NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

NATIONAL TECHNICAL INFORMATION SERVICE

FISCAL YEAR 2018
BUDGET SUBMISSION TO CONGRESS

Exhibit 1

Department of Commerce
National Institute of Standards and Technology
BUDGET ESTIMATES, FISCAL YEAR 2018
CONG SUBMISSION

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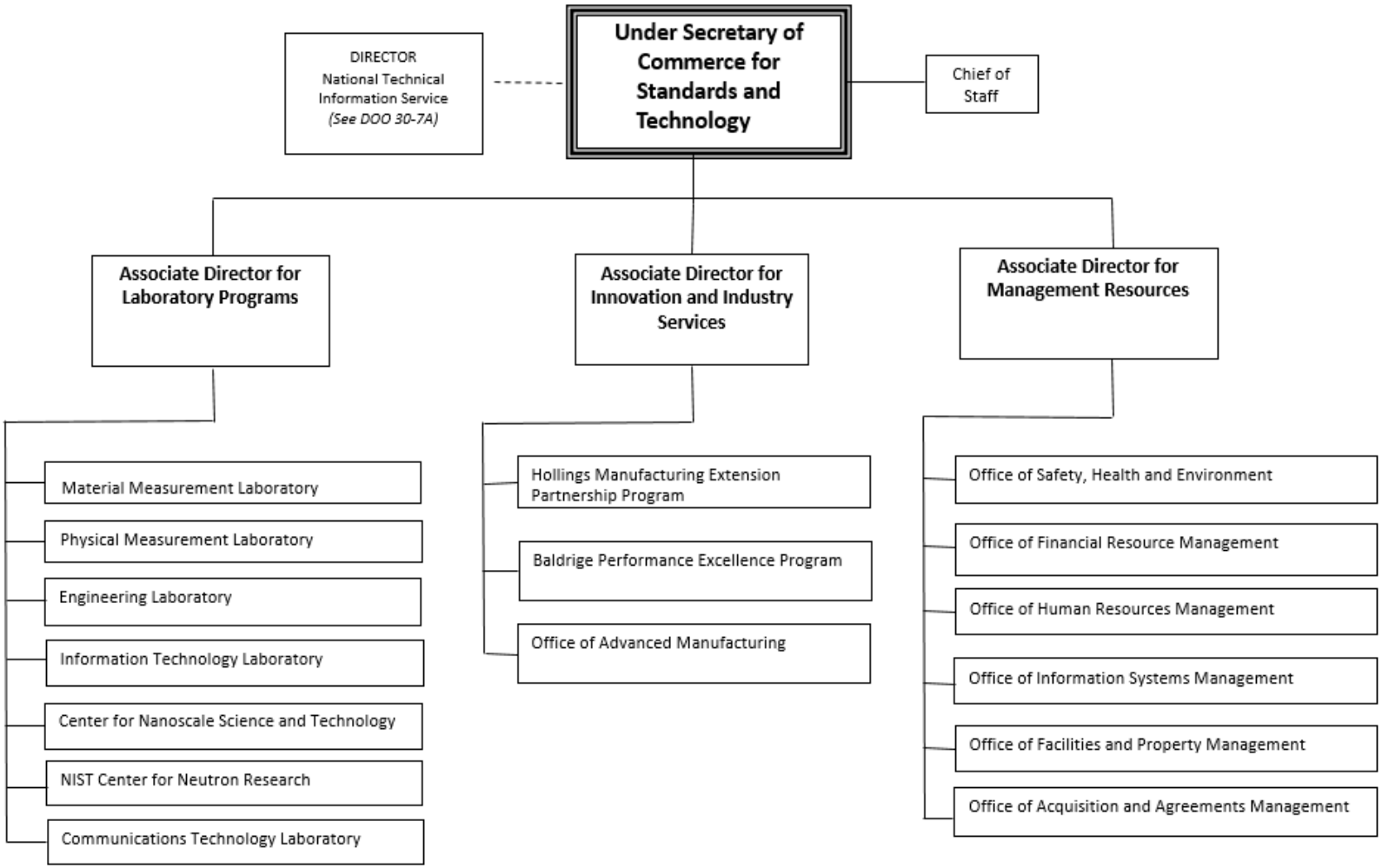
National Institute of Standards
and Technology

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



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EXECUTIVE SUMMARY

General Statement/Goals of the Program/Statement of Objectives

The National Institute of Standards and Technology (NIST) mission is: To promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. NIST is authorized by the NIST Organic Act (15 USC 271) which outlines major roles for NIST in promoting national competitiveness and innovation.

For more than 110 years, NIST has maintained the national standards of measurement, a role that the U.S. Constitution assigns to the federal government to ensure fairness in the marketplace. NIST was founded in 1901 and is one of the nation's oldest physical science laboratories. Congress established the agency to remove a major challenge to U.S. industrial competitiveness. Today, the NIST Laboratory Programs work at the frontiers of measurement science to ensure that the U.S. system of measurements is firmly grounded on sound scientific and technical principles. Today, the seven NIST Laboratories address increasingly complex measurement challenges, ranging from the very small (nanoscale devices for advanced computing) to the very large (vehicles and buildings), and from the physical resilient infrastructure to the virtual (cybersecurity and the internet of things). As new technologies develop and evolve, NIST's measurement research and services remain critical to national defense, homeland security, trade, and innovation.

This budget request is consistent with the administration's priority in FY 2018 to redirect domestic discretionary resources for rebuilding the military and making critical investments in the nation's security, and keep the nation on a responsible fiscal path. The FY 2018 discretionary budget request for NIST includes three appropriations accounts.

1. Scientific and Technical Research and Services (STRS): The STRS account provides resources for NIST's Laboratory Programs. NIST's 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. Because discovery, development, refinement, and commercialization relies on the ability to measure key attributes of technology, measurement research and services remain central to American innovation, productivity, trade, national security, and public safety. The measurement science research at NIST is useful to all science and engineering disciplines that contribute to the productivity and competitiveness of numerous sectors of the American economy. NIST is the only entity in the U.S. that has the mission to deliver the measurement science necessary for U.S. competitiveness and security. NIST is also the best in the world at measurement science research. Ensuring NIST's continued excellence will provide the administration with a critical tool for strengthening American competitiveness.

FY 2018 budget request for STRS is $600.0 million, an $88.7 million reduction from the FY 2017 annualized Continuing Resolution (CR) level.

2. Industrial Technology Services (ITS): The ITS FY 2018 budget request is $21.0 million for two programs.

- Manufacturing USA: Formerly known as the National Network for Manufacturing Innovation, Manufacturing USA serves to create effective robust manufacturing research infrastructure for U.S. industry and academia to solve industry-relevant problems. The Manufacturing USA consists of linked Institutes for Manufacturing Innovation with

common goals, but unique concentrations. In an Institute, industry, academia, and government partners leverage existing resources, collaborate, and co-invest to nurture manufacturing innovation and accelerate commercialization. The FY 2018 budget request for Manufacturing USA is $15.0 million, a $10.0 million reduction from the FY 2017 annualized Continuing Resolution (CR) level.

- Hollings Manufacturing Extension Partnership (MEP): The FY 2018 budget request proposes to discontinue federal funding for the MEP program. However, $6.0 million is requested in FY 2018 for the orderly wind down of federal funding for the program.

3. Construction of Research Facilities (CRF): This appropriation funds NIST construction activities, including maintenance, repair, improvements, and major renovation of facilities occupied or used by NIST in Gaithersburg, Maryland; Boulder and Fort Collins, Colorado; and Kauai, Hawaii striving to meet measurement and research needs for the nation. While some improvements have been made, the current state of facilities and failing infrastructure remain a serious impediment to NIST's ability to have the facilities and infrastructure which meet the needs of present day measurement research. The FY 2018 budget request for CRF is $104.0 million, a $14.8 million reduction from the FY 2017 annualized Continuing Resolution (CR) level.

For FY 2018, NIST is submitting a total discretionary request level of $725.0 million, a $237.2 million reduction from the FY 2017 annualized CR level. The following is a comparison of NIST's FY 2018 discretionary request level with the FY 2017 annualized CR level.

Appropriation	(Dollar amounts in millions) FY 2017 Annualized CR Level		FY 2018 President's Budget		Change from FY 2017 Annualized CR Level	
	FTE	Amount	FTE	Amount	FTE	Amount
Scientific and Technical Research and Services	2,492	$688.7	2,155	$600.0	-337	-$88.7
Industrial Technology Services	97	154.7	36	21.0	-61	-133.7
Construction of Research Facilities	110	118.8	110	104.0	0	-14.8
Working Capital Fund	689	0.0	689	0.0	0	0.0
TOTAL DISCRETIONARY RESOURCES	**3,388**	**962.2**	**2,990**	**725.0**	**-398**	**-237.2**

A full-year 2017 appropriation was not enacted at the time the FY 2018 Budget was prepared; therefore, the Budget assumes the Department is operating under the Further Continuing Appropriations Act, 2017 (P.L. 114–254). The amounts included for 2017 reflect the annualized level provided by the continuing resolution.

Department of Commerce
National Institute of Standards and Technology
FY 2018 PROGRAM INCREASES / DECREASES / TERMINATIONS
(Dollar amounts in thousands)
(Largest to Smallest)

Decreases

Page No. in CJ	Appropriation	Budget Program	Budget Sub-program	FTE	Budget Authority
NIST - 30	STRS	Measurement science, services, and programs	Laboratory programs	-285	-$68,660
NIST - 39	STRS	Measurement science, services, and programs	Standards coordination and special programs	-46	-24,421
NIST - 96	CRF	Construction of Research Facilities	Construction and major renovations	0	-15,811
NIST - 72	ITS	Industrial Technology Services	Manufacturing USA	0	-10,065
NIST - 36	STRS	Measurement science, services, and programs	Corporate services	-6	-2,722
Subtotal, Decreases				-337	-121,679

Department of Commerce
National Institute of Standards and Technology
FY 2018 PROGRAM INCREASES / DECREASES / TERMINATIONS
(Dollar amounts in thousands)
(Largest to Smallest)

Terminations

Page No. in CJ	Appropriation	Budget Program	Activity/Subactivity	FTE	Budget Authority
NIST - 64	ITS	Industrial Technology Services	Hollings manufacturing extension partnership	-61	-$124,107
Subtotal, Terminations				-61	-124,107
Total, Increases, Decreases and Terminations				-398	-245,786

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Scientific and Technical
Research and Services

Exhibit 5

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

	Positions	FTE	Budget Authority	Direct Obligations	Appro-priation
2017 Annualized CR	2,481	2,492	$694,676	$717,395	$688,688
less: Unobligated balance from prior year	0	0	0	(21,719)	0
less: Transfers from DoJ	0	0	(4,491)	(4,491)	0
less: Transfer from EAC	0	0	(1,497)	(1,497)	0
2018 Adjustments to base:					
plus: Restoration of 2017 deobligation offset	0	0	1,000	0	1,000
plus: Inflationary cost changes	0	0	7,115	7,115	7,115
less: Estimated recoveries, 2018	0	0	(1,000)	0	(1,000)
2018 Base Request	2,481	2,492	695,803	696,803	695,803
less: 2018 Program changes	(337)	(337)	(95,803)	(95,803)	(95,803)
plus: Transfer from DoJ			4,499	4,499	0
plus: Transfer from EAC			1,500	1,500	0
2018 Estimate	2,144	2,155	605,999	606,999	600,000

		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
Comparison by program/sub-program:		Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount
Measurement science, services, and programs											
Laboratory programs	Pos./Approp	2,245	$605,156	2,245	$603,566	2,245	$612,976	1,960	$544,316	(285)	($68,660)
	FTE/Obl.	2,195	613,497	2,258	619,554	2,258	613,895	1,973	546,735	(285)	(67,160)
Corporate services	Pos./Approp	49	17,311	49	17,278	49	13,985	43	11,263	(6)	(2,722)
	FTE/Obl.	48	17,391	49	17,408	49	14,002	43	11,280	(6)	(2,722)
Standards coordination and special programs	Pos./Approp	187	67,533	187	67,844	187	68,842	141	44,421	(46)	(24,421)
	FTE/Obl.	181	73,113	185	80,433	185	68,906	139	48,984	(46)	(19,922)
TOTALS	Pos./Approp	2,481	690,000	2,481	688,688	2,481	695,803	2,144	600,000	(337)	(95,803)
	FTE/Obl.	2,424	704,001	2,492	717,395	2,492	696,803	2,155	606,999	(337)	(89,804)

Comparison by program/sub-program:	2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount
Adjustments for:										
Recoveries		(6,786)		(1,000)		(1,000)		(1,000)		0
Refunds		(22)		0		0		0		0
Unobligated balance, start of year		(22,928)		(21,719)		0		0		0
Unobligated balance, end of year		21,719		0		0		0		0
Unobligated balance, expired account		16		0		0		0		0
Budget Authority		696,000		694,676		695,803		605,999		(89,804)
Financing from transfers:										
Transfers from DoJ for forensic sciences and OLES		(4,500)		(4,491)		0		(4,499)		(4,499)
Transfer from Election Assistance Commission		(1,500)		(1,497)		0		(1,500)		(1,500)
Appropriation		690,000		688,688		695,803		600,000		(95,803)

Exhibit 6

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

		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
Comparison by program/sub-program:		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Measurement science, services, and programs											
Laboratory programs	Pos./BA	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0	0	0	0	0

Exhibit 7

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

	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
Total Obligations	$704,001	$717,395	$696,803	$606,999	($89,804)
Offsetting collections from:					
Federal funds	0	0	0	0	0
Non-Federal sources	0	0	0	0	0
Total offsetting collections	0	0	0	0	0
Adjustments for:					
Recoveries and refunds	(6,808)	(1,000)	(1,000)	(1,000)	0
Unobligated balance, start of year	(22,928)	(21,719)	0	0	0
Unobligated balance, end of year	21,719	0	0	0	0
Unobligated balance, expired	16	0	0	0	0
Budget Authority	696,000	694,676	695,803	605,999	(89,804)
Financing:					
Transfer to other accounts	0	0	0	0	0
Transfers from other accounts	(6,000) [1/]	(5,988) [1/]	0	(5,999) [1/]	(5,999)
Appropriation	690,000	688,688	695,803	600,000	(95,803)

[1/] Transfers of $1,500K from EAC and $4,500K from DOJ in FY 2016; planned transfers of $1,497K from EAC and $4,491K from DOJ in FY 2017; and planned transfers of $1,500K from EAC and $4,499K from DOJ in FY 2018.

Exhibit 9

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

	FTE	Amount
Adjustments:		
Restoration of FY 2017 deobligation offset	0	$1,000

In FY 2017, NIST's STRS budget authority was reduced by $1,000,000 based on an estimated level of prior year deobligations. This adjustment would restore the reduction in FY 2018.

Financing:		
Recoveries of prior year deobligations	0	(1,000)

NIST's FY 2018 STRS budget authority is reduced by the estimated level of prior year deobligations in FY 2018.

Other Changes:		
Annualization of 2017 pay raise	0	2,968

A pay raise of 2.1 percent is assumed to be effective January 1, 2017.

Total cost in FY 2018 of 2017 pay raise	6,924,750
Less amount requested in FY 2017	(3,957,000)
Less amount absorbed in FY 2017	0
Amount requested in 2018 to provide full-year cost of 2017 pay raise	2,967,750

2018 Pay increase and related costs		0	$4,813

A general pay raise of 1.9 percent is assumed to be effective January 1, 2018.

Total cost in FY 2018 of pay increase	4,813,000
Less amount absorbed in FY 2018	0
Amount requested for FY 2018 pay increase	4,813,000
Payment to Departmental Management Working Capital Fund	0
Total adjustment for FY 2018 pay increase	4,813,000

Annualization of positions financed in FY 2017		0	0

NIST requires no additional FTE to staff FY 2017 requested increases at the annualized FY 2017 Continuing Resolution operating level.

New positions in 2017	0
Less 5 percent lapse	(0)
Full-Year FTE	0
Less FTE Funded in 2017	(0)
Annualization of Positions/FTE in 2018	0

Personnel benefits		1,353

Civil Service Retirement System (CSRS)	(265)
Federal Employees' Retirement System (FERS)	506
Thrift Savings Plan (TSP)	201
Federal Insurance Contribution Act (FICA) - OASDI	269
Health Insurance	729
Employees Compensation Fund	(87)

Civil Service Retirement System (-$265,000) – The number of employees covered by the Civil Service Retirement System (CSRS) continues to drop as positions become vacant and are filled by employees who are covered by the Federal Employees' Retirement System (FERS). The estimated percentage of payroll for employees covered by CSRS will decrease from 5.3 percent in FY 2017 to 3.9 percent in FY 2018. The contribution rate will remain at 7.0 percent in FY 2018.

Payroll subject to retirement systems ($270,018,880)	
Cost of CSRS contributions in FY 2018 ($270,018,880 x .039 x .07)	737,152
Cost of CSRS contributions in FY 2017 ($270,018,880 x .053 x .07)	1,001,770
Total adjustment to base	(264,618)

Federal Employees' Retirement System ($506,000) – The number of employees covered by FERS continues to rise as employees covered by CSRS leave and are replaced by employees covered by FERS. The estimated percentage of payroll for employees covered by FERS will increase from 94.7 percent in FY 2017 to 96.1 percent in FY 2018. P.L. 112-240 enacted in January 2013 modified the federal retirement annuity establishing a Revised Annuity Employee (RAE) followed by a Further Revised Annuity Employee (FRAE) reducing the amount of government FERS contribution percentage for those employees hired after January 1, 2013 with less than five years of creditable service.

Payroll subject to retirement systems ($221,710,154) (non-RAE employees)	
Basic benefit cost in FY 2018 ($221,710,154 x .961 x .137)	29,189,694
Basic benefit cost in FY 2017 ($221,710,154 x .947 x .137)	28,764,454
Increase (FY 2017-FY 2018)	425,240
Payroll subject to retirement systems ($48,308,726) (RAE/FRAE employees)	
Basic benefit cost in FY 2018 ($48,308,726 x .961 x .119)	5,524,538
Basic benefit cost in FY 2017 ($48,308,726 x .947 x .119)	5,444,055
Increase (FY 2017-FY 2018)	80,483
Total adjustment to base	505,723

Thrift Savings Plan ($201,000) – The cost of agency contributions to the TSP will also rise as FERS participation increases. The contribution rate will increase from 4.63 percent to 4.64 percent in FY 2018.

Thrift plan cost in FY 2018 ($270,018,880 x .961 x .0464)	12,040,250
Thrift plan cost in FY 2017 ($270,018,880 x .947 x .0463)	11,839,275
Total adjustment to base	200,975

Federal Insurance Contributions Act (FICA) - OASDI ($269,000) – As the percentage of payroll covered by FERS rises, the cost of OASDI contributions will increase. In FY 2018, the maximum salary subject to OASDI tax is $130,950. The OASDI tax rate for employers also remains at 6.2 percent in FY 2018.

FERS payroll subject to FICA tax in 2018 ($270,018,880 x .961 x .923 x .062)	14,849,469
FERS payroll subject to FICA tax in 2017 ($270,018,880 x .947 x .920 x .062)	14,585,577
Increase (FY 2017-FY 2018)	263,892
OTP payroll subject to FICA tax in FY 2018 ($5,291,120 x .961 x .923 x .062).....	290,981
OTP payroll subject to FICA tax in FY 2017 ($5,291,120 x .947 x .920 x .062).....	285,810
Increase (FY 2017-FY 2018)	5,171
Total adjustment to base	269,063

Health insurance ($729,000) – Effective January 2016, NIST's contribution to federal employees' health insurance premiums increased by 3.5 percent. Applied against the FY 2017 estimate of $20,827,000, the additional amount required is $728,945.

Employees' Compensation Fund (-$87,000) – The Employees' Compensation Fund bill for the year ending June 30, 2016, is $87,000 less than for the year ending June 30, 2015.

Per Diem	0	$80

The General Services Administration has set the federal per diem reimbursement rate for meals and lodging at $142 per day which is an increase of 1.4 percent from the prior rate of $140. This percentage was applied to the FY 2017 estimate of $5,691,000 to arrive at an adjustment to base of $79,674.

Rental Payments to GSA	0	4

GSA rates are projected to be 2.0 percent in FY 2018 after economic adjustments. This percentage was applied to the FY 2017 estimate of $209,000 to arrive at an adjustment to base of $4,180.

Communications, utilities, and miscellaneous charges 0 ($1,393)

Postage.....	1
Electricity rate decrease.....	(1,358)
Natural Gas rate decrease.....	(36)

On January 15, 2016, the Governors of the Postal Service implemented a rate increase for shipping services. The overall price change is 4.3 percent. When applied to the FY 2017 postage estimate of $31,000, this results in an increase of $1,333.

The electricity ATB amount was derived using a year to year comparison of the cost per kilowatt hour. In analyzing the 12 months ending February 2016 and 2015, the per kilowatt hour rate decreased 4.8 percent (from .104 to .099) for Gaithersburg, Maryland; decreased 12.0 percent (from .078 to .069) for Boulder, Colorado; and increased 4.4 percent (from .096 to .100) for Ft. Collins, Colorado for a net decrease of $1,358,000.

The natural gas ATB amount was derived using a year to year comparison of the average cost per therm. In analyzing the 12 months ended February 2016 and 2015, the per therm rate increased 1.3 percent (from .719 to .728) for Gaithersburg, Maryland and decreased 13.2 percent (from .659 to .572) for Boulder, Colorado resulting in a net decrease of $36,000.

Other Services 0 (4,086)

Commerce Business Systems.....	(3,501)
National Archives and Records Administration (NARA).....	(1)
Working Capital Fund (Departmental Management).....	(584)

Commerce Business Systems (CBS) (-$3,501,000) – A decrease of $3,501,000 is required in FY 2018 consistent with the CBS Capital Asset Plan.

National Archives and Records Administration (-$1,000) – NARA estimates reflect a decrease of $1,000 in FY 2018 for records storage and maintenance costs.

Working Capital Fund (Departmental Management) (-$584,000) – A decrease of $584,000 is applied for reduced costs in the Departmental Management Working Capital Fund.

Supplies and Materials		0	$210
Scientific journal subscriptions	210		

Scientific journal subscriptions ($210,000) – This adjustment to base addresses the FY 2015 to FY 2016 inflationary increase in costs for NIST's subscriptions journals which exceed the inflationary increases provided through the regular general pricing level deflator. The application of the 5.6 percent Science Citation deflator results in an increase of $209,720 when applied to the FY 2017 estimate of $3,745,000.

General pricing level adjustment		0	3,166

This request applies the OMB economic assumption of 2.0 percent for FY 2018 where the prices that the government pays are established through the market system. Factors are applied to sub-object classes that result in the following adjustments to base: transportation of things $25,740; rental payments to others $37,420; communications, utilities, and miscellaneous charges $67,140; printing and reproduction $12,220; other services $1,433,820; supplies and materials $652,980; and equipment $936,700.

Subtotal, Other changes		0	7,115
Total, Adjustments to base		0	7,115

Exhibit 10

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

Program: Measurement science, services, and programs
Sub-program: Laboratory programs

Line Item		2016 Actual Personnel	2016 Actual Amount	2017 Annualized CR Personnel	2017 Annualized CR Amount	2018 Base Personnel	2018 Base Amount	2018 Estimate Personnel	2018 Estimate Amount	Increase/ (Decrease) over 2018 Base Personnel	Increase/ (Decrease) over 2018 Base Amount
Strategic and emerging	Pos./Approp	46	$12,324	46	$15,845	46	$16,040	46	$16,040	0	0
research initiative fund	FTE/Obl.	45	18,638	46	16,611	46	16,071	46	16,071	0	0
National measurement and	Pos./Approp	1,830	500,172	1,830	494,667	1,830	502,521	1,566	439,417	(264)	($63,104)
standards laboratories	FTE/Obl.	1,790	501,989	1,844	506,369	1,844	503,262	1,580	441,658	(264)	(61,604)
User facilities	Pos./Approp	271	80,819	271	79,997	271	80,945	250	75,389	(21)	(5,556)
	FTE/Obl.	265	80,696	271	81,089	271	81,060	250	75,504	(21)	(5,556)
Postdoctoral research	Pos./Approp	98	11,841	98	13,057	98	13,470	98	13,470	0	0
associateship program	FTE/Obl.	95	12,174	97	15,485	97	13,502	97	13,502	0	0
Total	Pos./Approp	2,245	605,156	2,245	603,566	2,245	612,976	1,960	544,316	(285)	(68,660)
	FTE/Obl.	2,195	613,497	2,258	619,554	2,258	613,895	1,973	546,735	(285)	(67,160)

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

	FY 2016 Actual	FY 2017 Annualized CR	FY 2018 Estimate
Department of Defense			
Air Force	$8,612	$9,056	$8,101
Army	512	540	540
Navy	1,305	1,793	1,763
Other, Department of Defense	14,923	18,038	15,000
Subtotal, Department of Defense	25,352	29,427	25,404
Department of Commerce	20,482	19,747	18,155
Department of Energy	2,436	2,670	2,400
Dept. of Health & Human Services	5,379	7,675	4,864
Dept. of Homeland Security	16,784	15,935	13,870
Department of the Interior	247	100	100
Department of Justice	4,318	11,713	6,960
Department of Transportation	650	1,815	420
Department of the Treasury	42	15	0
Department of Veterans Affairs	145	150	150
Environmental Protection Agency	43	100	100
General Services Administration	517	15	500
National Aeronautics & Space Admin.	2,888	2,942	2,622
National Science Foundation	2,929	2,500	3,500
Nuclear Regulatory Commission	1,923	2,400	2,500
Other	7,547	7,974	4,288
Subtotal, Other Agency	91,682	105,178	85,833
Calibrations & Testing	7,360	7,279	7,282
Technical & Advisory Services	24,085	30,296	27,267
Standard Reference Materials	20,084	22,516	23,085
Subtotal, Other Reimbursables	51,529	60,091	57,634
Total, Reimbursable Program	143,211	165,269	143,467
Equipment Investments	19,536	23,813	22,335
IE Amortization	(20,302)	(16,678)	(22,335)
WCF Operating Adjustments	20,736	0	0
Total, WCF Investments	19,970	7,135	0
Total, Reimbursable Program and WCF Investments	163,181	172,404	143,467

Exhibit 10

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

Program: Measurement science, services, and programs
Sub-program: Corporate services

		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) over 2018 Base	
Line Item		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Corporate services	Pos./Approp	49	$17,311	49	$17,278	49	$13,985	43	$11,263	(6)	($2,722)
	FTE/Obl.	48	17,391	49	17,408	49	14,002	43	11,280	(6)	(2,722)
Total	Pos./Approp	49	17,311	49	17,278	49	13,985	43	11,263	(6)	(2,722)
	FTE/Obl.	48	17,391	49	17,408	49	14,002	43	11,280	(6)	(2,722)

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

	FY 2016 Actual	FY 2017 Annualized CR	FY 2018 Estimate
Department of Commerce	$3,599	$6,287	$6,162
General Services Administration	6	9	9
Subtotal, Other Agency	3,605	6,296	6,171
Total, Reimbursable Program	3,605	6,296	6,171
Equipment Investments	2,391	2,236	2,915
IE Amortization	(2,045)	(2,473)	(2,915)
Total, WCF Investments	346	(237)	0
Total, Reimbursable Program and WCF Investments	3,951	6,059	6,171

Exhibit 10

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

Program: Measurement science, services, and programs
Sub-program: Standards coordination and special programs

Line Item		2016 Actual Personnel	2016 Actual Amount	2017 Annualized CR Personnel	2017 Annualized CR Amount	2018 Base Personnel	2018 Base Amount	2018 Estimate Personnel	2018 Estimate Amount	Increase/ (Decrease) over 2018 Base Personnel	Increase/ (Decrease) over 2018 Base Amount
Standards coordination	Pos./Approp	187	$67,533	187	$67,844	187	$68,842	141	$44,421	(46)	($24,421)
and special programs	FTE/Obl.	181	73,113	185	80,433	185	68,906	139	48,984	(46)	(19,922)
Total	Pos./Approp	187	67,533	187	67,844	187	68,842	141	44,421	(46)	(24,421)
	FTE/Obl.	181	73,113	185	80,433	185	68,906	139	48,984	(46)	(19,922)

Department of Commerce

National Institute of Standards and Technology

Standards Coordination and Special Programs

REIMBURSABLE PROGRAM AND WORKING CAPITAL FUND INVESTMENTS

(Dollar amounts in thousands)

	FY 2016 Actual	FY 2017 Annualized CR	FY 2018 Estimate
Dept. of Health & Human Services	$75	$75	$75
Dept. of Homeland Security	(2,710)	575	575
Department of Justice	126	421	421
Subtotal, Other Agency	(2,509)	1,071	1,071
Technical & Advisory Services	6,315	4,035	4,040
Subtotal, Other Reimbursables	6,315	4,035	4,040
Total, Reimbursable Program	3,806	5,106	5,111
Equipment Investments	5	0	0
IE Amortization	(253)	(215)	0
Total, WCF Investments	(248)	(215)	0
Total, Reimbursable Program and WCF Investments	3,558	4,891	5,111

APPROPRIATION ACCOUNT: Scientific and Technical Research and Services (STRS)

BUDGET PROGRAM: Laboratory Programs

The FY 2018 request for STRS is $600.0 million, $88.7 million below an FY 2017 annualized Continuing Resolution (CR) level.

BASE JUSTIFICATION:

Laboratory Programs Overview

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. 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 that form the foundation of our global system of weights and measures and enable innovation.
- Basic and applied measurements, calibrations, and standards that impact every aspect of our economy and lives from the accuracy of airplane altimeters, to the reliability of clinical measurements, to the strength of the encryption technologies that protect our digital lives and businesses.
- Unbiased technical support for the development of industry-led, open, consensus-based documentary standards and specifications that drive the deployment of advanced technology solutions and facilitate global commerce.
- Unique, cutting-edge user facilities that help 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 creates the infrastructure necessary to measure the performance and quality of products and services through the delivery of robust array of measurement standards and services like calibrations and the provision of Standard Reference Data (SRD). NIST supplies 1,200 unique Standard Reference Materials (SRM) selling 32,000 units per year to over 2,000 unique customers. NIST also performs almost 13,000 calibrations every year for customers in industry and fields such as manufacturing, aerospace, instrument and control, lighting, biomedical, and energy. These tools, which the private sector cannot provide due to the high cost and unique skills needed, are the foundations for interoperability between products and systems, and enable fair and equitable trade.

Industry relies on NIST for the physical measurements and standards needed to enable advanced manufacturing, to develop and test new technologies, and to enable innovation. In addition, NIST provides measurement and calibration products and services via its SRM, calibration services, and SRD programs. These products and services assure the accuracy of measurements made daily throughout the U.S.

Technology is rapidly evolving to integrate new capabilities across the economy, including manufacturing processes, transportation systems, critical infrastructure, and healthcare. While

these innovations will contribute to the U.S. economy and quality of life, they have associated challenges in interoperability, security, and resiliency. The NIST Laboratory Programs respond to these challenges by engaging with government and industry stakeholders to develop the standards, prototypes, and guidelines essential for technology adoption and dissemination. In addition, NIST provides test-beds, testing and validation methodologies, and support for certification to enable technology deployment.

Examples of Accomplishments

Recent highlights of accomplishments from the Laboratory Programs include:

- Community Resilience: NIST issued the final Community Resilience Planning Guide for Buildings and Infrastructure Systems in October 2016. The Guide provides a practical and flexible approach to help communities protect themselves against the high tolls of natural, technological, and human caused hazards through better setting of priorities, allocation of resources, and reduction of hazard risks to lives, livelihoods, and quality of life. The Guide will lead communities to better integrate resilience plans into their economic development, zoning, mitigation, and other local planning activities that impact buildings, public utilities, and other infrastructure systems. It engages a broad range of community stakeholders and representatives in a series of six steps that include defining how vital social functions, such as healthcare, education, and public safety are supported by buildings and infrastructure systems (transportation, energy, communications, and water and wastewater). Several communities, including the city of Fort Collins, Colorado and Boulder County, Colorado, have fully implemented the NIST Guide to create effective and affordable community resilience solutions.
- Biomanufacturing and Bioengineering: NIST has made investments in applied research that have resulted in new reference materials that will provide much-needed measurement science and standards capabilities to the growing biotherapeutics and engineering biology industries. In July, NIST issued an exhaustively analyzed antibody protein that the biopharmaceutical industry will use to help ensure the quality of treatments across a widening range of health conditions, including cancers, autoimmune disorders, and infectious diseases. This standard has already been purchased by nearly fifty different companies, demonstrating the pent-up need for this capability. In September, NIST added four new reference materials to a growing collection of measuring sticks for gene sequencing, providing laboratories with even more capability to accurately map DNA for genetic testing, medical diagnoses, and future customized drug therapies.
- Nanotechnology: NIST developed and used world-leading scanned probe instrumentation to make unprecedented atomic scale measurements in graphene. Electronic devices based on graphene, and other two-dimensional materials, are being pursued by the U.S. electronics industry as replacements for silicon in its pursuit of faster, smaller, and more energy-efficient electronic devices. These measurements enable deeper understanding of these new materials, leading to new designs for high speed digital switches.
- Quantum Based Measurements: NIST researchers recently improved the stability level of the strontium lattice clock to an unprecedented level. The new atomic clock has achieved a level of stability that enables it to neither gain nor lose one second in more than a billion years. NIST's precision timekeeping service is used more than 12 billion times per day and has broad impacts on advanced communications, positioning technologies (such as GPS), and many other technologies that impact the daily lives of everyone on the planet.

- Smart Cities: NIST sponsored the Global City Teams Challenge that brought together more than 20 cities and communities with over 180 universities and companies in 45 teams to deploy smart city solutions that apply advanced cyber-physical systems concepts. The projects demonstrate how to integrate city-scale IT and physical infrastructures for powerful new safe, reliable, secure, privacy-enhancing, and cost-saving platforms and services that make communities more livable, workable, safe, and sustainable and that support an informed and engaged populace.
- Advanced Communications: Most mobile devices operate below 3 gigahertz (GHz), but some devices are starting to use fast silicon-germanium radio chips operating at millimeter (mm) wavelengths above 10 GHz and researchers are pursuing channels up to 100 GHz. The metrology infrastructure for telecommunications at these frequencies is incomplete. NIST developed a calibrated, modulated signal source to test mm wave instruments to support wireless communications at higher frequencies offering more channel capacity. The new facility has been demonstrated at 94 GHz, traceable to fundamental physical quantities.
- Cybersecurity**:** In 2016, NIST engaged the public to understand whether to clarify, refine, and enhance the Framework for Improving Critical Infrastructure Cybersecurity. That engagement includes feedback NIST received since publication of Cybersecurity Framework Version 1.0, including responses to a December 2015 RFI entitled Views on the Framework for Improving Critical Infrastructure Cybersecurity and discourse at Cybersecurity Framework Workshop 2016. Also, in April of 2017, NIST published an Internal Report on Post-Quantum Cryptography which details the status of research into quantum computers which, if built, will be able to defeat many of our modern cryptographic systems. NIST's report outlines a long-term approach for avoiding this vulnerability before it arises. A key part of this effort will be an open collaboration with the public which will be invited to devise and vet cryptographic methods that, to the best of experts' knowledge, will be resistant to quantum attack. NIST plans to launch this collaboration formally soon, but in general, it will resemble past competitions such as the one for developing the SHA-3 hash algorithm, used in part for authenticating digital messages.

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

Priority Objectives for FY 2018

NIST Laboratory Focus Areas

NIST continually collects information on major national issues, shifting trends in science and technology, and the performance of operational processes through a variety of mechanisms including meetings, workshops, industry visits, and objective 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. Based on these efforts, the following are key focus areas for NIST Laboratory Program R&D efforts.

Advanced Manufacturing – The U.S. must remain a competitive force in advanced manufacturing to ensure our economic and national security. The NIST Laboratories have prioritized research efforts that support advanced manufacturing by advancing the state-of-the-art across multiple key technology areas.

- Additive Manufacturing: NIST will develop true temperature measurement methods to enable improvements and verification of high-fidelity additive manufacturing (AM) process models, as well as quality control and assurance, for rapid qualification of AM materials and processes for high-performance commercial applications.
- Advanced Sensing: NIST will maintain efforts to develop measurement science and standards that will accelerate the design, development, and manufacturability of advanced electronic and photonic devices - those that require new concepts, architectures, materials, and manufacturing methods. NIST will address a rapidly emerging trend in manufacturing: the need for non-invasive sensing and real-time process analysis to reduce the rejection rate associated with manufacturing products that involve multiple complex steps. NIST will provide measurement science and standards to support the development of distributed and ubiquitous devices that can be integrated everywhere by consumers and manufacturers to meet diverse needs.
- Advanced Materials and the Materials Genome Initiative: NIST has a key role in the Materials Genome Initiative (MGI), an interagency effort to capitalize on recent breakthroughs in materials modeling, theory, and data mining to significantly accelerate discovery and deployment of advanced materials while decreasing their cost. To support this effort, NIST is developing an advanced materials innovation infrastructure, including data assessment and validation, data standards, and modeling and simulation tools. New measurement science and standards developed based on this infrastructure will enable industrial researchers to discover data and models, assess their quality, and use them to maximum effect.
- Smart Manufacturing: From collaborative robots on the manufacturing floor to ensuring digital models and designs are well-communicated throughout the supply chain, manufacturers are increasingly using the promise of smart technologies to increase productivity, efficiency, and quality. NIST will develop the metrics, methods, and protocols to ensure that manufacturers of every product and of every size, from small and medium enterprises to multinational corporations, can optimally deploy these technologies.

Precision Metrology and Quantum Science

- Quantum Based Sensors/Measurements: Quantum information science is an emerging research field with the potential to revolutionize computation, communication, precision measurement, and fundamental quantum science. This field seeks to harness the fundamental laws of physics to dramatically improve information acquisition, transmission, and processing. NIST will expand efforts to advance quantum information science to improve information security and assurance, improve standards, and develop more-sensitive sensors for a variety of applications.
- Neutron Research: NIST will fund fuel requirements to ensure that NIST continues to provide a world-class neutron research facility, providing access to sophisticated measurement tools that can be used by industry.
- Redefinition of international system of units: The U.S., through NIST, is a global leader in an international effort to redefine the kilogram from a physical object housed in Paris, France to a value based on the fundamental physical principles of the universe. To do this, NIST has leveraged its world-class metrology expertise across a number of physical

disciplines to make increasingly precise measurements. NIST will continue to refine those measurements and methods to ensure the success of this ambitious goal.

Biosciences – Research in bioscience is driving several critical economic sectors and a vast array of critical measurement needs have emerged to support this research. NIST is committed to meeting the metrology needs to support this industry by prioritizing research efforts on the following topics:

- Biomanufacturing: The vision of industrial biomanufacturing is to use living organisms to produce a commodity, such as fuel, chemicals, pharmaceuticals, or medical therapies. Creating efficient, reliable biomanufacturing processes requires the development of tools to explore, manipulate, and ultimately explain the intricate complexities of biological cells. NIST will address the technical challenges faced by the biomanufacturing industry by developing a suite of quantitative methods for accurate measurement of biological systems, creating the necessary tools to methodically design and test engineered organisms. Such tools are badly needed but challenging to develop since biological cells are inherently complex and interact with the environment in unexpected ways. NIST will use its convening power and its expertise in precision measurement to coordinate the strategic development and implementation of accurate and quantitative measurements of engineered biological systems.
- Healthcare and Precision Medicine: NIST will develop and disseminate reference methods and protocols, reference materials, measurement quality assurance programs, and new instrumentation needed to advance biomedical technologies. These tools will support a variety of healthcare innovations including whole genome sequencing, early detection and diagnosis of diseases such as cancer, and genetics-based diagnostics for detection of chromosomal disorders; blood protein health status marker detection, such as those used for detection of heart attack, kidney function, and prostate cancer; the development and manufacturing of innovative biopharmaceuticals such as protein therapeutics; and ensuring the reliability of implanted medical devices such as pacemakers.

Built Environment – The U.S. relies on our built environment as critical infrastructure needed to support our economic and social stability and competitiveness. The performance of our built environment can have a profound impact on our daily lives and our ability to thrive, and disruptions to it can have severe consequences. NIST has prioritized research programs in the following areas to improve our built environment:

- Indoor Environment: Buildings consume 72 percent of all electricity in the U.S. and space conditioning is the largest single use in buildings. Heating, Ventilating, and Air-Conditioning (HVAC) equipment rarely operates as designed throughout their useable lifetime. Commercial products intended to diagnose HVAC system faults have had little market acceptance because of a lack of customer and industry confidence. NIST will develop software tools and a rating methodology for evaluating the performance of such products, which is an essential step towards achieving “as designed” performance. This will significantly increase the operating efficiency of HVAC equipment used in homes and small businesses.
- Fire Research: Damage from building fires cost the nation over $10 billion every year. NIST’s National Fire Research Laboratory is the only facility in the world that allows scientists and engineers to conduct research on the response of real-scale structural systems to realistic fire and mechanical loading under controlled laboratory conditions. Through this facility, NIST will test the performance of full-scale structures subjected to realistic fires and structural loading under controlled laboratory conditions; develop an

experimental database on the performance of large-scale structural connections, components, subassemblies, and systems under realistic fire and loading; validate physics-based models to predict fire resistance performance of structures; and enable performance-based standards for fire resistance design of structures and foster innovations in design and construction.

- Resilience: Preventing hazards (e.g., earthquakes, hurricanes, and community-scale fires) from becoming debilitating disasters depends on the resilience of our buildings and infrastructure. To enhance disaster resilience stakeholders must be able to predict the effects of hazards on the performance of complex structural systems. Developing tools to make such predictions will require data to characterize the hazard, validated physics-based models to predict performance, metrics for measuring performance, and mitigation strategies based on performance evaluation. NIST will develop the measurement science required to achieve disaster resilient buildings and infrastructure in a timely manner.

Digital Economy – The digital economy is an extraordinary platform for innovation, growth, and social progress. As it grows in size, scope, and importance, NIST is committed to helping the U.S. achieve and maintain global leadership on internet and technology issues. NIST has prioritized programs in the following areas to achieve this goal:

- Advanced Communications: New and improved spectrum sharing technologies will address spectrum scarcity due to strict, exclusive, and static allocation of frequency bands. Spectrum sharing technologies could benefit many applications, such as device-to-device communications in mobile cellular networks and sensor networks and prioritizing traffic in the unlicensed spectrum. However, spectrum sharing involves multiple users with diverse technologies interacting with the system which could produce unwanted interference or performance degradation for primary users. NIST will also develop improved spectrum measurement technologies, thus allowing industry to identify potential issues with next generation wireless systems before they are commercialized and deployed.
- Advanced Networking: NIST will develop advanced test and measurement techniques to characterize and improve designs for fundamentally new architectures and protocols for core internet services including new routing; information centric networking architectures; and software defined and virtualized networks.
- Cybersecurity and Privacy: The proliferation of data generation, storage, and use associated with the digital economy is making it increasingly important to protect that data with effective cryptography and privacy standards. Furthermore, with more citizens using web-based tools for everyday activities, there is a pressing need for these tools to provide privacy assurance. Individual, corporate, and public sector data privacy is continuously at risk from attacks by individual actors, criminal organizations, and nation-states. NIST will address the rapidly emerging threats in this field, including new threats posed by future computing technologies like quantum computing, by furthering the development of new and needed cryptographic standards and technologies.
- Scientific Data: NIST will continue to generate and maintain data of the highest quality, characterization, and integrity. NIST's SRD collection is a national asset for research and industry, containing physical, material, chemical, and biological data covering a broad range of substances and properties. NIST will continue to find ways to make this SRD more usable and accessible, and to expand the suite of SRDs to meet stakeholders' needs.

Additional Information on NIST Laboratories

NIST's Laboratory Programs consists of seven major laboratories in Gaithersburg, Maryland and Boulder, Colorado. Additional information on recent activities specific to each of these laboratories can be found online through the web sites provided below:

Center for Nanoscale Science and Technology:
https://www.nist.gov/cnst

Communications Technology Laboratory:
https://www.nist.gov/communications-technology-laboratory-ctl

Engineering Laboratory:
https://www.nist.gov/el

Information Technology Laboratory:
https://www.nist.gov/itl

Material Measurement Laboratory:
https://www.nist.gov/mml

NIST Center for Neutron Research:
https://www.nist.gov/ncnr

Physical Measurement Laboratory:
https://www.nist.gov/pml

PROGRAM CHANGES:

Laboratory Programs (Base Funding: $613.0 million and 2,258 FTE; Program Change: -$68.6 million and -285 FTE)

The request for laboratory programs is approximately a 13 percent reduction from the FY 2017 Annualized Continuing Resolution and is consistent with the Administration's priority in FY 2018 to redirect domestic discretionary resources for rebuilding the military and making critical investments in the nation's security. The funding for the NIST laboratory programs will be reduced by $68.6 million and proposes the elimination of 285 employees. Of those employees,187 of them come from NIST's scientific workforce, a 10 percent reduction in scientists and engineers.

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

Proposed Reductions (not in priority order):

Advanced Networks, Connected Systems, and Data Science (-$15.5 million and -45 FTE) – There are a growing number of measurement science and standards issues emerging with the growth of the Internet of Things, Smart Systems, and Artificial Intelligence, At the FY 2018 funding levels, NIST will reduce a number of projects in order to consolidate efforts on highest priority research. NIST will reduce projects focusing on assessment of technologies for indoor location tracking of first responders, support for smart grid communications protocols, as well as the development of standards for the smart grid and other cyber physical systems, including the elimination of work on the development of standards and guidelines for wireless communications and process control for the manufacturing industry. These reductions will include the elimination of $7.2 million in contracts and grants to research universities.

Advanced Materials Manufacturing (-$8.3 million and -38 FTE) – The development and manufacture of new materials is essential to U.S. competitiveness and domestic high-value manufacturing in various economic sectors, including computing, energy, automotive, and textiles. There are significant measurement science and standards challenges with advanced materials. With reduced budgets, NIST will terminate, sub-critical research efforts in thin film photovoltaics that reduce the cost of solar energy, inorganic electronic materials critical for electronics, materials for advanced battery systems, as well as capabilities focused on computational modeling and characterization of advanced materials systems. NIST will also eliminate its nanomaterial environment, health, and safety (nano-EHS) program, ending the research and development efforts needed to develop new and continue providing existing standard reference materials. For example, NIST will stop development of new silicon nano-EHS standard reference material and not renew nanoscale reference materials in the current catalog.

Semiconductor and Microelectronic Measurements (-$6.9 million and -33 FTE) – NIST has a long history of supporting the measurement science needs of the semiconductor industry. Because a robust and competitive U.S. semiconductor industry is critical to our national security, and essential to advances in smart systems, automation, and Internet of Things applications, NIST will prioritize resources to focus on the next generation materials and hardware characterization to ensure it can meet future industry needs. NIST will discontinue lower-priority programs focusing on material reliability measurements for current generation semiconductors, the advancement of ultraprecise measurement technologies to measure changes in structure and magnetic state of semiconductors, the development and dissemination of 3D nanometer scale dimensional measurements, and research focused on the measurements necessary to advance micro-electrical mechanical systems, very small sensors and devices that have been successfully commercialized in a host of applications from automobiles and smartphones to personal fitness devices.

Environmental Measurements (-$6.6 million and -37 FTE) – To consolidate and focus NIST's work on its core measurement programs, NIST will reduce programs focused on environmental measurements that are used by industry to innovate and comply with state and local regulations. These reductions include measuring the impact of aerosols on pollution and climate change, as well as the impact of volatile organic compounds on indoor air quality. In addition, these reductions eliminate key research staff making it necessary for NIST to halt the production of secondary gas reference materials which help prolong the life of primary reference materials used to calibrate scientific instrumentation, reducing costs for users. NIST will also shut down the NIST marine environment program and our associated partnership with the Hollings Marine Laboratory in Charleston, South Carolina, thus discontinuing maintenance of standard reference materials used to support the measurement of hazards in water, including groundwater and coastal waters.

Time and Fundamental Measurement Dissemination (-$6.3 million and -36 FTE) – NIST will continue to maintain the U.S. time standard, and continue to advance the development of best in the world atomic clocks as part of its core foundational work in this area, and disseminate standard time through the internet. However, NIST will discontinue the dissemination of the U.S. time and frequency via the NIST radio stations in Hawaii and Ft. Collins, CO. These radio stations transmit signals that are used to synchronize consumer electronic products like wall clocks, clock radios, and wristwatches, and may be used in other applications like appliances, cameras, and irrigation controllers. NIST will also scale back efforts to disseminate, and halt efforts to improve, and expand the atomic spectra database that serves a wide range of users.

Cybersecurity (-$5.9 million and -24 FTE) – To focus on core NIST cybersecurity activities and the work of NIST's National Cybersecurity Center of Excellence, NIST will eliminate program management resources from the former National Strategy for Trusted Identities in Cyberspace (NSTIC) program, that are no longer necessary now that the work of the NSTIC program has been incorporated into the NCCOE. NIST will also curtail work on biometrics for commercial and government applications, as well as eliminate the Tool Chain Assurance Research Competition that focuses on reducing bugs in software that reduce security.

Resilience and Structural Engineering (-$5.9 million and -21 FTE) – Since its founding, NIST has supported safety, interoperability, and resilience of the nation's infrastructure. NIST will continue to develop high-priority measurement methods and disseminate reference materials and data that support innovation in performance and resilience of the built environment. However, NIST will eliminate lower-priority work on certain structural materials characterization and testing, including studies on the weathering of polymers conducted in support of a NIST-led consortia. In addition, NIST will eliminate the extramural Fire Grants Program that funds grants at multiple universities and standards development organizations (SDOs).

Biological Science and Health Measurements (-$5.4 million and -20 FTE) – Breakthrough technologies like advanced imaging, gene sequencing, and gene-editing techniques in the biotech sector have laid the foundation for significant growth opportunities in fields including not just medicine and health, but also chemical manufacturing, energy development, and agriculture. These technological advances have also created a host of measurement challenges that need to be resolved to realize the full potential of concepts like personalized medicine, where approaches to health and treatment decisions are tailored to every individual. NIST is focusing its efforts in the biosciences to build the measurement science capabilities necessary to support progress in these emerging areas. Therefore, NIST will eliminate older biological science and health measurement programs focused on measuring DNA damage, characterizing radionuclide based imaging techniques often used in the diagnosis of cancer, and developing new imaging tools to help advance new nanoscale therapies. In addition, NIST will discontinue a line of Standard Reference Material products on dietary health supplements, which have had little demand outside of their initial use by the National Institutes of Health and the Food and Drug Administration to support labelling.

Quantum Science (-$4.1 million and -14 FTE) – NIST is a leader in basic and applied research in quantum science with a rich history at the forefront in areas like atomic and molecular physics, chemical physics, laser physics, photonics, nanoscience, precision measurement and quantum information. Within the FY 2018 budget, NIST will prioritize research focused on engineering robust quantum systems for improved sensing and better quantum standards, and work to create, develop, and characterize powerful and efficient hybrid quantum systems that enable the transformation of quantum information from one modality to another. NIST will focus on basic research while reducing funding for efforts that apply some of NIST's breakthroughs in quantum science into new metrology applications such as new sensing technologies that with further R&D could have an impact on the factory by reducing calibration needs in factories. Eliminated efforts include the development of compact cryogenics for novel quantum based sensors, the establishment of a best-in-the-world temperature measurement technology, the development of advanced materials like graphene to use as ion traps, and the application of new quantum sensors as detectors of greenhouse gases.

User Facilities (-$3.7 million and -17 FTE) – NIST operates two user facilities, the NIST Center for Neutron Research (NCNR) and the Center for Nanoscale Science and Technology (CNST). These unique facilities provide over 3,000 scientists from academia and industry unique world-class capabilities that help move the state-of-the-art forward in advanced materials, nanotechnology, bioscience, and other emerging technology areas. To meet the funding levels outlined in the President's FY 2018 budget request, NIST will reduce support at both facilities. At the NCNR, NIST will remove two instruments from the user program, selected to have the least impact on the overall user community, slow the development of new instruments, and cut back on support services provided to users. At the CNST, the reduced funds will slow the rate of replacement of the equipment, and reduce the number of staff available to support facility users. The proposed reductions will also eliminate $1.2 million in grants.

PROGRAM CHANGE PERSONNEL DETAIL

Program: Measurement Science, Services, and Programs
Subprogram: Laboratory Programs
Program Change: Laboratory Programs Decrease

Title:	Grade	Number of Positions	Salary Annual	Salaries Total
Scientist/Engineer	ZP V	(48)	$131,767	($6,324,816)
Scientist/Engineer	ZP IV	(97)	112,021	(10,866,037)
Scientist/Engineer	ZP III	(29)	79,720	(2,311,880)
Scientist/Engineer	ZP II	(7)	54,972	(384,804)
Management and Program Analyst	ZA IV	(17)	112,021	(1,904,357)
Management and Program Analyst	ZA III	(40)	79,720	(3,188,800)
Management and Program Analyst	ZA II	(3)	54,972	(164,916)
Engineering Technician	ZT V	(1)	94,796	(94,796)
Engineering Technician	ZT IV	(7)	79,720	(558,040)
Engineering Technician	ZT III	(10)	60,538	(605,380)
Administrative Support	ZS V	(1)	60,538	(60,538)
Administrative Support	ZS IV	(2)	49,771	(99,542)
Administrative Support	ZS III	(21)	40,442	(849,282)
Administrative Support	ZS II	(1)	32,428	(32,428)
Administrative Support	ZS I	(1)	26,474	(26,474)
Total		(285)		(27,472,090)
Less Lapse	0%	0		-
Total full-time permanent (FTE)		(285)		(27,472,090)
2018 Pay Adjustment (0.0%)				-
TOTAL				(27,472,090)

Personnel Data	Number
Full-Time Equivalent Employment	
Full-time permanent	(285)
Other than full-time permanent	0
Total	(285)
Authorized Positions:	
Full-time permanent	(285)
Other than full-time permanent	0
Total	(285)

PROGRAM CHANGE BY OBJECT CLASS
(Dollar amounts in thousands)

Program: Measurement Science, Services, and Programs
Subprogram: Laboratory Programs
Program Change: Laboratory Programs Decrease

	Object Class	FY 2018 Decrease	FY 2018 Total Program
11	Personnel compensation		
11.1	Full-time permanent	$ (27,472)	$ 202,854
11.3	Other than full-time permanent	0	25,387
11.5	Other personnel compensation	0	1,230
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	(27,472)	229,471
12	Civilian personnel benefits	(8,638)	78,119
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	(549)	11,832
22	Transportation of things	(388)	853
23.1	Rental payments to GSA	0	186
23.2	Rental Payments to others	0	1,655
23.3	Communications, utilities and miscellaneous	(3,726)	9,640
24	Printing and reproduction	(502)	24
25.1	Advisory and assistance services	(52)	3,619
25.2	Other services	(5,117)	18,883
25.3	Purchases of goods & services from Gov't	(2,279)	26,498
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	(6,103)	163
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	(292)	15,820
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	(2,750)	31,328
31	Equipment	(3,703)	42,812
41	Grants, subsidies and contributions	(7,089)	75,832
44	Refunds	0	0
99	Total obligations	(68,660)	546,735

Corporate Services (Base Funding: $14.0 million and 49 FTE; Program Change: -$2.7 million and -6 FTE)

Consistent with NIST's priority to focus resources on the laboratory programs, NIST is proposing reductions to the Corporate Services sub program line by approximately 19 percent, a reduction of $2.7 million dollars. The proposed reductions will streamline management's monitoring of operational metrics and CIO-wide trends potentially increasing risk of service interruptions. Network maintenance will be kept on most critical network components; however, less critical systems may experience increased times to respond to network connections and Windows desktop incidents and requests.

PROGRAM CHANGE PERSONNEL DETAIL

Program: Measurement Science, Services, and Programs
Subprogram: Corporate Services
Program Change: Corporate Services Decrease

Title:	Grade	Number of Positions	Annual Salary	Total Salaries
Information Technology Specialist	ZP V	(1)	$131,767	($131,767)
Information Technology Specialist	ZP IV	(3)	112,021	(336,063)
Management and Program Analyst	ZA IV	(1)	112,021	(112,021)
Management and Program Analyst	ZA III	(1)	79,720	(79,720)
Total		(6)		(659,571)
Less Lapse	0%	0		0
Total full-time permanent (FTE)		(6)		(659,571)
2018 Pay Adjustment (0%)				0
TOTAL				(659,571)

Personnel Data	Number
Full-Time Equivalent Employment	
Full-time permanent	(6)
Other than full-time permanent	0
Total	(6)
Authorized Positions:	
Full-time permanent	(6)
Other than full-time permanent	0
Total	(6)

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollars in thousands)

Budget Program: Measurement Science, Services, and Programs
Sub-program: Corporate Services
Program Change: Corporate Services Decrease

	Object Class	2018 Decrease	FY 2018 Total Program
11	Personnel compensation		
11.1	Full-time permanent	($660)	$3,220
11.3	Other than full-time permanent	0	265
11.5	Other personnel compensation	0	856
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	(660)	4,341
12	Civilian personnel benefits	(207)	1,257
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	(7)	17
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	10
23.3	Communications, utilities and miscellaneous charges	(254)	1,015
24	Printing and reproduction	(1)	1
25.1	Advisory and assistance services	0	306
25.2	Other services	(989)	890
25.3	Purchases of goods & services from Gov't accounts	(28)	1,902
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	(213)	983
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	(30)	2
31	Equipment	(333)	556
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(2,722)	11,280

Standards Coordination and Special Programs (Base Funding: $68.8 million and 185 FTE; Program Change: -$24.4 million and -46 FTE)

Consistent with NIST's priority to focus resources on the laboratory programs, NIST is proposing reductions to the Standards Coordination and Special Programs sub-program line by 36 percent, a reduction of $24.4 million dollars. The Standards Coordination and Special Programs sub-program line houses two cross-NIST activities managed by the Associate Director for Laboratory Programs: crosscutting R&D programs, and documentary standards coordination and policy development. The proposed reductions will largely eliminate external R&D partnerships that expand and broaden the impact of the NIST Laboratory R&D programs. They will also eliminate crosscutting R&D program management functions of the Office of Special Programs, leaving the individual NIST laboratories responsible for remaining intramural work to taking on those responsibilities. Specific details of the reductions are outlined below.

Office of Special Programs (-$16.0 million and -38 FTE) – NIST proposes to reduce the Office of Special Programs by $16 million. In accordance with prioritizing investment in core NIST research, the reductions will terminate all extramural grant programs supported by the office, and eliminate the cross-NIST program management functions of the office. The management of the remaining funds that support internal R&D activities in the NIST laboratories will be taken over by the responsible lab organization, potentially reducing the sum value of the research activities due to a lack of coordination and management of the entire portfolio of activities. The major activities within the Office of Special Programs that will be eliminated include:

- **Greenhouse Gas and Climate Measurements (-$5.8 million and -8 FTE) –** The NIST Greenhouse Gas (GHG) Measurements Program develops advanced tools and standards for accurately measuring GHG emissions. This work increases the accuracy of GHG emissions measurements so that industries and governments have the best available measurement-based information they need to manage emissions effectively. NIST will eliminate research grants to external partners, including the funds that support the Urban Dome program, which supports test-beds in urban environments that advance the development of technologies for the direct measurement of greenhouse gas emissions at the scale of an urban region or city. These reductions will terminate support for three urban test beds: the Indianapolis Flux Experiment, or INFLUX; the Los Angeles Megacity Carbon Project; and the Northeast Corridor Project which stretches from Washington, D.C. to Boston, Massachusetts. Discontinuation of NIST's support will terminate modeling and other research efforts by test bed university partners across the U.S.

- **NIST Consortium for Semiconductor and Future Computing Research (-$3.3 million and -0 FTE) –** Since 2007 NIST has supported a project with the Semiconductor Research Corporation with the purpose of catalyzing industry investment in use-inspired basic research to address shared technical challenges in early "pre-competitive" stages of development. To meet the levels of the FY 2018 request, NIST will terminate support for this grant program.

- **Forensic Science Program Management and Organization of Scientific Area Committees (OSAC) Support (-$2.7 million and -12 FTE) –** To reduce costs, NIST will no longer support a centrally managed forensic science research program. NIST measurement science research supported by the current program will continue but will be managed by the specific NIST laboratory responsible for carrying out the work. This will make coordination of work with the needs of the vast external forensic science

community across multiple forensic science disciplines less efficient. NIST will also reduce support for the operation of the OSAC program which was funded by the Department of Justice to facilitate the development and promulgation of consensus-based forensic science standards and guidelines that are fit-for-purpose and based on sound scientific principles, promote their use by accreditation and certification bodies, and establish and maintain working relationships with similar organizations. The OSAC program has more than 540 committee members from 49 states representing the forensic science, legal, law enforcement, and research communities. These programmatic reductions will significantly slow progress toward addressing the significant, unaddressed issues identified by the 2009 National Academies Report *Strengthening Forensic Science in the United States: a Path Forward*.

- **Office of Special Programs Management and Program Coordination (- $4.2 million and -18 FTE) –** As previously mentioned, because of the reductions above, NIST will eliminate crosscutting R&D program management functions of the Office of Special Programs, leaving the individual NIST laboratories responsible for remaining intramural work to taking on those responsibilities.

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

NIST Center of Excellence Program (-$4.0 million and -0 FTE) – The NIST Center of Excellence Program supports collaborations between NIST and leading research institutes in emerging technology areas to expand NIST's impact and mission delivery through strategic partnerships with the country's foremost experts in critical technology areas. Currently NIST supports three Centers of Excellence in Advanced Materials, Community Resilience, and Forensic Science. To meet the requested funding levels for FY 2018, NIST would retain the centers most closely aligned with NIST's core mission space in advanced materials and disaster resilience. NIST would end funding for the most recently awarded of the three, the Forensic Science Center of Excellence. The center is focused on advancing the development and adoption of probabilistic methods to enhance forensic analysis.

PROGRAM CHANGE PERSONNEL DETAIL

Program: Measurement Science, Services, and Programs
Subprogram: Standards Coordination and Special Programs
Program Change: Standards Coordination and Special Programs Decrease

Title:	Grade	Number of Positions	Salary Annual	Salaries Total
Scientist/Engineer	ZP V	(6)	$131,767	($790,601)
Scientist/Engineer	ZP IV	(13)	112,021	(1,456,273)
Scientist/Engineer	ZP III	(4)	79,720	(318,880)
Management and Program Analyst	ZA IV	(5)	112,021	(560,105)
Management and Program Analyst	ZA III	(5)	79,720	(398,600)
Management and Program Analyst	ZA II	(3)	54,972	(164,916)
Administrative Support Assistant	WG VII	(1)	53,302	(53,302)
Administrative Support Assistant	ZS IV	(3)	49,771	(149,313)
Administrative Support Assistant	ZS III	(5)	40,442	(202,210)
Administrative Support Assistant	ZS II	(1)	32,428	(32,428)
Total		(46)		(4,126,628)
Less Lapse	0%	0		-
Total full-time permanent (FTE)		(46)		(4,126,628)
2018 Pay Adjustment (0.0%)				-
TOTAL				(4,126,628)

Personnel Data	Number
Full-Time Equivalent Employment	
Full-time permanent	(46)
Other than full-time permanent	0
Total	(46)
Authorized Positions:	
Full-time permanent	(46)
Other than full-time permanent	0
Total	(46)

PROGRAM CHANGE BY OBJECT CLASS
(Dollar amounts in thousands)

Program: Measurement Science, Services, and Programs
Subprogram: Standards Coordination and Special Programs
Program Change: Standards Coordination and Special Programs Decrease

	Object Class	FY 2018 Decrease	FY 2018 Total Program
11	Personnel compensation		
11.1	Full-time permanent	(4,127)	11,671
11.3	Other than full-time permanent	0	989
11.5	Other personnel compensation	0	2,832
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	(4,127)	15,492
12	Civilian personnel benefits	(1,297)	4,579
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	(56)	1,335
22	Transportation of things	(3)	69
23.1	Rental payments to GSA	0	3
23.2	Rental Payments to others	0	240
23.3	Communications, utilities and miscellaneous	(2,088)	3,027
24	Printing and reproduction	(6)	89
25.1	Advisory and assistance services	0	310
25.2	Other services	(1,035)	9,603
25.3	Purchases of goods & services from Gov't	(231)	1,931
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	(357)	191
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	(103)	1,383
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	(248)	2,899
31	Equipment	(270)	1,746
41	Grants, subsidies and contributions	(14,600)	6,087
44	Refunds	0	0
99	Total obligations	(24,421)	48,984

Exhibit 16

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

	Object Class	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
11	Personnel compensation					
11.1	Full-time permanent	$240,559	$244,505	$250,004	$217,745	($32,259)
11.3	Other than full-time permanent	25,820	26,055	26,641	26,641	0
11.5	Other personnel compensation	4,918	4,918	4,918	4,918	0
11.9	Total personnel compensation	271,297	275,478	281,563	249,304	(32,259)
12.1	Civilian personnel benefits	85,687	91,049	94,098	83,955	(10,143)
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	12,200	13,715	13,795	13,184	(611)
22	Transportation of things	1,265	1,287	1,313	922	(391)
23.1	Rental payments to GSA	143	186	189	189	0
23.2	Rental payments to others	1,838	1,871	1,905	1,905	0
23.3	Communications, utilities, and miscellaneous charges	22,255	21,079	19,753	13,682	(6,071)
24	Printing and reproduction	602	611	623	114	(509)
25.1	Advisory and assistance services	4,326	4,643	4,287	4,235	(52)
25.2	Other services	69,373	62,134	30,515	29,376	($1,139)
25.3	Purchases of goods and services from Government accounts	30,589	36,831	32,869	30,331	(2,538)
25.5	Research and development contracts	3,148	3,249	6,814	354	(6,460)
25.7	Operation and maintenance of equipment	18,150	18,425	18,794	18,186	(608)
26	Supplies and materials	35,535	36,394	37,257	34,229	(3,028)
31	Equipment	43,942	46,835	49,420	45,114	(4,306)
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	103,608	103,608	103,608	81,919	(21,689)
42	Insurance claims and indemnities	1	0	0	0	0
43	Interest and dividends	42	0	0	0	0
99	Total Obligations	704,001	717,395	696,803	606,999	(89,804)

	Object Class	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
99	Total Obligations	704,001	717,395	696,803	606,999	(89,804)
	Less Prior Year Recoveries	(6,786)	(1,000)	(1,000)	(1,000)	0
	Less Prior Year Refunds	(22)				
	Less Prior Year Unobligated Balance	(22,928)	(21,719)	0	0	0
	Plus Unobligated Balance, End of Year	21,719				
	Plus Unobligated Balance, Expired	16				
	Total Budget Authority	696,000	694,676	695,803	605,999	(89,804)
	Transfer from Election Assistance Commission	(1,500)	(1,497)	0	(1,500)	(1,500)
	Transfers from DoJ for forensic sciences and Office of Law Enforcement Standards	(4,500)	(4,491)	0	(4,499)	(4,499)
	Appropriation	690,000	688,688	695,803	600,000	(95,803)
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	2,101	2,169	2,169	1,832	(337)
	Other than full-time permanent	323	323	323	323	0
	Total	2,424	2,492	2,492	2,155	(337)
	Authorized Positions:					
	Full-time permanent	2,422	2,422	2,422	2,085	(337)
	Other than full-time permanent	59	59	59	59	0
	Total	2,481	2,481	2,481	2,144	(337)

Exhibit 33

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. 378g-1(d)(e)

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. $600,000,000, to remain available until expended, no specific authority

3. of which not to exceed $9,000,000 may be transferred to the "Working Capital Fund." 15 U.S.C. 278b

   15 U.S.C. 278b provides in part: "The National Institute of Standards and Technology is authorized to utilize in the performance of its functions the Working Capital Fund."

4. Public Law 110-69, America Competes Act, 121 Stat 572, passed August 9, 2007 reauthorizes the Scientific and Technical Research and Services appropriation through 2010. Public Law 111-358, America Competes Reauthorization Act, 2010, 124 Stat 3982, passed January 4, 2011 reauthorized the Scientific and Technical Research and Standards appropriation through 2013. In addition, an Emergency Communication and Tracking Technologies Research initiative and a Green Manufacturing and Construction initiative were authorized to develop advanced technologies in these areas.

5. Public Law 111-5 American Recovery and Reinvestment Act of 2009 appropriates $220,000,000 for the Scientific and Technical Research and Services appropriation from FY 2009 to FY 2010 and makes available by reimbursable agreement $10,000,000 from the Department of Energy for the development of Smart Grid Technology by reference to Public Law 110-140, the Energy Independence and Security Act of 2007, and makes available by reimbursable agreement $2,230,186 for a service level agreement with the National Telecommunications and Information Administration. In addition, $20,000,000 is transferred from the Department of Health and Human Services for continued work on advancing health care information enterprise integration.

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

7. 15 U.S.C. 378g-1(d)(e) provides that not to exceed $5,000 shall be for official reception and representation expenses and provides further that NIST may provide local transportation for summer undergraduate research fellowship program participants.

Exhibit 34

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 2016 Actual	FY 2017 Estimate	FY 2018 Estimate
Management and professional support services……	$2,667	$2,564	$2,297
Studies, analyses, and evaluations……	162	266	191
Engineering and technical services……	1,497	1,813	1,747
Total……	4,326	4,643	4,235

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, 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.

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Industrial
Technology Services

Exhibit 5

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
2017 Annualized CR	98	97	$154,705	$193,947	$154,705
less: Unobligated balance from prior year			0	(43,242)	0
Unobligated balance adjusted for transfer to CRF			0	4,000	0
2018 Adjustments to base:					
plus: Inflationary cost changes	0	0	467	467	467
2018 Base Request/Estimate	98	97	155,172	155,172	155,172
less: 2018 Program changes	(81)	(61)	(134,172)	(134,172)	(134,172)
2018 Estimate	17	36	21,000	21,000	21,000

		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
Comparison by program/sub-program:		Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount
Technology innovation program											
Technology innovation program	Pos./Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	$671	0	$1,095	0	0	0	0	0	0
Hollings manufacturing extension partnership											
Hollings manufacturing extension partnership	Pos./Approp	81	130,000	81	129,753	81	$130,107	0	$6,000	(81)	($124,107)
	FTE/Obl.	70	140,883	80	145,422	80	130,107	19	6,000	(61)	(124,107)
Manufacturing USA											
Manufacturing USA	Pos/Approp	16	25,000	17	24,952	17	25,065	17	15,000	0	(10,065)
	FTE/Obl.	17	5,872	17	47,363	17	25,065	17	15,000	0	(10,065)
Baldrige performance excellence program											
Baldrige performance excellence program	Pos./Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	67	0	0	0	0	0	0
TOTALS	Pos./Approp	97	155,000	98	154,705	98	155,172	17	21,000	(81)	(134,172)
	FTE/Obl.	87	147,426	97	193,947	97	155,172	36	21,000	(61)	(134,172)

Comparison by program/sub-program:	2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount
Adjustments for:										
Recoveries		(13,225)		0		0		0		0
Refunds		(1,043)		0		0		0		0
Unobligated balance, start of year		(21,400)		(43,242)		0		0		0
Unobligated balance, end of year		43,242		0		0		0		0
Unobligated balance adjustment (transfer to CRF)		0		4,000		0		0		0
Budget Authority/Appropriation		155,000		154,705		155,172		21,000		(134,172)

Exhibit 9

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

	FTE	Amount
Other Changes:		
Annualization of 2017 pay raise	0	$115
A pay raise of 2.1 percent is assumed to be effective January 1, 2017.		
Total cost in FY 2018 of 2017 pay raise..... 267,750		
Less amount requested in FY 2017..... (153,000)		
Less amount absorbed in FY 2017..... 0		
Amount requested in 2018 to provide full-year cost of 2017 pay raise..... 114,750		
2018 Pay increase and related costs	0	198
A general pay raise of 1.9 percent is assumed to be effective January 1, 2018.		
Total cost in FY 2018 of pay increase..... 198,000		
Less amount absorbed in FY 2018..... 0		
Amount requested for FY 2018 pay increase..... 198,000		
Payment to Departmental Management Working Capital Fund 0		
Total adjustment for FY 2018 pay increase 198,000		

Annualization of positions financed in FY 2017		0	0

The ITS account does not require additional FTE to staff FY 2018 at the planning ceiling level.

New positions in 2017	(0)
Less 5 percent lapse	(0)
Full-Year FTE	(0)
Less FTE funded in 2017	(0)
Annualization of Positions/FTE in 2018	(0)

Personnel benefits		0	$57

Civil Service Retirement System (CSRS)	(11)
Federal Employees' Retirement System (FERS)	21
Thrift Savings Plan (TSP)	8
Federal Insurance Contribution Act (FICA) – OASDI	11
Health Insurance	30
Employees Compensation Fund	(2)

Civil Service Retirement System (-$11,000) – The number of employees covered by the Civil Service Retirement System (CSRS) continues to drop as positions become vacant and are filled by employees who are covered by the Federal Employees' Retirement System (FERS). The estimated percentage of payroll for employees covered by CSRS will decrease from 5.3 percent in FY 2017 to 3.9 percent in FY 2018. The contribution rate will remain at 7.0 percent in FY 2018.

Payroll subject to retirement systems ($11,152,836)	
Cost of CSRS contributions in FY 2018 ($11,152,836 x .039 x .07)	30,447
Cost of CSRS contributions in FY 2017 ($11,152,836 x .053 x .07)	41,377
Total adjustment to base	(10,930)

Federal Employees' Retirement System ($21,000) – The number of employees covered by FERS continues to rise as employees covered by CSRS leave and are replaced by employees covered by FERS. The estimated percentage of payroll for employees covered by FERS will increase from 94.7 percent in FY 2017 to 96.1 percent in FY 2018. P.L. 112-240 enacted in January 2013 modified the federal retirement annuity establishing a Revised Annuity Employee (RAE) followed by a Further Revised Annuity Employee (FRAE) reducing the amount of government FERS contribution percentage for those employees hired after January 1, 2013 with less than five years of creditable service.

Payroll subject to retirement systems ($9,156,478) (non-RAE employees)	
Basic benefit cost in FY 2018 ($9,156,478 x .961 x .137)	1,205,514
Basic benefit cost in FY 2017 ($9,156,478 x .947 x .137)	1,187,952
Increase (FY 2017–FY 2018	17,562
Payroll subject to retirement systems ($1,996,358) (RAE/FRAE employees)	
Basic benefit cost in FY 2018 ($1,996,358 x .961 x .119)	228,301
Basic benefit cost in FY 2017 ($1,996,358 x .947 x .119)	224,976
Increase (FY 2017–FY 2018)	3,325
Total adjustment to base	20,887

Thrift Savings Plan ($8,000) – The cost of agency contributions to the Thrift Savings Plan will also rise as FERS participation increases. The contribution rate increased from 4.63 percent in FY 2017 to 4.64 percent in FY 2018.

Thrift plan cost in FY 2018 ($11,152,836 x .961 x .0464)	497,309
Thrift plan cost in FY 2017 ($11,152,836 x .947 x .0463)	489,008
Total adjustment to base	8,301

Federal Insurance Contributions Act (FICA) - OASDI (11,000) – As the percentage of payroll covered by FERS increases, the cost of OASDI contributions will increase. In FY 2018, the maximum salary subject to OASDI tax is $130,950. The OASDI tax rate for employers remains at 6.2 percent in FY 2018.

FERS payroll subject to FICA tax in 2018 ($11,152,836 x .961 x .923 x .062)	613,341
FERS payroll subject to FICA tax in 2017 ($11,152,836 x .947 x .920 x .062)	602,441
Increase (FY 2017-FY 2018)	10,900
OTP payroll subject to FICA tax in 2018 ($176,164 x .961 x .923 x .062)	9,688
OTP payroll subject to FICA tax in 2017 ($176,164 x .947 x .920 x .062)	9,516
Increase (FY 2017-FY 2018)	172
Total adjustment to base	11,072

Health insurance ($30,000) – Effective January 2016, NIST's contribution to federal employees' health insurance premiums increased by 3.5 percent. Applied against the FY 2017 estimate of $843,000, the additional amount required is $29,505.

Employees' Compensation Fund (-$2,000) – The Employees' Compensation Fund bill for the year ending June 30, 2016, is $1,888 less than for the year ending June 30, 2015.

Per Diem	0	$4

The General Services Administration has set the federal per diem reimbursement rate for meals and lodging at $142 per day which is an increase of 1.4 percent from the prior rate. This percentage was applied to the FY 2017 estimate of $274,000 to arrive at an adjustment to base of $3,836.

Communications, utilities, and miscellaneous charges	0	(78)

Electricity rate decrease	(76)
Natural Gas rate decrease	(2)

The electricity ATB amount was derived using a year to year comparison of the cost per kilowatt hour. In analyzing the 12 months ending February 2016 and 2015, the per kilowatt hour rate decreased 4.8 percent (from .104 to .099) for Gaithersburg, Maryland; decreased 12.0 percent (from .078 to .069) for Boulder, Colorado; and increased 4.4 percent (from .096 to .100) for Ft. Collins, Colorado for a net decrease of $76,000.

The natural gas ATB amount was derived using a year to year comparison of the average cost per therm. In analyzing the 12 months ending February 2016 and 2015, the per therm rate increased 1.3 percent (from .719 to .728) for Gaithersburg, Maryland and decreased 13.2 percent (from .659 to .572) for Boulder, Colorado resulting in a net decrease of $2,000.

General pricing level adjustment	0	$171

This request applies the OMB economic assumptions of 1.020 percent for FY 2018 where the prices that the government pays are established through the market system. Factors are applied to sub-object classes that result in the following adjustments to base: communications, utilities, and miscellaneous charges $2,700; other services $153,720; supplies $5,740; and equipment $8,200.

Subtotal, Other changes	0	467
Total, Adjustments to base	0	467

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APPROPRIATION ACCOUNT: Industrial Technology Services (ITS)

The FY 2018 request for ITS which consists of two extramural programs, the Hollings Manufacturing Extension Partnership (MEP) and Manufacturing USA (MFG USA) is $21.0 million, $133.7 million below the annualized Continuing Resolution (CR) level.

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Exhibit 10

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

Program: Technology innovation program
Sub-program: Technology innovation program

		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
Line Item		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	$671	0	$1,095	0	0	0	0	0	0

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Exhibit 10

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

Program: Hollings manufacturing extension partnership
Sub-program: Hollings manufacturing extension partnership

Line Item		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Hollings manufacturing	Pos./Approp	81	$130,000	81	$129,753	81	$130,107	0	$6,000	(81)	($124,107)
extension partnership	FTE/Obl.	70	140,883	80	145,422	80	130,107	19	6,000	(61)	(124,107)

Department of Commerce

National Institute of Standards and Technology

Hollings Manufacturing Extension Partnership

REIMBURSABLE PROGRAM AND WORKING CAPITAL FUND INVESTMENTS

(Dollar amounts in thousands)

	FY 2016 Actual	FY 2017 Annualized CR	FY 2018 Estimate
Department of Transportation	$35	0	0
Subtotal, Other Agency	35	0	0
Total, Reimbursable Program	35	0	0
Equipment Investments	2	0	0
IE Amortization	(12)	0	0
Total, WCF Investments	(10)	0	0
Total, Reimbursable Program and WCF Investments	25	0	0

BUDGET PROGRAM: Hollings Manufacturing Extension Partnership Program (MEP)

BASE JUSTIFICATION:

Hollings Manufacturing Extension Partnership Program Overview

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

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

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

In FY 2017 MEP has advanced the following initiatives:

Leading the Department's response to the Presidential Memorandum on "Streamlining Permitting and Reducing Regulatory Burdens for Domestic Manufacturing" and supporting the Department's response to the Presidential Memorandum on "Construction of American Pipelines."

Working with NIST's Information Technology Laboratory and the Baldrige Performance Excellence Program to develop a customized self-assessment tool and technical assistance portfolio for cyber-security risk management.

Supporting a projected 9,187 client firms, including 1,300 rural and 2,200 very small manufacturers, with in-depth technical assistance from MEP centers.

Collaborating with the DOD Office of Economic Adjustment in 15 states across the country to provide supply chain service to small manufacturers impacted by Defense program changes, as well as conducting activities with the DOD funded Procurement Technical Assistant Centers (PTACs) to provide risk management services to meet the December 31, 2017, DOD deadline for cybersecurity compliance.

PROGRAM CHANGE(S):

Hollings Manufacturing Extension Partnership Program (Base Funding: $130.107 million and 80 FTE; Program Change: -$124.107 million and -61 FTE)

The FY 2018 budget eliminates federal funding for NIST MEP but requests $6.0 million for MEP to cover the anticipated costs associated with winding down the program.

The FY 2018 Budget request for NIST proposes to end federal funding for MEP. MEP Centers are operated by academic/educational institutions in 17 States, state agencies in 8 states, and nonprofit organizations in 26 states. MEP centers receive funding under five-year cooperative agreements with a federal/non-federal cost share; no federal center funding will be provided in FY 2018 and centers will be required to change to an entirely self-supporting basis.

The proposed reduction of $124.107 million will eliminate $110.0 million in funding to the MEP centers, $4.8 million in contract support for the MEP system, and $9.3 million and a 100 percent reduction of NIST MEP federal employees who support and administer the MEP program. The reduction will impact 1,300 non-federal technical experts in the 51 state-based organizations that operate the MEP program, and affect over 2,500 partners in all centers and nearly 600 field offices, depending on whether states continue to support these centers in the absence of federal funding. Approximately 9,400 client firms will need to find services elsewhere, and 25 states with clients in primarily rural areas may not be able to provide alternative services. The $6.0 million in remaining funding will be used for an orderly shutdown of the program.

Performance Goals and Measurement Data:

Performance Goal Performance Measure: Number of firms receiving in-depth technical assistance from MEP Centers	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target
With decrease	9,187	0	0	0	0
Without decrease	9,187	9,487	9,652	9,893	10,140

Performance Goal Performance Measure: Percentage of MEP clients receiving in-depth technical assistance that increase their competitiveness	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target
With decrease	64%	0	0	0	0
Without decrease	64%	65%	66%	67%	68%

PROGRAM CHANGE PERSONNEL DETAIL

Program: Hollings Manufacturing Extension Partnership Program
Subprogram: Hollings Manufacturing Extension Partnership Program
Program Change: Hollings Manufacturing Extension Partnership Program Decrease

Title:	Grade	Number of Positions	Salary Annual	Salaries Total
Executive Management	SES	(2)	$181,767	($363,534)
Executive Management	ZA V	(1)	162,767	(162,767)
Scientist/Engineer	ZP V	(1)	162,767	(162,767)
Scientist/Engineer	ZP IV	(5)	138,021	(690,105)
Scientist/Engineer	ZP III	(7)	100,720	(705,040)
Management and Program Analyst	ZA V	(2)	162,767	(325,534)
Management and Program Analyst	ZA IV	(4)	138,021	(552,084)
Management and Program Analyst	ZA III	(12)	100,720	(1,208,637)
Management and Program Analyst	ZA II	(4)	70,972	(283,888)
Economist	ZP V	(1)	162,767	(162,767)
Economist	ZP IV	(2)	138,021	(276,042)
Industrial Specialist	ZA V	(3)	162,767	(488,300)
Industrial Specialist	ZA IV	(20)	138,021	(2,760,419)
Industrial Specialist	ZA III	(3)	100,720	(302,159)
Administrative Support	ZS V	(2)	79,538	(159,075)
Administrative Support	ZS IV	(3)	64,771	(194,314)
Administrative Support	ZS IV	(2)	60,455	(120,910)
Administrative Support	ZS III	(7)	54,442	(381,095)
Total		(81)		(9,299,435)
Less Lapse	25%	20		2,324,859
Total full-time permanent (FTE)		(61)		(6,974,576)
2018 Pay Adjustment (1.9%)				(132,517)
TOTAL				(7,107,093)

Personnel Data	Number
Full-Time Equivalent Employment	
Full-time permanent	(61)
Other than full-time permanent	0
Total	(61)
Authorized Positions:	
Full-time permanent	(81)
Other than full-time permanent	0
Total	(81)

PROGRAM CHANGE BY OBJECT CLASS
(Dollar amounts in thousands)

Program: Hollings Manufacturing Extension Partnership Program
Subprogram: Hollings Manufacturing Extension Partnership Program
Program Change: Hollings Manufacturing Extension Partnership Program Decrease

	Object Class	FY 2018 Decrease	FY 2018 Total Program
11	Personnel compensation		
11.1	Full-time permanent	($7,107)	$1,414
11.3	Other than full-time permanent	0	778
11.5	Other personnel compensation	0	148
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	(7,107)	2,340
12	Civilian personnel benefits	(2,245)	764
13	Benefits for former personnel	200	200
21	Travel and transportation of persons	(531)	0
22	Transportation of things	(9)	0
23.1	Rental payments to GSA	0	7
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous	(303)	309
24	Printing and reproduction	(7)	0
25.1	Advisory and assistance services	(305)	0
25.2	Other services	(2,581)	1,909
25.3	Purchases of goods & services from Gov't	(489)	251
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	(395)	20
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	(34)	200
31	Equipment	(283)	0
41	Grants, subsidies and contributions	(110,018)	0
44	Refunds	0	0
99	Total obligations	(124,107)	6,000

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Exhibit 10

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

Program: Manufacturing USA
Sub-program: Manufacturing USA

Line Item		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
		Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount
Manufacturing USA	Pos./Approp	16	$25,000	17	$24,952	17	$25,065	17	$15,000	0	($10,065)
	FTE/Obl.	17	5,872	17	47,363	17	25,065	17	15,000	0	(10,065)

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

	FY 2016 Actual	FY 2017 Annualized CR	FY 2018 Estimate
Equipment Investments	0	0	0
IE Amortization	($2)	0	0
Excess Amortizations over Equipment Investments	0	0	0
WCF Operating Adjustments	0	0	0
Total, WCF Investments	(2)	0	0
Total, Reimbursable Program and WCF Investments	(2)	0	0

BUDGET PROGRAM: Manufacturing USA (MFG USA)

The request provides funds for federal investment in the Manufacturing USA program which serves to increase U.S. global competitiveness by creation of an effective public-private manufacturing research infrastructure for U.S. industry and academia to solve industry-relevant problems. Manufacturing USA consists of institutes that are stood up with short-term federal funds (five-year) plus matching non-federal funds, eventually moving to no core federal funds. The linked institutes for manufacturing innovation have common goals, but unique technical concentrations which can benefit an entire industry sector. In an institute, industry, academia, and government partners leverage existing resources, collaborate, and co-invest to nurture manufacturing innovation and accelerate commercialization. As sustainable manufacturing innovation hubs, the institutes create, showcase, and deploy new capabilities, new products, and new processes that an entire industry sector can use to improve commercial production. They build workforce skills at all levels and enhance manufacturing capabilities in companies large and small. Institutes draw together the best talents and capabilities from all the partners to build the proving grounds where innovations flourish and help advance American domestic manufacturing. The request includes $15.0 million in discretionary funds for the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) as well as coordination of the network of manufacturing institutes.

BASE JUSTIFICATION:

Manufacturing USA Overview

The FY 2016 enacted appropriations bill provided $25.0 million in discretionary funds. The FY 2017 annualized Continuing Resolution level provides roughly the same continuing level of funding. This program and funding is part of government-wide efforts to strengthen public-private efforts in the U.S. advanced manufacturing sector.

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

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

PROGRAM CHANGE(S):

Manufacturing USA (Base Funding: $25.0 million and 17 FTE; Program Change: -$10.065 million and -0 FTE)

The FY 2018 Budget request is $15.0 million for the Manufacturing USA program: $10 million to maintain support for the NIIMBL Institute and $5 million for coordination of the network of manufacturing institutes. With this level NIST will be able to fund the NIIMBL Institute at the planned level of $70.0 million for the five-year start-up period, and provide network support for all institutes in the network, including those funded by other agencies. With the reduction in funding from the base level of $25 million, NIST will not award a second institute from the open-topic competition. The multi-year funding stream to complete the planned $70 million total for NIIMBL would be $20 million annually in FY 2016 and FY 2017, and $10 million annually in FY 2018, FY 2019, and FY 2020.

PROGRAM CHANGE BY OBJECT CLASS
(Dollar amounts in thousands)

Program: Industrial Technology Services
Subprogram: Manufacturing USA
Program Change: Manufacturing USA Decrease

	Object Class	FY 2018 Decrease	FY 2018 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	$1,949
11.3	Other than full-time permanent	0	169
11.5	Other personnel compensation	0	41
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	2,159
12	Civilian personnel benefits	0	702
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	132
22	Transportation of things	0	6
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous	0	90
24	Printing and reproduction	0	5
25.1	Advisory and assistance services	0	0
25.2	Other services	0	384
25.3	Purchases of goods & services from Gov't	0	2,186
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	146
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	59
31	Equipment	0	135
41	Grants, subsidies and contributions	($10,065)	8,996
44	Refunds	0	0
99	Total obligations	(10,065)	15,000

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Exhibit 10

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

Program: Baldrige performance excellence program
Sub-program: Baldrige performance excellence program

Line Item		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
		Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount
Baldrige performance excellence program	Pos./Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	$67	0	0	0	0	0	0

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

	FY 2016 Actual	FY 2017 Annualized CR	FY 2018 Estimate
Technical & Advisory Services	$69	$90	$100
Subtotal, Other Reimbursables	69	90	100
Total, Reimbursable Program	69	90	100
Total, Reimbursable Program and WCF Investments	69	90	100

Exhibit 16

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

	Object Class	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
11	Personnel compensation					
11.1	Full-time permanent	$9,180	$10,237	$10,470	$3,363	($7,107)
11.3	Other than full-time permanent	977	986	947	947	0
11.5	Other personnel compensation	189	189	189	189	0
11.9	Total personnel compensation	10,346	11,412	11,606	4,499	(7,107)
12.1	Civilian personnel benefits	3,244	3,731	3,711	1,466	(2,245)
13	Benefits for former personnel	0	0	0	200	200
21	Travel and transportation of persons	612	660	663	132	(531)
22	Transportation of things	15	15	15	6	(9)
23.1	Rental payments to GSA	5	7	7	7	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and miscellaneous charges	894	778	702	399	(303)
24	Printing and reproduction	12	12	12	5	(7)
25.1	Advisory and assistance services	1,145	705	305	0	(305)
25.2	Other services	5,208	7,807	4,874	2,293	(2,581)
25.3	Purchases of goods and services from government accounts	2,941	2,883	2,926	2,437	(489)
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	552	549	561	166	(395)
26	Supplies and materials	293	288	293	259	(34)
31	Equipment	409	410	418	135	(283)
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	121,748	164,690	129,079	8,996	(120,083)
43	Interest and dividends	2	0	0	0	0
99	Total Obligations	147,426	193,947	155,172	21,000	(134,172)

	Object Class	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
99	Total Obligations	$147,426	$193,947	$155,172	$21,000	($134,172)
	Less Prior Year Recoveries	(13,225)	0	0	0	0
	Less Prior Year Refunds	(1,043)	0	0	0	0
	Less Prior Year Unobligated Balance	(21,400)	(43,242)	0	0	0
	Plus Unobligated Balance End of Year	43,242	0	0	0	0
	Unobligated TIP balance, transfer to CRF	0	4,000	0	0	0
	Total Budget Authority/Appropriation	155,000	154,705	155,172	21,000	(134,172)
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	80	90	90	29	(61)
	Other than full-time permanent	7	7	7	7	0
	Total	87	97	97	36	(61)
	Authorized Positions:					
	Full-time permanent	90	91	91	16	(75)
	Other than full-time permanent	7	7	7	1	(6)
	Total	97	98	98	17	(81)

Exhibit 33

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. $6,000,000 is provided for the Hollings Manufacturing Extension Partnership for shutdown processes.

   $15,000,000 is provided for the Manufacturing USA program to remain available until expended.

3. Public Law 110-69, America Competes Act, 121 Stat 572, enacted August 9, 2007, reauthorized the Industrial Technology Services appropriation through 2010. In addition, it eliminated the Advanced Technology Program (ATP) and established the Technology Innovation Program (TIP) which provides grants to eligible companies or joint ventures whose proposed technology has strong potential to address critical national needs. It also amended 15 U.S.C. 3711 by changing the name of the National Medal of Technology from "Technology Medal" to "Technology and Innovation Medal."

4. Public Law 111-358, America Competes Reauthorization Act, 2010, 124 Stat 3982, enacted January 4, 2011 reauthorized the Industrial Technology Services appropriation through 2013 to include the Manufacturing Extension Partnership Program (MEP) and the Malcolm Baldrige National Quality Award program. In addition, authorization is provided for an Innovative Services Initiative to assist small and medium-sized manufacturers within the MEP program.

5. Public Law 112-55, Consolidated and Further Continuing Appropriations Act, 2012, 125 Stat 552, enacted November 18, 2011, did not contain funding for the Technology Innovation Program (TIP) and the Baldrige Performance Excellence Program (BPEP).

6. Public Law 113-235, Consolidated and Further Continuing Appropriations Act, 2015, 128 Stat 2130, enacted December 16, 2014 amends 15 U.S.C. 271 et seq by establishing the Network for Manufacturing Innovation Program within the Industrial Technology Services appropriation to facilitate access to capital-intensive infrastructure in order to transition innovative technologies into scalable, cost-effective, and high-performing manufacturing capabilities thereby stimulating U.S. leadership in advanced manufacturing research, innovation, and technology. As part of the program, the Secretary shall establish a network of centers for manufacturing innovation. Funding for the program is as follows: "to the extent provided for in advance by appropriations Acts the Secretary may use not to exceed $5,000,000 for each of the fiscal years 2015 through 2024 to carry out this section from amounts appropriated to the Institute for Industrial Technical Services" and "to the extent provided for in advance by appropriations Acts, the Secretary of Energy may transfer to the Institute not to exceed $250,000,000 for the period encompassing fiscal years 2015 through 2024 from amounts appropriated for advanced manufacturing research and development within the Energy Efficiency and Renewable Energy account for the Department of Energy."

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

Exhibit 34

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

	FY 2016 Actual	FY 2017 Estimate	FY 2018 Estimate
Management and professional support services……	$1,145	$705	0
Studies, analyses, and evaluations…….	0	0	0
Engineering and technical services…….	0	0	0
Total……..	1,145	705	0

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 Hollings Manufacturing Extension Partnership Program. Final evaluations are being done in FY 2017 as this program will be winding down in FY 2018.

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.

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Construction of
Research Facilities

Exhibit 5

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
2017 Annualized CR	116	110	$118,774	$146,088	$118,774
less: Unobligated balance from prior year	0	0	0	(23,314)	0
less: Unobligated balance transfer from ITS	0	0	0	(4,000)	0
2018 Adjustments to base:					
plus: Inflationary cost changes	0	0	1,037	1,037	1,037
Other Changes:					
less: FY 2018 Program changes	0	0	(15,811)	(15,811)	(15,811)
2018 Base Request/Estimate	116	110	104,000	104,000	104,000

		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
Comparison by program/sub-program:		Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount
Construction and major renovations											
Construction and major	Pos/Approp	120	$119,000	116	$118,774	116	$119,811	116	$104,000	0	($15,811)
renovations	FTE/Obl.	85	121,300	110	146,088	110	119,811	110	104,000	0	(15,811)
Adjustments for:											
Prior year recoveries			(729)		0		0		0		0
Prior year refunds			(58)		0		0		0		0
Unobligated balance, start of year			(24,827)		(23,314)		0		0		0
Unobligated balance, end of year			23,314		0		0		0		0
Unobligated balance adjustment (transfer from ITS)			0		(4,000)		0		0		0
Appropriation			119,000		118,774		119,811		104,000		(15,811)

Exhibit 6

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

Comparison by program/sub-program:		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Construction and major renovations											
Safety, Capacity, Maintenance and	Pos./BA	0	0	0	0	0	0	0	0	0	0
Major Repairs	FTE/Obl.	0	$919	0	$902	0	0	0	0	0	0

Exhibit 7

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

	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
Total Obligations	$122,219	$146,990	$119,811	$104,000	($15,811)
Financing:					
Offsetting collections from:					
Federal funds	0	0	0	0	0
Non-Federal sources	(902)	0	0	0	0
Total offsetting collections	(902)	0	0	0	0
Adjustments for:					
Prior year recoveries (Direct)	(729)	0	0	0	0
Prior year refunds	(58)				
Unobligated balance, start of year (Direct)	(24,827)	(23,314)	0	0	0
Unobligated balance, start of year (Reimbursable)	(919)	(902)	0	0	0
Unobligated balance, end of year (Direct)	23,314	0	0	0	0
Unobligated balance, end of year (Reimbursable)	902	0	0	0	0
Unobligated balance, transfer from ITS appropriation	0	(4,000)	0	0	0
Budget Authority/Appropriation	119,000	118,774	119,811	104,000	(15,811)

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Exhibit 9

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

	FTE	Amount
Other Changes:		
Annualization of 2017 pay raise	0	$122

A pay raise of 2.1 percent is assumed to be effective January 1, 2017.

Total cost in FY 2018 of 2017 pay raise	285,250
Less amount requested in FY 2017	(163,000)
Less amount absorbed in FY 2017	0
Amount requested in 2018 to provide full-year cost of 2017 pay raise	122,250

2018 Pay increase and related costs	0	191

A general pay raise of 1.9 percent is assumed to be effective January 1, 2018.

Total cost in FY 2018 of pay increase	191,000
Less amount absorbed in FY 2018	0
Amount requested for FY 2018 pay increase	191,000
Payment to Departmental Management Working Capital Fund	0
Total adjustment for FY 2018 pay increase	191,000

Personnel benefits		0	$56
Civil Service Retirement System (CSRS)	(11)		
Federal Employees' Retirement System (FERS)	20		
Thrift Savings Plan (TSP)	8		
Federal Insurance Contribution Act (FICA) - OASDI	11		
Health Insurance	29		
Employees Compensation Fund	(1)		

Civil Service Retirement System (-$11,000) – The number of employees covered by the Civil Service Retirement System (CSRS) continues to drop as positions become vacant and are filled by employees who are covered by the Federal Employees Retirement System (FERS). The estimated percentage of payroll for employees covered by CSRS will decrease from 5.3 percent in FY 2017 to 3.9 percent in FY 2018. The contribution rate will remain at 7.0 percent in FY 2018.

Payroll subject to retirement systems ($10,763,226)	
Cost of CSRS contributions in FY 2018 ($10,763,226 x .039 x .07)	29,384
Cost of CSRS contributions in FY 2017 ($10,763,226 x .053 x .07)	39,932
Total adjustment to base	(10,548)

Federal Employees' Retirement System ($20,000) – The number of employees covered by FERS continues to rise as employees covered by CSRS leave and are replaced by employees covered by FERS. The estimated percentage of payroll for employees covered by FERS will increase from 94.7 percent in FY 2017 to 96.1 percent FY 2018. P.L. 112-240 enacted in January 2013 modified the federal retirement annuity establishing a Revised Annuity Employee (RAE) followed by a Further Revised Annuity Employee (FRAE) reducing the amount of government FERS contribution percentage for those employees hired after January 1, 2013, with less than five years of creditable service.

Payroll subject to retirement systems ($8,836,609) (non-RAE employees)	
Basic benefit cost in FY 2018 ($8,836,609 x .961 x .137)	1,163,401
Basic benefit cost in FY 2017 ($8,836,609 x .947 x .137)	1,146,453
Increase (FY 2017-FY 2018)	16,948
Payroll subject to retirement systems ($1,926,617) (RAE/FRAE employees)	
Basic benefit cost in FY 2018 ($1,926,617 x .961 x .119)	220,326
Basic benefit cost in FY 2017 ($1,926,617 x .947 x .119)	217,116
(Increase (FY 2017-FY 2018)	3,210
Total adjustment to base	20,158

Thrift Savings Plan ($8,000) – The cost of agency contributions to the Thrift Savings Plan will also rise as FERS participation increases. The contribution rate increased from 4.63 percent in FY 2017 to 4.64 percent in FY 2018.

Thrift plan cost in FY 2018 ($10,763,226 x .961 x .0464)	479,937
Thrift plan cost in FY 2017 ($10,763,226 x .947 x .0463)	471,925
Total adjustment to base	8,012

Federal Insurance Contributions Act (FICA) - OASDI ($11,000) – As the percentage of payroll covered by FERS increases, the cost of OASDI contributions will increase. In FY 2017, the maximum salary subject to OASDI tax is $130,950. The OASDI tax rate for employers will remain at 6.2 percent in FY 2017.

FERS payroll subject to FICA tax in 2018 ($10,763,226 x .961x .923 x .062)	591,915
FERS payroll subject to FICA tax in 2017 ($10,763,226 x .947 x .920 x .062)	581,396
Increase (FY 2017-FY 2018)	10,519
OTP payroll subject to FICA tax in FY 2018 ($336,774 x .961 x .923 x .062)	18,521
OTP payroll subject to FICA tax in FY 2017 ($336,774 x .947 x .920 x .062)	18,191
Increase (FY 2017-FY 2018)	330
Total adjustment to base	10,849

Health insurance ($29,000) – Effective January 2015 NIST's contribution to federal employees' health insurance premiums increased by 3.5 percent. Applied against the FY 2017 estimate of $836,000, the additional amount required is $29,260.

Employees' Compensation Fund (-$1,000) – The Employees' Compensation Fund bill for the year ending June 30, 2016, is $804.19 less than for the year ending June 30, 2015.

Communications, utilities, and miscellaneous charges	0	($2)
Electricity rate decrease	(2)	

The electricity ATB amount was derived using a year to year comparison of the cost per kilowatt hour. In analyzing the 12 months ending February 2016 and 2015, the per kilowatt hour rate decreased 4.8 percent (from .104 to .099) for Gaithersburg, Maryland; decreased 12.0 percent (from .078 to .069) for Boulder, Colorado; and increased 4.4 percent (from .096 to .100) for Ft. Collins, Colorado for a net decrease of $2,000.

General pricing level adjustment	0	$670

This request applies the OMB economic assumptions of 2.0 percent for FY 2018 where the prices that the government pays are established through the market system. Factors are applied to sub-object classes that result in the following adjustments to base: communications, utilities, and miscellaneous $740; other services $644,240; supplies and materials $21,900; and equipment $3,380.

Subtotal, Other changes	0	1,037
Total Adjustments to base	0	1,037

Exhibit 10

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

Program: Construction and major renovations
Sub-program: Construction and major renovations

Line Item		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		(Increase/ Decrease) Over 2018 Base	
		Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount
Construction and major renovations	Pos/Approp	9	$60,000	0	$60,000	0	$60,000	0	$60,000	0	0
	FTE/Obl.	7	60,478	0	63,813	0	60,000	0	60,000	0	0
Safety, Capacity, Maintenance and Major Repairs	Pos/Approp	110	59,000	116	58,774	116	59,811	116	44,000	0	($15,811)
	FTE/Obl.	77	60,708	110	81,314	110	59,811	110	44,000	0	(15,811)
External Projects	Pos/Approp	1	0	0	0	0	0	0	0	0	0
	FTE/Obl.	1	114	0	961	0	0	0	0	0	0
Total	Pos/Approp	120	119,000	116	118,774	116	119,811	116	104,000	0	(15,811)
	FTE/Obl.	85	121,300	110	146,088	110	119,811	110	104,000	0	(15,811)

APPROPRIATION ACCOUNT: CONSTRUCTION OF RESEARCH FACILITIES (CRF)

BUDGET PROGRAM: CONSTRUCTION AND MAJOR RENOVATIONS

For FY 2018, NIST requests a total of $104.0 million and 110 FTE for Construction and Major Renovations.

BASE JUSTIFICATION:

CRF Overview

The NIST CRF appropriation funds NIST construction activities, including maintenance, repair, improvements, and major renovation of facilities occupied or used by NIST in Gaithersburg, Maryland; Boulder and Fort Collins, Colorado; and Kauai, Hawaii to meet current and future measurement and research needs for the nation.

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

Aging laboratory facilities at NIST substantially hinder NIST's mission of fostering innovation and ensuring U.S. competitiveness. Scientific work at NIST laboratories supports national priorities such as energy, environment, manufacturing, health care, physical infrastructure, information technology, and many other areas. However, this work is significantly impaired by aging facilities that cannot provide the control of temperature, vibration, humidity, and air cleanliness required for world-leading research and measurement to support 21st century innovation and competitiveness. Variations in temperature cause sensitive optics to misalign; fluctuations in humidity interfere with sensitive measurements of light; and vibrations make sensitive spatial measurements impossible to make reliably. Scientists and engineers working to push beyond the limits of today's advanced technology require stable environments. When making the world's most precise measurements or creating quantum-based measurement tools that are only a handful of atoms wide, the tiniest variations in temperature, or vibrations from increased local traffic, or unreliable electrical current can destroy months of work. The nearly 60-year-old facilities cause a productivity loss of at least 20 percent,[1] and prevent NIST from performing the most demanding measurement research needed by industry and the scientific community. Even for the limited range of work that can be attempted, current laboratory conditions create significant inefficiencies, and the aging facility systems present safety concerns. In terms of lost productivity, many measurements can only be conducted sporadically when environmental conditions are temporarily stable, and significant experimental data and construction of nanoscale devices becomes worthless because of corruption due to poor laboratory conditions. The types of high-precision research and measurement planned for the future will not be possible without wholesale facility upgrades.

[1] NIST Boulder Facilities Review Team, Report on "NIST Boulder Laboratory Facilities: Findings and Recommendations on Possible Renovation of Existing Facilities and Possible Construction of New Laboratory Facilities," January 31, 2006.

Without proper and reliable facilities and infrastructure, the work and research being conducted at NIST, and relied upon globally is at risk of failure. NIST plays a critical role at the apex of calibrations; radioactivity and dose measurements; and neutron dosimetry for many U.S. industries. For example, NIST's Radiation Physics Building alone directly supports: 38.9 million annual mammography procedures; 81.2 million computed tomography scan procedures; a $2.0 billion brachytherapy (cancer radiation therapy) market; a $152.3 million global radiation detection, monitoring and safety market with a U.S. market share of 40 percent; irradiation of 120,000 tons of food annually; and development of 276 radioactivity standard reference materials. The work conducted at NIST has critical impact on multiple sectors of the economy and directly affects consumer safety with food irradiation; worker safety with radiation protection; environmental health with environmental monitoring; public safety through homeland security applications; and public health through medical applications. Some examples of technologies relying on traceability to NIST include: mammography; external radiation beam therapies (cancer treatment); internal radiation therapies; positron emission tomography/computed tomography scans; dental and medical x-rays; medical fluoroscopy; cardio stress tests; metabolic studies (gallbladder, kidney, intestines); and medical device sterilization.

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

- Replace aging underground site utility distribution systems that are failing;
- Replace aging, obsolete, failed mechanical systems, to include heating and cooling coils, chillers, condenser units, exhaust fans, condensate receivers, vacuum pumps, steam traps;
- Upgrade heating, ventilation, and air conditioning control systems from 1960's pneumatic to current-day direct digital to address building supply/return/exhaust air rebalancing issues;
- Replace roofs;
- Refurbish elevators;
- Replace motor control centers, transformers, switchgear, network protectors, buss ducts, panels, UPS systems, fire alarm systems, variable frequency drives;
- Upgrade electrical distribution systems to accommodate expanding research capacity requirements;
- Address building envelope exterior and interior architectural systems' degradations – energy inefficient and/or leaking windows and doors, rollup doors, below grade water infiltration through foundation cracks, and worn out ceilings and flooring;
- Address leaks and deterioration of underground potable water, sewer, electrical feeder, and compressed air systems;
- Abate asbestos; and
- Repair deteriorating road, parking lot, and sidewalk surfaces.

SUB-PROGRAM: Safety, Capacity, Maintenance, and Major Repairs (SCMMR)

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

The continued FY 2018 efforts for the Building 1 Renovation (B1R) project will include $10.0 million to fund hazardous material abatement in Wing 5. This will include the removal of asbestos that has been found to be present in floor tiles, adhesive, pipe insulation and caulking; removal of materials containing lead that has been found in paint on doors and windows; and testing for and removal of radiation contaminated materials.

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

The National Research Council (NRC) recommends annual funding between two percent and four percent of the organization's Current Replacement Value (CRV) for routine maintenance and repair work.[2] The current CRV of NIST buildings and structures is $2.1 billion. For NIST, this would equate to between $42 and $84 million in SCMMR funding annually. NIST's aging facilities has created a current deferred maintenance and repair backlog of $346 million. The NRC report further states, "Where neglect of maintenance has caused a backlog of needed repairs to accumulate, spending must exceed this minimum level [two to four percent] until the backlog has been eliminated."

Example objectives of the SCMMR sub-program are to:

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

SUB-PROGRAM: Construction and Major Renovations

Base funds of $60.0 million will continue the multi-year effort to renovate and modernize the Radiation Physics Building (Building 245). The FY 2018 funding will allow NIST to begin the next phase of a multi-phased project for the Building 245 Modernization (B245M), specifically to complete water infiltration repairs; renovate the A-Wing sub-basement; begin hazardous material remediation; install A-Wing wired systems; begin asbestos remediation; D-Wing interior renovations; and heating, ventilation, and air conditioning upgrades in the D-Wing.

Funding provided in FY 2017 will allow construction of a D-Wing addition, excavation and waterproofing of existing subterranean laboratory spaces in the D-Wing, and installation of utility systems for the B/C Wing addition. This funding will allow the continued migration of research requiring strict environmental tolerances (temperature, humidity, and air filtration) from

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

antiquated space to modern facilities. This FY 2017 funded phase will incorporate the addition of approximately 9,000 gross square feet (gsf) of modern laboratory space and approximately 9,000 gsf of new consolidated mechanical/infrastructure support space with new mechanical equipment as well as controls to provide the much-needed tighter environmental controls. This funding also incorporates the correction of a portion of the chronic water infiltration problem in the basement and sub-basement laboratories.

Multi-Year Budget Information ($ in millions)

Major Cost Categories	FY 2016 and Prior	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
B1R Design and Limited Renovation of Building 3	$12.0						
B1R Exterior Renovations	14.9						
B1R Wing 3	15.0						
B1R Wing 6	15.7						
B1R Swing Space	3.9						
B3R	18.0						
B1R Wing 4, Wing 5 and Limited Center Spine (1)	12.0	$10.0	$10.0				
B245M (2)	62.0	60.0	60.0	70.0	70.0	5.0	
General Purpose Laboratories Modernization (3)							
Boulder Modernization (Wing 1, Wing 2 and Remaining Center Spine) (3)							

(1) Will be completed with existing SCMMR as well as future funding requests within the Construction and Major Renovations (CMR) line item.
(2) Will be completed with CMR funding requests.
(3) Future projects that will be submitted as CMR funding requests.

PROGRAM CHANGES:

1. SCMMR Decrease (Base Funding: $59.8 million and 110 FTE; Program Change: -$15.811 million, 0 FTE):

NIST acknowledges a decrease in the amount of $15.811 million to reduce the SCMMR program to $44.0 million for FY 2018. This reduction will result in an increased backlog of deferred maintenance and only allow NIST to carry out the highest priority infrastructure repairs and patches thus increasing the risk of system outages and unstable environmental conditions within the laboratories.

PROGRAM CHANGE PERSONNEL DETAIL
(Dollars in thousands)

Budget Program: Construction and Major Renovations
Sub-program: Construction and Major Renovations
Program Change: SCMMR Decrease

No change in FTE is required.

PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Dollars in thousands)

Budget Program: Construction and Major Renovations
Sub-program: SCMMR
Program Change: SCMMR Decrease

	Object Class	FY 2018 Decrease	FY 2018 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	$11,016
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	326
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	11,342
12	Civilian personnel benefits	0	3,793
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	($3)	32
22	Transportation of things	0	19
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	(121)	139
24	Printing and reproduction	0	6
25.1	Advisory and assistance services	0	0
25.2	Other services	(15,637)	11,658
25.3	Purchases of goods & services from Gov't accounts	(14)	5,162
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	(6)	590
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	(14)	1,103
31	Equipment	(16)	156
32	Lands and structures	0	70,000
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(15,811)	104,000

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Exhibit 16

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	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
11	Personnel compensation					
11.1	Full-time permanent	$8,245	$10,774	$11,016	$11,016	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	326	326	326	326	0
11.9	Total personnel compensation	8,571	11,100	11,342	11,342	0
12.1	Civilian personnel benefits	2,698	3,667	3,793	3,793	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	35	35	35	32	($3)
22	Transportation of things	19	19	19	19	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	261	261	260	139	(121)
24	Printing and reproduction	6	6	6	6	0
25.1	Advisory and assistance services	5	0	0	0	0
25.2	Other services	21,151	40,025	27,295 *	11,658 *	(15,637)
25.3	Purchases of goods and services from government accounts	5,075	5,078	5,176	5,162	(14)
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	577	584	596	590	(6)
26	Supplies and materials	1,071	1,095	1,117	1,103	(14)
31	Equipment	165	1,319	172	156	(16)
32	Land and structures	81,665	82,200	70,000 *	70,000 *	0
41	Grants, subsidies, and contributions	0	699	0	0	0
43	Interest and dividends	1	0	0	0	0
99	Total Obligations	121,300	146,088	119,811	104,000	(15,811)

* An increase of $10M is reflected in the lands and structures object class to support the continued efforts of the Building 1 Renovation project in FY 2018; the offsetting reduction is from general SCMMR contracts. Please note, the FY 2018 President's Budget MAX data entry for the object class schedule did not reflect these changes.

	Object Class	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
99	Total Obligations	$121,300	$146,088	$119,811	$104,000	($15,811)
	Less Prior Year Recoveries	(729)	0	0	0	0
	Less Prior Year Refunds	(58)	0	0	0	0
	Less Prior Year Unobligated Balance	(24,827)	(23,314)	0	0	0
	Plus Unobligated Balance End of Year	23,314	0	0	0	0
	Unobligated Balance Adjustment (transfer from ITS)	0	(4,000)	0	0	0
	Total Budget Authority/Appropriation	119,000	118,774	119,811	104,000	(15,811)
	Plus Transfers from Other Accounts	0	0	0	0	0
	Appropriation	119,000	118,774	119,811	104,000	(15,811)
	Personnel Data					
	Full-time equivalent employment:					
	Full-time permanent	85	110	110	110	0
	Other than full-time permanent	0	0	0	0	0
	Total	85	110	110	110	0
	Authorized Positions:					
	Full-time permanent	120	116	116	116	0
	Other than full-time permanent	0	0	0	0	0
	Total	120	116	116	116	0

Exhibit 33

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. $104,000,000 to remain available until expended.

3. Public Law 110-69, America Competes Act, 121 Stat 572, passed August 9, 2007 reauthorizes the Construction of Research Facilities appropriation through 2010. It also provided for the Retention of Fees to the Construction of Research Facilities account. “The Director is authorized to retain all building use and depreciation surcharge fees collected pursuant to OMB Circular A-25. Such fees shall be collected and credited to the Construction of Research Facilities Appropriation Account for use in maintenance and repair of the Institute's existing facilities”. Public Law 111-358, America Competes Reauthorization Act, 2010, 124 Stat 3982, passed January 4, 2011 reauthorized the Construction of Research Facilities appropriation through 2013.

4. Public Law 111-5, American Recovery and Reinvestment Act of 2009 appropriated $360,000,000 to the Construction of Research Facilities appropriation from FY 2009 to FY 2010.

Exhibit 34

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

	FY 2016 Actual	FY 2017 Estimate	FY 2018 Estimate
Management and professional support services.....	$0	$0	$0
Studies, analyses, and evaluations.....	0	0	0
Engineering and technical services.....	0	0	0
Total.....	0	0	0

Significant Activities

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

Need for Advisory and Assistance Services

NIST uses outside professional support and engineering and technical services whenever necessary expertise is not available in-house to ensure the safety of NIST staff and visitors.


Working
Capital Fund

Exhibit 5

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

	Positions	FTE	Budget Authority	Obligations
2017 Annualized CR	638	689	0	0
Reduction in transfers from prior STRS program changes	0	0	0	0
2018 Base	638	689	0	0
Transfer from STRS program changes for equipment investments	0	0	0	0
2018 Estimate	638	689	0	0

Exhibit 6

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

Comparison by activity:	2016 Actual FTE	2016 Actual Amount	2017 Annualized CR FTE	2017 Annualized CR Amount	2018 Base FTE	2018 Base Amount	2018 Estimate FTE	2018 Estimate Amount	Increase/ (Decrease) Over 2018 Base FTE	Increase/ (Decrease) Over 2018 Base Amount
Laboratory programs										
WCF transfer		0		0		0		0		0
Reimbursables	630	$143,211	638	$165,269	638	$143,467	638	$143,467	0	0
WCF investments	0	19,970	0	7,135	0	0	0	0	0	0
Subtotal	630	163,181	638	172,404	638	143,467	638	143,467	0	0
Corporate services										
WCF transfer		0		0		0		0		0
Reimbursables	0	3,605	0	6,296	0	6,171	0	6,171	0	0
WCF investments	0	346	0	(237)	0	0	0	0	0	0
Subtotal	0	3,951	0	6,059	0	6,171	0	6,171	0	0
Standards coordination and special programs										
WCF transfer		0		0		0		0		0
Reimbursables	29	3,806	31	5,106	31	5,111	31	5,111	0	0
WCF investments	0	(248)	0	(215)	0	0	0	0	0	0
Subtotal	29	3,558	31	4,891	31	5,111	31	5,111	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	0	0	0	0	0	0	0
Subtotal	0	(2)	0	0	0	0	0	0	0	0
Hollings manufacturing extension partnership										
WCF transfer		0		0		0		0		0
Reimbursables	0	35	0	0	0	0	0	0	0	0
WCF investments	0	(10)	0	0	0	0	0	0	0	0
Subtotal	0	25	0	0	0	0	0	0	0	0

Comparison by activity:	2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Baldrige performance excellence program										
WCF transfer		0		0		0		0		0
Reimbursables	20	69	20	90	20	100	20	100	0	0
WCF investments	0	0	0	0	0	0	0	0	0	0
Subtotal	20	69	20	90	20	100	20	100	0	0
Total, National Institute of Standards and Technology										
WCF transfer		0		0		0		0	0	0
Reimbursables	679	150,726	689	176,761	689	154,849	689	154,849	0	0
WCF investments	0	20,056	0	6,683	0	0	0	0	0	0
Grand Total	679	170,782	689	183,444	689	154,849	689	154,849	0	0

Exhibit 7

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

	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
Total Obligations	$170,782	$183,444	$154,849	$154,849	0
Offsetting collections from:					
Federal funds	(88,805)	(112,545)	(93,075)	(93,075)	0
Non-Federal sources	(72,894)	(70,899)	(61,774)	(61,774)	0
Total offsetting collections	(161,699)	(183,444)	(154,849)	(154,849)	0
Unobligated balance, start of year	(105,118)	(90,168)	(90,168)	(90,168)	0
Unobligated balance transferred	0	0			
Unobligated balance, end of year	90,168	90,168	90,168	90,168	0
Change in uncollected customer payments - Federal	5,867	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

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

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Exhibit 16

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

	Object Class	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	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 miscellaneous charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services	0	0	0	0	0
25.3	Purchases of goods and services from Government accounts	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Land and structures	0	0	0	0	0
41	Grants, subsidies, and contributions	0	0	0	0	0
99	Total Obligations	0	0	0	0	0

Personnel Data	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
Full-time equivalent employment:					
Full-time permanent	593	603	603	603	0
Other than full-time permanent	86	86	86	86	0
Total	679	689	689	689	0
Authorized Positions:					
Full-time permanent	623	623	623	623	0
Other than full-time permanent	15	15	15	15	0
Total	638	638	638	638	0

Exhibit 34

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

	FY 2016 Actual	FY 2017 Estimate	FY 2018 Estimate
Management and professional support services……	$1,063	$357	$193
Studies, analyses, and evaluations……	47	65	65
Engineering and technical services……...	1,658	377	303
Total……..	2,768	799	561

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

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.

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NIST Public Safety
Communications
Research Fund

Exhibit 5

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

	Positions	FTE	Budget Authority	Direct Obligations	Appro-priation
2017 Annualized CR	0	0	0	0	0
2018 Adjustments to base	0	0	0	0	0
2018 Base Request/Estimate	0	0	0	0	0

		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) Over 2018 Base	
Comparison by program/sub-program:		Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	Amount	Per-sonnel	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 - Mandatory Account											
	Pos/Approp	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0	0	0	0	0

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

Exhibit 6

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

	2016 Actual		2017 Annualized CR		2018 Estimate	
Comparison by program/sub-program:	FTE	Amount	FTE	Amount	FTE	Amount
NIST public safety communications research fund	28	$11,059	54	$49,800	56	$46,600

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

Exhibit 7

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

	2016 Actual	2017 Annualized CR	2018 Estimate
Total Obligations	$11,059	$49,800	$46,600
Offsetting collections from:			
Unobligated balance from offsetting collections, start of year	(92,700)		0
Unobligated balance from offsetting collections, end of year	(193,700)		
Adjustments for:			
Unobligated balance, start of year (Mandatory)		(275,341)	(225,541)
Unobligated balance from offsetting collections, end of year	275,341	225,541	178,941
Budget Authority/Appropriation - Mandatory Account	0	0	0

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

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Exhibit 10

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

Program: NIST Public Safety Communications Research Fund
Sub-program: NIST Public Safety Communications Research Fund

		2016 Actual		2017 Annualized CR		2018 Estimate	
Line Item		FTE	Amount	FTE	Amount	Per-sonnel	Amount
NIST public safety communications research fund	Pos/Approp	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0
Total	Pos/Approp	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0

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

MANDATORY ACCOUNT: NIST Public Safety Communications Research Fund (PSCRF)

BUDGET PROGRAM: NIST Public Safety Communications Research Fund

As part of the Middle Class Tax Relief and Job Creation Act of 2012, NIST has resources through the Public Safety Communications Research Fund (PSCRF) to help develop cutting-edge wireless technologies for public safety users. By 2016, the PSCRF was authorized approximately $285.0 million ($300.0 million prior to rescission) in mandatory funds from spectrum auction proceeds for NIST. In partnership with industry and public safety organizations, NIST will 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.

Exhibit 16

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	2016 Actual	2017 Annualized CR	2018 Estimate
11	Personnel compensation			
11.1	Full-time permanent	$3,126	$4,140	$4,206
11.3	Other than full-time permanent	321	1,740	1,946
11.5	Other personnel compensation	33	33	33
11.9	Total personnel compensation	3,480	5,913	6,185
12.1	Civilian personnel benefits	1,135	1,859	1,944
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	471	679	509
22	Transportation of things	77	223	254
23.1	Rental payments to GSA	0	0	0
23.2	Rental payments to others	0	0	0
23.3	Communications, utilities, and miscellaneous charges	306	2,071	2,209
24	Printing and reproduction	4	107	157
25.1	Advisory and assistance services	1,370	1,500	1,500
25.2	Other services	2,733	3,330	2,826
25.3	Purchases of goods and services from government accounts	295	274	371
25.5	Research and development contracts	1	4,000	5,000
25.7	Operation and maintenance of equipment	183	526	542
26	Supplies and materials	197	497	518
31	Equipment	764	1,821	585
32	Land and structures	0	0	0
41	Grants, subsidies, and contributions	42	27,000	24,000
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	1	0	0
99	Total Obligations	11,059	49,800	46,600

	Object Class	2016 Actual	2017 Annualized CR	2018 Estimate
99	Total Obligations	11,059	49,800	46,600
	Unobligated balance from offsetting collections, start of year	(92,700)	(275,341)	(225,541)
	Unobligated balance from offsetting collections, end of year	275,341	225,541	178,941
	Budgetary Resources - Mandatory Account	193,700	0	0
	Less: Offsetting collections	(193,700)	0	0
	Net Budget Authority - Mandatory Account	0	0	0

Personnel Data

Full-time equivalent employment:			
Full-time permanent	24	38	38
Other than full-time permanent	4	16	18
Total	28	54	56
Authorized Positions:			
Full-time permanent	24	40	40
Other than full-time permanent	0	17	19
Total	24	57	59

Note: Beginning in FY 2015, the NIST Public Safety Communications Research Fund (from offsetting collections) will obligate over several fiscal years.

Exhibit 33

Department of Commerce
National Institute of Standards and Technology
WIRELESS INNOVATION FUND
APPROPRIATION LANGUAGE AND CODE CITATIONS

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

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

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

2. MANDATORY ACCOUNT: Wireless Innovation (WIN) Fund: As part of the National Wireless Initiative included in the American Jobs Act, NIST also has resources through the Wireless Innovation (WIN) Fund to help develop cutting-edge wireless technologies for public safety users. The WIN Fund contains $300 million in mandatory funds for NIST from the spectrum auction proceeds to help industry and public safety organizations conduct research and develop new standards, technologies and applications to advance public safety communications in support of the initiative's efforts to build an interoperable nationwide broadband network for first responders.

   P.L. 112-96 established the Public Safety Communications Research Fund per section 6303 of the Middle Class Tax Relief and Job Creation Act of 2012. The fund’s availability extends through 2022 and began to execute in FY 2015. $92.7 million was transferred to NIST in FY 2015. Currently $275.34 million has been carried forward from FY 2016 into FY 2017 with $49.8 million apportioned for FY 2017, $46.6 million apportioned for FY 2018, and $178.9 million apportioned for FY 2019. Additional transfers to NIST from NTIA are expected as proceeds from the spectrum auctions become available.

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Summary of National Institute of Standards and Technology (NIST)

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

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

Summary of Total NIST Discretionary Program

(Obligations in thousands)

	FY 2016			FY 2017			FY 2018			
Source and Use of Funds Spent	Perm. Pos. [1]	FTE	Oblig.	Perm. Pos. [1]	FTE	Oblig.	Perm. Pos. [1]	FTE	Oblig.	Approp. Requested
Direct Funding										
Scientific and technical research and services	2,481	2,424	$704,001	2,481	2,492	$717,395	2,144	2,155	$606,999	$600,000
Industrial technology services	97	87	147,426	98	97	193,947	17	36	21,000	21,000
Construction of research facilities	120	85	121,300	116	110	146,088	116	110	104,000	104,000
Gifts and bequests	18	19	3,741	18	19	2,500 [3]	18	19	2,500 [3]	0
Total, direct funding	2,716	2,615	976,468	2,713	2,718	1,059,930	2,295	2,320	734,499	725,000
Reimbursable Funding and WCF Investments										
Construction of research facilities - building surcharge	0	0	919	0	0	902	0	0	0	
Research, development and supporting services:										
Federal government	460	490	92,813	460	497	112,545	460	497	93,075	
Calibrations and tests, technical and advisory services:										
Federal government	20	21	6,700	20	22	7,435	20	22	6,839	
Public and non-federal government	64	68	27,157	64	69	30,137	64	69	27,724	
Subtotal, Services	84	89	33,857	84	91	37,572	84	91	34,563	
National Voluntary Laboratory Accreditation Program	15	16	3,972	15	16	4,127	15	16	4,127	
Standard reference materials (SRMs):										
SRM Sales:										
Federal government	3	3	820	3	3	946	3	3	971	
Public and non-federal government	58	62	18,676	58	63	21,571	58	63	22,113	
Subtotal, SRM sales	61	65	19,496	61	66	22,516	61	66	23,084	
SRM investment adjustment	0	0	588	0	0	0	0	0	0	
Subtotal, SRM	61	65	20,084	61	66	22,517	61	66	23,084	
Total, Reimbursable program	620	660	151,645 [2]	620	670	177,663 [2]	620	670	154,849	
WCF Investments and Operating Adjustments										
WCF investments	0	0	21,934	0	0	26,049	0	0	25,250	
WCF transfers	0	0	0	0	0	0	0	0	0	
WCF operating adjustments	0	0	20,736	0	0	0	0	0	0	
Total, WCF Investments and operating adjustments	0	0	42,670	0	0	26,049	0	0	25,250	
Total, NIST program	3,336	3,275	1,170,783	3,333	3,388	1,263,642	2,915	2,990	914,598	
Offsetting adjustment for amortization of equipment	0	0	(22,614)	0	0	(19,366)	0	0	(25,250)	
Adjusted total, NIST program	3,336	3,275	1,148,169	3,333	3,388	1,244,276	2,915	2,990	889,348	

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

[2] Total reimbursable numbers are different from the next page due to inclusion of CRF reimbursable obligations.

[3] Estimate support from Foundation for the Malcolm Baldrige National Quality Award, Inc. to Baldrige Performance Excellence Program.

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

	FY 2016 Actual	FY 2017 Annualized CR	FY 2018 Estimate
Department of Defense			
Air Force	$8,612	$9,056	$8,101
Army	512	540	540
Navy	1,305	1,793	1,763
Other, Department of Defense	14,923	18,038	15,000
Subtotal, Department of Defense	25,352	29,427	25,404
Department of Commerce	24,081	26,034	24,317
Department of Energy	2,436	2,670	2,400
Dept. of Health & Human Services	5,454	7,750	4,939
Dept. of Homeland Security	14,074	16,510	14,445
Department of the Interior	247	100	100
Department of Justice	4,444	12,134	7,381
Department of Transportation	685	1,815	420
Department of the Treasury	42	15	0
Department of Veterans Affairs	145	150	150
Environmental Protection Agency	43	100	100
General Services Administration	523	24	509
National Aeronautics & Space Admin.	2,888	2,942	2,622
National Science Foundation	2,929	2,500	3,500
Nuclear Regulatory Commission	1,923	2,400	2,500
Other	7,547	7,974	4,288
Subtotal, Other Agency	92,813	112,545	93,075
Calibrations & Testing	7,360	7,279	7,282
Technical & Advisory Services	30,469	34,421	31,407
Standard Reference Materials	20,084	22,516	23,085
Subtotal, Other Reimbursables	57,913	64,216	61,774
Total, Reimbursable Program	150,726	176,761	154,849
Equipment Transfers	0	0	0
Subtotal, WCF transfer	0	0	0
Equipment Investments	21,934	26,049	25,250
IE Amortization	(22,614)	(19,366)	(25,250)
WCF Operating Adjustments	20,736	0	0
Total, WCF Investments	20,056	6,683	0
Total, Reimbursable Program and WCF Investments	170,782	183,444	154,849

Exhibit 35

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

	FY 2015 Actual	FY 2016 Actual	FY 2017 Estimate	FY 2018 Estimate
Periodicals	0.0	0.0	0.0	0.0
Pamphlets	$15.3	$6.0	$10.0	$10.0
Audiovisuals	24.3	51.0	55.0	57.0
Total	39.6	57.0	65.0	67.0

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

Exhibit 36

Department of Commerce
National Institute of Standards and Technology
AVERAGE SALARY

	2016 Estimate	2017 Estimate	2018 Estimate
Average ES salary	$180,337	$185,531	$189,056
Average scientific and professional	181,999	187,240	190,798
Average Career Path Salary	113,174	116,433	118,646
Average salary of ungraded positions	58,596	60,283	61,429

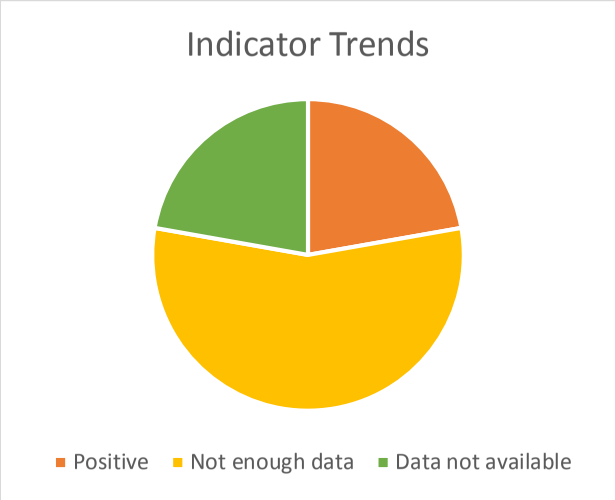
FY 2017 average salaries reflect a 2.88 percent pay raise and FY 2018 average salaries reflect a 1.9 percent pay raise.

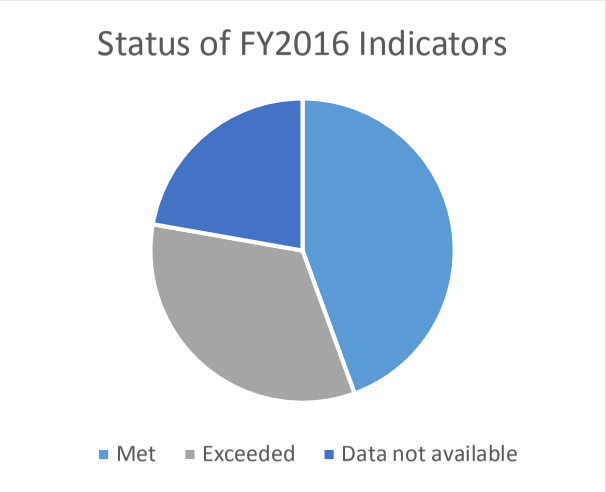
FY 2018 Performance Planning and FY 2016 Reporting Backup

National Institute of Standards and Technology

Performance Indicator Information

Summary of Performance





Summary of Indicator Performance

- Of the 9 NIST performance indicators, 3 were Exceeded and 6 were Met.
- Of the 9 NIST performance indicators, 3 have trend data. Of these indicators with trend data, 2 were positive and 1 is negative.

Summary of FY 2016 Indicator Performance

Indicator	Target	Actual	Status	Trend
Dollar amount of co-investment by non-federal sources in DOC-supported NNMI institutes (Key)	$0	$0	Met	Not enough data
Number of businesses using NIST research facilities (Key)	275	435	Exceeded	Negative
Number of firms receiving in-depth technical assistance from MEP centers (Key)	8986	8921	Met	Positive
Percentage of MEP clients receiving in-depth technical assistance that increase their competitiveness (Key)	63%	59.7%	Met	Stable
Relative citation impact of NIST-authored publications (Key)	1.5	1.8	Exceeded	Positive
Number of critical infrastructure sectors with work products integrating the Cybersecurity Framework (Key)	13	16	Exceeded	Positive
Number of Public safety communications stakeholder R&D roadmaps (Supporting)	2	2	Met	Not enough data
Number of MEP centers partnering with skills training providers (e.g., community colleges) to link manufacturing firms with skills training resources (Key)	53	53	Met	Not enough data
Number of Communities Working with NIST to Pilot the *Community Resilience Planning Guide*	3	3	Met	Not enough data

Detailed Indicator Plans and Performance

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies							
Objective 2.1	Accelerate advanced manufacturing							
Indicator	Dollar amount of co-investment by non-federal sources in DOC-supported Manufacturing USA institutes							
Category	Key							
Type	Intermediate Outcome							
Description	This indicator reflects how well the focus area of the Manufacturing USA (formerly National Network for Manufacturing Innovation) Institutes matches a real national need and is intended to measure the extent to which the industrial partners perceive that they are receiving value from the existence of the Institute. Non-federal partners dedicate resources when they believe that there will be economic benefit. Non-federal sources include industry partners of all sizes, state and local governments, economic development entities, institutions of higher education, private organizations and individuals. Investment includes cash and in-kind resources provided.							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target							$6M	$15M
Actual						$0		
Status						Met		
Trend	Not Enough Data							

Explanation (if not met in FY 2016)	Not applicable
Actions to be taken / Future Plans	None
Adjustments to targets	FY 2017 targets have been adjusted because appropriated funds for NIST's Manufacturing USA program were not sufficient to support more than one institute.
Notes	None
Information Gaps	None

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies							
Objective 2.1	Accelerate advanced manufacturing							
Indicator	Number of businesses using NIST research facilities							
Category	Key							
Type	Output							
Description	This indicator reflects the value, relevance, and usefulness of NIST research facilities to industry users. NIST research facilities are unique capabilities that can be leveraged through partnerships with businesses, especially manufacturers, to accelerate discovery and commercialization of innovative products. This indicator counts the number of Cooperative Research and Development Agreements between industry and NIST laboratories, as well as the number of industrial institutions that use the NIST user facilities (NIST Center for Neutron Research and the Center for Nanoscale Science and Technology).							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target				215	225	275	325	325
Actual				514	444	435		
Status				Exceeded	Exceeded			
Trend	Negative							

Explanation (if not met in FY 2016)	Not Applicable
Actions to be taken / Future Plans	None
Adjustments to targets	FY2016 target has been increased to reflect the expanded collaborations with industry in the areas of cybersecurity and advanced communications.
Notes	FY2017 is partial data because data from the NIST Center for Neutron Research (NCNR) and the Center for Nanoscale Science and Technology (CNST) lag due to the time it takes for industry participants to publish in peer-reviewed publications.
Information Gaps	Data may not include all instances of industry use of NIST research facilities indirectly through support of academic research.

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies							
Objective 2.1	Accelerate advanced manufacturing							
Indicator	Number of firms receiving in-depth technical assistance from MEP centers							
Category	Key							
Type	Output							
Description	Number of client firms receiving services from MEP centers where those services were substantial and essential and therefore could reasonably be assumed to have directly or entirely led to the impacts reported through the MEP client survey.							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target				8340	8750	8986	9187	retiring
Actual		7614	8140	8353	8419	8921		
Status				Exceeded	Met	Met		
Trend	Positive							

Explanation (if not met in FY 2016)	Not Applicable
Actions to be taken / Future Plans	NIST will retire this indicator in 2018 since the President's request discontinues federal funds for the MEP program.
Adjustments to targets	None
Notes	None
Information Gaps	None

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies							
Objective 2.1	Accelerate advanced manufacturing							
Indicator	Percentage of MEP clients receiving in-depth technical assistance that increase their competitiveness							
Category	Key							
Type	Outcome							
Description	Percentage of MEP clients receiving in-depth technical assistance that reported increasing sales, reducing costs, or making new investments as a result of the services received.							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target				60%	62%	63%	64%	retired
Actual		61%	59%	58%	56%	59.7%		
Status				Met	Met	Met		
Trend	Stable							
Explanation (if not met in FY 2016)	Not Applicable							
Actions to be taken / Future Plans	NIST will retire this indicator in 2018 since the President's request discontinues federal funds for the MEP program.							
Adjustments to targets	None							
Notes	None							
Information Gaps	None							

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies							
Objective 2.1	Accelerate advanced manufacturing							
Indicator	Relative citation impact of NIST-authored publications							
Category	Key							
Type	Outcome							
Description	This indicator demonstrates that NIST consistently produces useful and relevant scientific and technical publications and is outcome-oriented. The "relative citation impact" indicator is the ratio of the average number of citations per publication (citation rate) for all NIST publications in a year to the average expected citation rate for similar publications in a large group of peer institutions in the world. Publications typically lag by a minimum of two years due to the time needed for research, writing, journal peer review, and publication processes. The average for US institutions is about 1.3.							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target	1.1	1.1	1.1	1.5	1.5	1.5	1.6	1.6
Actual	1.63	1.31	1.58	1.53	1.7	1.8		
Status	Exceeded	Exceeded	Exceeded	Exceeded	Exceeded	Exceeded		
Trend	Positive							

Explanation (if not met in FY 2015)	Not Applicable
Actions to be taken / Future Plans	None
Adjustments to targets	None
Notes	* The FY 2016 actual for this measure is the most volatile and likely to change. Actuals for FY 2011 – FY2015 have been updated to reflect most recent data available. NIST is now using Category Normalized Citation Impact, which accounts for variations in typical citation rates between disciplines and journals.
Information Gaps	Due to the ever-changing nature of research and publication, and continual updating of the dataset used to generate these metrics, the actuals for any given year are subject to change.

Strategic Goal	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies							
Objective 2.2	Strengthen the nation's digital economy							
Indicator	Number of critical infrastructure sectors with work products integrating the Cybersecurity Framework							
Category	Key							
Type	Intermediate Outcome							
Description	This indicator demonstrates that NIST consistently produces useful and relevant cybersecurity publications and reference materials that organizations representing or participating in a diverse set of the sixteen total critical infrastructure sectors can use. The Cybersecurity Framework may be cited in professional journals; international/national/industry standards, guidelines, and practices; sector-specific federal agency guidance to industry; and commercial/government-off-the-shelf software.							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target				10	12	13	14	Retired
Actual				9	12	16		
Status				Met	Met	Exceeded		
Trend	Positive							

Explanation (if not met in FY 2015)	Not applicable
Actions to be taken / Future Plans	NIST will retire this indicator in 2018 because it has fulfilled the general target of ensuring use of the Cybersecurity Framework by all 16 critical infrastructure sectors as defined in originating executive order. NIST will continue to work with stakeholders to refine and improve the Framework and support its implementation by critical infrastructure sectors, as well as other sectors.
Adjustments to targets	None
Notes	None
Information Gaps	None

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies							
Objective 2.2	Strengthen the nation's digital economy							
Indicator	Number of Public safety communications stakeholder R&D roadmaps							
Category	Supporting (non-strategic plan)							
Target	Intermediate Outcome							
Description	This indicator demonstrates significant milestones and the value of NIST's convening and technical roles in advanced communications related to communications for public safety. NIST will receive funds starting in 2015 from the 2012 Middle Class Tax Relief act to perform R&D that supports FirstNet, the broadband first responder communications network. In addition to legislatively-mandated R&D topics, NIST has worked with stakeholders to prioritize additional critical R&D topics. From this prioritization, and working closely stakeholders, NIST will develop an R&D roadmap for each topic.							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target					1	2	3	Retiring
Actual					1	2		
Status					Met	Met		
Trend	Not enough data							

Explanation (if not met in FY 2015)	Not Applicable
Actions to be taken / Future Plans	NIST will retire this indicator in 2018 because it will have completed roadmaps on the most significant research areas facing public safety communications.
Adjustments to targets	None
Notes	None
Information Gaps	None

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies							
Objective 2.3	Catalyze innovation ecosystems							
Indicator	Number of MEP centers partnering with skills training providers (e.g., community colleges) to link manufacturing firms with skills training resources							
Category	Key							
Type	Output							
Description	This indicator reflects the number of MEP centers involved in activities supporting the development of a workforce with industry-aligned skills. MEP is working with partners throughout the national network of centers to provide the tools, services, and connections necessary to develop a workforce with industry-aligned skills							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target				50	55	53	48	retiring
Actual				54	54	53		
Status				Met	Met	Met		
Trend	Not enough data							

Explanation (if not met in FY 2015)	Not Applicable
Actions to be taken / Future Plans	NIST will retire this indicator in 2018 since the President's request discontinues federal funds for the MEP program.
Adjustments to targets	The multi-year recompetition of the MEP system will result in a single MEP center in each state, reducing the total number of MEP centers. The FY 2017 target represents 96 percent of the MEP system partnering with a workforce development organization.
Notes	MEP Centers currently partnered with a 1) workforce investment board, 2) community college, 3) technical college, 4) university, or 5) state workforce agency are included in this count.
Information Gaps	None

Strategic Goal 3	ENVIRONMENT: Help communities and businesses prepare for and prosper in a changing environment							
Objective 3.3	Strengthen the resiliency of communities and regions							
Indicator	Number of Communities Working with NIST to Pilot the *Community Resilience Planning Guide*							
Category	Supporting (Non-Strategic Plan)							
Type	Intermediate Outcome							
Description	This indicator demonstrates that NIST consistently produces useful and relevant community resilience guidance and training materials that local governments can use to develop their long-term resilience plans.							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target						3	6	7
Actual						3		
Status						Met		
Trend	Not enough data							

Explanation (if not met in FY 2015)	Not Applicable
Actions to be taken / Future Plans	None
Adjustments to targets	None
Notes	NIST will publish the Community Resilience Planning Guide, Version 1 in September 2015 and will revise and update the Guide in future years. NIST will publish training materials and host online user forums to support the effective use of the Community Resilience Planning Guide. The nature and level of support will depend upon the number of communities piloting the Guide. The term "community" refers to a place that is designated by geographical boundaries and functions under the jurisdiction of a governance structure, such as a town, city, or county.
Information Gaps	This indicator measures the number of communities piloting the *Guide*. Since the Community Resilience Planning Guide is freely available for download, the indicator may only capture communities that self-disclose usage of the *Guide*.

Non-Recurring Indicators

Indicators Proposed but not Implemented

The indicators below were originally proposed and included in the current strategic plan. However, these indicators were not implemented and new indicators, better reflecting current and future activities have been proposed.

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies
Objective 2.1	Accelerate advanced manufacturing
Indicator	Number of Full-Time Equivalents (FTEs) supporting Advanced Manufacturing Technology (AMTech) consortia
Description	Measures the sustainability/growth of funded AMTech partnerships by tracking private contributions

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies
Objective 2.2	Strengthen the Nation's digital economy
Indicator	Number of government and private test-bed facilities partnering with the Center for Advanced Communications
Description	The number of partners that invest funding, facilities and/or staff to test and evaluate new advanced wireless technologies

Strategic Goal 2	INNOVATION: Foster a more innovative U.S. economy—one that is better at inventing, improving, and commercializing products and technologies
Objective 2.2	Strengthen the Nation's digital economy
Indicator	Number of government and private test-bed facilities partnering with the Center for Advanced Communications
Description	The number of partners that invest funding, facilities and/or staff to test and evaluate new advanced wireless technologies

Strategic Goal 3	ENVIRONMENT: Help communities and businesses prepare for and prosper in a changing environment
Objective 3.1	Advance the understanding and prediction of changes in the environment
Indicator	Annual number of peer-reviewed publications related to environmental understanding and prediction
Description	The annual number of peer-reviewed publications is an indicator of productivity and relevance and is tracked using online resources. Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community.

Strategic Goal 3	ENVIRONMENT: Help communities and businesses prepare for and prosper in a changing environment
Objective 3.1	Advance the understanding and prediction of changes in the environment
Indicator	Number of comparative greenhouse gas emissions studies completed
Description	Scientific studies comparing top-down and bottom-up emission estimation methodologies provide the means to improve the quality of greenhouse gas emissions data

Strategic Goal 3	ENVIRONMENT: Help communities and businesses prepare for and prosper in a changing environment
Objective 3.3	Strengthen the resiliency of communities and regions
Indicator	Percentage of key milestones met for Disaster Resilience Standards Panel
Description	A series of nationwide workshops will be held to gather input for a draft disaster resilience framework. A plan will be established to develop a complete Disaster Resilience Framework that puts community – level guidelines into action.

Strategic Goal 3	ENVIRONMENT: Help communities and businesses prepare for and prosper in a changing environment
Objective 3.5	Enable U.S. businesses to adapt and prosper by developing environmental and climate informed solutions
Indicator	Number of page visits to BIRDS, a free online software tool for businesses to assess the economic and environmental tradeoffs in developing green buildings
Description	An online software tool to help stakeholders put an environmental score on a proposed building and to assess the life cycle costs associated with that building.

Resource Requirements Table

NIST Resource Requirements (obligations in M)										
	FY 2011 Actual	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Actual	FY 2017 Estimate	FY 2018 Base	Increase/ Decrease	FY 2018 Request
Objective 2.1 Accelerate Advanced Manufacturing										
TIP	$74.2	$4.4	1.4	1.6	0.8	0.7	1.1	-	-	-
AMTech	-	-	3.0	12.6	11.7	-	-	-	-	-
MEP	129.3	130.9	118.2	122.6	144.6	140.9	145.4	130.1	(124.1)	6.0
NNMI	-	-	-	-	-	5.9	47.4	25.1	(10.1)	15.0
Labs	667.3	706.4	715.6	755.5	755.9	767.8	790.4	741.2	(67.6)	673.6
Construction and SCMMR	91.0	35.6	75.0	64.8	40.6	122.2	147.0	119.8	(15.8)	104.0
Recovery Act funds	4.4	7.0	1.4	-	-	-	-	-	-	-
Subtotal Funding	966.2	884.3	914.6	957.1	953.6	1,037.5	1,131.3	1,016.2	(217.6)	798.6
Direct	797.7	712.6	741.1	795.9	804.1	874.6	953.9	868.3	(217.6)	650.7
Reimbursable	168.5	171.7	173.5	161.2	149.5	162.9	177.4	147.9	-	147.9
Total	**966.2**	**884.3**	**914.6**	**957.1**	**953.6**	**1,037.5**	**1,131.3**	**1,016.2**	**(217.6)**	**798.6**
Subtotal FTE	**2,990**	**2,928**	**2,893**	**2,993**	**3,045**	**3,108**	**3,200**	**3,200**	**(356)**	**2,844**

Objective 2.2 Strengthen the Nation's digital economy										
Cybersecurity Framework and Communications Technology Laboratory	-	16.5	21.7	35.6	65.0	75.6	74.4	74.4	(7.2)	67.2
Direct	-	16.5	21.7	34.3	58.1	66.8	67.5	67.5	(7.2)	60.3
Reimbursable	-	-		1.3	6.9	8.8	6.9	6.9	-	6.9
Total	**-**	**16.5**	**21.7**	**35.6**	**65.0**	**75.6**	**74.4**	**74.4**	**(7.2)**	**67.2**
Subtotal FTE	**-**	**6**	**18**	**40**	**111**	**121**	**122**	**122**	**(20)**	**102**
Objective 2.3 Catalyze Innovation ecosystems										
National Initiative for Cyber Education (NICE) and Lab to Market	-	-	-	4.0	9.7	10.1	10.0	10.0	(3.5)	6.5
Direct	-	-	-	4.0	9.7	10.1	10.0	10.0	(3.5)	6.5
Reimbursable	-	-	-	-	-	-	-	-	-	-
Total	**-**	**-**	**-**	**4.0**	**9.7**	**10.1**	**10.0**	**10.0**	**(3.5)**	**6.5**
Subtotal FTE	**-**	**-**	**-**	**1**	**6**	**10**	**13**	**13**	**(2)**	**11**
Objective 3.1 Advance the understanding and prediction of changes in the environment										
Greenhouse Gas and Urban Dome	9.1	9.0	8.8	11.9	13.9	13.6	13.9	13.9	(5.7)	8.2
Direct	9.1	9.0	8.8	11.9	13.9	13.6	13.9	13.9	(5.7)	8.2

Reimbursable	-	-	-	-	-	-	-	-	-	-
Total	**9.1**	**9.0**	**8.8**	**11.9**	**13.9**	**13.6**	**13.9**	**13.9**	**(5.7)**	**8.2**
Subtotal FTE	**22**	**23**	**19**	**20**	**24**	**21**	**24**	**24**	**(6)**	**18**
Objective 3.2 Strengthen the resiliency of communities and regions										
Disaster Resilience	4.3	7.2	7.1	5.7	8.4	7.7	12.2	12.2	(5.9)	6.3
Direct	4.3	7.2	7.1	5.6	8.4	7.7	12.2	12.2	(5.9)	6.3
Reimbursable	-	-	-	0.1	-	-	-	-	-	-
Total	4.3	7.2	7.1	5.7	8.4	7.7	12.2	12.2	(5.9)	6.3
Subtotal FTE	**9**	**16**	**12**	**16**	**16**	**15**	**29**	**29**	**(14)**	**15**
Total Funding	**979.6**	**917.0**	**952.2**	**1,014.3**	**1,050.6**	**1,144.5**	**1,241.8**	**1,126.7**	**(239.9)**	**886.8**
Direct	811.1	745.3	778.7	851.7	894.2	972.8	1,057.5	971.9	(239.9)	732.0
Reimbursable	168.5	171.7	173.5	162.6	156.4	171.7	184.3	154.8	-	154.8
Total	979.6	917.0	952.2	1,014.3	1,050.6	1,144.5	1,241.8	1,126.7	(239.9)	886.8
Total FTE	**3,021**	**2,973**	**2,942**	**3,070**	**3,202**	**3,275**	**3,388**	**3,388**	**(398)**	**2,990**
*** Dollars reflect obligations for all fund sources and exclude Public Safety Communications Research Fund (mandatory appropriation).**										

DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
NTIS Revolving Fund
Budget Estimates, Fiscal Year 2018
President's Submission

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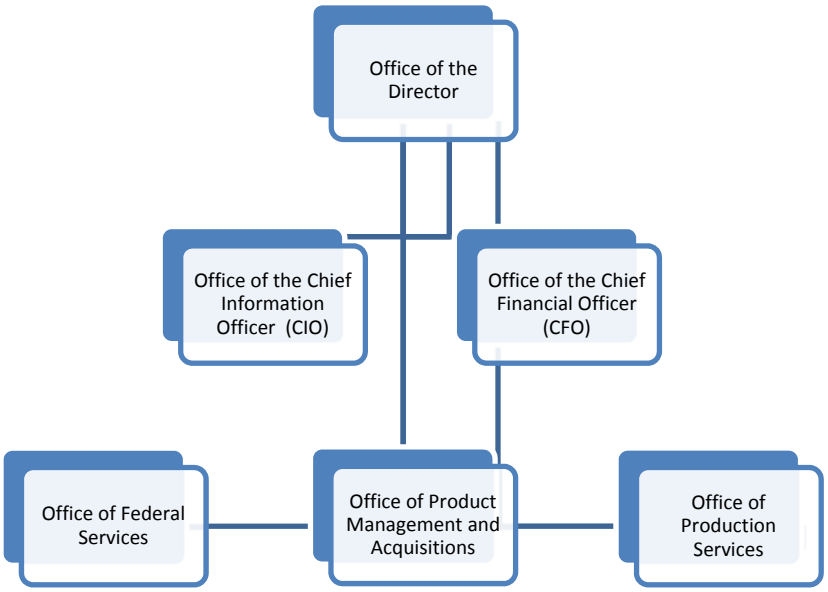
U.S Department of Commerce
National Technical Information Service



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Department Of Commerce
National Technical Information Service
NTIS Revolving Fund
Budget Estimates, Fiscal Year 2018
President's Submission

General Statement

Goals of the Program

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

Statement of Objectives

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

NTIS provides data services within four key elements:

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

NTIS leverages its unique capabilities and authorities to partner with the private sector to rapidly execute projects requiring the use of modern data science, engineering, and best practices. Critical to success of these projects is the ability to use advanced software development processes, specifically:

- Agile and collaborative development process to support frequent software releases and

risk reduction;

- DevOps process to tightly integrate software development with quality assurance, deployment, and operations while also supporting frequent releases and risk reduction; and,
- Life cycle approach to software development (plan, code, build, test, release, deploy, and operate).

NTIS services include a permanent repository and clearinghouse for scientific, technical, engineering, and business information which includes more than three million publications covering more than 350 subject areas. Today, NTIS receives federal agency reports electronically, attaches robust metadata to these reports and ensures that the documents remain available to the public even if individual agencies remove them from their websites. NTIS's online database also presents this metadata and the full text of reports in a form that enables access across the internet. As a result, scientists, engineers, and other customers looking for federal reports and data get much better results from the search engines than would be possible without NTIS efforts. In addition, NTIS is often the only current source for many reports issued prior to 1995. NTIS received these reports from federal agencies in paper copy and has archived them on microfiche. A recent Government Accountability Office report found that in some subject areas up to 45 percent of the collection of three million publications on more than 350 subjects is exclusively available from NTIS.

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

A full-year 2017 appropriation was not enacted at the time the FY 2018 Budget was prepared; therefore, the Budget assumes the Department is operating under the Further Continuing Appropriations Act, 2017 (P.L. 114–254). The amounts included for 2017 reflect the annualized level provided by the continuing resolution.

Summary of Performance and Resources

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

NTIS plans to obligate $170,000,000 of earned revenue in FY 2018.

(Dollar amounts in thousands)

	FY 2016	FY 2017	FY 2018
National Technical Information Service: Reimbursement from offsetting collections:			
Information clearinghouse program	$183,602	$145,500	$170,000
Total, NTIS	$183,602	$145,500	$170,000

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

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

	Positions	FTE	Budget Authority	Direct Obligations
2017 Annualized CR	0	0	0	0
Plus 2018 Adjustments to base:	0	0	0	0
less: Obligations from prior years	0	0	0	0
2018 Base	0	0	0	0
Plus: 2018 Program Changes	0	0	0	0
2018 Estimate	0	0	0	0

Comparison by activity/subactivity:		2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/(Decrease over 2018 Base	
		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
TOTALS	Pos./BA	0	0	0	0	0	0	0	0	0	0
	FTE/Obl.	0	0	0	0	0	0	0	0	0	0
Adjustments for:											
Recoveries		0	0	0	0	0	0	0	0	0	0
Unobligated balance, start of year		0	0	0	0	0	0	0	0	0	0
Unobligated balance transferred		0	0	0	0	0	0	0	0	0	0
Unobligated balance, end of year		0	0	0	0	0	0	0	0	0	0
Unobligated balance expiring		0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
Financing from transfers:		0	0	0	0	0	0	0	0	0	0
Transfer from other accounts (-)		0	0	0	0	0	0	0	0	0	0
Transfer to other accounts (+)		0	0	0	0	0	0	0	0	0	0
Appropriation		0	0	0	0	0	0	0	0	0	0

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

Activity: National Technical Information Service
Subactivity: Information Clearinghouse Program

Line Item	2016 Actual		2017 Annualized CR		2018 Base		2018 Estimate		Increase/ (Decrease) over 2018 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
National Technical Information Service: Information Clearinghouse Program	101	$183,602	150	$145,500	150	$170,000	150	$170,000	0	0
Total	101	$183,602	150	$145,500	150	$170,000	150	$170,000	0	0

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

	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over 2018 Base
Total Obligations	$183,602	$145,500	$170,000	$170,000	0
Offsetting collections from:					
Federal funds	(178,636)	(123,707)	(148,207)	(148,207)	0
Trust funds	0	0	0	0	0
Non-Federal sources	(8,532)	(13,800)	(13,800)	(13,800)	0
Recoveries	0	0	0	0	0
Unobligated balance, start of year	(9,486)	(7,954)	(7,954)	(7,954)	0
Unobligated balance transferred	0	0	0	0	0
Unobligated balance, end of year	(7,954)	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
JUSTIFICATION OF PROGRAM AND PERFORMANCE

APPROPRIATION ACCOUNT: NTIS Revolving Fund

BUDGET ACTIVITY: Organization, Preservation and Public Access to Technical Information

For FY 2018, the National Technical Information Service plans to continue to operate on a self-supporting reimbursable basis, which will include estimated obligations of $170,000,000 and 150 FTE.

BASE JUSTIFICATION FOR FY 2018:

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".

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

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

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

Significant Adjustments-to-Base (ATBs):

- None

PROGRAM CHANGES FOR FY 2018:

None

Deliverables:

Performance Goals and Measurement Data

Performance Measure: Number of updated items available	FY 2016 Act.	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target	FY 2022 Target
Total	44,371	451,769	463,063	474,640	486,506	498,668	511,134

Description: The number of information items available to the public includes scientific, technical, and engineering information products added to the permanent collection, as well as items made available through online electronic subscriptions. A continuous expansion and refinement effort, to acquire new scientific and technical information products, is reflected in future targets.

Performance Measure: Number of information products disseminated (annual)	FY 2016 Act.	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target	FY 2022 Target
Total	1.1M	54.9M	55.9M	56.9M	58.0M	59.1M	60.2M

Description: This measure represents the volume of information products disseminated to the public and includes compact discs, diskettes, tapes, online subscriptions, web site pages, as well as the traditional paper products. NTIS recently deployed its new Next Generation 2.0 website and has initiated the use of Social Media technology as part of its outreach and Education activities to further the success of this goal.

Performance Measure: Customer Satisfaction	FY 2016 Act.	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target	FY 2022 Target
Total	97.5%	95%-98%	95%-98%	95%-98%	95%-98%	95%-98%	95%-98%

Description: This measure represents the percentage of NTIS customers that are satisfied with the quality of their order, the ease of order placement, and they timely processing of that order. NTIS' continual efforts to maintain and possibly improve this very high rate of customer satisfaction are essential to the success of NTIS' performance and mission to collect and disseminate scientific and business-related information.

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

	Object Class	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) Over2018 Base
11.1	Full-time permanent (Compensation)	$ 9,723	$ 13,750	$ 13,970	$ 13,970	0
11.3	Other than full-time permanent	243	150	477	$ 477	0
11.5	Other personnel compensation	77	116	116	$ 116	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	10,043	14,016	14,563	14,563	0
12.1	Civilian personnel benefits	3,240	4,725	4,875	$ 4,875	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	75	200	200	$ 200	0
22	Transportation of things	581	3,250	3,250	$ 3.250	0
23.1	Rental payments to GSA	2,094	1,950	1,950	$ 1,950	0
23.2	Rental payments to others	87	1,000	1,000	$ 1,000	0
23.3	Communications, utilities and miscellaneous charges	660	1,800	1,800	$ 1,800	0
24	Printing and reproduction	68	4,000	4,000	$ 4.000	0
25.1	Consulting services	216	100	100	$ 100	0
25.2	Other services	160,636	107,459	131,262	$ 131,262	0
25.3	Purchases of goods and services from Government accounts	3,219	1,500	1,500	$ 1,500	0
25.4	Operation of GOCOs	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and Maintenance of Equipment	1,745	500	500	$ 500	0
26	Supplies and materials	174	3.000	3,000	$ 3,000	0
31	Equipment	764	2,000	2,000	$ 2,000	0

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

	Object Class	2016 Actual	2017 Annualized CR	2018 Base	2018 Estimate	Increase/ (Decrease) over 2018 Base
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total Obligations	183,602	145,500	170,000	170,000	0
	Earned Revenue/Reimbursable Obligations	183,602	145,500	170,000	170,000	0
	Total Obligations	183,602	145,500	170,000	170,000	0
Personnel Data						
Full-Time equivalent Employment:						
	Full-time permanent	96	140	145	145	0
	Other than full-time permanent	5	10	10	10	0
	Total	101	150	150	150	0
Authorized Positions:						
	Full-time permanent	190	190	190	190	0
	Other than full-time permanent	10	10	10	10	0
	Total	200	200	200	200	0

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

	2016 Actual	2017 Annualized CR	2018 Estimate
Consulting Services	$216	$100	$500
Management and professional services	0	0	0
Special studies and analysis	0	0	0
Management and Support Services for research and development	0	0	0
Total	$216	$100	$500

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

	2016 Actual	2017 Annualized CR	2018 Estimate
Periodicals	$2	$2	$2
Pamphlets	0	0	0
Audiovisuals	0	0	0
Total	$2	$2	$2

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

	2016 Actual	2017 Annualized CR	2018 Estimate
Average GS/GM Grade…… ……	11	11	11
Average GS/GM Salary ……..……..……..	$98,868	$100,450	$102,058

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FY 2018 Performance Planning and FY 2016 Reporting Backup

(National Technical Information Service)

Summary of Performance

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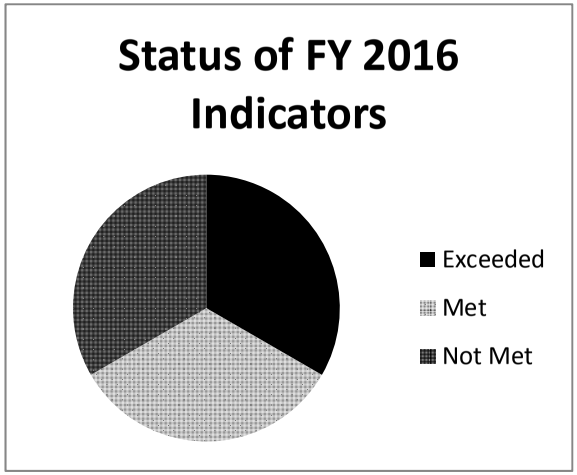
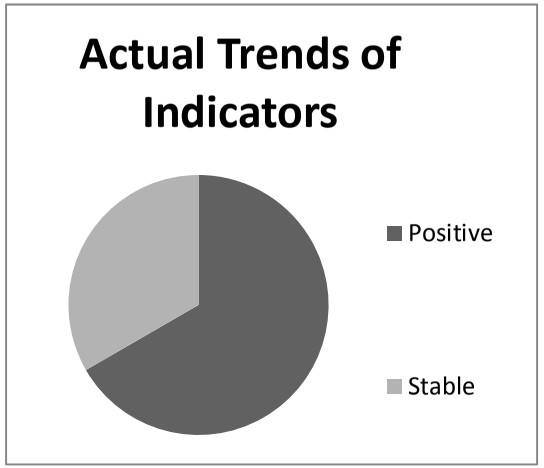
NTIS exceeded the target for one of three indicators, and didn't meet the target for the two. All three indicators had trends with two having positive trends and one having a stable trend.





Summary of FY 2016 Indicator Performance

Strategic Goal 4: DATA – Maximize the positive impacts of Commerce data on society

Objective 4.1: Deliver increasing amounts of data to governments, businesses, and the public in formats that are easier to access and use

Indicator	Target	Actual	Status	Trend
Number of Updated Items Available	440,750	44,371	Not Met	Positive
Number of Information Products Disseminated (Annual)	53,900,000	1,089,730	Not Met	Positive
Customer Satisfaction	95-98%	97.5%	Met	Stable

Detailed Indicator Plans and Performance

Indicator	Number of Updated Items Available							
Category	Supporting (Non-Strategic Plan)							
Type	Output							
Description	The number of information items available to the public includes scientific, technical, and engineering information products added to the permanent collection, as well as items made available through online electronic subscriptions. A continuous expansion and refinement effort, to acquire new scientific and technical information products, is reflected in future targets.							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target	825,000	875,000	892,500	910,350	430,000	440,750	451,769	463,063
Actual	836,579	978,871	987,866	648,299	519,091	44,371		
Status	Exceeded	Exceeded	Exceeded	Not Met	Exceeded	Not Met		
Trend	Positive							

Actions to be taken / Future Plans	Will need to revise this measure going forward for FY2019. Federal Research in Progress (FEDRIP) was most of this measure and has since been discontinued.
Adjustments to targets	Need to revise targets going forward. FEDRIP was most of this measure and was discontinued.
Notes	Will be gathering data to create the benchmarks for responsiveness for providing DMF and DEA revisions for FY2017 going forward.
Information Gaps	None

Indicator	Number of Information Products Disseminated (Annual)							
Category	Supporting(Non-Strategic Plan)							
Type	Output							
Description	This measure represents the volume of information disseminated to the public and includes compact disks, diskettes, tapes, online subscriptions, electronic document downloads, web site pages, as well as traditional paper products. NTIS recently deployed its new Next Generation 2.0 website and has initiated the use of Social Media technology as part of its Outreach and Education activities to further the success of this goal							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target	47,800,000	48,878,000	50,875,560	51,893,071	52,910,932	53,900,000	54,900,000	55,900,000
Actual	48,958,993	54,592,481	68,938,571	51,901,102	48,794,579	1,089,730		
Status	Exceeded	Exceeded	Exceeded	Exceeded	Not Met	Not Met		

Trend	Positive
Explanation (if not met in FY 2015)	Not met due to the following products being discontinued in FY2015: 1) BIS Export Administration Regulations (EAR) Papercopy and CD ROM; 2) National Correct Coding Manual (NCCM) and associated product line; and 3) Distribution services for USDA Supplemental Nutrition Assistance Program (SNAP) and USDA Food and Nutrition Service (FNS).
Actions to be taken / Future Plans	Will need to revise this measure as NTIS evolves with the new Data Mission
Adjustments to targets	Need to revise targets as NTIS evolves with the new Data Mission State
Notes	
Information Gaps	None

Indicator	Customer Satisfaction							
Category	Supporting (Non-Strategic Plan)							
Type	Customer Service							
Description	This measure represents the percentage of NTIS customers that are satisfied with the quality of their order, the ease of order placement, and the timely fulfillment of that order. NTIS' continual efforts to maintain and possibly improve this very high rate of customer satisfaction are essential to the success of NTIS' performance and mission to collect and disseminate scientific and business-related information.							
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Target	95-98%	95-98%	95-98%	95-98%	95-98%	95-98%	95-98%	95-98%
Actual	99.5%	98.4%	98.5%	98.3%	97.5%	97.5%		
Status	Met	Met	Met	Met	Met	Met		
Trend	Targets have remained stable. Actuals have risen slightly each year.							
Actions to be taken / Future Plans	None							
Adjustments to targets	None							
Notes	None							
Information Gaps	None							

Non-Recurring Indicators

None

Resource Requirements Table

	FY 2011 Actual	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Actual	FY 2017 Annualized CR	FY 2018 Base	Increase / Decrease	FY 2018 Request
Goal 4: DATA – Maximize the positive impacts of Commerce data on society										
Objective 4.1: Deliver increasing amounts of data to governments, businesses, and the public in formats that are easier to access and use										
Total Funding										
Direct										
Reimbursable	$65,000	$65,500	$66,000	$66,500	$175,202	$183,602	$145,500	$170,000	0	$170,000
Total										
Total FTE	150	150	150	150	150	150	150	150	0	150