

About the NITRD Supplement to the President's Budget

The annual Supplement to the President's Budget for the NITRD Program provides a technical summary of the research activities planned and coordinated through NITRD in a given Federal budget cycle, as required by law. The details are organized by PCA and presented using a common format:

- Listing of the NITRD member agencies requesting budget in the PCA and other participating agencies active in the PCA
- Definition of the research covered in the PCA
- Strategic priorities in the PCA for the forthcoming fiscal year
- Budget highlights – agencies' key R&D programs and topical emphases in the PCA for the forthcoming year
- Interagency coordination – current and planned activities in which multiple agencies are collaborating
- Ongoing core activities of each agency in the PCA

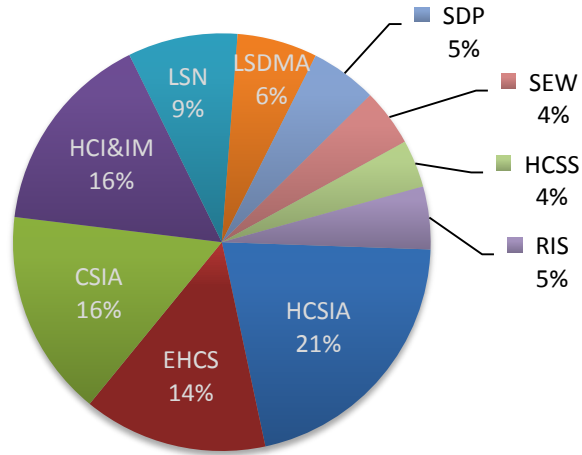
The NITRD Supplement includes annual budget tables and a budget analysis section, organized by PCA and by agency, to facilitate budgetary and programmatic comparisons from year to year. The budget tables report actual expenditures for FY 2015, estimated expenditures for FY 2016, and proposed funding levels for FY 2017. Note that with the exception of the three PCAs that were not impacted by the new PCAs, and whose definitions did not change—CSIA, SDP, and SEW—the continuity between the PCAs in the pre-FY 2017 set and those in the new FY 2017 set is limited. This affects tracking budget trends over time. Additionally, for purposes of the NITRD budget crosscut, agencies categorized past expenditures for FY 2015 retrospectively because the new set of PCAs did not exist in the FY 2015 timeframe. Any longitudinal comparisons of PCA budgets should take these factors into consideration.

In addition to budget reporting, the Supplement also provides an overview of NITRD Program coordination, a listing of the NITRD Working Groups, and brief descriptions of additional program focus areas.

The President's FY 2017 budget request for the NITRD Program is \$4.54 billion and the 2016 NITRD budget estimates totaled \$4.49 billion. Details of the budget are presented in the tables on pages 10-11 and discussed in the budget analysis section.

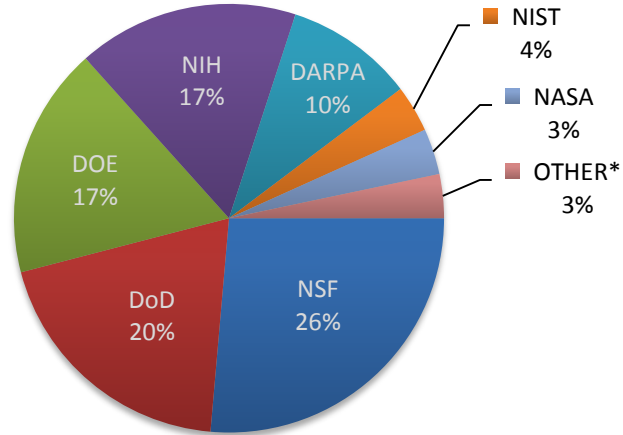
The following illustration shows the percentages of the FY 2017 budget requests by PCA.

FY 2017 Budget Requests by PCA



The following illustration shows the percentages of the FY 2017 budget requests by agency.

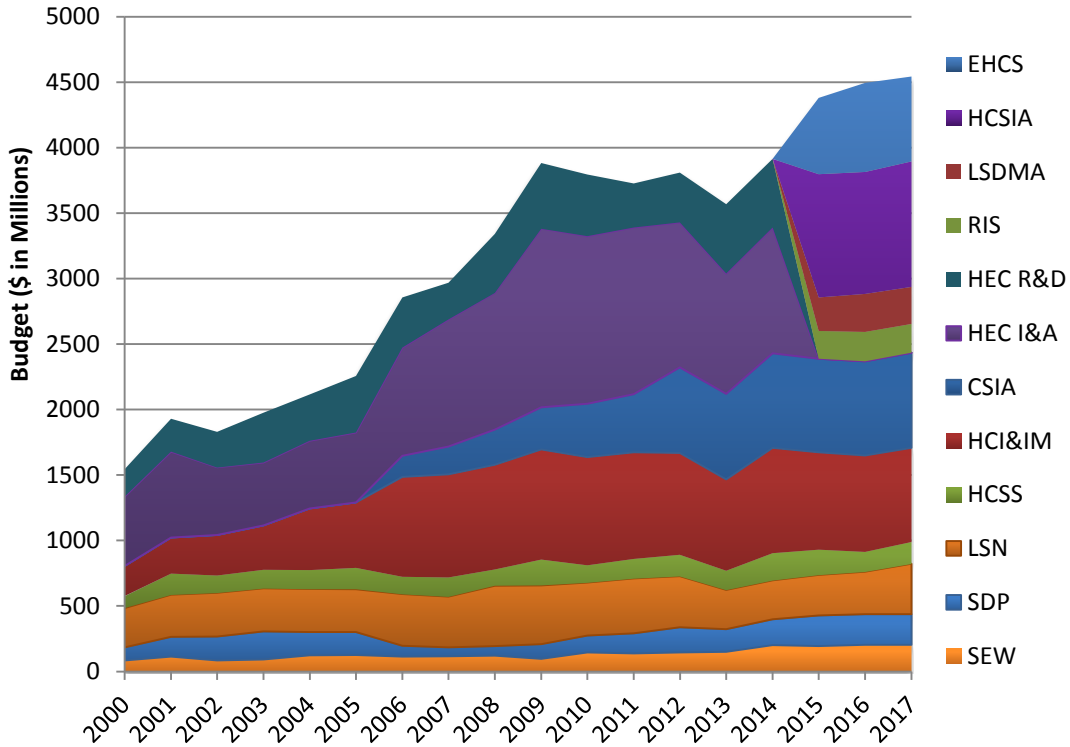
FY 2017 Budget Requests by Agency



*Includes AHRQ, DHS, EPA, NARA, NIJ, and NOAA.

The following illustration shows budget trends by PCA since FY 2000.⁴

Budget Trends by PCA



Key

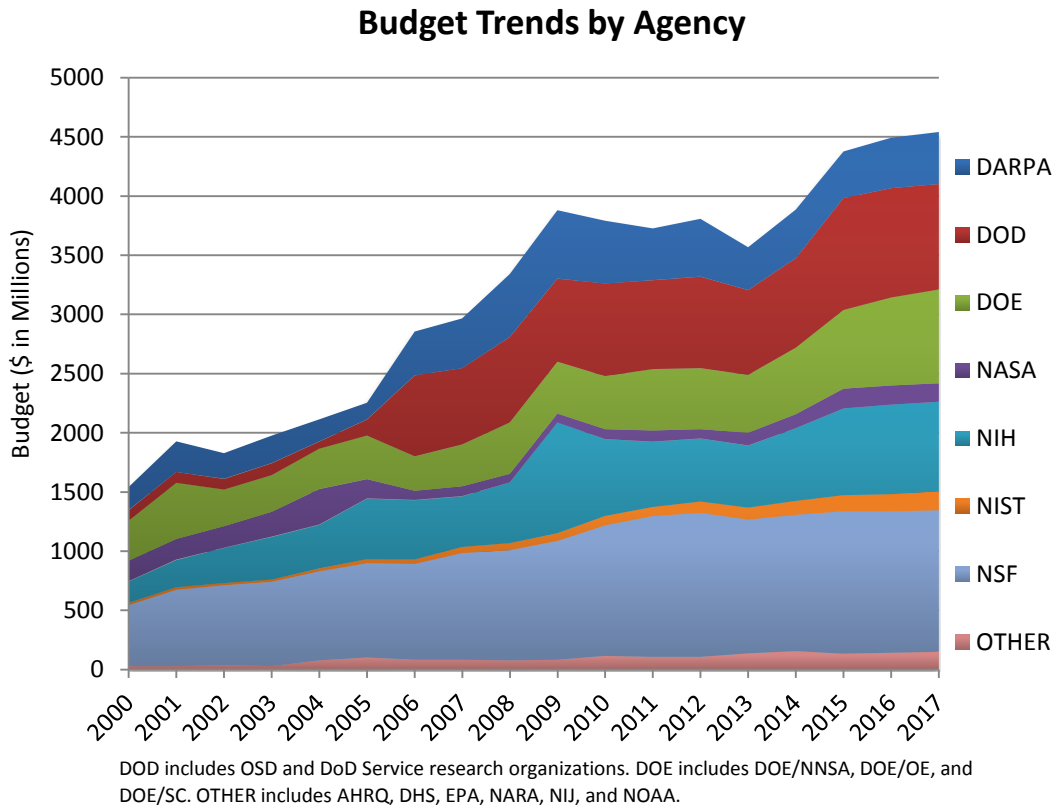
- EHCS Enabling-R&D for High-Capability Computing Systems
- HCSIA High-Capability Computing Systems Infrastructure and Applications
- LSDMA Large-Scale Data Management and Analysis
- RIS Robotics and Intelligent Systems
- HEC R&D High End Computing Research and Development
- HEC I&A High End Computing Infrastructure and Applications
- CSIA Cyber Security and Information Assurance
- HCI&IM Human Computer Interaction and Information Management
- HCSS High Confidence Software and Systems
- LSN Large Scale Networking
- SDP Software Design and Productivity
- SEW Social, Economic, and Workforce Implications of IT and IT Workforce Development

Note that budget reporting for CSIA began in FY 2006 and for EHCS, HCSIA, LSDMA, and RIS in FY 2015. Budget reporting for HEC R&D and HEC I&A ended in FY 2014.

⁴ The budget trends by PCA illustration uses the budget actuals, estimates, and requests provided in the tables on pages 10-11. Budget actuals are used prior to FY 2015, when available; otherwise, estimates are used.

NITRD SUPPLEMENT TO THE PRESIDENT'S FY 2017 BUDGET

The following illustration shows budget trends by agency since FY 2000.⁵



⁵ The budget trends by agency illustration uses the budget actuals, estimates, and requests provided in the tables on pages 10-11. Budget actuals are used prior to FY 2015, when available; otherwise, estimates are used.

Agency NITRD Budgets by Program Component Area

FY 2015 Budget Actuals (Dollars in Millions)

Agency/ Program Component Area ^e	Cyber Security & Infor- mation Assurance	Enabling- R&D for High- Capability Computing Systems	Human Computer Interaction & Infor- mation Manage- ment	High- Capability Computing Systems Infrastruc- ture & Applica- tions	High Confi- dence Software & Systems	Large-Scale Data Manage- ment & Analysis	Large Scale Networking	Robotics & Intelligent Systems	Software Design & Productiv- ity	Social, Economic, & Work- force Implica- tions of IT	Total ^a
	CSIA	EHCS	HCI&IM	HCSIA	HCSS	LSDMA	LSN	RIS	SDP	SEW	
NSF	107.3	133.1	187.5	189.0	83.7	110.7	134.8	43.1	89.1	127.1	1,205.3
DoD ^b	159.8	251.7	199.2	80.8	28.4	31.9	85.3	96.6	8.9	0.3	942.9
DOE ^c	32.7	123.1		378.8	30.6	7.4	69.3			3.0	644.9
NIH ^d	3.0	23.1	299.0	194.6	29.0		8.0		122.0	51.0	729.7
DARPA	285.5	25.1				85.2					395.8
NIST	65.2	4.4	7.2	8.1	14.7	15.8	9.1	7.9	1.8	4.0	138.3
NASA		1.0	13.0	67.3	8.3	5.0	0.6	63.8	8.6		167.5
DHS	60.6		3.7								64.3
NOAA			0.2	23.0			3.3		3.7		30.2
NNSA		16.7								4.2	20.9
AHRQ			28.2								28.2
EPA		3.2	2.7								5.9
NIJ	0.5		0.5			0.7		0.2		2.8	4.7
NARA			0.2								0.2
Total^{a, d}	714.5	581.3	741.4	941.6	194.6	256.7	310.3	211.6	234.1	192.4	4,378.6

FY 2016 Budget Estimates (Dollars in Millions)

Agency/ Program Component Area	Cyber Security & Infor- mation Assurance	Enabling- R&D for High- Capability Computing Systems	Human Computer Interaction & Infor- mation Manage- ment	High- Capability Computing Systems Infrastruc- ture & Applica- tions	High Confi- dence Software & Systems	Large-Scale Data Manage- ment & Analysis	Large Scale Networking	Robotics & Intelligent Systems	Software Design & Productiv- ity	Social, Economic, & Work- force Implica- tions of IT	Total ^a
	CSIA	EHCS	HCI&IM	HCSIA	HCSS	LSDMA	LSN	RIS	SDP	SEW	
NSF	110.5	129.8	187.4	180.4	85.8	110.4	137.8	43.0	84.6	126.2	1,195.9
DoD ^b	146.5	264.6	182.7	80.8	13.3	36.2	84.6	101.8	9.5	3.2	923.1
DOE ^c	30.0	204.3		374.4	2.7	5.9	78.2	15.0		10.0	720.5
NIH ^d	3.0	23.1	313.0	194.6	30.0		8.0		129.0	54.0	754.7
DARPA	292.3	23.8				109.4					425.5
NIST	70.2	4.4	8.2	8.1	15.7	15.8	10.8	7.9	1.8	4.0	146.9
NASA		8.5	14.0	62.8	7.5	5.4	0.7	56.3	6.6		161.9
DHS	63.9		4.0			4.0					71.9
NOAA			0.2	29.7			3.3		3.7		36.9
NNSA		18.7								3.5	22.2
AHRQ			21.5								21.5
EPA		3.5	3.0								6.5
NIJ	1.5					2.5		1.0		0.5	5.5
NARA			0.2								0.2
Total^{a, d}	718.0	680.7	734.2	930.8	155.0	289.6	323.4	225.0	235.2	201.4	4,493.3

NITRD SUPPLEMENT TO THE PRESIDENT'S FY 2017 BUDGET

FY 2017 Budget Requests (Dollars in Millions)

Agency/ Program Component Area	Cyber Security & Infor- mation Assurance CSIA	Enabling- R&D for High- Capability Computing Systems EHCS	Human Computer Interaction & Infor- mation Manage- ment HCI&IM	High- Capability Computing Systems Infrastruc- ture & Applica- tions HCSIA	High Confi- dence Software & Systems HCSS	Large-Scale Data Manage- ment & Analysis LSDMA	Large Scale Networking LSN	Robotics & Intelligent Systems RIS	Software Design & Productiv- ity SDP	Social, Economic, & Work- force Implica- tions of IT SEW	Total ^a
NSF	111.0	131.0	182.8	183.2	86.5	111.3	139.0	43.5	82.7	127.1	1,198.0
DoD ^b	145.1	216.4	170.0	81.9	12.9	38.2	108.0	102.9	10.2	3.1	888.7
DOE ^c	30.0	208.3		393.6	17.5		88.0	11.7		10.0	759.1
NIH ^d	3.0	23.1	313.0	194.6	30.0		8.0		129.0	54.0	754.7
DARPA	300.1	6.0				106.6	27.6				440.4
NIST	70.2	18.0	8.2	8.1	15.7	15.8	10.8	7.9	1.8	4.0	160.5
NASA		11.0	14.0	60.9	4.9	5.4	0.8	53.5	6.6		157.0
DHS	66.8		2.0			5.0					73.8
NOAA			0.2	36.0			3.3		3.7		43.2
NNSA		30.0								3.5	33.5
AHRQ			22.9								22.9
EPA		3.7	3.1								6.8
NIJ	1.5						1.0	1.0			3.5
NARA			0.2								0.2
Total ^{a, d}	727.7	647.5	716.4	958.3	167.5	282.3	386.4	220.5	234.0	201.7	4,542.4

Notes

- a) Totals may not sum correctly due to rounding.
- b) DoD budget includes funding for OSD and the DoD Service research organizations. DoD Service research organizations include: Air Force Research Laboratory (AFRL), including the Air Force Office of Scientific Research (AFOSR); Army Research Laboratory (ARL), including the Army Research Office (ARO); Naval Research Laboratory (NRL); and Office of Naval Research (ONR). The Communications-Electronics Research, Development, and Engineering Center (CERDEC), Defense Research and Engineering Network (DREN), and High Performance Computing Modernization Program (HPCMP) are under Army. Although DARPA and OSD research organizations are under DoD, they are independent of the research organizations of the DoD Services (Air Force, Army, and Navy). NSA is a research organization under DoD, but does not report NITRD funding.
- c) DOE budget includes funding from DOE's Office of Science (SC), Office of Electricity Delivery and Energy Reliability (OE), Advanced Research Projects Agency - Energy (ARPA-E), and the Office of Environmental Management (EM).
- d) NIH investments in LSDMA and RIS were not available at the time this Supplement was released. NIH anticipates reporting on these new PCAs in the next NITRD Budget Supplement.
- e) Actual expenditures for FY 2015 were categorized into the PCAs retrospectively because the set of PCAs for the FY 2017 request did not exist in the FY 2015 timeframe.

National Strategic Computing Initiative

The 2017 Budget supports NSCI investments through many agencies, with major investments within DOE (\$285 million) and NSF (\$33 million).

NITRD Program Budget Analysis

Changes to Budget Categories for 2015-2017 NITRD Investments

NITRD investments for 2015 through 2017 are reported here for the first time under the updated PCA categories described in “Changes to the NITRD Budget Reporting Structure” on p. 2. The reporting reflects the first-time use and adoption of the revised PCA categories by NITRD agencies. Note that the revised PCA categories represent an update of how NITRD investments by the Federal Government are tabulated, but not a change in the overall scope. Investments under these revised categories should not be compared directly to investments in the PCAs reported in previous NITRD Budget Supplement reports, with the exception of CSIA, SDP, and SEW, which remain unchanged between the old and new PCA categories.

Fiscal Year Overview for 2016-2017

In the following analysis of the NITRD Program, the President's FY 2017 request is compared with the FY 2016 estimates. Changes in NITRD Program budgets reported in the budget analysis reflect revisions to program budgets due to evolving priorities, as well as Congressional actions and appropriations.

Summary

The President's 2017 budget request for the NITRD Program is \$4.54 billion, an increase of \$0.05 billion or approximately 1.11 percent, compared to the \$4.49 billion 2016 estimate. The overall change is due to both increases and decreases in individual agency NITRD budgets, which are described below.

NITRD Program Budget Analysis by Agency

This section describes changes greater than \$10 million between 2016 estimated spending and 2017 requests. Smaller changes are discussed only if they represent shifts in funding focus. Budget numbers in these descriptions are rounded from initial agency numbers with three decimals to the nearest tenth.

DoD

Comparison of 2016 estimate (\$923.1 million) and 2017 request (\$888.7 million): The decrease of \$34.4 million is primarily due to a decrease of \$48.2 million in EHCS and a decrease of \$12.7 million in HCI&IM, with smaller increases and decreases in other PCAs, partially offset by an increase of \$23.4 million in LSN.

DOE

Comparison of 2016 estimate (\$720.5 million) and 2017 request (\$759.1 million): The increase of \$38.6 million is primarily due to a \$19.2 million increase in DOE/SC funding in HCSIA in support of the NSCI to develop scientific applications, particularly those advancing clean energy technologies, and to explore technologies “beyond Moore's Law;” a \$14.8 million increase in the Energy Transformation Acceleration Fund for ARPA-E projects in HCSS; and smaller increases and decreases in other PCAs.

DARPA

Comparison of 2016 estimate (\$425.5 million) and 2017 request (\$440.4 million): The increase of \$14.9 million is primarily due to a \$27.6 million increase in LSN for Advanced RF Mapping and Spectrum Efficiency and Access programs, with smaller increases and decreases in other PCAs, partially offset by a decrease of \$17.8 million in EHCS due to the completion of the Unconventional Processing of Signals for Intelligent Data Exploitation program.

NIST

Comparison of 2016 estimate (\$146.9 million) and 2017 request (\$160.5 million): The increase of \$13.6 million is due to a \$13.6 million increase in EHCS for the Measurement Science for Future Computing Technologies and Applications initiative.

NNSA

Comparison of 2016 estimate (\$22.2 million) and 2017 request (\$33.5 million): The increase of \$11.3 million is due to an increase in exascale vendor R&D partnerships.

NITRD Program Budget Analysis by PCA

Using the information presented above, this section provides an analysis of the NITRD Program budget by PCA, summarizing the more substantial differences between 2016 estimates and 2017 requests. The changes are described below.

EHCS

Comparison of 2016 estimate (\$680.7 million) and 2017 request (\$647.5 million): The \$33.2 million decrease is largely due to a decrease of \$48.2 million at DoD and \$17.8 million decrease at DARPA, partially offset by a \$13.6 million increase at NIST, \$11.3 million increase at DOE/NNSA, and smaller increases at other agencies.

HCI&IM

Comparison of 2016 estimate (\$734.2 million) and 2017 request (\$716.4 million): The \$17.8 million decrease is largely due to a decrease of \$12.7 million at DoD, with smaller increases and decreases at other agencies.

HCSIA

Comparison of 2016 estimate (\$930.8 million) and 2017 request (\$958.3 million): The \$27.5 million increase is largely due to an increase of \$19.2 million at DOE, with smaller increases and decreases at other agencies.

HCSS

Comparison of 2016 estimate (\$155.0 million) and 2017 request (\$167.5 million): The \$12.5 million increase is largely due to an increase of \$14.8 million at DOE, with smaller increases and decreases at other agencies.

LSN

Comparison of 2016 estimate (\$323.4 million) and 2017 request (\$386.4 million): The \$63.0 million increase is largely due to an increase of \$23.4 million at DoD, \$27.6 million increase at DARPA, with smaller increases at other agencies.