measurements and technology to support reference materials, calibrations, and measurement validation in application areas including advanced polymeric materials, collection, and sortation infrastructure, advanced recycling pathways, and environmental assessment of plastics waste.

	2023	2024	2025	2026	2027
With increase	2	4	8	16	32
Without increase	1	1	1	1	1

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: Measurements and Data to Enable the Circular Economy

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Physical Scientist		ZP IV	8	$125,838	$1,006,704
Administrative/Technical Support		ZA II	1	68,004	68,004
Total			9		1,074,708
Less lapse	25.00%		(2)		(268,677)
Total full-time permanent (FTE)			7		806,031
2023 pay Adjustment (4.6%)					37,077
					$843,108
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			7		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			7		
Authorized Positions					
Full-time permanent			9		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			9		

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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$279,910	$843
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	311,596	843
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,342	278
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,647	26
22	Transportation of things	1,093	1,210	1,139	1,160	21
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	13,203	498
24	Printing and reproduction	342	459	361	372	11
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,036	0
25.2	Other services from non-Federal sources	55,879	57,011	27,376	27,747	371
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	51,291	1,149
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	37,981	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	13,901	133
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	24,678	151
31	Equipment	43,120	44,745	45,038	46,557	1,519
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	85,870	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	$695,793	$728,642	$726,660	$731,660	$5,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services (STRS)
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
iEdison System	Pos/BA	4	$1,358	4	$3,358	0	$2,000
	FTE/Obl.	4	1,358	4	3,358	0	2,000

iEdison System - Federal Inventions and Patent Applications (+$2,000, 0 FTE/0 Positions) – NIST requests $2 million to support the ongoing maintenance and continued improvement of the Interagency Edison (iEdison) system. iEdison is an online portal and database which allows recipients of Federal grants and contracts to report resulting inventions and patents, as well as the utilization of those inventions and patents to the respective funding agencies. It allows both funding recipients to comply with Federal invention reporting regulations (pursuant to the Bayh-Dole Act's implementing regulations under 37 CFR 401) and Federal funding agencies to track compliance and generate reports various reports.

While iEdison was originally developed and maintained by the National Institutes of Health (NIH), NIST has been working on redevelopment and modernization of the iEdison system for the past two years. In 2022, the full management of iEdison will be transferred from NIH and NIST. The system is currently used by over 30 Federal funding agency offices; however, the goal is to have an interoperable system capable of hosting all Federal agencies by 2025. Having a single system used by all agencies is expected to increase reporting compliance and will lead to better tracking of federally funding inventions, patents, and additional information such as where resulting products are being manufactured (domestically or abroad).

With the requested funding levels, NIST will be better able to support the iEdison system for the participating Federal agencies. As such, there will be a significant increase in compliant reporting of federally funded inventions, patents, and utilization for agencies participating in iEdison. Furthermore, NIST will be able to offer changes to the system needed to maintain current agency users or attract additional agency participation, thusallowing the Department of Commerce to better fulfill the goal of providing a timely and accurate assessment of federal inventions and patents. The entire $2 million requested will be used to pay for support labor and IT infrastructure of the system.

The request increases NIST's investment in its Fundamental Measurement, Quantum Science, and Measurement Dissemination portfolio by $2 million.

Performance Measure: Number of new utilization reports reported through iEdison.

	2023	2024	2025	2026	2027
With increase	46,000	52,000	58,000	60,000	60,000
Without increase	42,000	42,000	42,000	42,000	42,000

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	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$252,695	$263,111	$279,067	$279,067	0
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	279,746	290,162	310,753	310,753	0
12.1	Civilian personnel benefits	98,689	102,373	108,064	108,064	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	4,624	$3
22	Transportation of things	1,093	1,210	1,139	1,140	1
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and misc. charges	12,345	14,642	12,705	12,910	205
24	Printing and reproduction	342	459	361	361	0
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	3,649	2,683	2,036	2,036	0
25.2	Other services from non-Federal sources	55,879	57,011	27,376	29,052	1,676
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	50,188	46
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	36,209	42,209	37,981	37,981	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	13,814	46
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	23,489	23,825	24,527	24,542	15
31	Equipment	43,120	44,745	45,038	45,046	8
32	Lands and structures	86	86	86	86	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	81,870	81,870	85,870	85,870	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	$695,793	$728,642	$726,660	$728,660	$2,000

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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease over 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Corporate Services	Pos./Approp	32	$17,460	32	$17,460	32	$18,434	32	$18,434	0	0
	FTE/Obl.	29	17,466	31	17,460	31	18,434	31	18,434	0	0
Total	Pos./Approp	32	17,460	32	17,460	32	18,434	32	18,434	0	0
	FTE/Obl.	29	17,466	31	17,460	31	18,434	31	18,434	0	0

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 2023, the Corporate Services will focus on the following items:

- Refresh remote access hardware to ensure secure, resilient, and protected access to NIST supported services enabling world-class research;
- Continue to incrementally invest in the network backbone upgrades for enhanced high-speed network enabling NIST's leading edge research;
- Refresh IT infrastructure equipment nearing end-of-life with modern, higher-capacity equipment; and
- Maintain and deliver reliable financial, acquisition, and administrative systems to assist NIST users in processing mission-related transactions, while striving to streamline business processes and improve transparency.

Explanation and Justification

Line Item		2021 Actual		2022 Annualized CR		2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Corporate Services	Pos./BA	32	$17,460	32	$17,460	32	$18,434
	FTE/Obl	29	17,466	31	17,460	31	18,434

Corporate Services (Total Funding: $18.4 million and 32 Positions)

Computer Support - This effort ensures that NIST's IT infrastructure provides the fundamental backbone for requirements associated with NIST's scientific and technical leadership. NIST maintains an IT Infrastructure Roadmap that defines a phased, prioritized approach for upgrading the network/computing environments, and maintaining performance consistent with NIST mission requirements. This roadmap addresses the following critical issues:

- Building a research network with the speed and capacity to transfer the volumes of data that NIST's mission requires to support American corporate leadership;
- Ensuring reliable network availability and support to advanced web collaboration tools and VoIP (Voice over IP) technologies; and
- Upgrading network and network security infrastructure so that NIST services can be migrated to cloud infrastructure.

Business Systems - The DOC is undertaking a major multi-year consolidation and modernization initiative of multiple business systems, functions, and processes and has entered into a long-term contract to implement a flexible system to support the management of financial, procurement, travel, grants, property, and other administrative functions called Business Applications Solution (BAS). NIST's business systems are an integral part of DOC's vision for consolidation and modernization. NIST has representatives participating in all facets of BAS's implementation (property, acquisitions, and core financial system). NIST supports DOC's effort to pursue a modernized Grants Management solution and continues to provide input to the DOC/Office of the Chief Information Officer's Grants Enterprise Management System effort. These efforts are undertaken while supporting NIST's current Commerce Business Systems.

The base funding requested of $18.4 million for Corporate Services supports the following ongoing mission functions and programmatic areas that are also described in more detail in the Laboratory Programs section of this budget request:

- Exploratory Measurement Science ($1.9 million)
- Advanced Manufacturing and Material Measurements ($3.2 million)

- Fundamental Measurement, Quantum Science, and Measurement Dissemination ($6.0 million)
- Advanced Communications, Networks, and Scientific Data Systems ($1.5 million)
- Cybersecurity and Privacy ($2.0 million)
- Health and Biological Systems and Measurements ($0.8 million)
- Physical Infrastructure and Resilience ($1.6 million)
- NIST User Facilities ($1.4 million)

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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease over 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Standards Coordination and Special Programs	Pos./Approp	210	$83,401	210	$83,875	210	$87,072	236	$101,102	26	$14,030
	FTE/Obl.	188	90,359	200	93,112	200	87,072	220	102,602	20	15,530
Total	Pos./Approp	210	83,401	210	83,875	210	87,072	236	101,102	26	14,030
	FTE/Obl.	188	90,359	200	93,112	200	87,072	220	102,602	20	15,530

* Includes Baldrige Performance Excellence Program (BPEP) funded at $2.5M in FY 2021, requested at $2.5M in FY 2022 and $2.7M in FY 2023.

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) was created to manage 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 Greenhouse Gas (GHG) Measurements program and the Forensic Science program are managed by the office.

    - The NIST GHG Measurements Program develops advanced tools and standards for accurately measuring GHG emissions so industries and governments will have the information they need to manage emissions effectively. The GHG program manages a series of test-beds to measure and monitor GHG emissions, and conducts research on multiple areas including advanced sensors for remote surveillance of gases, improved methods to reduce the error of measurements from smokestacks, and calibration of satellite sensors used to observe the impact changing environmental factors on the earth's climate.

    - The NIST Forensic Science Program is working to strengthen forensic practice through research and improved standards, conducting research in several forensic disciplines, including DNA, ballistics, fingerprint analysis, and trace evidence among others. NIST provides physical reference standards and data that help forensic laboratories validate their analytical methods and ensure accurate test results. The program also supports the Center for Statistics and Applications in Forensic Evidence (CSAFE), a NIST Center of Excellence in Forensic Science, which is working to develop new statistical methods for use in evidence examination.

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 of 1995 (P.L. 104-113), 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 coordinates 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. by providing 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. NIST also designs and implements procedures for accrediting laboratories for their capability to provide calibrations traceable to national standards.

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.

- NIST develops advanced tools and standards for accurately measuring greenhouse gas emissions so industries and governments can have the information needed to manage emissions effectively. Two studies partly funded by NIST found that U.S. cities often underestimate their emissions when using bottom-up methods alone, and that combining bottom-up and top-down methods increases accuracy. Scientists at NIST, NASA's Jet Propulsion Laboratory, and the University of Notre Dame led a study published in June 2021 which demonstrated that a

top-down approach to measuring urban emissions can produce reliable results, indicating that cities have a new tool available for operation to gain relatively quick feedback on whether efforts to reduce emissions are working.

- Researchers from NIST and Kansas State University (KSU) used NIST's optical comb technology to simultaneously measure emissions of methane, ammonia, carbon dioxide and water vapor from the atmosphere around a beef cattle feedlot in Kansas. The NIST apparatus, a two-comb system, identifies trace gases based on the exact shades and amounts of infrared light absorbed by the atmosphere when the comb light is sent back and forth across open-air paths. The research team published its work in Science Advances in March 2021.

- The NIST Forensic Science Research Program facilitated the development of the Firearms Process Map through a collaboration with OSAC's Firearms & Toolmarks Subcommittee and the Association of Firearm and Tool Mark Examiners (AFTE). The process mapping team worked together to capture and document the diverse practices of multiple laboratories. The map, released in January 2021, can benefit the firearm discipline by providing a behind-the-scenes perspective into the various components and complexities involved in the firearms examination process. It can also be used to identify best practices, reduce errors, assist in training new examiners and highlight areas where further research or standardization would be beneficial.

- Researchers at Los Alamos National Laboratory used the NIST sensors to demonstrate a highly sensitive forensic technique on debris from a historic nuclear explosion. In a new study, part of a series showing the connection between science from 75 years ago and today's nuclear energy and technology, the researchers measured the composition of a small bead of trinitite using decay energy spectroscopy

- NIST through the SCO is coordinating with Federal partners on the U.S. Government's engagement in key standard development areas including critical and emerging technologies such as Artificial Intelligence, 5G and beyond, and quantum information systems. As China's engagement in international standards grows, NIST has ramped up coordination and increased its leadership in critical and emerging technology standards, including through the Interagency Committee on Standards Policy. Today, over 400 NIST staff participate in over 1,700 standards activities. NIST is also working closely with the National Security Council to develop a first of its kind National Strategy for Critical and Emerging Technologies. NIST has engaged with National Science and Technology Council (NSTC) subcommittees in relevant areas for key emerging technology standardization, and the SCO continues to provide support to U.S. Trade Representatives with respect to 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.

- In the pursuit of diversity, equity, and inclusivity, the use of inclusive language benefits people by respecting them all equally and by avoiding potential gaps in understanding. To support these outcomes in international standards development, in April 2021 NIST published the report, *Guidance for NIST Staff on Using Inclusive Language in Documentary Standards.*

- The SCO provides standards training across the government to improve participation in and use of standards. To date, NIST has trained nearly 6,000 individuals, and recently modernized its training for a virtual environment. The SCO also launched the U.S. government-only publication *International Standards Alert* that provides information about important standards activity occurring in International Organization for Standardization (ISO), International Electrotechnical Commission, and International Telecommunication Union (ITU), to generate U.S. government participation and influence in key areas.

- As part of the NIST Standards Services Curricula Development Cooperative Agreement Program, NIST launched a new competition to fund cooperative agreements for curricula development that will educate students about the impact, nature and value of standards and standardization so they develop a strong understanding and appreciation for the role of standards in the domestic and global marketplace. Since the program's inception, NIST has received nearly 200 applications and has made 36 awards totaling over $2.2 million. Awardees have developed curricula that cover a wide range of topics, including science and engineering disciplines, business, public policy, and law.
- 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.

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 - The SPO will continue to foster communication and collaboration between NIST and external communities focused on critical national needs. To meet those needs, SPO works closely with and forges partnerships among government, military, academia, professional organizations, and private industry to provide world-class leadership in standards and technology innovation. In FY 2023 the SPO will continue its efforts focusing on Forensic Science and GHG Measurements.

In Forensic Science NIST is focused on 4 main areas:

- Advanced Forensic Science Research – 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 science community, NIST develops measurement protocols, calibration systems, Standard Reference Materials and Data, authoritative guidelines, and works with standards-developing organizations to formalize many of these as consensus standards.
- Science-based Standards Development – Since 2014, NIST has administered the OSAC Program which brings together over 550 members representing forensic science stakeholders from academia, Federal, state, and local government, and the private sector to develop scientifically sound forensic science standards and encourage their adoption across the country.

- Scientific Foundation Studies – NIST conducts in-depth reviews to identify priorities for future research, help laboratories identify appropriate limitations on the use of forensic methods, and suggest steps for moving the field forward. NIST recently published the first of several scientific foundation reviews on DNA mixture interpretation. Reviews of firearm examination, digital evidence and bitemark analysis are currently underway.

- Operation of the NIST Center of Excellence in Forensics – CSAFE was established in 2015 and renewed in 2020 to help build a statistically sound and scientifically solid foundation for the analysis and interpretation of pattern impression evidence. This multi-university *NIST Center of Excellence* is working to address the issues of accuracy, reliability, and validity of forensic evidence analyses. NIST is planning to expand the work of the COE in the areas of computational forensic science, forensic science data, forensic science quality assurance, and forensic science education for the legal community.

In Greenhouse Gas Measurements NIST is focused on:

- Developing and Providing an Innovative Measurement Framework – NIST has made significant progress toward the development of an innovative measurement framework to estimate urban GHG emissions with high accuracy to track progress (one to three percent per year) and at the space and time resolutions required to guide evidence-based decision-making for implementing climate actions. The new framework combines two independent methods (top-down and bottom-up) to measure and map urban GHG emissions, in effect using one method to calibrate the other.
    - The top-down or atmospheric method measures and maps urban GHG emissions by coupling high accuracy surface (ground-based) observing networks and airborne measurements of atmospheric GHG concentrations with numerical weather simulation and statistical optimization methods (i.e., tracer-transport inversion flux estimation).
    - The bottom-up method uses advanced GHG accounting methods to provide fine scale estimates of urban GHG emissions that account for space and time resolved fossil fuel emissions, as well as biogenic uptake (sink) and emissions (source) associated with urban vegetation and with agricultural and forested areas surrounding cities.
- Urban Dome Testbeds – NIST established its Urban GHG Measurements Testbed System to demonstrate the feasibility and validity of the new measurement framework. NIST operates testbeds in Indianapolis, the Los Angeles (LA) Air Basin, and the U.S. Northeast Corridor beginning in the Washington, DC/Baltimore regions (NEC/BW) and extending to Boston over time. These testbeds encompass a range of meteorological, climatic, and emissions profiles spanning U.S. urban topographic and meteorological conditions. Recent measurements in the Indianapolis testbed (1 km and hourly resolution) demonstrated a better than 10 percent consistency between the top-down and bottom-up methods. Recent results in the LA and NEC/BW testbeds, using similar methods, detected and accurately quantified GHG reductions before and during the early months of the 2020 pandemic in two significantly different urban typologies.
- U.S. GHG Information Center – NIST plans to establish the U.S. GHG Information Center (USGIC) in partnership with government stakeholders at all levels and with the business, academic, and Non-Government Organizations communities. The USGIC will develop and provide mature, measurements-based scientific tools, methods, and data to estimate GHG emissions with high accuracy to track progress (one to three percent per year) and with the space and time resolutions required to guide evidence-based decision-making. The validated tools, methods, and data disseminated by the USGIC will enable the identification and pursuit of the most efficient and economically viable

emission reduction opportunities in urban areas. Such measurement tools will help authenticate resulting carbon credits with continuing, before and after, emissions data in urban mitigation projects in a cost-effective and transparent manner. They also will provide a means of assessing the effectiveness of mitigation actions taken by other nations. NIST plans to significantly expand its GHG Measurements Program to advance the work of the center in three major areas:

- Fossil Fuel and Biogenic Emissions/Uptake Modeling for Bottom-Up GHG Estimation;
- Measurements and Models for Top-Down GHG Estimation; and
- International Standards and Measurement Methods.

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.

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. Examples of efforts include work currently underway in collaboration with NIST's Information Technology Laboratory: two labeling programs on cybersecurity capabilities of Internet-of-Things (IoT) consumer devices and software development practices. The SCO is also supporting a number of efforts targeting artificial intelligence, and space commerce-related standard's needs. 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 ISO and the International Electrotechnical Commission.

Baldrige Performance Excellence Program - Baldrige helps organizations address a dynamic environment, focus on strategy-driven performance, achieve customer and workforce engagement, and improve governance and ethics, societal responsibilities, competitiveness, and long-term organizational sustainability. It offers participants a comprehensive management approach that focuses on results in all areas, organizational and personal learning, and knowledge sharing.

Explanation and Justification

Line Item		2021 Actuals		2022 Annualized CR		2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Standards Coordination and Special Programs	Pos./BA	210	$83,401	210	$83,875	210	$87,072
	FTE/Obl	188	90,359	200	93,112	200	87,072

Standards Coordination and Special Programs (Total Funding: $87.1 million and 210 Positions)

The FY 2023 base budget request is at the same programmatic level as the FY 2022 Annualized Continuing Resolution (CR) level, adjusted for inflation. 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 for that purpose. 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 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 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 ($61.4 million)
- Exploratory Measurement Science ($2.1 million)
- Advanced Manufacturing and Material Measurements ($13.1 million)
- Physical Infrastructure and Resilience ($5.5 million)

- Health and biological systems measurements ($2.1 million)
- Advanced Communications, Networks, and Scientific Data Systems ($0.2 million)

Additionally, this Activity/Subactivity funds the Baldrige Performance Excellence Program at $2.7 million.

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Scientific and Technical Research and Services (STRS)
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Standards for Critical and Emerging Technologies	Pos/BA	5	$2,400	14	$10,400	9	$8,000
	FTE/Obl.	5	2,400	12	10,400	7	8,000

Standards for Critical and Emerging Technologies (+$8,000, +7 FTE/+9 Positions) - NIST requests a total of $8 million to execute a forward-leaning initiative that will strengthen U.S. leadership in international standards development for critical and emerging technologies (CET). This initiative will: (1) facilitate U.S. private sector expert influence; (2) enable U.S. leadership in targeted priority technology areas; (3) streamline U.S. technology inclusion in standards; and (4) improve Federal agency coordination and engagement. For the U.S. to maintain competitive market advantage, robust U.S. participation in international standards development is an essential requirement. American companies have historically led these efforts, but now U.S. leadership is currently being challenged by a substantial and strategic increase in China's standards engagement. In order to maintain global leadership, U.S. public and private sector experts must strengthen their international standards development competencies, especially for CET. Without the additional funding to do so, America's competitive edge in standards-setting may soon dissipate. This request will ensure that U.S. public and private sector experts are at the forefront of CET and are well-positioned with the skills, relationships, and experience needed to shape international CET standards. NIST will therefore allocate $4.0 million of the request to enhance U.S. private sector-led standards activity for CET areas: advanced communications, advanced manufacturing, artificial intelligence, biotechnology, cybersecurity, privacy, and quantum information science. NIST will establish a "Standards Center of Excellence (SCoE)" through a competitive award process, modeled off the NIST-funded Center for Risk-Based Community Resilience Planning (Resilience). The SCoE will increase U.S. private sector standards competence and engagement through state and local partnerships with academia and state agencies by conducting meetings and workshops geared toward a larger base of CET stakeholders. The SCoE will leverage existing standards infrastructure and work with companies, particularly small and medium-size enterprises (SMEs), to identify key standards development organizations and activities where U.S. leadership is essential. The SCoE will incentivize private sector partners to develop standards strategies and associated engagement tactics, focusing on CET. Additionally, Cooperative Research and Development Agreements (CRADA) will be issued for studying standardization in CET areas. NIST will also allocate $4.0 million to significantly expand its current efforts in inter-agency coordination on standards issues to facilitate more effective, proactive,

and dedicated Federal agency engagement and leadership. NIST's Standards Coordination Office (SCO) will modernize its standards information resources and training program to communicate standardization activities in CET to a broader number of stakeholders. This will provide early-warning mechanisms and actionable information to public and private sector entities. NIST will hire and develop a dedicated talent pool of federally employed "standards liaisons" to conduct inclusive standards education, advocacy, and coordination at the state and local level by leveraging a robust network under the Hollings Manufacturing Extension Partnership and Manufacturing USA programs. NIST will increase the number of detail assignments from other Federal agencies to the NIST SCO to strengthen Federal understanding and engagement in standards development.

The request increases NIST's investment in its Fundamental Measurement, Quantum Science, and Measurement Dissemination portfolio by $8 million.

Performance Measure: Number of outreach and training events to effectively educate, coordinate, and enhance U.S. participation and influence in international CET standards development.

	2023	2024	2025	2026	2027
With increase	3	6	8	10	10
Without increase	1	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: Standards Coordination and Special Programs
Program Change: Standards for Critical and Emerging Technologies

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Physical Scientist		ZP V	1	$148,019	$148,019
Physical Scientist		ZP IV	2	125,838	251,676
Physical Scientist		ZP III	1	89,552	89,552
Management and Program Analyst		ZA IV	2	125,838	251,676
Management and Program Analyst		ZA III	2	89,552	179,104
Administrative/technical support		ZA II	1	68,004	68,004
Total			9		988,031
Less lapse	25.00%		(2)		(247,008)
Total full-time permanent (FTE)			7		741,023
2023 pay Adjustment (4.6%)					34,087
					$775,110
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			7		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			7		
Authorized Positions					

Full-time permanent			9		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			9		

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	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$22,531	$23,207	$24,932	$25,707	$775
11.3	Other than full-time permanent	1,796	1,796	1,929	1,929	0
11.5	Other personnel compensation	615	615	661	661	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	24,943	25,618	27,522	28,297	775
12.1	Civilian personnel benefits	8,301	8,550	8,727	8,982	255
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	146	146	146	176	30
22	Transportation of things	54	54	54	76	22
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	3,806	3,806	3,806	4,598	792
24	Printing and reproduction	36	36	36	53	17
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	6,228	8,056	3,460	4,760	1,300
25.3	Other goods and services from Federal sources	4,825	4,825	5,300	5,643	343
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3,999	3,999	3,999	3,999	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	1,412	1,412	1,412	1,589	177
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,872	1,872	1,872	2,030	158
31	Equipment	4,422	4,422	4,422	4,553	131
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	30,316	30,316	26,316	30,316	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	$90,359	$93,112	$87,072	$95,072	$8,000

Department of Commerce
National Institute of Standards and Technology
Scientific and Technical Research and Services (STRS)
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Strengthening Equity and Diversity in the NIST Workforce	Pos/BA	20	$11,480	36	$17,260	16	$5,780
	FTE/Obl.	20	11,480	32	17,260	12	5,780

Strengthening Equity and Diversity in the NIST Workforce ($5,780, +12 FTE/+16 Positions) - NIST requests $5.78 million to recruit 12 postdoctoral fellows from underrepresented backgrounds to NIST to build a more equitable and diverse scientific workforce. More and more industries are in demand of a highly-skilled science and engineering workforce. With increasing global competition and heightened national security concerns, it is even more critical to invest in the pipeline that will nurture the talent required to maintain leadership in areas like quantum science, artificial intelligence, advanced communications, and cybersecurity. Expansion of existing NIST programs will help ensure that college students have the support necessary for furthering their education; stay in science, technology, engineering, and mathematics (STEM) majors; and have access to employment opportunities. Through partnerships with minority-serving institutions (MSIs), including, for example, Historically Black Colleges and Universities, Hispanic-Serving Institutions, and Tribal Colleges and Universities, NIST will support the development of a well-rounded, diverse workforce and new pipelines for the next generation of innovative scientists and engineers. Additionally, more students and professors will be aware of and engaged with metrology. This investment will help improve diversity, inclusion, and equity in STEM careers and leverage MSIs, a major focus in the U.S. for at least the last decade. Access to student talent and workforce is recognized as a critical gap in research areas essential for U.S. competitiveness. As the National Metrology Institute, NIST is the only Federal agency qualified to create training programs targeting measurement science. Reliable measurements ensure trustworthiness, underpin innovation, and are woven into all aspects of society and the economy. Without additional workforce training and pipelines, NIST cannot reach its full potential, adversely impacting U.S. competitiveness, the economy, and national security. Additionally, without these partnerships and program expansion, new networks are not created that could improve inclusion and equity in STEM fields. One of the main focuses of the current Administration is advancing racial equity and providing support for underserved groups, outlined in the Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (EO 13985). Students in underserved groups have been found to innovate at higher rates, but their novel contributions are often discounted, and diverse and inclusive workplaces are better at retaining talent and are more innovative and productive.

Without initiatives that support career development and hiring pathways for diverse populations, the U.S. risks missing out on potential scientific expertise, experiences, and talent. The postdoctoral recruitment program will be similar to the well-regarded NIST NRC Postdoctoral Research Associateships Program with the National Academies that brings over 100 researchers of rare promise and ability to NIST every year. However, the new program will allow NIST to seek out and select candidates from underserved groups, providing additional job opportunities for early-career U.S. scientists and engineers to work at NIST, increasing diversity and equity in STEM fields, and bringing new innovative ideas to the U.S. R&D ecosystem.

The request increases NIST's investment in its Exploratory Measurement Science portfolio by $5.78 million.

Performance measure: Number of postdoctoral fellows from underrepresented backgrounds hired for science and engineering careers at NIST.

	2023	2024	2025	2026	2027
With increase	12	12	12	12	12
Without increase	0	0	0	0	0

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: Strengthening Equity and Diversity in the NIST Workforce

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Postdoctoral Fellow		ZP III	12	$89,552	$1,074,624
Program Manager		ZP III	1	89,552	89,552
Program Manager		ZA IV	1	125,838	125,838
Program Administrative Officer		ZA II	1	68,004	68,004
Administrative/technical support		ZA II	1	68,004	68,004
Total			16		1,426,022
Less lapse	25.00%		(4)		(356,506)
Total full-time permanent (FTE)			12		1,069,516
2023 pay Adjustment (4.6%)					49,198
					$1,020,318
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			12		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			12		
Authorized Positions					
Full-time permanent			16		

Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			16		

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	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$22,531	$23,207	$24,932	$25,952	$1,020
11.3	Other than full-time permanent	1,796	1,796	1,929	1,929	0
11.5	Other personnel compensation	615	615	661	661	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	24,943	25,618	27,522	28,542	1,020
12.1	Civilian personnel benefits	8,301	8,550	8,727	9,095	368
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	146	146	146	183	37
22	Transportation of things	54	54	54	76	22
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	3,806	3,806	3,806	4,368	562
24	Printing and reproduction	36	36	36	57	21
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	6,228	8,056	3,460	4,033	573
25.3	Other goods and services from Federal sources	4,825	4,825	5,300	5,582	282
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3,999	3,999	3,999	3,999	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	1,412	1,412	1,412	1,540	128
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,872	1,872	1,872	2,087	215
31	Equipment	4,422	4,422	4,422	4,474	52
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	30,316	30,316	26,316	28,816	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	$90,359	$93,112	$87,072	$92,852	$5,780

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PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Advanced Communications Research and Standards	Pos/BA	0	0	0	0	1	$250
	FTE/Obl.	0	0	0	0	1	250

Advanced Communications Research and Standards (+250 thousand +1 FTE/+1 Position) - This request increases funds for the Standards Coordination and Special Programs (SCO-SPO) portion of the same initiative under Laboratory Programs. The funds requested is for $0.250 million for NIST to expand its standards coordination, participation, and information services for advanced communications. The request increases each of NIST's investments in its Advanced Communications, Networks, and Scientific Data Systems portfolio by $0.250 million.

Performance Measure: Number of measurement and modeling methodologies for a hybrid of radiated signals in wireless spectrums, and other associated contributions (e.g., workshops, datasets) to advanced communications standards development.

	2023	2024	2025	2026	2027
With increase	2	4	6	8	16
Without increase	1	2	2	2	3

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: Advanced Communications Research and Standards

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Standards Coordination Expert		ZP IV	1	$125,838	$125,838
Total			1		125,838
Less lapse	25.00%		-		(31,460)
Total full-time permanent (FTE)			1		94,378
2023 pay Adjustment (4.6%)					4,341
					$ 98,719
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			1		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			1		
Authorized Positions					
Full-time permanent			1		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			1		

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

	Object Class	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$22,531	$23,207	$24,932	$25,031	$99
11.3	Other than full-time permanent	1,796	1,796	1,929	1,929	0
11.5	Other personnel compensation	615	615	661	661	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	24,942	25,618	27,522	27,621	99
12.1	Civilian personnel benefits	8,301	8,550	8,727	8,760	33
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	146	146	146	146	0
22	Transportation of things	54	54	54	54	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	3,806	3,806	3,806	3,832	26
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	6,228	8,056	3,460	3,478	18
25.3	Other goods and services from Federal sources	4,825	4,825	5,300	5,305	5
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3,999	3,999	3,999	4,059	60
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	1,412	1,412	1,412	1,418	6
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,872	1,872	1,872	1,874	2
31	Equipment	4,422	4,422	4,422	4,423	1
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	30,316	30,316	26,316	26,316	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	$90,359	$93,112	$87,072	$87,322	$250

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

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$278,590	$289,682	$307,691	$327,600	$19,909
11.3	Other than full-time permanent	22,214	22,214	23,601	23,601	0
11.5	Other personnel compensation	7,608	7,608	11,035	11,035	0
11.9	**Total personnel compensation**	308,412	319,504	342,327	362,236	19,909
12.1	Civilian personnel benefits	108,202	112,135	118,014	124,568	6,554
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	952	5,339	4,789	5,404	615
22	Transportation of things	1,244	1,361	1,290	1,687	397
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and miscellaneous charges	17,011	19,308	17,371	31,681	14,310
24	Printing and reproduction	405	522	424	753	329
25.1	Advisory and assistance services	3,649	2,683	2,036	2,058	22
25.2	Other services from non-Federal sources	65,477	68,431	34,328	55,950	21,622
25.3	Other goods and services from Federal sources	51,150	54,525	58,573	71,712	13,139
25.5	Research and development contracts	42,385	48,385	44,157	48,977	4,820
25.7	Operation and maintenance of equipment	14,966	15,255	15,949	19,967	4,018
26	Supplies and materials	25,701	26,037	26,742	31,249	4,507
31	Equipment	49,783	51,408	51,701	78,539	26,838
32	Land and structures	86	86	86	86	0
41	Grants, subsidies, and contributions	112,186	112,186	112,186	139,386	27,200
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
99	Total Obligations	803,618	839,214	832,166	976,446	144,280

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
99	Total Obligations	$803,618	$839,214	$832,166	$976,446	$144,280
	Less Prior Year Recoveries	(4,741)	0	0	0	0
	Less Prior Year Refunds	(109)	0	0	0	0
	Less prior year unobligated balance	(34,027)	(26,214)	0	0	0
	Plus Unobligated Balance, End of Year	26,214	0	0	0	0
	Plus Unobligated Balance, Expired	45	0	0	0	0
	Total Budget Authority	791,000	813,000	832,166	976,446	144,280
	Transfer to DoC Working Capital for HCHB renovation.					
	Transfer from Election Assistance Commission	(1,500)	(1,500)	0	0	0
	Transfers from DoJ for Office of Law Enforcement Standards	(1,500)	(1,500)	0	(1,500)	(1,500)
	Appropriation	788,000	810,000	832,166	974,946	142,780
	Personnel Data					
	Full-time Equivalent Employment:					
	Full-time permanent	2,129	2,267	2,285	2,458	173
	Other than full-time permanent	253	253	253	253	0
	Total	2,382	2,520	2,538	2,711	173
	Authorized Positions:					
	Full-time permanent	2,561	2,558	2,576	2,807	231
	Other than full-time permanent	76	76	76	76	0
	Total	2,637	2,634	2,652	2,883	231

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

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$252,695	$263,111	$279,067	$296,983	$17,916
11.3	Other than full-time permanent	20,150	20,150	21,404	21,404	0
11.5	Other personnel compensation	6,901	6,901	10,282	10,282	0
11.9	**Total personnel compensation**	279,746	290,162	310,753	328,669	17,916
12.1	Civilian personnel benefits	98,689	102,373	108,064	113,962	5,898
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	784	5,171	4,621	5,169	548
22	Transportation of things	1,093	1,210	1,139	1,492	353
23.1	Rental payments to GSA	108	108	170	170	0
23.2	Rental payments to others	1,901	1,941	2,023	2,023	0
23.3	Communications, utilities, and miscellaneous charges	12,345	14,642	12,705	25,634	12,929
24	Printing and reproduction	342	459	361	652	291
25.1	Advisory and assistance services	3,649	2,683	2,036	2,058	22
25.2	Other services from non-Federal sources	55,879	57,011	27,376	45,608	18,232
25.3	Other goods and services from Federal sources	43,698	47,073	50,142	62,651	12,509
25.5	Research and development contracts	36,209	42,209	37,981	42,741	4,760
25.7	Operation and maintenance of equipment	12,785	13,074	13,768	17,475	3,707
26	Supplies and materials	23,489	23,825	24,527	28,758	4,231
31	Equipment	43,120	44,745	45,038	71,692	26,654
32	Land and structures	86	86	86	86	0
41	Grants, subsidies, and contributions	81,870	81,870	85,870	106,570	20,700
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
99	Total Obligations	695,793	728,642	726,660	855,410	128,750

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
99	Total Obligations	$695,793	$728,642	$726,660	$855,410	$128,750
	Less Prior Year Recoveries	(4,360)	0	0	0	0
	Less Prior Year Refunds	(109)	0	0	0	0
	Less prior year unobligated balance	(21,207)	(18,477)	0	0	0
	Plus Unobligated Balance, End of Year	18,477	0	0	0	0
	Plus Unobligated Balance, Expired	45	0	0	0	0
	Total Budget Authority	688,639	710,165	726,660	855,410	128,750
	Transfer to DoC Working Capital for HCHB renovation.					
	Transfer from Election Assistance Commission	(1,500)	(1,500)	0	0	0
	Transfers from DoJ for Office of Law Enforcement Standards	0	0	0	0	0
	Appropriation	687,139	708,665	726,660	855,410	128,750
	Personnel Data					
	Full-time Equivalent Employment:					
	Full-time permanent	1,935	2,059	2,077	2,230	153
	Other than full-time permanent	230	230	230	230	0
	Total	2,165	2,289	2,307	2,460	153
	Authorized Positions:					
	Full-time permanent	2,326	2,323	2,341	2,546	205
	Other than full-time permanent	69	69	69	69	0
	Total	2,395	2,392	2,410	2,615	205

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

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$3,364	$3,364	$3,692	$3,692	0
11.3	Other than full-time permanent	268	268	268	268	0
11.5	Other personnel compensation	92	92	92	92	0
11.9	**Total personnel compensation**	3,724	3,724	4,052	4,052	0
12.1	Civilian personnel benefits	1,212	1,212	1,223	1,223	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	22	22	22	22	0
22	Transportation of things	97	97	97	97	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	860	860	860	860	0
24	Printing and reproduction	27	27	27	27	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	3,370	3,364	3,492	3,492	0
25.3	Other goods and services from Federal sources	2,627	2,627	3,131	3,131	0
25.5	Research and development contracts	2,177	2,177	2,177	2,177	0
25.7	Operation and maintenance of equipment	769	769	769	769	0
26	Supplies and materials	340	340	343	343	0
31	Equipment	2,241	2,241	2,241	2,241	0
32	Land and structures	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
99	Total Obligations	17,466	17,460	18,434	18,434	0

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
99	Total Obligations	$17,466	$17,460	$18,434	$18,434	0
	Less Prior Year Recoveries	(4)	0	0	0	0
	Less Prior Year Refunds	0	0	0	0	0
	Less prior year unobligated balance	(2)	0	0	0	0
	Plus Unobligated Balance, End of Year	0	0	0	0	0
	Total Budget Authority	17,460	17,460	18,434	18,434	0
	Transfer from Election Assistance Commission	0	0	0	0	0
	Transfers from DoJ for Office of Law Enforcement Standards	0	0	0	0	0
	Appropriation	17,460	17,460	18,434	18,434	0
	Personnel Data					
	Full-time Equivalent Employment:					
	Full-time permanent	26	28	28	28	0
	Other than full-time permanent	3	3	3	3	0
	Total	29	31	31	31	0
	Authorized Positions:					
	Full-time permanent	31	31	31	31	0
	Other than full-time permanent	1	1	1	1	0
	Total	32	32	32	32	0

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

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$22,531	$23,207	$24,932	$26,925	$1,993
11.3	Other than full-time permanent	1,796	1,796	1,929	1,929	0
11.5	Other personnel compensation	615	615	661	661	0
11.9	**Total personnel compensation**	24,942	25,618	27,522	29,515	1,993
12.1	Civilian personnel benefits	8,301	8,550	8,727	9,383	656
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	146	146	146	213	67
22	Transportation of things	54	54	54	98	44
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	3,806	3,806	3,806	5,187	1,381
24	Printing and reproduction	36	36	36	74	38
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	6,228	8,056	3,460	6,850	3,390
25.3	Other goods and services from Federal sources	4,825	4,825	5,300	5,930	630
25.5	Research and development contracts	3,999	3,999	3,999	4,059	60
25.7	Operation and maintenance of equipment	1,412	1,412	1,412	1,723	311
26	Supplies and materials	1,872	1,872	1,872	2,148	276
31	Equipment	4,422	4,422	4,422	4,606	184
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	30,316	30,316	26,316	32,816	6,500
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
99	Total Obligations	90,359	93,112	87,072	102,602	15,530

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
99	Total Obligations	$90,359	$93,112	$87,072	$102,602	$15,530
	Less Prior Year Recoveries	(377)	0	0	0	0
	Less Prior Year Refunds	0	0	0	0	0
	Less prior year unobligated balance	(12,818)	(7,737)	0	0	0
	Plus Unobligated Balance, End of Year	7,737	0	0	0	0
	Total Budget Authority	84,901	85,375	87,072	102,602	15,530
	Transfer from Election Assistance Commission	0	0	0	0	0
	Transfers from DoJ for Office of Law Enforcement Standards	(1,500)	(1,500)	0	(1,500)	(1,500)
	Appropriation	83,401	83,875	87,072	101,102	14,030
	Personnel Data					
	Full-time Equivalent Employment:					
	Full-time permanent	168	180	180	200	20
	Other than full-time permanent	20	20	20	20	0
	Total	188	200	200	220	20
	Authorized Positions:					
	Full-time permanent	204	204	204	230	26
	Other than full-time permanent	6	6	6	6	0
	Total	210	210	210	236	26

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. $974,946,000, to remain available until expended,
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.

7. Public Law 116-136, The Coronavirus Aid, Relief, and Economic Security Act, (CARES Act), as enacted March 27, 2020 made available funding, $6,000,000 for Scientific and Technical Research and Services “to remain available until September 30, 2021, to prevent, prepare for, and respond to coronavirus, domestically or internationally, by supporting continuity of operations, including measurement science to support viral testing and bio-manufacturing.”

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 2021 Actual	FY 2022 Annualized CR	FY 2023 Estimate
Consulting Services			
Management and professional support services	$749	$611	$689
Studies, analyses, and evaluations	1,115	684	1,368
Engineering and technical services	1,785	1,388	1
Total	3,649	2,683	2,058

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
Annualized CR, 2022	104	102	$166,500	$171,996	$166,500
2023 Adjustments to Base					
Other Changes:					
Annualization of positions financed in FY 2022	0	0	0	0	0
Plus: Inflationary adjustments to base	0	0	1,321	1,321	1,321
2023 Base	104	102	167,821	173,317	167,821
Plus: 2023 Program changes	60	45	204,497	204,497	204,497
2023 Estimate	164	147	372,318	377,814	372,318

Comparison by activity with totals by activity		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 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	0	0	$66	0	0	0	0	0	0
Hollings Manufacturing Extension Partnership	Pos./Approp	81	$150,000	86	150,000	86	$151,076	144	$275,266	58	$124,190
	FTE/Obl.	86	157,112	86	151,995	86	151,076	129	275,266	43	124,190
Manufacturing USA	Pos/Approp	18	16,500	18	16,500	18	16,745	20	97,052	2	80,307
	FTE/Obl.	14	14,180	16	19,935	16	16,745	18	97,052	2	80,307
CARES Act (P.L. 116-136) - Hollings MEP	Pos/Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	14	0	0	0	0	0	0	0	0
TOTALS	Pos./Approp	99	166,500	104	166,500	104	167,821	164	372,318	60	204,497
	FTE/Obl.	100	171,306	102	171,996	102	167,821	147	372,318	45	204,497
Adjustments for											
Recoveries			(1,774)		0		0		0		0
Refunds			(2)		0		0		0		0
Unobligated balance, start of year			(8,526)		(5,496)		0		0		0
Unobligated balance, end of year			5,496		0		0		0		0
Budget Authority/Appropriation			166,500		166,500		167,821		372,318		204,497
Adjustments for											
Plus restoration of cancellation of anticipated recoveries			0		0		0		0		0
Plus restoration of unobligated balances rescission			0		0		0		0		0
Appropriation			166,500		166,500		167,821		372,318		204,497

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Exhibit 8

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

	Perm. Pos.	FTE	Amount
Transfer	...	...	0
Adjustment	...	...	0
Financing	...	...	0
Other Changes:			
FY 2022 pay increase and related costs	...	...	$506
FY 2023 pay increase and related costs	...	...	647
Change in compensable days	...	...	(66)
Annualization of positions financed in FY 2022	0	0	
Awards	...	...	(18)
Personnel benefits:			
Civil Service Retirement System (CSRS)	...	...	(7)
Federal Employees' Retirement System (FERS)	...	...	17
Thrift Savings Plan (TSP)	...	...	(74)
Federal Insurance Contribution Act (FICA)	...	...	18
Health insurance	...	...	29
Employees' Compensation Fund	...	...	0
Travel and transportation of persons:			
Mileage	...	...	0
Per Diem	...	...	1
Communications, utilities, and miscellaneous charges:			
HCHB Electricity	...	...	0
HCHB Water/Sewer	...	...	0
Electricity rate	...	...	(3)
Natural gas rate	...	...	10
Other services:			
Working Capital Fund (Departmental Management)	...	...	0
NARA storage costs	...	...	0
General pricing level adjustment	...	...	261
Subtotal, Other Changes	0	0	1,321
Total, Adjustments to base	0	0	1,321

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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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 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	0	0	66	0	0	0	0	0	0

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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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Hollings Manufacturing	Pos./Approp	81	$150,000	86	$150,000	86	$151,076	144	$275,266	58	$124,190
Extension Partnership	FTE/Obl.	86	157,112	86	151,995	86	151,076	129	275,266	43	124,190
CARES Act (P.L. 116-136)	Pos./Approp	0	0	0	0	0	0	0	0	0	0
Hollings MEP	FTE/Obl.	0	14	0	0	0	0	0	0	0	0

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

Goal Statement

The Hollings Manufacturing Extension Partnership Program (MEP) is a national network of Federal, State, and Industry partnerships that provide U.S. manufacturers with access to technology, resources, and industry experts. The critical part of the MEP National Network consists of the Manufacturing Extension Partnership centers located across the country that work directly with their local manufacturing communities to strengthen the competitiveness of the U.S. 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.

The mission of the MEP program is to be a trusted advisor to U.S. manufacturers to help promote business growth, to connect manufacturers to public and private resources essential for increased competitiveness and profitability. In doing so, MEP supports NIST's mission of promoting U.S. innovation and industrial competitiveness, while also advancing the goals of the U.S. Department of Commerce to maximize U.S. competitiveness and enable economic growth for U.S. industries, workers and consumers

Base Program

The MEP primarily aids small- and medium-sized U.S. manufacturers through 51 centers, one in every U.S. State and Puerto Rico.MEP uses a networked partnership approach to deliver services such as product and market development tools and resources for improved processes and best practices, supply chain, growth services, and workforce development. NIST MEP also provides technical assistance in areas such as food safety best practices, accelerating the adoption of advanced manufacturing technologies, addressing emerging manufacturing needs, exporting and international business, advising on cybersecurity of supply chains, and transferring technology to manufacturers from NIST Laboratories and other Federal research organizations. In 2021, MEP centers interacted with over 34,300 manufacturers to perform its mission. Through the NIST MEP client impact survey, clients reported $14.4 billion in new and retained sales, $1.5 billion in cost savings, $5.2 billion in new capital investments, and helped create and retain more than 125,700 jobs.

In 1988, Congress passed the Omnibus Trade and Competitiveness Act of 1988 (P.L. 100-418) that 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), which was signed into law January 2017. For thirty years, MEP centers have acted as the go-to experts to promote business growth and connect manufacturers to public and private resources essential for increased competitiveness and profitability.

Historically, U.S. manufacturing faced an enormous challenges as overall manufacturing jobs declined from approximately 18 million in 1988 to about 12.5 million in 2021, with the manufacturing sector's share of total employment declining from 16 to 8%. During this same period, MEP played a critical role in supporting the U.S. economy and worked with over 132,400 manufacturers, leading to $138.8 billion in new sales, $26.2 billion in cost savings and helped create and retain over 1.45 million jobs

Examples of Accomplishments

In FY21, client surveys reported that the MEP Centers helped their clients to create and retain over 125,746 jobs, recognize $1.5 billion in cost savings, generate $14.4 billion in new and retained sales, and make investments of $5.2 million in their companies. Full MEP Program accomplishments and industry impact for the program can be found at:
https://www.nist.gov/system/files/documents/2022/02/15/MEPNN%20FY21%20Impacts%20Overview_FINAL-508.pdf

Statement of Operating Objectives

In the post-COVID-19 economy, MEP will serve as the primary source of assistance to growth oriented, U.S.-based small- and medium-sized enterprises (SMEs) so that they are operationally resilient and prepared to respond to critical national needs both immediate and long-term.

Explanation and Justification

Line Item		2021 Actual		2022 Annualized CR		2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Hollings Manufacturing Extension Partnership	Pos./BA	81	$150,000	86	$150,000	86	$151,076
	FTE/Obl	86	157,126	86	151,995	86	151,076

MEP plans to build on its tradition of delivering impactful services to U.S. manufacturers. In partnership with local, state and other Federal programs, MEP Centers will identify initiatives for recruiting and retaining workers in the manufacturing sector to align with identified needs, priorities and strategies in states and localities as well as in industries and sectors. With MEP Centers positioned as partners in critical workforce ecosystems throughout the U.S., MEP will engage and coordinate local and national efforts to help manufacturers incorporate diversity, equity, and inclusion into

their workforce development strategy. Additionally, MEP will promote a collaborative environment in which these partners will complement the efforts of the MEP Centers, share best practices, and lead the execution of Center activities to serve as trusted advisors to their manufacturing clients and help them navigate economic and businesses challenges as well as advanced technology solutions.

Some of MEP services are:

- MEP Centers continue to focus on service delivery to rural manufacturers and to very small manufacturers (with fewer than 20 employees).
- MEP's goals have been expanded to include working with traditionally underserved populations including women-owned companies and minority-owned companies. MEP will augment its services to these traditionally underserved populations as a consequence of MEP's increased emphasis on delivering assistance in the workforce development area.
- Cybersecurity awareness, training, and technical assistance are essential to the resilience of U.S. manufacturers, and especially for small defense contractors and the protection of controlled, unclassified information. MEP continues to execute partnerships with the Department of Defense, thereby, serving thousands of U.S. defense contractors in approximately three dozen states.
- MEP provides nationwide technical assistance to small U.S. food manufacturers relating to food safety practices and implementation of the Food Safety Modernization Act (FSMA) in particular. Under a Memorandum of Understanding (MOU) with the U.S. Food and Drug Administration, MEP centers are recognized across the U.S. as local resources for small food manufacturers to understand and implement safe food manufacturing practices. Nearly a quarter of all MEP Center clients are connected to the food industry.
- MEP's ongoing national supply chain initiative coordinates several critical partners and services with the goal to achieve resilient and secure supply chains. The MEP Centers are amplifying current practices to develop collaborative programs and to disseminate best practices to U.S. manufacturers. MEP Centers provide direct assistance to U.S. manufacturing supply chains across several industries. MEP's Supplier Scouting services have demonstrated capability to identify U.S. manufacturers capable of producing critically needed supply chain items in short supply including personal protective equipment as well as other medical equipment and supplies.
- Centers develop and deliver technical assistance to small U.S. manufacturers nationwide relating to advanced manufacturing technology, with an emphasis on small manufacturer implementation of Industry 4.0. Technical assistance includes implementation of digital manufacturing approaches, flexible automation/collaborative robotics, artificial intelligence, additive manufacturing, and smart manufacturing.

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Hollings Manufacturing Extension Partnership Program	Pos/BA	86	$151,076	144	$275,266	58	$124,190
	FTE/Obl.	86	151,076	129	275,266	43	124,190

Hollings Manufacturing Extension Partnership Program (+$124,190, +43 FTE/+58 Positions) - The request will increase the breadth of services offered and expert manufacturing capabilities of the 51 MEP Centers to assist small- and medium-sized enterprises (SMEs) to respond to critical national needs. The FY 2023 request will provide funds to establish the infrastructure needed for a national supplier database, for sector and market-specific services to increase the number of companies within critical supply chains, support assistance for recruiting, retraining and upskilling a post pandemic workforce, and fund manufacturing experts to assist very small manufacturers' advancement with technology and innovation such as Robotics, Automation, Artificial Intelligence, Industry 4.0.

MEP will build on the MEP Centers' current unique suite of services and tools in three themed areas: Workforce, Supply Chain, and Technology and Innovation.

In the area of workforce, MEP will target funding to MEP Centers regionally to support expanded workforce support of small manufacturers' apprenticeship programs and to establish partnerships with state and local workforce programs to specifically coordinate efforts with their manufacturing clients. Funded initiatives will act as the knowledge base and the connectors and convenors in regional manufacturing ecosystems. MEP Centers will organize groups of manufacturing companies, identify their workforce needs, and work with partner workforce organizations to coordinate and tailor services to meet the identified needs of U.S. manufacturers. MEP will:

- Position MEP Centers as regional/state intermediaries, to coordinate workforce resources for manufacturers, identify needs, and work with partner workforce organizations to address critical manufacturing workforce shortages.
- Develop strategies for manufacturers to tap into multiple workforce pipelines, such as educational institutions including HBCUs, transitioning military, and upskilling the existing workforce in diverse and underserved communities.

- Develop and expand manufacturing apprenticeships, incumbent worker training and other work-based learning experiences with state partners.
- Identify innovative ways to increase productivity and retention to fully engage the existing workforce.
- Develop talent pipelines for the future manufacturing workforce such as youth manufacturing programs.
- Assist on succession planning for retiring owners of small and medium manufactures to ensure continued operations.

MEP will work at all levels of the supply chain, from original equipment manufacturers (OEMs) to Tier 3 and 4 suppliers, and with state and federal stakeholders. MEP will link market information and business opportunities enabling MEP Centers and their clients to respond quickly to new market opportunities and new supply sources, thereby accelerating U.S. suppliers' and federal partners' responses to market demands and supply chain pressures. MEP plans to:

- Develop national-level manufacturing support to connect U.S. manufacturers with potential customers, suppliers, and partners for securing critically needed products in emergency situations for national health, defense and competitiveness.
- Partner with federal agencies and private top-tier entities to identify supply chain gaps, shortcomings and critical areas needing attention and target appropriate industries for reshoring.
- Target up to $25 million of funding to expand MEP Supplier Scouting to identify and facilitate new sources of domestic supply to fill supply chain gaps, including for federal procurements to reduce Buy American waivers, consistent with Executive Order 14005.
- Assist individual U.S. manufacturers to become more resilient by addressing both the technical and business practices that will allow them to pivot and enter new supply chains, thus improving their competitiveness in current global markets.

The MEP Centers will become the primary advanced manufacturing knowledge base and resource in their market for smaller manufacturers. MEP Centers will pursue partnerships with large OEMs, government agencies, laboratories, and research institutions for technology demonstration, large-scale cybersecurity deployment and specialized technology adoption projects. Each Center will be positioned in its state to convene, connect and coordinate the local advanced manufacturing ecosystem resources and be the voice of the small and medium-sized manufacturers in those environments. MEP Centers will act as connector and project manager, ensuring that company needs are effectively serviced. Strategic partnerships with regional technology demonstration facilities will be funded that will allow multi-tier supplier adoption of technology thereby supporting supply chain agility, transparency and resiliency. In addition, MEP Centers will:

- Establish a national team of MEP Center staff that are experts in advanced manufacturing and cybersecurity to help smaller manufacturers address their major technology challenges.
- Expand MEP Center expertise and capabilities in-house and through stronger partnerships in Industry 4.0, cybersecurity and advanced technology providers, including Manufacturing USA institutes.
- Help manufacturers, including entrepreneurs and early-stage companies, identify opportunities to apply technology through assistance with needs assessments, designing solutions, developing business cases, and identifying qualified vendors and integrators.
- Develop mobile training on advanced manufacturing technology and cybersecurity to reach rural manufacturers.

Performance Measure:

	2022	2023	2024	2025	2026
Number of firms receiving in-depth technical assistance from MEP Centers					
With increase	13,000	14,200	14,900	15,500	16,000
Without increase	11,000	11,000	11,000	11,000	11,000
New or retained sales ($) in key product and critical technology supply chains					
With increase	$640M	$780M	$890M	$950M	$1,000M
Without increase	$400M	$400M	$400M	$400M	$400M

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM CHANGE PERSONNEL DETAIL

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

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Admin & Financial Management Specialist		ZA V	1	$148,019	$148,019
Industrial Specialist		ZA V	2	148,019	296,038
IT Specialist		ZA V	1	148,019	148,019
Economist		ZP IV	1	125,838	125,838
General Business Specialist		ZA IV	1	125,838	125,838
General Engineer		ZP IV	1	125,838	125,838
Industrial Specialist		ZA IV	20	125,838	2,516,760
Information Specialist		ZA IV	1	125,838	125,838
IT Specialist		ZP IV	2	125,838	251,676
Physical Scientist		ZP IV	1	125,838	125,838
Administrative Officer		ZA III	2	89,552	179,104
General Business Specialist		ZA III	3	89,552	268,656
General Engineer		ZP III	1	89,552	89,552
Industrial Specialist		ZA III	3	89,552	268,656
Information Specialist		ZA III	2	89,552	179,104
Program Analyst		ZA III	1	89,552	89,552
Statistician		ZP III	1	89,552	89,552
Administrative Officer		ZA II	1	68,004	68,004
IT Specialist		ZA II	1	68,004	68,004
Secretary		ZS V	1	68,004	68,004
Administrative/Technical Support		ZA II	6	68,004	408,024
Administrative Support Assistant		ZS IV	4	55,910	223,640
Administrative Support Clerk		ZS II	1	36,428	36,428

Total			58		6,025,982
Less lapse	25.00%		(15)		(1,506,496)
Total full-time permanent (FTE)			43		4,519,486

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Direct Obligations amounts in thousands)

Activity: Hollings Manufacturing Extension Partnership

	Object Class	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$11,590	$11,590	$13,457	$18,184	$4,727
11.3	Other than full-time permanent	814	814	858	858	0
11.5	Other personnel compensation	262	262	261	261	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	12,666	12,666	14,576	19,303	4,727
12.1	Civilian personnel benefits	4,439	4,435	5,042	6,599	1,557
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	123	123	124	371	247
22	Transportation of things	20	20	20	231	211
23	Rent, communications, and utilities	0	0	0	0	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 misc. charges	822	822	831	4,853	4,022
24	Printing and reproduction	9	9	9	217	208
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	0	0	1	1	0
25.2	Other services from non-Federal sources	5,373	5,377	3,857	13,091	9,234
25.3	Other goods and services from Federal sources	1,332	1,332	1,368	2,225	857
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	473	473	488	1,581	1,093
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	256	256	259	1,091	832
31	Equipment	356	356	370	1,020	650
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	131,253	126,122	124,127	224,679	100,552
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	$157,126	$151,995	$151,076	$275,266	$124,190

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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Manufacturing USA	Pos./Approp	18	$16,500	18	$16,500	18	$16,745	20	$97,052	2	$80,307
	FTE/Obl.	14	14,180	16	19,935	16	16,745	18	97,052	2	80,307

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 U.S. discoveries to create advanced manufacturing products and processes, benefitting entire industry sectors to address national needs. Another major goal is workforce training in new and advanced technology, including helping veterans and disadvantaged communities to enter the manufacturing workforce and upskilling current workers for advanced technologies.

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 Federal funding plus matching non-Federal funds over a 5 to 7-year period, which may be renewed after a rigorous assessment process. The Institutes form a network for manufacturing innovation with common goals, but unique technical concentrations that can benefit an entire industry sector. Industry, academia, and government partners leverage existing resources, collaborate, and co-invest to nurture manufacturing innovation and accelerate commercialization. As an anchor for 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). 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 has tools (manufacturing processes) to make their products. The budget request continues program coordination and network support of Manufacturing USA institutes, which at the end of FY 2022 should stand at 19 institutes, including 18 sponsored by the Department of Defense (DoD) and Department of Energy (DOE), and continues the role of the Department of Commerce (DOC) sponsored institute authorized by the Revitalize American Manufacturing and Innovation Act, as reauthorized in December 2019.

Examples of Accomplishments

Program accomplishments and industry impact for the program can be found at: https://www.manufacturingusa.com/.

Statement of Operating Objectives

As part of efforts to revitalize U.S. manufacturing and ensure U.S. global leadership, NIST proposed and Congress authorized a network of manufacturing innovation institutes where researchers, companies, universities, community colleges, and entrepreneurs come together to develop new manufacturing technologies with broad applications. These institutes also train the workforce, including returning veterans, needed to address a shortage of qualified workers in advanced manufacturing industries. The primary objective is to ensure that American innovations and inventions, currently going offshore for production, would be scaled up from laboratory experiments to an industrial level in the U.S. by developing new manufacturing processes to be used by entire industry sectors. The program is designed to meet broad industry needs across sectors, with priority given to address national advanced manufacturing-related needs, such as artificial intelligence, cybersecurity, and quantum information.

Each Manufacturing USA Institute has a unique technology focus with the objective of creating robust regional manufacturing hubs that have national impact. The Institutes support an ecosystem of manufacturing activity in regions of the U.S., enabling redevelopment of domestic supply chains in areas of advanced technology. 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 U.S. manufacturing process technologies.

Explanation and Justification

Line Item		2021 Actual		2022 Annualized CR		2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Manufacturing USA	Pos./BA	18	$16,500	18	$16,500	18	$16,745
	FTE/Obl	14	14,180	16	16,500	16	16,745

Manufacturing USA promotes direct and broad collaboration on industry relevant research and development to make sure that innovations developed in the U.S. are also manufactured in the U.S. rather than other countries. Institutes facilitate the adoption of new manufacturing technologies, tools, and methodologies that make U.S. manufacturers more competitive. Manufacturing USA emphasizes outreach and engagement with small and medium sized manufacturing enterprises. DOC's industry-driven Innovation Institutes bridge a key market failure in the U.S. innovation ecosystem which is even more pronounced in advanced manufacturing. U.S. manufacturers individually are challenged to fund these technological development functions, and small manufacturers especially struggle with individually investing in prototyping and scale up of new technologies and products.

NIST is required by Congress to convene, support, and coordinate the network of all Manufacturing USA Institutes, including the existing Institutes at the Department of Defense and Department of Energy. Manufacturing USA is specified in the White House *Strategy for American Leadership in Advanced Manufacturing* (2018-2022) as the means for achieving many of the key national objectives necessary for the U.S. to maintain a competitive manufacturing sector. Failure to maintain support for this initiative could lead to a loss of U.S. competitiveness in this sector as other countries are increasingly adept at technology transfer and scaling to production.

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Manufacturing USA	Pos/BA	18	$16,745	20	$97,052	2	$80,307
	FTE/Obl.	16	16,745	18	97,052	2	80,307

Fund Four Additional DOC Manufacturing USA Institutes (+$80,307, +2 FTE/+2 Positions) – The request funds the first year of an additional four Manufacturing USA Institutes, one of which will help restore the United States as a leader in the design and manufacture of semiconductors. The request helps expand Manufacturing USA, which was created by Congress to strengthen U.S. manufacturing. Manufacturing USA promotes direct and broad collaboration on industry relevant research and development to improve access to best manufacturing practices so that innovations developed in the U.S. are also manufactured in the U.S. rather than other countries. Institutes will facilitate the adoption of new manufacturing technologies, tools, and methodologies that make U.S. manufacturers more competitive. Manufacturing USA efforts will emphasize outreach and engagement with small- and medium-sized manufacturing enterprises (SMEs), geographic regions of the country currently underrepresented in manufacturing, and underrepresented groups such as women and minorities. Institute's state-of-the-art facilities not only allow collaborative research among institute members, but will provide shared facilities for workforce training, including the education and training of returning veterans, individuals with disabilities and underrepresented minorities. Without the increased funding, the DOC is not able to establish any additional industry-driven Innovation Institutes. These Institutes bridge a key market failure in the U.S. innovation ecosystem, which is even more pronounced in advanced manufacturing. U.S. manufacturers individually are challenged to fund these technological development functions, and small manufacturers especially struggle with individually investing in prototyping and scale-up of new technologies and products.

The $80.307 million increase, along with $16.745 million from base funds, allows the program to fund the first year of an additional four Manufacturing USA Institutes, one of which will help restore the United States as leader in the design and manufacture of semiconductors.

Performance Measure:

	2023	2024	2025	2026	2027
Number of DOC Mfg. USA Institutes with increase	5	5	5	5	5
Number of DOC Mfg. USA Institutes without increase	1	1	1	1	1

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Manufacturing USA
Program Change: Fund Four Additional DOC Manufacturing USA Institutes

Full-time permanent					
Title		Grade	Number	Annual Salary	Total Salaries
Federal Program Officer		ZP V	1	$148,019	$74,010
Technical Program Officer		ZP V	1	148,019	148,019
Total			2		222,029
Less lapse	25.00%		-		(55,507)
Total full-time permanent (FTE)			2		166,522
2023 pay Adjustment (4.6%)					7,660
					$ 174,182
Personnel Data Summary					
Full-time Equivalent Employment (FTE)					
Full-time permanent			2		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total FTE			2		
Authorized Positions					
Full-time permanent			2		
Part-time permanent			0		
Full-time temporary			0		
Part-time temporary			0		
Total Positions			2		

Department of Commerce
National Institute of Standards and Technology
Industrial Technology Services
PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Direct Obligations amounts in thousands)

Activity: Manufacturing USA

	Object Class	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$2,152	$2,451	$2,716	$2,890	$174
11.3	Other than full-time permanent	0	0	11	11	0
11.5	Other personnel compensation	48	48	48	48	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	2,200	2,499	2,775	2,949	174
12.1	Civilian personnel benefits	827	939	1,026	1,083	57
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	8	8	8	54	46
22	Transportation of things	14	14	14	30	16
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	1	1	1	1	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	141	141	143	2,219	2,076
24	Printing and reproduction	2	2	2	21	19
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	0	0	5	5	0
25.2	Other services from non-Federal sources	1,460	1,034	898	5,145	4,247
25.3	Other goods and services from Federal sources	210	210	211	1,424	1,213
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	4	4	4	754	750
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	80	80	85	549	464
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	37	37	38	290	252
31	Equipment	50	50	54	233	179
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	9,146	11,481	11,481	82,295	70,814
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	$14,180	$16,500	$16,745	$97,052	$80,307

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

	Object Class	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$13,742	$14,041	$16,173	$21,074	$4,901
11.3	Other than full-time permanent	814	814	869	869	0
11.5	Other personnel compensation	310	310	309	309	0
11.9	**Total personnel compensation**	14,866	15,165	17,351	22,252	4,901
12.1	Civilian personnel benefits	5,266	5,374	6,068	7,682	1,614
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	131	131	132	425	293
22	Transportation of things	34	34	34	261	227
23.1	Rental payments to GSA	5	5	5	5	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	963	963	974	7,072	6,098
24	Printing and reproduction	11	11	11	238	227
25.1	Advisory and assistance services	0	0	6	6	0
25.2	Other services from non-Federal sources	6,833	6,477	4,755	18,236	13,481
25.3	Other goods and services from Federal sources	1,542	1,542	1,579	3,649	2,070
25.5	Research and development contracts	4	4	4	754	750
25.7	Operation and maintenance of equipment	553	553	573	2,130	1,557
26	Supplies and materials	293	293	297	1,381	1,084
31	Equipment	406	406	424	1,253	829
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	140,399	137,603	135,608	306,974	171,366
43	Interest and dividends	0	0	0	0	0
99	Total Obligations	171,306 [1/]	168,561	167,821	372,318	204,497

	Object Class	2021 Actuals	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
99	Total Obligations	$171,306 [1/]	$168,561	$167,821	$372,318	$204,497
	Less prior year unobligated balance	(8,526)	0	0	0	0
	Total Budget Authority/Appropriation	162,780 [1/]	168,561	167,821	372,318	204,497
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	89	91	91	136	45
	Other than full-time permanent	11	11	11	11	0
	Total	100	102	102	147	45
	Authorized Positions:					
	Full-time permanent	95	100	100	160	60
	Other than full-time permanent	4	4	4	4	0
	Total	99	104	104	164	60

[1/] Includes supplemental CARES ACT obligations of $14K for COVID-19 related expenses.

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	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$11,590	$11,590	$13,457	$18,184	$4,727
11.3	Other than full-time permanent	814	814	858	858	0
11.5	Other personnel compensation	262	262	261	261	0
11.9	**Total personnel compensation**	12,666	12,666	14,576	19,303	4,727
12.1	Civilian personnel benefits	4,439	4,435	5,042	6,599	1,557
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	123	123	124	371	247
22	Transportation of things	20	20	20	231	211
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	822	822	831	4,853	4,022
24	Printing and reproduction	9	9	9	217	208
25.1	Advisory and assistance services	0	0	1	1	0
25.2	Other services from non-Federal sources	5,373	5,377	3,857	13,091	9,234
25.3	Other goods and services from Federal sources	1,332	1,332	1,368	2,225	857
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	473	473	488	1,581	1,093
26	Supplies and materials	256	256	259	1,091	832
31	Equipment	356	356	370	1,020	650
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	131,253	126,122	124,127	224,679	100,552
43	Interest and dividends	0	0	0	0	0
99	Total Obligations	157,126 [1/]	151,995	151,076	275,266	124,190

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
99	Total Obligations	$157,126 [1/]	$151,995	$151,076	$275,266	$124,190
	Less prior year recoveries	(1,759)	0	0	0	0
	Less prior year refunds	(2)	0	0	0	0
	Less prior year unobligated balance	(7,360)	(1,995)	0	0	0
	Plus unobligated balance end of year	1,995	0	0	0	0
	Less anticipated recoveries	0	0	0	0	0
	Total Budget Authority/Appropriation	150,000 [1/]	150,000	151,076	275,266	124,190
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	77	77	77	120	43
	Other than full-time permanent	9	9	9	9	0
	Total	86	86	86	129	43
	Authorized Positions:					
	Full-time permanent	79	84	84	142	58
	Other than full-time permanent	2	2	2	2	0
	Total	81	86	86	144	58

[1] Includes supplemental CARES ACT obligations of $14K from FY 2020 unobligated balances for COVID-19 related expenses.

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	2021 Actual	2022 Annualized	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$2,152	$2,451	$2,716	$2,890	$174
11.3	Other than full-time permanent	0	0	11	11	0
11.5	Other personnel compensation	48	48	48	48	0
11.9	**Total personnel compensation**	2,200	2,499	2,775	2,949	174
12.1	Civilian personnel benefits	827	939	1,026	1,083	57
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	8	8	8	54	46
22	Transportation of things	14	14	14	30	16
23.1	Rental payments to GSA	1	1	1	1	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	141	141	143	2,219	2,076
24	Printing and reproduction	2	2	2	21	19
25.1	Advisory and assistance services	0	0	5	5	0
25.2	Other services from non-Federal sources	1,460	1,034	898	5,145	4,247
25.3	Other goods and services from Federal sources	210	210	211	1,424	1,213
25.5	Research and development contracts	4	4	4	754	750
25.7	Operation and maintenance of equipment	80	80	85	549	464
26	Supplies and materials	37	37	38	290	252
31	Equipment	50	50	54	233	179
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	9,146	11,481	11,481	82,295	70,814
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
99	Total Obligations	14,180	16,500	16,745	97,052	80,307

	Object Class	2021 Actual	2022 Annualized	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
99	Total Obligations	$14,180	$16,500	$16,745	$97,052	$80,307
	Less prior year recoveries	(15)	0	0	0	0
	Less prior year refunds	0	0	0	0	0
	Less prior year unobligated balance	(1,100)	(3,435)	0	0	0
	Plus unobligated balance end of year	3,435	0	0	0	0
	Total Budget Authority/Appropriation	16,500	13,065	16,745	97,052	80,307
	Offset or recoveries of prior year obligations (P.L. 115-31)	0	0	0	0	0
	Plus Unobligated Balance Rescission	0	0	0	0	0
	Total Appropriation	16,500	13,065	16,745	97,052	80,307

Personnel Data

Full-time equivalent employment:					
Full-time permanent	12	14	14	16	2
Other than full-time permanent	2	2	2	2	0
Total	14	16	16	18	2
Authorized Positions:					
Full-time permanent	16	16	16	18	2
Other than full-time permanent	2	2	2	2	0
Total	18	18	18	20	2

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. 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”.

3. 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.

4. 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).

5. 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.”

6. 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).”

7. Public Law 116-136, The Coronavirus Aid, Relief, and Economic Security Act, (CARES Act), as enacted March 27, 2020 made available funding, $60,000,000 for Industrial Technology Services, “to remain available until September 30, 2021, to prevent, prepare for, and respond to coronavirus, domestically or internationally: *Provided,* That of the amount provided under this heading in this Act, $50,000,000 shall be for the Hollings Manufacturing Extension Partnership to assist manufacturers to prevent, prepare for, and respond to coronavirus and $10,000,000 shall be for the National Network for Manufacturing Innovation (also known as “Manufacturing USA”) to prevent, prepare for, and respond to coronavirus, including to support development and manufacturing of medical counter-measures and biomedical equipment and supplies.”

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

	FY 2021 Actual	FY 2022 Annualized CR	FY 2023 Estimate
Consulting Services			
Management and professional support services	0	0	$6
Studies, analyses, and evaluations	0	0	0
Engineering and technical services	0	0	0
Total	0	0	6

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
Annualized CR, 2022	149	145	$80,000	$143,389	$80,000
2023 Adjustments to Base					
Plus: Inflationary adjustments to base	0	0	3,447	3,447	3,447
2023 Base	149	145	83,447	83,447	83,447
Plus: 2023 Program changes	0	0	36,838	36,838	36,838
2023 Estimate	149	145	120,285	120,285	120,285

Comparison by activity/subactivity with totals by activity		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and Major Renovations											
Construction and Major	Pos/Approp	116	$80,000	149	$80,000	149	$83,447	149	$120,285	0	$36,838
Renovations	FTE/Obl.	143	250,591	145	143,389	145	83,447	145	120,285	0	36,838
Adjustments for											
Recoveries			(4,231)		0		0		0		0
Refunds			(1)		0		0		0		0
Unobligated balance, start of year			(229,748)		(63,389)		0		0		0
Unobligated balance, end of year			63,389		0		0		0		0
Financing from transfers:											
Transfers to other accounts (+)			0		0		0		0		0
Budget Authority/Appropriation			80,000		80,000		83,447		120,285		36,838

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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 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	$1,033	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)

	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
Total Obligations	$251,476	$144,422	$83,447	$120,285	$36,838
Offsetting collections from:					
Non-Federal sources	(1,033)	0	0	0	0
Total offsetting collections	(1,033)	0	0	0	0
Recoveries (Direct)	(4,231)	0	0	0	0
Prior year recoveries (Reimbursable)	0	0	0	0	0
Refunds (Direct)	(1)	0	0	0	0
Unobligated balance, start of year (Direct)	(229,748)	(63,389)	0	0	0
Unobligated balance, start of year (Reimbursable)	(885)	(1,033)	0	0	0
Unobligated balance, end of year (Direct)	63,389	0	0	0	0
Unobligated balance, end of year (Reimbursable)	1,033	0	0	0	0
Budget Authority/Appropriation	80,000	80,000	83,447	120,285	36,838

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

	Perm. Pos.	FTE	Amount
Transfer	...	...	0
Adjustment	...	...	0
Financing	...	...	0
Other Changes:			
FY 2022 pay increase and related costs	...	...	$402
FY 2023 pay increase and related costs	...	...	514
Change in compensable days	...	...	(53)
Annualization of positions financed in FY 2022	0	0	
Awards	...	...	11
Personnel benefits:			
Civil Service Retirement System (CSRS)	...	...	(5)
Federal Employees' Retirement System (FERS)	...	...	13
Thrift Savings Plan (TSP)	...	...	(59)
Federal Insurance Contribution Act (FICA) - OASDI	...	...	14
Health insurance	...	...	24
Other (includes Medicare)	...	...	0
Employees' Compensation Fund	...	...	0
Travel and transportation of persons:			
Mileage	...	...	0
Per Diem	...	...	0
Rental Payments to GSA including FIT costs	...	...	0
Communications, utilities, and miscellaneous charges:			
HCHB Electricity	...	...	0
HCHB Water/Sewer	...	...	0
Electricity rate	...	...	0
Natural gas rate	...	...	1
Other services:			
Working Capital Fund (Departmental Management)	...	...	0
NARA storage costs	...	...	0
General pricing level adjustment	...	...	2,585
Subtotal, Other Changes	0	0	3,447
Total, Adjustments to base	0	0	3,447

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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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and Major Renovations	Pos/Approp	9	$6,095	0	6,095	0	6,095	0	0	0	(6,095)
	FTE/Obl.	12	123,068	0	34,807	0	6,095	0	0	0	(6,095)
Safety, Capacity, Maintenance and Major Repairs	Pos/Approp	107	73,905	149	$73,905	149	$77,352	149	$120,285	0	$42,933
	FTE/Obl.	131	127,523	145	107,708	145	77,352	145	120,285	0	42,933
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	80,000	149	80,000	149	83,447	149	120,285	0	36,838
	FTE/Obl.	143	250,591	145	143,389	145	83,447	145	120,285	0	36,838

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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 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	$1,033	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	1,033	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 with the intent to meet current and future advancements in measurement science, standards, and technology to promote innovation and industrial competitiveness for the Nation.

In the 1950s and 1960s, the U.S. government recognized the need to invest in science and technology and built state-of-the-art scientific facilities to support the research mission of NIST (then the National Bureau of Standards). Well over half a century later, the aging and deteriorating buildings and infrastructure threaten NIST's ability to meet its mission. Additionally, even if buildings were operating as if new in the 1950s and 1960s, they would not have the environmental controls or utility capacities necessary for cutting edge 21st century research. While the construction of new facilities and major renovation of existing facilities in recent years have made some improvements to each campus, the current overall state of facilities and infrastructure continues to be a serious impediment to NIST's ability to conduct advanced measurement science and research. This is primarily due to the unique funding requirements of major construction projects, which often require full contractual funding prior to award, and the prerequisite of sustained funding levels for annual operations and maintenance.
Examples of critical facility and infrastructure investments to support the needs of these modern research institutions include:

- Replacement of aging underground site utility distribution systems that are failing at an accelerated frequency;
- Replacement of aging, obsolete, and failed mechanical systems, which includes heating and cooling coils, chillers, condenser units, exhaust fans, condensate receivers, vacuum pumps, and steam traps that are well beyond their useful life;
- Replacement of the failing 1950s and 1960s pneumatic heating, ventilation, and air conditioning control systems with current-day direct digital systems to address the buildings' supply/return/exhaust air rebalancing issues;
- Replacement of aging and failing electrical distribution systems to provide safe working conditions and to accommodate current and expanding research capacity requirements;

- Providing back-up power capabilities for mission resiliency;
- Replacement of motor control centers, transformers, switchgear, network protectors, buss ducts, panels, UPS systems, fire alarm systems, and variable frequency drives no longer supported by manufacturers and for which parts are no longer available;
- Replacement of the obsolete 30-year old IT network infrastructure that can no longer support the capacity and speed required by facility and scientific systems;
- Replacement of the aging mechanical and electrical systems that can no longer support the load requirement of IT systems;
- Address degradations to the buildings' envelope exteriors and interior architectural systems – energy inefficient and/or leaking windows and doors, uninsulated rollup doors that do not seal, below grade water infiltration through foundation cracks, worn out ceilings and flooring, and lack of insulation in exterior walls;
- Replacement of roofs;
- Refurbishment of elevators;
- Updating buildings and exterior pathways to be Americans with Disabilities Act compliant;
- Abatement of asbestos; and
- Repair of deteriorating road, parking lot, and sidewalk surfaces.

Statement of Operating Objectives

Facilities that can maintain environmental conditions (temperature, relative humidity, and air quality) are essential to NIST laboratory programs to maintain U.S. leadership in critical technologies such as quantum information science, advanced communications, advanced manufacturing and engineering biology; and to pursue the fields of quantum biology, the circular economy, forensic sciences, advanced environmental measurements and others. NIST measurement capabilities must be maintained at the highest levels of precision and accuracy to meet the increasing requirements of its users. Facilities that can maintain ideal environmental conditions would eliminate lost productivity by researchers who currently spend their valuable time recalibrating scientific instruments and also enable more accurate measurements. If researchers could work in optimal research environments, efficiency and effectiveness would increase providing the opportunity to maximize their time on mission-related activities. Facilities must also provide an IT infrastructure with supporting power and cooling systems that have both enterprise and research infrastructure components to provide the speed and capacity necessary to meet ever increasing computing power requirements for NIST to maintain and improve its leading role in the fields of cybersecurity, artificial intelligence, privacy, and advanced communications. In addition to being environmentally sound, all facilities must have appropriate back-up power capabilities for mission resiliency and be compliant with various health and safety regulations. Other major conditions that must be addressed are the needs to increase the capacity of NIST 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) funds to maintain and upgrade facilities at a level necessary to carry out the mission of NIST and DOC. For decades, NIST's SCMMR funding has been well below the estimated value for maintaining its facilities and well below the funding required to improve "facilities in a declining state."[3] The infrastructure of NIST's Boulder and Gaithersburg campuses is

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

exceeding 60 to 70 years old and is having critical level incidents that are increasing exponentially. These campuses have utility distribution systems and infrastructure that need to be maintained and replaced as equipment exceeds its useful life and parts become obsolete or facilities could fail – halting valuable research work. NIST facilities are in an accelerated rate of decline and need extensive work to reverse the trend.

At the end of FY 2021, NIST's facilities maintenance and improvements backlog included $542.4 million in building and $257.0 million in site and utility infrastructure. However, the FY 2021 site and utility backlog was not updated for IT infrastructure which went up an additional $35.0 million, bringing the total NIST facilities backlog to $834.4 million. NIST continues to experience ongoing utility infrastructure issues similar to the hot water riser failures in Building 101 (NIST's headquarters building) in Gaithersburg, MD where between April 2021 and February 2022 there were 13 separate riser failures resulting in flooding of 54 separate office spaces. Degrading pipes have been the primary cause of water loss at the Gaithersburg campus due to the inability to return and reuse adequate condensate for steam production. Over the past three years, a temporary fix was installed to mitigate this loss from 70,000 gallons of water per day to the current level of 50,000 gallons daily. While this temporary fix was installed to mitigate these losses, the underground piping downstream has now started losing equivalent amounts of water. Recent issues have developed indicating a further degradation of the Gaithersburg campus chilled water system.

Approximately 65 percent of NIST's facilities have not been renovated or newly constructed in the last 20 years. The declining condition of the facilities shows a strong justification for increasing SCMMR funding until the facilities can be brought back above the minimum Facility Condition Index (FCI) values established by DOC. Use of industry standards, benchmarks, and NRC guidelines ensures the lowest cost possible to the taxpayer while enabling agencies to receive the investment necessary to support work toward improving facilities deficiencies. Principal criteria used in establishing priorities include protection of the Government's investment, health and safety of building occupants, and repairs and alterations that avert deterioration and damage to buildings with continued support to facility systems and equipment. As NIST effectively implements current and proposed spend plans essential to long-term positioning of resources to improve deficiencies, consistent annual funding adhering to industry norms and guidelines is essential.

Example objectives of Safety, Capacity, Maintenance, and Major Repairs (SCMMR) funding:

- Develop a utility infrastructure specific replacement program that:
  - Continues 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/replacements, to include underground electrical, chilled water, steam, condensate, and natural gas distribution systems;
  - Continue site infrastructure upgrades and repairs, to include roads, loading docks, pedestrian walk areas, and storm water drainage; and
  - Continue site upgrades to the IT network infrastructure.
- Enable or maintain building environmental conditions required for meeting scientific requirements;
- Continue the repair and upgrade of facilities that have a high impact on staff and visitor safety;

- Continue abatement of hazardous materials from site buildings and structures;
- Continue modifications of facilities 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 the sustainability requirements stipulated in Executive Order 13693.

In concert with these objectives, some of the projects planned to accomplish with FY 2023 funding:

- Correction of 90 percent or greater of the deferred maintenance backlog in Building 235 while taking advantage of a once in a decade year-long shutdown of the research nuclear reactor;
- Capacity improvements, life safety corrective measures, and major component replacements at both campuses' Central Utility Plants;
- Replacement of the underground sewer and domestic water systems in Boulder, CO;
- Upgrades to the chilled water distribution system in Boulder, CO;
- Correction of all deferred maintenance to the research building in Kauai, HI;
- Fire alarm panel replacements in Gaithersburg, MD;
- Replacement of electrical switchgear in two buildings in Gaithersburg, MD;
- Begin a multi-year replacement project for heating, ventilating, and air conditioning systems in Gaithersburg, MD;
- $3 million or more for IT infrastructure upgrades to include upgraded fiber and system hardware to increase transmission speeds and provide capacity upgrades;
- Address a deteriorating condensate distribution system on the south side of the Gaithersburg, MD campus;
- Begin a multi-year rehabilitation program for roads and parking lots in Gaithersburg, MD; and
- Americans with Disabilities Act compliance projects at both campuses.

Increased annual funding over some of the last few years has allowed development of forward-leaning planning for addressing these critical facility and infrastructure necessities. While major improvements are still required due to the size of the portfolio of facilities, some recent and ongoing examples of work being implemented include:

- Over 50 percent of SCMMR funding is invested in utility infrastructure with 57 projects in procurement;
- Designs in progress for correction of a majority of deferred maintenance in Building 235, our reactor building, 14 roof replacements, and paving rehabilitation program;
- Replacement of failing heating, ventilating and air conditioning systems in three buildings;
- Upgrades to Building 101, the main headquarters building, a structure that hasn't seen major renovation since being one of the first built on campus in the early 1960s;
- Replacement of major electrical equipment in six buildings and designs in progress for replacements in three others;
- Over $10 million in investments in upgrading and replacement of IT infrastructure equipment and distribution wiring; and
- Beginning of Americans with Disabilities Act upgrade projects at both campuses.

Construction of Research Facilities funding has allowed the award of Wings 4 and 5 in Building 1 in Boulder, CO for complete renovation as well as a large portion of Building 245 in Gaithersburg, MD to include two building additions.

Simply stated, NIST is continuously directed by Congress to expand its research efforts in the industries of the future and to strengthen U.S. standards leadership. That, coupled with NIST's role in technology transfer to advance the U.S. economy, requires facilities that enable the work required to meet these mandates and expectations from our external stakeholders and thus needs the appropriate level of funding to do so.

Explanation and Justification

Line Item		2021 Actual		2022 Annualized CR		2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and Major Renovations	Pos./BA	9	$6,095	0	$6,095	0	$6,095
	FTE/Obl	12	123,068	0	34,807	0	6,095
Safety, Capacity, Maintenance And Major Repairs	Pos./BA	107	73,905	149	73,905	149	77,352
	FTE/Obl	131	127,523	145	107,708	145	77,352
External Projects	Pos./BA	0	0	0	0	0	0
	FTE/Obl	0	0	0	874	0	0

Construction of Research Facilities (Total Funding: $83.4 million and 149 Positions)

With SCMMR base funding, NIST will fund annual labor, operations and maintenance expenses as well as 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 will be reprioritized as appropriate.

NIST Campus - Implementation Plan

NIST awarded a contract to develop a 20-year implementation plan for the Gaithersburg and Boulder master plans. This combined plan includes timing, phasing, and budget estimates for each project. The contractor conducted a lengthy analysis of each campus and the associated master plan. In October 2020, the final report was submitted to the DOC for submission to Congress.[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 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and major renovations	Pos/BA	0	$6,095	0	0	0	($6,095)
	FTE/Obl.	0	6,095	0	0	0	(6,095)

Studies decrease (-$6,095, 0 FTE/0 Positions) - NIST requests a decrease in the amount of $6.1 million to reflect the one-time construction drop out for the early programming and planning studies for the Building 222 modernization and Gates A&F projects.

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	2021 Actuals	2022 Enacted	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$14,289	$14,289	$0	$0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	548	548	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	14,837	14,837	0	0	0
12.1	Civilian personnel benefits	5,101	5,099	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	36	36	0	0	0
22	Transportation of things	15	15	0	0	0
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	3	3	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	269	317	0	0	0
24	Printing and reproduction	4	4	0	0	0
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	212	0	0	0	0
25.2	Other services from non-Federal sources	103,815	83,337	$6,095	0	($6.095)
25.3	Other goods and services from Federal sources	441	441	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1	1	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	5,043	5,043	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,130	1,130	0	0	0
31	Equipment	3,499	5,715	0	0	0
32	Lands and structures	116,185	26,712	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	250,591	143,389	6,095	0	(6,095)

Department of Commerce
National Institute of Standards and Technology
Construction of Research Facilities
PROGRAM CHANGES FOR 2023
(Dollar amounts in thousands)

		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Safety, Capacity, Maintenance and Major Repairs	Pos/BA	149	$77,352	149	$120,285	0	$42,933
	FTE/Obl.	145	77,352	145	120,285	0	42,933

Repair and Revitalization of NIST Facilities ($42,933, 0 FTE/0 Positions) - NIST is requesting $120.3 million to make progress in addressing its major utility infrastructure maintenance backlog (steam, electrical, chilled water, etc.) and to modernize its IT networking infrastructure to deliver the speed, reliability, and capacity needed to meet the large data and computing demands of high-technology research facilities. . While this funding will not alleviate the entire maintenance backlog in a single year, it is necessary to begin to reverse the trend of declining facilities condition across the Boulder and Gaithersburg campuses. This funding will support the highest priority infrastructure improvements including:

1) Upgrade of IT networks which will enable NIST researchers to manage and analyze volumes of data generated from cutting-edge research and to effectively exchange large volumes of research data between NIST sites, and collaborate with National Laboratories (e.g. Argonne and Brookhaven National Laboratories), and other institutions;

2) Utility infrastructure projects, including water piping/underground utility replacements, decoupling of buildings in Boulder, air handling units and high voltage equipment replacements in Gaithersburg, program of requirements for modernization of the Gaithersburg Central Utility Plant, and replacement of switchgear/panels and air conditioning units;

3) Life-safety projects, including arc flash studies and replacement of failed arch beam cranes;

4) Roofing projects for 12 buildings in Gaithersburg; and

5) Modifications of facilities to comply with the Access to Federal Buildings Act, the Architectural Barriers Act, and the Americans with Disabilities Act.

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	2021 Actuals	2022 Enacted	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11.1	Full-time permanent compensation	$14,289	$14,289	$14,916	$14,916	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	548	548	572	572	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	14,837	14,837	15,488	15,488	0
12.1	Civilian personnel benefits	5,101	5,099	5,305	5,305	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	36	36	36	46	$10
22	Transportation of things	15	15	16	18	2
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	3	3	3	3	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	269	317	295	1,107	812
24	Printing and reproduction	4	4	4	6	2
25	Other contractual services	0	0	0	0	0
25.1	Advisory and assistance services	212	0	244	244	0
25.2	Other services from non-Federal sources	103,815	83,337	44,594	86,244	41,650
25.3	Other goods and services from Federal sources	441	441	443	626	183
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1	1	1	1	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	5,043	5,043	5,091	5,273	182
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,130	1,130	1,180	1,240	60
31	Equipment	3,499	5,715	4,652	4,684	32
32	Lands and structures	116,185	26,712	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	250,591	143,389	77,352	120,285	42,933

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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	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/(Decrease) from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$14,289	$14,289	$14,916	$14,916	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	548	548	572	572	0
11.9	**Total personnel compensation**	14,837	14,837	15,488	15,488	0
12.1	Civilian personnel benefits	5,101	5,099	5,305	5,305	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	36	36	36	46	10
22	Transportation of things	15	15	16	18	2
23.1	Rental payments to GSA	3	3	3	3	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	269	317	295	1,107	$812
24	Printing and reproduction	4	4	4	6	2
25.1	Advisory and assistance services	212	0	244	244	0
25.2	Other services from non-Federal sources	103,815	83,337	50,689	86,244	35,555
25.3	Other goods and services from Federal sources	441	441	443	626	183
25.5	Research and development contracts	1	1	1	1	0
25.7	Operation and maintenance of equipment	5,043	5,043	5,091	5,273	182
26	Supplies and materials	1,130	1,130	1,180	1,240	60
31	Equipment	3,499	5,715	4,652	4,684	32
32	Land and structures	116,185	26,712	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
99	Total Obligations	250,591	143,389	83,447	120,285	36,838

Exhibit 16

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/(Decrease) from 2023 Base
99	Total Obligations	$250,591	$143,389	$83,447	$120,285	$36,838
	Less prior year recoveries	(4,231)	0	0	0	0
	Less prior year refunds	(1)	0	0	0	0
	Less prior year unobligated balance	(229,748)	(63,389)	0	0	0
	Plus unobligated balance end of year	63,389	0	0	0	0
	Total Budget Authority/Appropriation	80,000	80,000	83,447	120,285	36,838
	Plus Transfers from Other Accounts	0	0	0	0	0
	Appropriation	80,000	80,000	83,447	120,285	36,838
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	143	145	110	110	0
	Other than full-time permanent	0	0	0	0	0
	Total	143	145	110	110	0
	Authorized Positions:					
	Full-time permanent	113	146	116	116	0
	Other than full-time permanent	3	3	0	0	0
	Total	116	149	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. $120,285,000 to remain available until expended, no specific authority.

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 2021 Actual	FY 2022 Annualized CR	FY 2023 Estimate
Consulting Services			
Management and professional support services	$207	0	0
Studies, analyses, and evaluations	0	0	0
Engineering and technical services	5	0	$244
Total	212	0	244

Significant Activities

Advisory and assistance services funded by the Construction of Research Facilities appropriation includes assisting the development of program requirements for addition, replacement, and consolidation of existing facilities and structures, services for interior and exterior signage standards, and conceptual design for new facilities.

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. These services provide for Construction of Research Facilities mainly relate to building construction architectural systems, facilities capital planning, and safety.

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

	Positions	FTE	Budget Authority	Direct Obligations
Annualized CR, 2022	618	618	0	0
Adjustment to account for overhead positions and FTE supported by the mandatory NIST Public Safety Communications Research Fund and American Rescue Plan Act, both of which are ending in FY 2022.	56	56	0	0
2023 Base	674	674	0	0
Transfer from STRS program changes for equipment investments	0	0	0	0
2023 Estimate	674	674	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	2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Laboratory Programs										
WCF transfer		0		0		0		0		0
Reimbursables	525	$147,303	578	$145,664	629	$133,668	629	$133,668	0	0
WCF investments	0	(7,987) [2/]	0	17,510	0	0	0	0	0	0
Subtotal	525	139,316	578	163,174	629	133,668	629	133,668	0	0
Corporate Services										
WCF transfer		0		0		0		0		0
Reimbursables	12	4,321	14	5,830	15	5,758	15	5,758	0	0
WCF investments	0	158	0	(18) [2/]	0	0	0	0	0	0
Subtotal	12	4,479	14	5,812	15	5,758	15	5,758	0	0
Standards Coordination and Special Programs [1/]										
WCF transfer		0		0		0		0		0
Reimbursables	20	8,146	24	9,599	28	9,345	28	9,345	0	0
WCF investments	0	27	0	(50) [2/]	0	0	0	0	0	0
Subtotal	20	8,173	24	9,549	28	9,345	28	9,345	0	0
Manufacturing USA										
WCF transfer		0		0		0		0		0
Reimbursables	0	0	0	0	0	0	0	0	0	0
WCF investments	0	2	0	(22) [2/]	0	0	0	0	0	0
Subtotal	0	2	0	(22)	0	0	0	0	0	0
Hollings Manufacturing Extension Partnership										
WCF transfer		0		0		0		0		0
Reimbursables	1	109	2	2,000	2	2,000	2	2,000	0	0
WCF investments	0	12	0	(4) [2/]	0	0	0	0	0	0
Subtotal	1	121	2	1,996	2	2,000	2	2,000	0	0

	2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 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	558	$159,879	618	$163,093	674	$150,771	674	$150,771	0	0
WCF investments	0	(7,788)	0	17,416	0	0	0	0	0	0
Grand Total	558	152,091	618	180,509	674	150,771	674	150,771	0	0

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

[2/] Repayment of loan principal for past invested equipment over current year's investment, resulting a net negative amount.

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

	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
Total Obligations	$152,091	$180,509	$150,771	$150,771	0
Offsetting collections from:					
Federal funds	(133,531)	(102,930)	(91,276)	(91,276)	0
Non-Federal sources	(60,069)	(77,579)	(59,495)	(59,495)	0
Total offsetting collections	(193,600)	(180,509)	(150,771)	(150,771)	0
Unobligated balance, start of year	(150,386)	(188,983)	(188,983)	(188,983)	0
Unobligated balance, end of year	188,983	188,983	188,983	188,983	0
Change in uncollected customer payments - Federal	2,912	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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratory Programs	Pos./BA	635	$139,316	578	$163,174	629	$133,668	629	$133,668	0	0
	FTE/Obl.	525	139,316	578	163,174	629	133,668	629	133,668	0	0
Corporate Services	Pos./BA	14	4,479	14	5,812	15	5,758	15	5,758	0	0
	FTE/Obl.	12	4,479	14	5,812	15	5,758	15	5,758	0	0
Standards Coordination	Pos./BA	24	8,173	24	9,549	28	9,345	28	9,345	0	0
and Special Programs [1/]	FTE/Obl.	20	8,173	24	9,549	28	9,345	28	9,345	0	0
Manufacturing USA	Pos./BA	0	2	0	(22) [2/]	0	0	0	0	0	0
	FTE/Obl.	0	2	0	(22) [2/]	0	0	0	0	0	0
Hollings Manufacturing	Pos./BA	1	121	2	1,996	2	2,000	2	2,000	0	0
Extension Partnership	FTE/Obl.	1	121	2	1,996	2	2,000	2	2,000	0	0
WCF investments	Pos./BA	674	152,091	618	180,509	674	150,771	674	150,771	0	0
Total	FTE/Obl.	558	152,091	618	180,509	674	150,771	674	150,771	0	0

[1/] Includes Baldrige Performance Excellence Program (BPEP).
[2/] Repayment of loan principal for past invested equipment over current year's investment, resulting a net negative amount.

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 employment and reimbursable obligations associated with the reimbursable work performed by NIST for other agencies, the public, and WCF investments. NIST's reimbursable services consist of technical work performed for other Federal agencies; state and local governments; and the private sector, including calibrations and special tests, advisory services, the sale of Standard Reference Materials and Baldrige Performance Excellence Program fees.

The unique measurement and standards expertise, developed with appropriated funding, gives NIST the capability to perform these services on a reimbursable basis. NIST accepts other agency work, based on an established set of criteria, which include: (1) the need for traceability of measurements to national standards; (2) the need for work which cannot or will not be addressed by the private sector; (3) work supported by legislation that authorizes or mandates certain services; (4) work which would result in an unavoidable conflict of interest if carried out by the private sector or regulatory agencies; and (5) requests by the private sector for NIST action or services.

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

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$63,584	$65,585	$68,290	$68,290	0
11.3	Other than full-time permanent	5,071	5,071	5,071	5,071	0
11.5	Other personnel compensation	985	985	985	985	0
11.9	**Total personnel compensation**	69,640	71,641	74,346	74,346	0
12.1	Civilian personnel benefits	24,430	24,785	25,264	25,264	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	176	449	250	250	0
22	Transportation of things	378	556	309	309	0
23.1	Rental payments to GSA	29	30	27	27	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	3,308	3,478	3,250	3,250	0
24	Printing and reproduction	79	115	64	64	0
25.1	Advisory and assistance services	182	20	20	20	0
25.2	Other services from non-Federal sources	11,755	15,736	8,732	8,732	0
25.3	Other goods and services from Federal sources	7,431	7,755	6,110	6,110	0
25.5	Research and development contracts	10,867	19,066	10,579	10,579	0
25.7	Operation and maintenance of equipment	3,206	5,986	3,321	3,321	0
26	Supplies and materials	6,321	11,707	6,802	6,802	0
31	Equipment	2,362	2,362	2,362	2,362	0
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	11,927	16,823	9,335	9,335	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
99	Total Obligations	152,091	180,509	150,771	150,771	0

Exhibit 16

Personnel Data	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
Full-time equivalent employment:					
Full-time permanent	494	554	610	610	0
Other than full-time permanent	64	64	64	64	0
Total	558	618	674	674	0
Authorized Positions:					
Full-time permanent	655	599	655	655	0
Other than full-time permanent	19	19	19	19	0
Total	674	618	674	674	0

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

	FY 2021 Actual	FY 2022 Annualized CR	FY 2023 Estimate
Consulting Services			
Management and professional support services	$164	$20	$20
Studies, analyses, and evaluations	0	0	0
Engineering and technical services	18	0	0
Total	182	20	20

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.

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

	Positions	FTE	Budget Authority	Direct Obligations	Appro-priation
President's Budget, 2022	0	0	0	0	0
2023 Adjustments to Base	0	0	0	0	0
2023 Base/Estimate	0	0	0	0	0

Comparison by activity/subactivity with totals by activity		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/(Decrease) from 2023 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

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		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/(Decrease) from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NIST Public Safety Communications Research Fund	Pos/Approp	97	0	111	0	0	0	0	0	0	0
	FTE/Obl.	111	$63,687	111	$46,816	0	0	0	0	0	0

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

	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
Total Obligations	$63,687	$46,816	0	0	0
Offsetting collections from:					
Unobligated balance from offsetting collections, start of year	0	0	0	0	0
Unobligated balance from offsetting collections, end of year	0	0		0	
Adjustments for:					
Recoveries	(1,633)	0	0	0	0
Refunds	(203)	0	0	0	0
Unobligated balance, start of year	(108,667)	(46,816)	0	0	0
Unobligated balance from offsetting collections, end of year	46,816	0	0	0	0
Budget Authority/Appropriation	0	0	0	0	0

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

Activity: NIST Public Safety Communications Research Fund

Line Item		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NIST Public Safety Communications	Pos/Approp	0	0	0	0	0	0	0	0	0	0
Research Fund	FTE/Obl.	0	0	0	0	0	0	0	0	0	0

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

Activity: NIST Public Safety Communications Research Fund

Comparison by activity/subactivity		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/(Decrease) from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NIST Public Safety Communications	Pos/Approp	97	0	111	0	0	0	0	0	0	0
Research Fund	FTE/Obl.	111	$63,687	111	$46,816	0	0	0	0	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. Funds expired for obligation in FY 2022 but outlays continue into FY 2023.

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

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$12,442	$11,444	0	0	0
11.3	Other than full-time permanent	3,077	2,704	0	0	0
11.5	Other personnel compensation	276	288	0	0	0
11.9	**Total personnel compensation**	15,795	14,437	0	0	0
12.1	Civilian personnel benefits	5,483	4,656	0	0	0
13	Benefits for former personnel	0	1	0	0	0
21	Travel and transportation of persons	39	200	0	0	0
22	Transportation of things	17	5	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 miscellaneous charges	1,015	1,680	0	0	0
24	Printing and reproduction	10	0	0	0	0
25.1	Advisory and assistance services	803	3,533	0	0	0
25.2	Other services from non-Federal sources	6,644	2,287	0	0	0
25.3	Other goods and services from Federal sources	5,474	0	0	0	0
25.5	Research and development contracts	4,591	0	0	0	0
25.7	Operation and maintenance of equipment	332	239	0	0	0
26	Supplies and materials	648	742	0	0	0
31	Equipment	6,779	820	0	0	0
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	16,057	18,216	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	63,687	46,816	0	0	0

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
99	Total Obligations	$63,687	$46,816	0	0	0
	Adjustments for:					
	Recoveries	(1,633)	0	0	0	0
	Refunds of prior year paid obligations	(203)	0	0	0	0
	Unobligated balance from offsetting collections, start of year	(108,667)	(46,816)	0	0	0
	Unobligated balance from offsetting collections, end of year	46,816	0	0	0	0
	Appropriation	0	(0)	0	0	0
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent:	87	87	0	0	0
	Other than full-time permanent	24	24	0	0	0
	Total	111	111	0	0	0
	Authorized Positions:					
	Full-time permanent	97	87	0	0	0
	Other than full-time permanent	0	24	0	0	0
	Total	97	111	0	0	0

Department of Commerce
National Institute of Standards and Technology
PUBLIC SAFETY COMMUNICATIONS RESEARCH FUND
APPROPRIATION LANGUAGE AND CODE CITATIONS

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

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

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

2. MANDATORY ACCOUNT: Public Safety Communications Research Fund (PSCRF): 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, $300 million in mandatory funds for NIST from the spectrum auction proceeds, helps 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 $46.8M in total resources available for obligation in FY 2022.

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 2021 Actual	FY 2022 Annualized CR	FY 2023 Estimate
Consulting Services			
Management and professional support services	0	0	0
Studies, analyses, and evaluations	$82	0	0
Engineering and technical services	722	$3,818	0
Total	804	3,818	0

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.

Department of Commerce
National Institute of Standards and Technology
American Rescue Plan Act (P.L. 117-2)
SUMMARY OF RESOURCE REQUIREMENTS - MANDATORY
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations	Appro-priation
President's Budget, 2022	0	0	0	59,961	0
Less: American Rescue Plan Act (P.L. 117-2)	0	0	0	0	0
2023 Base/Estimate	0	0	0	59,961	0

Comparison by activity with totals by activity		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/(Decrease) from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
American Rescue Plan Act	Pos/Approp	11	$90,039	11	0	0	0	0	0	0	0
(P.L. 117-2)	FTE/Obl.	8	90,039	7	59,961	0	0	0	0	0	0
Budget Authority/Appropriation			90,039		59,961		0		0		0

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Department of Commerce
National Institute of Standards and Technology
American Rescue Plan Act (P.L. 117-2)
PROGRAM AND PERFORMANCE: MANDATORY
(Dollar amounts in thousands)

Activity: American Rescue Plan Act (P.L. 117-2)

Line Item		2021 Actual		2022 Annualized CR		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
American Rescue Plan Act	Pos/Approp	11	$90,039	11	0	0	0	0	0	0	0
(P.L. 117-2)	FTE/Obl.	8	90,039	7	59,961	0	0	0	0	0	0

Department of Commerce
National Institute of Standards and Technology
American Rescue Plan Act (P.L. 117-2)
JUSTIFICATION OF PROGRAM AND PERFORMANCE

Activity: American Rescue Plan Act (P.L. 117-2)

There is no base funding for the program.

Public Law 117-2, The American Rescue Plan Act, (ARP Act) in Subtitle E – Science and Technology, Section 7501 (as enacted March 11, 2021) made available $150,000,000 for the National Institute of Standards and Technology's (NIST).

SEC. 7501. NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.

In addition to amounts otherwise made available, there are appropriated to the National Institute of Standards and Technology for fiscal year 2021, out of any money in the Treasury not otherwise appropriated, $150,000,000, to remain available until September 30, 2022, to fund awards for research, development, and testbeds to prevent, prepare for, and respond to coronavirus. None of the funds provided by this section shall be subject to cost share requirements.

Funds expired for obligation in FY 2022 but outlays continue into FY 2023.

Department of Commerce
National Institute of Standards and Technology
American Rescue Plan Act (P.L. 117-2)
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
11	Personnel compensation					
11.1	Full-time permanent	$2,750	$2,750	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	69	69	0	0	0
11.9	**Total personnel compensation**	2,819	2,819	0	0	0
12.1	Civilian personnel benefits	970	970	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	11	11	0	0	0
22	Transportation of things	25	25	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 miscellaneous charges	384	384	0	0	0
24	Printing and reproduction	8	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	1,641	1,641	0	0	0
25.3	Other goods and services from Federal sources	580	576	0	0	0
25.5	Research and development contracts	4	4	0	0	0
25.7	Operation and maintenance of equipment	302	302	0	0	0
26	Supplies and materials	119	119	0	0	0
31	Equipment	176	176	0	0	0
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	83,000	52,934	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	90,039	59,961	0	0	0

	Object Class	2021 Actual	2022 Annualized CR	2023 Base	2023 Estimate	Increase/Decrease from 2023 Base
99	Total Obligations	$90,039	$59,961	0	0	0
	Adjustments for:					
	Recoveries	0	0	0	0	0
	Refunds of prior year paid obligations	0	0	0	0	0
	Unobligated balance from offsetting collections, start of year	0	(59,961)	0	0	0
	Unobligated balance from offsetting collections, end of year	59,961	0	0	0	0
	Appropriation	150,000	0	0	0	0

Department of Commerce
National Institute of Standards and Technology
American Rescue Plan Act (P.L. 117-2)
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: American Rescue Plan Act: Public Law 117-2, The American Rescue Plan Act, (ARP Act) in Subtitle E – Science and Technology, Section 7501 (as enacted March 11, 2021) made available $150,000,000 for the National Institute of Standards and Technology's (NIST), to remain available until September 30, 2022, to fund awards for research, development, and testbeds to prevent, prepare for, and respond to coronavirus. None of the funds provided by this section shall be subject to cost share requirements.

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Department of Commerce

National Institute of Standards and Technology

REIMBURSABLE PROGRAM AND WORKING CAPITAL FUND INVESTMENTS

(Dollar amounts in thousands)

	FY 2021 Actual	FY 2022 Annualized CR	FY 2023 Estimate
Department of Defense			
Air Force	$8,846	$9,415	$9,811
Army	859	2,574	2,584
Navy	97	2,680	2,460
Other, Department of Defense	20,357	19,450	17,211
Subtotal, Department of Defense	30,159	34,119	32,066
Department of Agriculture	639	516	1,755
Department of Commerce	21,503	22,996	19,634
Department of Energy	2,381	3,933	2,764
Dept. of Health & Human Services	3,512	3,671	3,571
Dept. of Homeland Security	14,758	15,494	8,567
Dept. of Housing & Urban Development	79	0	0
Department of Justice	7,078	6,255	6,796
Department of State	750	0	0
Department of Transportation	1,127	1,090	890
Department of the Treasury	388	0	0
Department of Veterans Affairs	81	100	100
General Services Administration	256	259	7
National Aeronautics & Space Admin.	10,081	7,192	7,281
National Science Foundation	3,188	2,361	3,365
Nuclear Regulatory Commission	672	711	404
Other	6,348	4,234	4,076
Subtotal, Other Agency	103,000	102,931	91,276

	FY 2021 Actual	FY 2022 Annualized CR	FY 2023 Estimate
Calibrations & Testing	$7,304	$7,911	$7,911
Technical & Advisory Services	30,455	32,516	31,696
Standard Reference Materials	19,120	19,735	19,888
Subtotal, Other Reimbursables	56,879	60,162	59,495
Total, Reimbursable Program	159,879	163,093	150,771
Equipment Investments	14,712	32,444	32,444
IE Amortization	(21,715)	(15,028)	(32,444)
WCF Operating Adjustments	(785)	0	0
Total, WCF Investments	(7,788)	17,416	0
Total, Reimbursable Program and WCF Investments	152,091	180,509	150,771

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 [1/]

(Obligations in thousands)

	FY 2021			FY 2022			FY 2023			
Source and Use of Funds Spent	Perm. Pos. [2/]	FTE	Oblig.	Perm. Pos. [2/]	FTE	Oblig.	Perm. Pos. [2/]	FTE	Oblig.	Approp. Requested
Direct Funding										
Scientific and technical research and services	2,637	2,382	$803,618	2,634	2,520	$839,214	2,883	2,711	$976,446	$974,946
Industrial technology services	99	100	171,306	104	102	171,996	164	147	372,318	372,318
Construction of research facilities	116	143	250,591	149	145	143,389	149	145	120,285	120,285
Total, direct funding	2,852	2,625	1,225,515	2,887	2,767	1,154,599	3,196	3,003	1,469,049	1,467,549
Reimbursable Funding and WCF Investments										
Construction of research facilities - building surcharge	0	0	885	0	0	1,033	0	0	0	
Research, development and supporting services:										
Federal government	440	364	103,000	404	404	102,931	440	440	91,276	
Calibrations and tests, technical and advisory services:										
Federal government	19	16	5,927	18	18	6,258	19	19	6,117	
Public and non-federal government	93	77	28,584	85	85	30,179	93	93	29,500	
Subtotal, Services	112	93	34,511	103	103	36,437	112	112	35,617	
National Voluntary Laboratory Accreditation Program	20	17	3,248	18	18	3,990	20	20	3,990	
Standard reference materials (SRMs):										
SRM Sales:										
Federal government	2	1	351	2	2	339	2	2	342	
Public and non-federal government	100	83	20,037	91	91	19,396	100	100	19,546	
Subtotal, SRM sales	102	84	20,388	93	93	19,735	102	102	19,888	
SRM investment adjustment	0	0	(1,268)	0	0	0	0	0	0	
Subtotal, SRM	102	84	19,120	93	93	19,735	102	102	19,888	
Total, Reimbursable program	674	558	160,764 [3/]	618	618	164,126 [3/]	674	674	150,771	
WCF Investments and Operating Adjustments										
WCF investments	0	0	14,712	0	0	32,444	0	0	32,444	
WCF operating adjustments	0	0	(785)	0	0	0	0	0	0	
Total, WCF Investments and operating adjustments	0	0	13,927	0	0	32,444	0	0	32,444	
Total, NIST program	3,526	3,183	1,400,206	3,505	3,385	1,351,169	3,870	3,677	1,652,264	
Offsetting adjustment for amortization of equipment	0	0	(21,715)	0	0	(15,028)	0	0	(32,444)	
Adjusted total, NIST program	3,526	3,183	1,378,491	3,505	3,385	1,336,141	3,870	3,677	1,619,820	

For comparison reason, mandatory funding, such as NIST PSCRF and American Rescue Plan (ARP) are not included.

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.

Total reimbursable numbers are different from the next section due to inclusion of CRF reimbursable obligations.

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

	2021 Actual	2022 Annualized CR	2023 Estimate
Periodicals	0.0	0.0	0.0
Pamphlets	$10.0	$10.0	$10.0
Audiovisual Products	85.0	100.0	100.0
Total	95.0	110.0	110.0

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. In order for our efforts to stimulate innovation, foster industrial competitiveness, and improve the quality of life, we need to broadly disseminate our work. NIST mainly accomplishes this through its primary public web site, www.nist.gov, and other subsidiary sites. We also produce collateral and AV materials, almost all of which direct individuals back to the www.nist.gov resource for additional information.

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 on the 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.

Department of Commerce
National Institute of Standards and Technology
AVERAGE SALARY AND BENEFITS

	2021 Actual	2022 Annualized CR	2023 Estimate
Average ES	$266,970	$274,178	$286,790
Average scientific and professional	266,811	274,015	286,619
Average career path	174,904	179,626	187,889
Average ungraded positions	89,970	92,215	96,457

FY 2022 average salaries reflect a 2.7 percent pay raise and FY 2023 average salaries reflect a 4.6 percent pay raise. Benefits rate of 35% is used per the OPM rate assumption.

Department of Commerce
National Institute of Standards and Technology
IMPLEMENTATION STATUS OF GAO AND OIG RECOMMENDATIONS

31 U.S.C. 720, as amended January 3, 2019, requires the head of a federal agency to submit a written statement of the actions taken or planned on Government Accountability Office (GAO) recommendations to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 180 calendar days after the date of the report.

The Good Accounting Obligation in Government Act (GAO-IG Act), passed on January 3, 2019, (P.L. 115-414) requires each agency to include, in its annual budget justification, a report that identifies each public recommendation issued by GAO and the agency's office of the inspector general (OIG) which has remained unimplemented for one year or more from the annual budget justification submission date. In addition, the Act requires a reconciliation between the agency records and the IGs' Semiannual Report to Congress.

Section 1. Recommendations for which action plans were finalized since the last appropriations request.

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Action(s) Planned	Action Status (Planned, In-Progress, or Complete)	Target Completion Date	Recommendation Status (Planned, In-Progress, or Complete)
OIG-21-024-A	Audit of National Institute of Standards and Technology Working Capital Fund For Fiscal Year Ended September 30, 2019	5/3/2021	1	Revise and finalize the Management Report on Expired Agreements Procedure. The revised procedure should specify how often the Management Report on Expired Agreements should be created by the Reimbursable Group (e.g., quarterly) and submitted to the Organizational Unit for review, evaluation and approval. Designate a specific period of time for the resolution of	1) Review and discuss current procedures with the Reimbursable Agreements (RA) Accountants and make appropriate updates to include a specific period of time to resolve undelivered orders (UDOs) and unmatched Cost. 2) Consult with Office of Financial Resource Management (OFRM) Senior Management Advisors and Administrative Officers (SMA/AO) representatives to	In Progress	9/30/2022	In Progress

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Action(s) Planned	Action Status (Planned, In-Progress, or Complete)	Target Completion Date	Recommendation Status (Planned, In-Progress, or Complete)
				UDOs and unmatched costs.	discuss period of time to resolve UDOs and Unmatched Cost and incorporate suggested times to updated procedures. 3) Introduce and discuss new timelines and procedures with broader SMA/AO Community; solicit and incorporate feedback and suggestions. 4) Implement and distribute communication on final revised process. Develop long term tracking automation tool using ServiceNow Platform.			
OIG-21-024-A	Audit of National Institute of Standards and Technology Working Capital Fund For Fiscal Year Ended September 30, 2019	5/3/2021	2	Revise the Revenue Cycle Memo to concisely document the current process for the close out of Expired Reimbursable Agreement Orders.	Review and discuss current cycle memo with the RA Accountants and make appropriate updates detailing the agreements closing process.	In Progress	6/30/2022	In Progress
OIG-21-024-A	Audit of National Institute of Standards and Technology Working	5/3/2021	3	Improve monitoring procedures, as needed, to ensure expiring Agreements and Orders whose transfer authority is the Economy Act are	1) Review current business processes for monitoring expiring and expired agreements and discuss possible ways to improve	In Progress	9/30/2022	In Progress

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Action(s) Planned	Action Status (Planned, In-Progress, or Complete)	Target Completion Date	Recommendation Status (Planned, In-Progress, or Complete)
	Capital Fund For Fiscal Year Ended September 30, 2019			clearly identified and monitored.	identifying Economy Act orders for closeout in accordance with the requirements of the Economy Act. 2) Consult with Commerce Business Systems (CBS) support team regarding possible improvements to current reports and downloads to more easily identify Economy Act agreements, and also consult with General Law Division regarding the closeout requirements of the Economy Act. 3) Update business processes and procedures to incorporate timely closeout of Economy Act agreements. 4) Implement and distribute communication on final revised process. Develop long term tracking automation tool using ServiceNow Platform.			
OIG-21-024-A	Audit of National Institute of Standards	5/3/2021	4	Reevaluate procedures that document the process NIST uses to timely	1) Review current business processes for monitoring expiring and expired	In Progress	9/30/2022	In Progress

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Action(s) Planned	Action Status (Planned, In-Progress, or Complete)	Target Completion Date	Recommendation Status (Planned, In-Progress, or Complete)
	and Technology Working Capital Fund For Fiscal Year Ended September 30, 2019			refund unused advances transferred under the authority of the Economy Act. Consider developing a process to inform the requesting agency that the period of availability has expired on an agreement or order whose transfer authority is the Economy Act.	agreements with advance payment and discuss possible ways to improve identifying Economy Act orders for timely refund of advance transferred in accordance with the requirements of the Economy Act. 2) Consult with CBS support team regarding possible improvements to current reports and downloads to more easily identify Economy Act agreements, and also consult with General Law Division regarding the closeout requirements of the Economy Act. 3) Update business processes and procedures to incorporate timely refund of unused advances transferred under the authority of the Economy Act. 4) Implement and distribute communication on final revised process. Develop long term tracking automation tool			

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Action(s) Planned	Action Status (Planned, In-Progress, or Complete)	Target Completion Date	Recommendation Status (Planned, In-Progress, or Complete)
					using ServiceNow Platform.			
OIG-21-024-A	Audit of National Institute of Standards and Technology Working Capital Fund For Fiscal Year Ended September 30, 2019	5/3/2021	5	Develop and document for Fund Code 98 formal policies and procedures that describe roles and responsibilities by component for the process of tracking and billing costs, recording advances, the carryover process and tracking and monitoring the period of performance on an order when applicable.	NIST will develop a directive that addresses the Working Capital Fund processes and procedures identified in Recommendation 5. The directive will also address the carryover and closeout processes. Directives include roles and responsibilities. In addition to issuing a directive, OFRM will work with our business systems team to implement a systematic tracking tool to track expiring and expired balances, notify applicable parties of their responsibilities and provide automated reminders in order to close out agreements within the time frame identified in Recommendation 1.	In Progress	9/30/2022	In Progress

Section 2. Implementation of GAO public recommendations issued no less than one year ago that are designated by GAO as 'Open' or 'Closed-Unimplemented.'

Open Recommendation(s) the Department has decided not to implement.

Report Number	None
Report Title	
Issue Date	
Recommendation Number	
Recommendation	

Reason for the Decision not to Implement	

Open Recommendation(s) the Department plans to implement.

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Target Implementation Date	Closure Request Pending with GAO (Yes/No)	Clear Budget Implications (Yes/No)
17-3	Climate Change: Improved Federal Coordination Could Facilitate Use of Forward-Looking Climate Information in Design Standards, Building Codes, and Certifications	11/30/2016	1	To help reduce Federal fiscal exposure by enhancing the resilience of infrastructure to extreme weather, we recommend that the Secretary of Commerce, through the Director of the National Institute of Standards and Technology (NIST), in consultation with the Mitigation Framework Leadership Group (MitFLG) and the United States Global Change Research Program (USGCRP), convene Federal agencies for an ongoing governmentwide effort to provide the best available forward-looking climate information to standards-developing organizations for their consideration in the development of design standards, building codes, and voluntary certifications.	Ongoing	No	
18-327	Federal Research: Additional Actions Needed to Improve Licensing of Patent Laboratory Inventions	6/19/2018	1	The Secretary of Commerce should instruct NIST to fully report the range of challenges in federal patent licensing, such as those outlined in this report, by, for example, leveraging its survey of practices at federal technology transfer offices, past FLC studies, and agency reports and including that information in its summary reports to Congress.	Completed October 2019	Yes	
18-327	Federal Research: Additional Actions Needed to Improve Licensing of Patent Laboratory Inventions	6/19/2018	2	The Secretary of Commerce should instruct NIST to clarify the link between establishing patent license financial terms and the goal of promoting commercial use, through appropriate means, such as the upcoming rule-making process and updating relevant guidance.	September 2022	No	

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Target Implementation Date	Closure Request Pending with GAO (Yes/No)	Clear Budget Implications (Yes/No)
18-327	Federal Research: Additional Actions Needed to Improve Licensing of Patent Laboratory Inventions	6/19/2018	3	The Secretary of Commerce should instruct NIST to facilitate formal information sharing among the agencies to provide federal labs with information on financial terms in comparable patent licenses, as appropriate.	Completed January 2021	Yes	
18-445	National Institute of Standards and Technology: Additional Review and Coordination Could Help Meet Measurement Service Needs and Strengthen Standards Activities	7/26/2018	1	The NIST Associate Director for Laboratory Programs should update NIST policy to include periodic comprehensive management review of the agency's measurement services to assess gaps and ensure alignment with stakeholders' needs and take steps to ensure that the Associate Director completes the review of NIST's standards development activities.	Completed May 2019	Yes	
18-656	Science and Technology: Considerations for Maintaining U.S. Competitiveness in Quantum Computing, Synthetic Biology, and Other Potentially Transformational Research Areas	9/26/2018	2	As the QIS Subcommittee moves forward, the Department of Commerce co-chair, in coordination with other co-chairs and participating agency officials, should take steps to fully implement leading practices that enhance and sustain collaboration.	Completed November 2019	Yes	

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Target Implementation Date	Closure Request Pending with GAO (Yes/No)	Clear Budget Implications (Yes/No)
19-265	Scientific Integrity Policies: Additional Actions Could Strengthen Integrity of Federal Research	4/4/2019	6	The Director of NIST should develop mechanisms to regularly monitor and evaluate implementation of the agency's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary.	May 2022	No	
19-409	Advanced Manufacturing: Innovation Institutes Have Demonstrated Initial Accomplishments, but Challenges Remain in Measuring Performance and Ensuring Sustainability	5/23/2019	1	The Secretary of Commerce should direct the NIST Director to work with other sponsoring federal agencies to develop and implement network-wide performance goals for the Manufacturing USA program with measurable targets and time frames.	Completed January 2021	Yes	
19-409	Advanced Manufacturing: Innovation Institutes Have Demonstrated Initial Accomplishments, but Challenges Remain in Measuring Performance and Ensuring Sustainability	5/23/2019	2	The Secretary of Commerce should direct the NIST Director to work with other sponsoring federal agencies to ensure that the Manufacturing USA network-wide performance measures are directly aligned with the network-wide performance goals, the Manufacturing USA strategic objectives and program goals, and the statutory purposes of the RAMI Act.	Completed January 2021	Yes	

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Target Implementation Date	Closure Request Pending with GAO (Yes/No)	Clear Budget Implications (Yes/No)
GAO-20-81	Federal Research: Additional Actions Needed to Improve Publish Access to Research Results	11/21/2019	31	The National Institute of Standards and Technology Director should fully develop and implement a mechanism to ensure researcher compliance with the public access plan and associated requirements.	September 2023	No	

Recommendations designated by GAO as "Closed-Unimplemented for the past 5 years (2015-2019). Future reports will cover a one-year period.

Report Number	None
Report Title	
Issue Date	
Recommendation Number	
Recommendation	
Reason Not Implemented	

Section 3. Implementation of OIG public recommendations issued no less than one year for which Final Action has not been Taken or Action Not Recommended has been Taken

Report Number	OIG-20-028-A
Report Title	The Department Needs to Improve Oversight Practices to Close Out Contract Files by Complying with Federal Regulations and
Issue Date	6/2/2020
Recommendation Number	2
Recommendation	NIST Director of Office of Acquisition and Agreements Management (OAAM) establish a periodic control to ensure that contracts
Target Implementation	June 2022
Reason No Final Action Taken or Action Not Recommended Taken	Action in progress. The unexpected and prolonged telework environment and the subsequent need to move to electronic filing has resulted in reconsideration of some processes including implementation of this recommendation.
Closure Request Pending	No

Section 4. Discrepancies between this report and the semiannual reports submitted by the Commerce Office of Inspector General or reports submitted by the GAO

Report Number	None
Report Title	
Issue Date	
Recommendation Number	
Recommendation	
Discrepancy	
Reason for Discrepancy	

FY2023 ANNUAL PERFORMANCE PLAN / FY2021 REPORT (APPR) BACKUP

Overview of Bureau Accomplishments

A full list of NIST's accomplishments can be found in Exhibit 12 for the NIST Laboratory Programs.

Quantum Information Science: NIST is a leader in basic and applied research in quantum science. Some of the most fundamental quantum research in the world is carried out in partnerships between NIST and top universities, such as JILA, the Joint Quantum Institute (JQI) and the Joint Center for Quantum Information and Computer Science (QuICS). Scientists in these institutes leverage the combined resources of the partners to advance research in the control of atoms and molecules and development of ultra-fast lasers capable of manipulating states of matter.

The Quantum Economic Development Consortium (QED-C) held a workshop to identify cryogenic technology advances that will enable a ten-fold improvement in quantum information science and technology (QIST) in the next decade—10X10. Quantum computing based on superconducting technologies is just one example of a quantum application that requires cooling to ultra-low temperatures.

Artificial Intelligence (AI) Standards and Trustworthiness: AI is rapidly transforming our world. Remarkable surges in AI capabilities have led to a wide range of innovations including autonomous vehicles and connected Internet of Things devices in our homes. NIST's AI portfolio includes fundamental research, development, and standards for AI technologies – including software, hardware, architectures, human interaction and teaming, and all relevant intersections and interfaces – vital for AI computational trust.

NIST is developing the taxonomy and terminology necessary to enable understanding and trust in the decisions or guidance provided by AI systems. To advance the discussion about identifying and understanding bias, NIST hosted a Bias in AI Workshop on August 18, 2020, to facilitate the development of a shared understanding of bias in AI, what it is, and how to measure it.

Cybersecurity and Privacy: NIST is the Department's lead agency on Cybersecurity issues. NIST works to secure the digital economy through a portfolio that bridges foundational cybersecurity research, applied cybersecurity research and development, and through the development of publicly available standards and technical guidance.
NIST launched on new project on Exposure Notification – protecting workplaces and vulnerable communities during a pandemic. The goal of this project is to utilize NIST expertise in privacy, cybersecurity, machine learning, wireless technology, ranging, modeling, and hardware and software development to save lives and support economic health during a pandemic through the development of open-sourced, accurate proximity detection with strong privacy and cybersecurity protocols.

Advanced Manufacturing: A partner to the U.S. manufacturing sector for more than a century, NIST has a proven track record in delivering useful tools and technical assistance that existing manufacturers and aspiring start-ups need. NIST's measurement research and manufacturing-focused programs provide a foundation that helps the nation's manufacturers to invent, innovate and create new products and services more rapidly and more efficiently than their competitors around the world.

A recent study by Summit Consulting and the W.E. Upjohn Institute for Employment Research found the MEP program generated a substantial economic and financial return of nearly 13.6:1 for the $146 million invested in fiscal year 2020 by the federal government. NIST Manufacturing USA.

Analysis of Performance Indicators

To ensure performance indicators 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 outreach, external advisory boards, and annual independent peer review of its programs. This input is viewed in the context of the NIST mission to make decisions on where NIST needs to develop specific capabilities, how to best marshal existing resources to address current issues, and how to continually optimize the organization for improved performance.

To track progress, NIST works with its standing advisory bodies, including the Visiting Committee on Advanced Technology and other program-specific advisory committees. NIST labs undergo periodic assessments by the National Academies of Sciences, Engineering, and Medicine to ensure NIST is addressing the nation's most pressing issues and with the highest-quality work.

Explanation of Trends

NIST's performance indicators track two types of metrics: impact factors and the willingness of industry to partner or co-invest with NIST. Performance indicators focused on impact track how NIST research benefits the development of new products and services, and the extent to which it produces relevant scientific and technical publications. Indicators that are focused on co-investment, demonstrate the value that NIST brings to its partners.

The pandemic significantly affected NIST operations in 2020 and 2021. The research facilities are operating at a fraction of their capacity and some user facilities, such as NIST Center for Neutron Research (NCNR) and Center for Nanoscale Science and Technology (NanoFab) were completely shut down. This greatly affects some performance indicators, such as "Number of businesses using NIST research facilities", although NIST continues to meet and exceed its targets.

Explanation of Targets for FY 2022 and FY 2023

The House and Senate Chambers of Congress have proposed an increase between $334 M and $359.6 M over FY 2021 enacted levels to fully fund inflationary adjustments to current programs, grow funding for nationally critical mission areas, and expand NIST's manufacturing programs. NIST continues to prioritize and expand research in the areas relevant to AI, advanced manufacturing, advanced communications, spectrum sharing, cybersecurity, and privacy. Despite the continued operational challenges of the pandemic, NIST proposed increases to its performance measures for FY 2023 reflect the expected impact of the increased budgetary growth.

Progression of the Performance Indicators
Performance indicators rely on the information that is tracked by specific units within NIST. This information is used for accounting and reporting purposes and in most cases has designated staff who are responsible for collecting, ensuring accuracy, and monitoring the data. The data serves as an indicator of the overall performance and 'health' of the designated function.

Performance Data Validation and Verification
NIST uses established processes to ensure accuracy and reliability of the data used to measure progress toward achieving the SOs. The data is collected and retained in databases, which are maintained at the individual unit level. To automate and streamline the collection of this data, NIST could benefit by additional resources to incorporate Robotic Process Automation into regular workflows.

Planned Actions for FY 2023

NIST will prioritize its R&D efforts related to the critical and emerging technologies including quantum science, AI, advanced communications, semiconductors, manufacturing, cybersecurity, and more to continue to provide the measurement science and standards infrastructure necessary to support innovation and global competitiveness of the U.S. 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, NIST will continue to:

- Support world class research capabilities in measurement science, forming the foundation of our global system of weights and measures and enable innovation
- Work with stakeholders across its programs to ensure NIST's research programs and capabilities are well-matched to their needs
- Improve the efficiency and effectiveness of operations and facilities supporting its scientific research

DEPARTMENT OF COMMERCE
National Technical Information Service
NTIS Revolving Fund
Budget Estimates, Fiscal Year 2023
Congressional Submission
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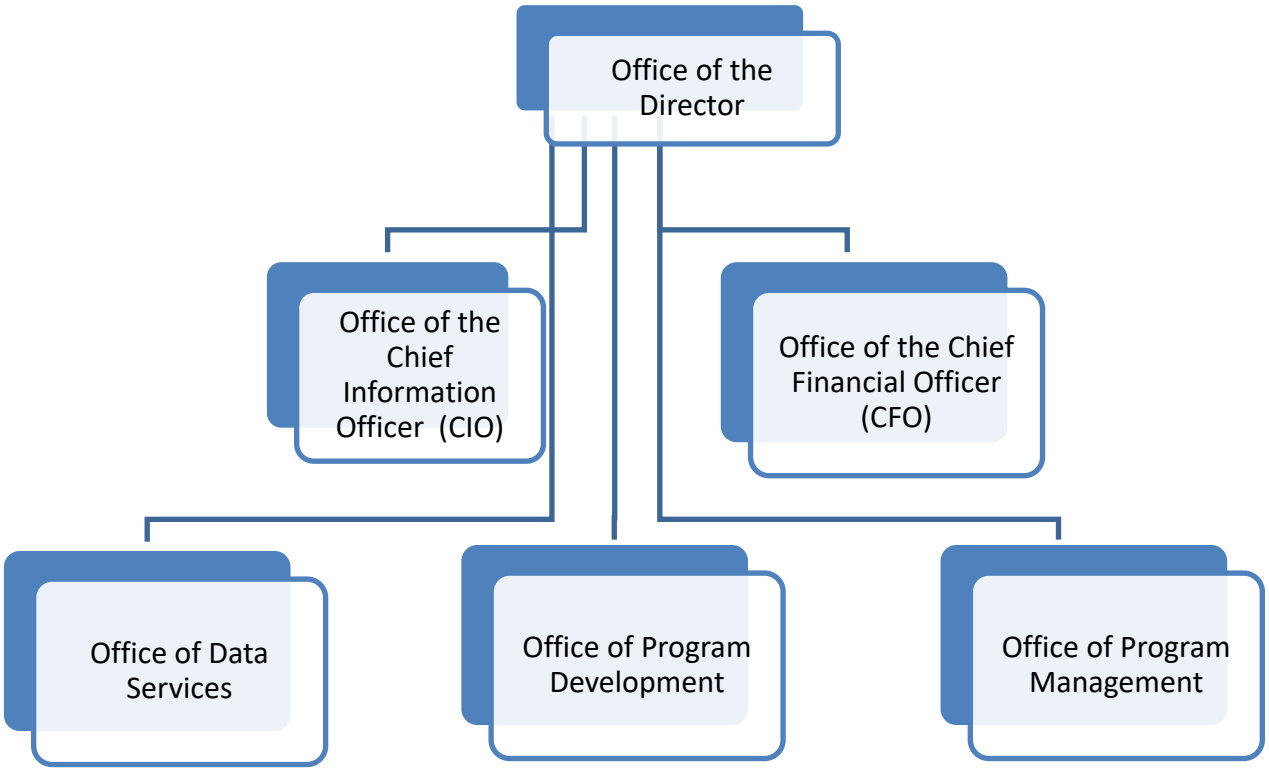
U.S Department of Commerce
National Technical Information Service



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Department of Commerce
National Technical Information Service
NTIS Revolving Fund
Budget Estimates, Fiscal Year 2023

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 Government Accountability Office report (GAO-14-781T) dated July 23, 2014, 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.

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

	Positions	FTE	Budget Authority	Direct Obligations
Appropriation Available, 2022	0	0	0	0
Plus 2023 Adjustments to Base	0	0	0	0
Less: Obligations from prior years	0	0	0	0
2023 Base	0	0	0	0
Plus 2023 program changes	0	0	0	0
2023 Estimate	0	0	0	0

		2021 Actual		2022 Enacted		2023 Base		2023 Estimate		Increase/Decrease over 2023 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		2021 Actual		2022 Enacted		2023 Base		2023 Estimate		Increase/Decrease from 2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Technical Information Service:	Pos/Approp	43	0	43	0	43	0	43	0	0	0
Information Clearinghouse Program	FTE/Obl.	40	$58,395	43	$100,000	43	$100,000	43	$100,000	0	0
Total	Pos/Approp	43	0	43	0	43	0	43	0	0	0
	FTE/Obl.	40	58,395	43	100,000	43	100,000	43	100,000	0	0

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

	2021 Actual	2022 Enacted	2023 Base	2023 Estimate	Increase/ Decrease/ from 2023 Base
Total Obligations	$ 58,395	$ 100,000	$ 100,000	$ 100,000	0
Offsetting collections from:					
Federal funds	(61,928)	(95,000)	(95,000)	(95,000)	0
Trust funds	0	0	0	0	0
Non-Federal sources	(1,140)	(5,000)	(5,000)	(5,000)	0
Recoveries	0	0	0	0	0
Unobligated balance, start of year	(24,848)	(23,243)	(23,243)	(23,243)	0
Unobligated balance transferred	0	0	0	0	0
Unobligated balance, end of year	23,243	23,243	23,243	23,243	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	0
Transfer to other accounts (+)	0	0	0	0	0
Appropriation	0	0	0	0	0

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Department of Commerce
National Technical Information Service NTIS Revolving Fund
NTIS Revolving Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: National Technical Information Service

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 30,000 scientific and technical reports annually that are added to its permanent collection. NTIS is planning on upgrading NTRL in FY2023.

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 and the Social Security Administration Limited Access Death Master File.

Line Item		2021 Actual		2022 Enacted		2023 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
NTIS Revolving Fund	Pos./BA	43		43		43	
	FTE/Obl	40	$58,395	43	$100,000	43	$100,000

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

	Object Class	2021 Actual	2022 Enacted	2023 Base	2023 Estimate	Increase/ Decrease from 2023 Base
11.1	Full-time permanent compensation	$ 4,892	$ 6,300	$ 6,670	$ 6,670	0
11.3	Other than full-time permanent	137	175	0	$ -	0
11.5	Other personnel compensation	198	125	125	$ 125	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	5,227	6,600	6,795	6,795	0
12.1	Civilian personnel benefits	1,409	1,850	1,850	$ 1,850	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	41	75	75	$ 75	0
22	Transportation of things	318	250	250	$ 250	0
23	Rent, communications, and utilities	0	0	0	$ -	0
23.1	Rental payments to GSA	762	2,000	2,000	$ 2,000	0
23.2	Rental payments to others	33	50	50	$ 50	0
23.3	Communications, utilities, and misc. charges	592	1,800	1,800	$ 1,800	0
24	Printing and reproduction	5	4	4	$ 4	0
25	Other contractual services	0	0	0	$ -	0
25.1	Advisory and assistance services	0	100	100	$ 100	0
25.2	Other services from non-Federal sources	47,478	81,521	81,326	$ 81,326	0
25.3	Other goods and services from Federal sources	2,178	3,750	3,750	$ 3,750	0
25.4	Operation and maintenance of facilities	5	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	23	500	500	$ 500	0
26	Supplies and materials	122	500	500	$ 500	0
31	Equipment	202	1,000	1,000	$ 1,000	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	2021 Actual	2022 Enacted	2023 Base	2023 Estimate	Increase/ Decrease from 2023 Base
32	Land and structures	0	0	0	0	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	58,395	100,000	100,000	100,000	0
	Earned Revenue/Reimbursable Obligations	58,395	100,000	100,000	100,000	0
	Total Obligations	58,395	100,000	100,000	100,000	0
	Personnel Data					
	Full-Time Equivalent Employment:					
	Full-time permanent	40	42	43	43	0
	Other than full-time permanent	0	1	0	0	0
	Total	40	43	43	43	0
	Authorized Positions:					
	Full-time permanent	42	42	43	43	0
	Other than full-time permanent	1	1	0	0	0
	Total	43	43	43	43	0

Department of Commerce
National Technical Information Service
NTIS Revolving Fund
APPROPRIATION LANGUAGE AND CODE CITATION

FY 2023

NTIS Revolving Fund

For expenses necessary in the conduct of business of the National Technical Information Service

Specific Code Number: 15 U.S.C 1151 et seq. and 3704b

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

	2021 Actual	2022 Enacted	2023 Estimate
Consulting Services	0	0	0
Management and professional services	0	100	100
Special studies and analysis	0	0	0
Management & Support Services for research and development	0	0	0
Total	0	100	100

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

	2021 Actual	2022 Enacted	2023 Estimate
Periodicals	-	-	-
Pamphlets	-	-	-
Audiovisuals	-	-	-
Total	-	-	-

Department of Commerce
National Technical Information Service
NTIS Revolving Fund
AVERAGE GRADE AND SALARIES

	2021 Actual	2022 Enacted	2023 Estimate
Average GS/GM Grade	12	13	13
Average GS/GM Salary	121,284	126,620	127,885

Department of Commerce
National Technical Information Service
NTIS Revolving Fund
IMPLEMENTATION STATUS OF GAO AND OIG RECOMMENDATIONS

31 U.S.C. 720, as amended January 3, 2019, requires the head of a federal agency to submit a written statement of the actions taken or planned on Government Accountability Office (GAO) recommendations to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 180 calendar days after the date of the report.

The Good Accounting Obligation in Government Act (GAO-IG Act), passed on January 3, 2019, (P.L. 115-414) requires each agency to include, in its annual budget justification, a report that identifies each public recommendation issued by GAO and the agency's office of the inspector general (OIG) which has remained unimplemented for one year or more from the annual budget justification submission date. In addition, the Act requires a reconciliation between the agency records and the IGs' Semiannual Report to Congress (SAR).

Section 1. Recommendations for which action plans were finalized since the last appropriations request.
Nothing to Report

Section 2. Implementation of GAO public recommendations issued no less than one year ago that are designated by GAO as 'Open' or 'Closed-Unimplemented.'
Nothing to Report

Section 3. Implementation of OIG public recommendations issued no less than one year for which Final Action has not been Taken or Action Not Recommended has been Taken
Nothing to Report

Section 4. Discrepancies between this report and the semiannual reports submitted by the Commerce Office of Inspector General or reports submitted by the GAO
Nothing to Report

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ANNUAL PERFORMANCE PLAN/REPORT (APPR) BACKUP
NATIONAL TECHNICAL INFORMATION SERVICE

Performance Indicators

Class	Strategic Objective	Program Activity	Type	Perfromance Indicator	Definition	FY 2021 Actual	FY 2021 Target	FY 2021 Status	FY 2022 Target	FY 2023 Target	Notes
Current / Recurring		NTIS REVOLVING FUND (REIMBURSABLE)	Output	Yearly average number of days required to complete public-private projects (or Government- Industry projects) entered into under the Joint Venture Authority	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.	97	90	Not met	90	90	FY20 Acutal was corrected to 104 days due to some agreements completd processing in FY21. FY20 goal was not met. FY21 goal was not met due to external factors such as delays in reviews and approvals by NTIS Federal client agencies caused by COVID.