

TITLE IV

RESEARCH, DEVELOPMENT, TEST AND EVALUATION

Funds appropriated under this title provide the resources required to conduct a program of research, development, test and evaluation, including research in basic science, applied research, advanced technology development, demonstration and validation, engineering and manufacturing development, and operational systems development.

The President's fiscal year 2019 budget requests a total of \$91,056,950,000 for research, development, test and evaluation appropriations.

SUMMARY OF COMMITTEE ACTION

The Committee recommends research, development, test and evaluation appropriations totaling \$95,131,819,000 for fiscal year 2019. This is \$4,074,869,000 above the budget estimate.

Committee recommended research, development, test and evaluation appropriations for fiscal year 2019 are summarized below:

SUMMARY OF RESEARCH, DEVELOPMENT, TEST AND EVALUATION APPROPRIATIONS

[In thousands of dollars]

Account	2019 budget estimate	Committee recommendation	Change from budget estimate
Research, Development, Test and Evaluation:			
Research, Development, Test and Evaluation, Army	10,159,379	10,812,458	+ 653,079
Research, Development, Test and Evaluation, Navy	18,481,666	18,992,064	+ 510,398
Research, Development, Test and Evaluation, Air Force	40,178,343	40,896,667	+ 718,324
Research, Development, Test and Evaluation, Defense-Wide	22,016,553	24,049,621	+ 2,033,068
Operational Test and Evaluation, Defense	221,009	381,009	+ 160,000
Total	91,056,950	95,131,819	+ 4,074,869

REPROGRAMMING GUIDANCE FOR ACQUISITION ACCOUNTS

The Secretary of Defense is directed to continue to follow the reprogramming guidance as specified in the report accompanying the House version of the Department of Defense appropriations bill for fiscal year 2008 (House Report 110-279). Specifically, the dollar threshold for reprogramming funds will remain at \$20,000,000 for procurement and \$10,000,000 for research, development, test and evaluation.

Also, the Under Secretary of Defense (Comptroller) is directed to continue to provide the congressional defense committees quarterly, spreadsheet-based DD Form 1416 reports for service and defense-wide accounts in titles III and IV of this act. Reports for titles III and IV shall comply with guidance specified in the explanatory statement accompanying the Department of Defense Appropria-

tions Act for Fiscal Year 2006. The Department shall continue to follow the limitation that prior approval reprogrammings are set at either the specified dollar threshold or 20 percent of the procurement or research, development, test and evaluation line, whichever is less. These thresholds are cumulative from the base for reprogramming value as modified by any adjustments. Therefore, if the combined value of transfers into or out of a procurement (P-1), or a research, development, test and evaluation (R-1) line exceeds the identified threshold, the Secretary of Defense must submit a prior approval reprogramming to the congressional defense committees. In addition, guidelines on the application of prior approval reprogramming procedures for congressional special interest items are established elsewhere in this report.

FUNDING INCREASES

The funding increases outlined in the tables for each appropriation account shall be provided only for the specific purposes indicated in the tables.

RESEARCH, DEVELOPMENT, TEST AND EVALUATION SPECIAL INTEREST ITEMS

Items for which additional funds have been recommended or items for which funding is specifically reduced as shown in the tables detailing Committee recommended adjustments or in paragraphs using the phrase “only for” or “only to” are congressional special interest items for the purpose of the Base for Reprogramming [DD Form 1414]. Each of these items must be carried on the DD Form 1414 at the stated amount, as specifically addressed in elsewhere in this report.

RESEARCH, DEVELOPMENT, TEST AND EVALUATION OVERVIEW

Basic Research.—The Committee understands that basic research is the foundation for Department of Defense innovation and future technologies. As the Under Secretary of Defense (Research and Engineering) recently testified before the Committee: “The Department of Defense has the third largest investment among Federal agencies in basic research at U.S. universities, who have, through years of continued investments, been the source of many of today’s transformational technologies. Traditionally, the Department has viewed the role of universities as producing the research innovation, the Department of Defense labs as the mechanism to nurture these findings and to render them defense-applicable, and the defense industrial base to integrate these new technologies into acquisition programs.” Accordingly, the Committee recommends a total basic research investment of \$2,798,456,000, an increase of \$529,280,000 above the fiscal year 2019 budget request. This includes an additional \$125,000,000 in Research, Development, Test and Evaluation, Army; \$125,000,000 in Research, Development, Test and Evaluation, Navy; \$125,000,000 in Research, Development, Test and Evaluation, Air Force; and \$100,000,000 in Research, Development, Test and Evaluation, Defense-Wide.

Directed Energy.—The 2018 National Defense Strategy describes a changing security environment due to rapid technological ad-

vancements and the changing character of war. The Committee understands that directed energy, a family of emerging non-kinetic capabilities, will play a key role in shaping the air, maritime, and ground battlefield environments. The Committee has been supportive of the Department's directed energy activities to date to ensure that these capabilities are an operational advantage for the U.S. military. The Committee supports additional investments to further develop directed energy technology and transition these activities to both offensive and defensive capabilities in the future. As a result, the Committee recommends an additional \$316,500,000 above the President's budget request for directed energy activities. Specifically, the Committee recommends an additional \$150,000,000 for Air Force prototyping activities to support the application of directed energy technology for air base air defense, precision attack, and aircraft self-protection. These investments are intended to support the Air Force Directed Energy Weapon Flight Plan and the continued development of high energy lasers and high-power microwave weapons. Additional investments to advance the development of directed energy capabilities by the Missile Defense Agency are addressed separately.

Hypersonics.—The 2018 National Defense Strategy identifies hypersonics as a key technology to ensure that the United States maintains its technology superiority and ability to fight and win the wars in the future. The fiscal year 2019 President's budget request invests in both offensive and defensive hypersonics capabilities. The Committee understands that the Department of Defense is accelerating existing efforts in hypersonics to counter the progress made by near peer threats. To support and accelerate several of the Department's current activities, the Committee recommends an increase of \$928,600,000 over the President's budget request to support hypersonics research and prototyping efforts. Specifically, the Committee recommends an additional \$345,000,000 for the Office of the Secretary of Defense to accelerate prompt global strike capability development as well as an additional \$50,000,000 for the Defense Advanced Research Projects Agency to develop offensive hypersonic weapons. Further, the recommendation includes an additional \$300,000,000 to support the Air Force's decision to accelerate prototyping efforts for the air launched rapid response weapon and hypersonic conventional strike weapon. Finally, the Committee recommends an additional \$113,000,000 for the Navy and the Strategic Capabilities Office to design, fabricate, and test an advanced rail gun mount and continue development of associated hypervelocity projectile. Additional investments to advance the development of hypersonic capabilities by the Missile Defense Agency are addressed separately.

Department of Defense Test and Evaluation Infrastructure.—The 2018 National Defense Strategy addresses the increasingly complex global threat environment driven in part by rapid technological advancements. The fiscal year 2019 President's budget request proposes investments in several programs that support a more capable and lethal force to prepare for this threat environment, including directed energy, hypersonics, advanced computing, big data analytics, artificial intelligence, autonomy, and robotics programs; the

Committee recommends targeted increases in these high priority areas to further accelerate U.S. technological innovation.

The Committee believes that concurrent with investments in leap-ahead technological advancements, an investment in the Department of Defense test and evaluation infrastructure is required to increase testing range space and availability and to ensure continued independent and objective assessments of weapon system capabilities. Therefore, after consultation with the Under Secretary of Defense (Research and Engineering) and Director, Operational Test and Evaluation, the Committee recommends an increase of \$846,000,000 above the President's budget request for the Army, Navy, Air Force and Office, Director, Operational Test and Evaluation to modernize the Department of Defense test and evaluation infrastructure in areas such as hypersonics, directed energy, augmented intelligence, machine learning and robotics.

The Committee directs the Under Secretary of Defense (Research and Engineering), in conjunction with the Director, Operational Test and Evaluation, and the Secretaries of the Army, Navy and Air Force, to conduct an in-depth assessment of the Department of Defense test and evaluation infrastructure and to identify improvements required to address future warfighting capabilities. The assessment shall be provided to the congressional defense committees not later than with the submission of the fiscal year 2020 President's budget request and shall include proposed coordinated investments by warfighting area in priority order and with associated cost estimates.

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, ARMY

Appropriations, 2018	\$10,647,426,000
Budget estimate, 2019	10,159,379,000
Committee recommendation	10,812,458,000

The Committee recommends an appropriation of \$10,812,458,000. This is \$653,079,000 above the budget estimate.

COMMITTEE RECOMMENDED PROGRAM

The following table summarizes the budget estimate for this appropriation, the Committee recommendation, and the Committee recommended adjustments to the budget estimate:

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	RESEARCH, DEVELOPMENT, TEST & EVAL, ARMY			
	BASIC RESEARCH			
1	IN-HOUSE LABORATORY INDEPENDENT RESEARCH	11,585	11,585	.....
2	DEFENSE RESEARCH SCIENCES	276,912	377,912	+ 101,000
3	UNIVERSITY RESEARCH INITIATIVES	65,283	65,283	.....
4	UNIVERSITY AND INDUSTRY RESEARCH CENTERS	92,115	127,865	+ 35,750
	TOTAL, BASIC RESEARCH	445,895	582,645	+ 136,750
	APPLIED RESEARCH			
5	MATERIALS TECHNOLOGY	28,600	58,600	+ 30,000
6	SENSORS AND ELECTRONIC SURVIVABILITY	32,366	85,866	+ 53,500
7	TRACTOR HIP	8,674	8,674	.....
8	TRACTOR JACK	400	400	.....
9	AVIATION TECHNOLOGY	64,847	76,847	+ 12,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
10	ELECTRONIC WARFARE TECHNOLOGY	25,571	25,571	.....
11	MISSILE TECHNOLOGY	50,183	75,183	+ 25,000
12	ADVANCED WEAPONS TECHNOLOGY	29,502	34,502	+ 5,000
13	ADVANCED CONCEPTS AND SIMULATION	28,500	28,500	.....
14	COMBAT VEHICLE AND AUTOMOTIVE TECHNOLOGY	70,450	95,450	+ 25,000
15	BALLISTICS TECHNOLOGY	75,541	75,541	.....
16	CHEMICAL, SMOKE AND EQUIPMENT DEFEATING TECHNOLOGY ...	5,032	5,032	.....
17	JOINT SERVICE SMALL ARMS PROGRAM	12,394	12,394	.....
18	WEAPONS AND MUNITIONS TECHNOLOGY	40,444	65,944	+ 25,500
19	ELECTRONICS AND ELECTRONIC DEVICES	58,283	83,283	+ 25,000
20	NIGHT VISION TECHNOLOGY	29,582	29,582	.....
21	COUNTERMINE SYSTEMS	21,244	27,244	+ 6,000
22	HUMAN FACTORS ENGINEERING TECHNOLOGY	24,131	26,631	+ 2,500
23	ENVIRONMENTAL QUALITY TECHNOLOGY	13,242	21,242	+ 8,000
24	COMMAND, CONTROL, COMMUNICATIONS TECHNOLOGY	55,003	55,003	.....
25	COMPUTER AND SOFTWARE TECHNOLOGY	14,958	14,958	.....
26	MILITARY ENGINEERING TECHNOLOGY	78,159	98,159	+ 20,000
27	MANPOWER/PERSONNEL/TRAINING TECHNOLOGY	21,862	21,862	.....
28	WARFIGHTER TECHNOLOGY	40,566	49,566	+ 9,000
29	MEDICAL TECHNOLOGY	90,075	90,075	.....
	TOTAL, APPLIED RESEARCH	919,609	1,166,109	+ 246,500
	ADVANCED TECHNOLOGY DEVELOPMENT			
30	WARFIGHTER ADVANCED TECHNOLOGY	39,338	39,338	.....
31	MEDICAL ADVANCED TECHNOLOGY	62,496	70,496	+ 8,000
32	AVIATION ADVANCED TECHNOLOGY	124,958	133,958	+ 9,000
33	WEAPONS AND MUNITIONS ADVANCED TECHNOLOGY	102,686	244,503	+ 141,817
34	COMBAT VEHICLE AND AUTOMOTIVE ADVANCED TECHNOLOGY ...	119,739	166,239	+ 46,500
35	SPACE APPLICATION ADVANCED TECHNOLOGY	13,000	51,000	+ 38,000
36	MANPOWER, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY	8,044	8,044	.....
37	TRACTOR HIKE	22,631	22,631	.....
38	NEXT GENERATION TRAINING & SIMULATION SYSTEMS	25,682	25,682	.....
40	COMBATING TERRORISM, TECHNOLOGY DEVELOPMENT	3,762	36,762	+ 33,000
41	TRACTOR NAIL	4,896	4,896	.....
42	TRACTOR EGGS	6,041	6,041	.....
43	ELECTRONIC WARFARE TECHNOLOGY	31,491	41,491	+ 10,000
44	MISSILE AND ROCKET ADVANCED TECHNOLOGY	61,132	86,132	+ 25,000
45	TRACTOR CAGE	16,845	16,845	.....
46	HIGH PERFORMANCE COMPUTING MODERNIZATION PROGRAM ...	183,322	218,322	+ 35,000
47	LANDMINE WARFARE AND BARRIER ADVANCED TECHNOLOGY	11,104	17,104	+ 6,000
48	JOINT SERVICE SMALL ARMS PROGRAM	5,885	22,805	+ 16,920
49	NIGHT VISION ADVANCED TECHNOLOGY	61,376	61,376	.....
50	ENVIRONMENTAL QUALITY TECHNOLOGY DEMONSTRATIONS	9,136	29,136	+ 20,000
51	MILITARY ENGINEERING ADVANCED TECHNOLOGY	25,864	95,464	+ 69,600
52	ADVANCED TACTICAL COMPUTER SCIENCE & SENSOR TECHNOLOGY	34,883	43,883	+ 9,000
53	COMMAND, CONTROL, COMMUNICATIONS ADVANCED TECHNOLOGY	52,387	52,387	.....
	TOTAL, ADVANCED TECHNOLOGY DEVELOPMENT	1,026,698	1,494,535	+ 467,837
	DEMONSTRATION & VALIDATION			
54	ARMY MISSILE DEFENSE SYSTEMS INTEGRATION	10,777	55,477	+ 44,700
56	AIR AND MISSILE DEFENSE SYSTEMS ENGINEERING	42,802	49,602	+ 6,800
57	LANDMINE WARFARE AND BARRIER—ADV DEV	45,254	45,254	.....
58	SMOKE, OBSCURANT AND TARGET DEFEATING SYS—ADV DEV	22,700	22,700	.....
59	TANK AND MEDIUM CALIBER AMMUNITION	41,974	41,974	.....
60	ARMORED SYSTEM MODERNIZATION—ADV DEV	119,395	63,585	- 55,810
61	SOLDIER SUPPORT AND SURVIVABILITY	8,746	8,746	.....
62	TACTICAL ELECTRONIC SURVEILLANCE SYSTEM—AD	35,667	35,667	.....
63	NIGHT VISION SYSTEMS ADVANCED DEVELOPMENT	7,350	7,350	.....
64	ENVIRONMENTAL QUALITY TECHNOLOGY	14,749	14,749	.....
65	NATO RESEARCH AND DEVELOPMENT	3,687	3,687	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
66	AVIATION—ADV DEV	10,793	86,193	+ 75,400
67	LOGISTICS AND ENGINEER EQUIPMENT—ADV DEV	14,248	17,248	+ 3,000
68	MEDICAL SYSTEMS—ADV DEV	34,284	37,284	+ 3,000
69	SOLDIER SYSTEMS—ADVANCED DEVELOPMENT	18,044	18,044	.....
70	ROBOTICS DEVELOPMENT	95,660	72,260	– 23,400
71	CROSS FUNCTIONAL TEAM (CFT) ADVANCED DEVELOPMENT	38,000	25,000	– 13,000
72	ANALYSIS OF ALTERNATIVES	9,765	9,765	.....
73	FUTURE TACTICAL UNMANNED AIRCRAFT SYSTEM (FUAS)	12,393	12,393	.....
74	LOWER TIER AIR MISSILE DEFENSE (LTAMID) SENSOR	120,374	87,874	– 32,500
75	TECHNOLOGY MATURATION INITIATIVES	95,347	95,347	.....
76	MANEUVER—SHORT RANGE AIR DEFENSE (M–SHORAD)	95,085	56,085	– 39,000
77	TRACTOR BEAM	52,894	52,894	.....
	SYNTHETIC TRAINING ENVIRONMENT REFINEMENT AND			
79	PROTOTYPING	77,939	77,939	.....
80	INDIRECT FIRE PROTECTION CAPABILITY INCREMENT 2—INTERC	51,030	51,030	.....
81	CYBERSPACE OPERATIONS FORCES AND FORCE SUPPORT	65,817	47,417	– 18,400
82	ASSURED POSITIONING, NAVIGATION AND TIMING (PNT)	146,300	111,300	– 35,000
83	ARMY SPACE SYSTEMS INTEGRATION	38,319	38,319	.....
	TOTAL, DEMONSTRATION & VALIDATION	1,329,393	1,245,183	– 84,210
	ENGINEERING & MANUFACTURING DEVELOPMENT			
84	AIRCRAFT AVIONICS	32,293	32,293	.....
85	ELECTRONIC WARFARE DEVELOPMENT	78,699	58,699	– 20,000
88	TRACTOR CAGE	17,050	17,050	.....
89	INFANTRY SUPPORT WEAPONS	83,155	57,355	– 25,800
90	MEDIUM TACTICAL VEHICLES	3,704	3,704	.....
85	JAVELIN	10,623	5,623	– 5,000
92	FAMILY OF HEAVY TACTICAL VEHICLES	11,950	11,950	.....
93	AIR TRAFFIC CONTROL	12,347	12,347	.....
95	LIGHT TACTICAL WHEELED VEHICLES	8,212	1,278	– 6,934
96	ARMORED SYSTEMS MODERNIZATION (ASM)—ENG DEV	393,613	393,613	.....
97	NIGHT VISION SYSTEMS—SDD	139,614	138,614	– 1,000
98	COMBAT FEEDING, CLOTHING, AND EQUIPMENT	4,507	7,507	+ 3,000
99	NON-SYSTEM TRAINING DEVICES—SDD	49,436	44,436	– 5,000
100	AIR DEFENSE COMMAND, CONTROL AND INTELLIGENCE—SDD ...	95,172	88,172	– 7,000
101	CONSTRUCTIVE SIMULATION SYSTEMS DEVELOPMENT	22,628	22,628	.....
102	AUTOMATIC TEST EQUIPMENT DEVELOPMENT	13,297	10,697	– 2,600
103	DISTRIBUTIVE INTERACTIVE SIMULATIONS (DIS)—SDD	9,145	9,145	.....
104	BRILLIANT ANTI-ARMOR SUBMUNITION (BAT)	9,894	6,894	– 3,000
105	COMBINED ARMS TACTICAL TRAINER (CATT) CORE	21,964	21,964	.....
106	BRIGADE ANALYSIS, INTEGRATION AND EVALUATION	49,288	49,288	.....
107	WEAPONS AND MUNITIONS—SDD	183,100	184,959	+ 1,859
108	LOGISTICS AND ENGINEER EQUIPMENT—SDD	79,706	79,706	.....
109	COMMAND, CONTROL, COMMUNICATIONS SYSTEMS—SDD	15,970	15,970	.....
110	MEDICAL MATERIEL/MEDICAL BIOLOGICAL DEFENSE EQUIPMENT	44,542	44,542	.....
111	LANDMINE WARFARE/BARRIER—SDD	50,817	45,117	– 5,700
112	ARMY TACTICAL COMMAND & CONTROL HARDWARE & SOFT- WARE	178,693	163,693	– 15,000
113	RADAR DEVELOPMENT	39,338	39,338	.....
114	GENERAL FUND ENTERPRISE BUSINESS SYSTEM [GFEB]	37,851	37,851	.....
115	FIREFINDER	45,473	45,473	.....
116	SOLDIER SYSTEMS—WARRIOR DEM/VAL	10,395	10,395	.....
117	SUITE OF SURVIVABILITY ENHANCEMENT SYSTEMS -EMD	69,204	52,904	– 16,300
118	ARTILLERY SYSTEMS	1,781	1,781	.....
119	INFORMATION TECHNOLOGY DEVELOPMENT	113,758	80,376	– 33,382
120	INTEGRATED PERSONNEL AND PAY SYSTEM—ARMY (IPPS–A)	166,603	155,103	– 11,500
121	ARMORED MULTI-PURPOSE VEHICLE	118,239	118,239	.....
	INTEGRATED GROUND SECURITY SURVEILLANCE RESPONSE			
122	CAPABILITY (IGSSR–C)	3,211	3,211	.....
123	JOINT TACTICAL NETWORK CENTER (JTNC)	15,889	15,889	.....
124	JOINT TACTICAL NETWORK (JTN)	41,972	41,972	.....
125	TRACTOR TIRE	41,166	41,166	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
126	GROUND-BASED OPERATIONAL SURVEILLANCE SYSTEM—			
	EXPEDITIONARY (GBOSS-E)	5,175	5,175	.....
127	TACTICAL SECURITY SYSTEM (TSS)	4,496	4,496	.....
128	COMMON INFRARED COUNTERMEASURES (CIRCM)	51,178	25,178	- 26,000
129	COMBATING WEAPONS OF MASS DESTRUCTION (CWMD)	11,311	11,311	.....
131	NUCLEAR BIOLOGICAL CHEMICAL RECONNAISSANCE VEHICLE ...	17,154	13,054	- 4,100
132	DEFENSIVE CYBER TOOL DEVELOPMENT	36,626	30,126	- 6,500
133	TACTICAL NETWORK RADIO SYSTEMS (LOW-TIER)	3,829	3,829	.....
134	CONTRACT WRITING SYSTEM	41,928	41,928	.....
135	MISSILE WARNING SYSTEM MODERNIZATION (MWSM)	28,276	6,276	- 22,000
136	AIRCRAFT SURVIVABILITY DEVELOPMENT	21,965	21,965	.....
137	INDIRECT FIRE PROTECTION CAPABILITY INC 2—BLOCK 1	157,710	145,710	- 12,000
138	GROUND ROBOTICS	86,167	61,549	- 24,618
139	EMERGING TECHNOLOGY INITIATIVES	42,866	68,266	+ 25,400
140	AMF JOINT TACTICAL RADIO SYSSTEM	15,984	15,984	.....
141	JOINT AIR-TO-GROUND MISSILE (JAGM)	11,773	11,773	.....
142	ARMY INTEGRATED AIR AND MISSILE DEFENSE (AIAMD)	277,607	322,607	+ 45,000
143	NATIONAL CAPABILITIES INTEGRATION	12,340	12,340	.....
144	JOINT LIGHT TACTICAL VEHICLE ENG AND MANUFACTURING	2,686	.....	- 2,686
145	AVIATION GROUND SUPPORT EQUIPMENT	2,706	7,706	+ 5,000
147	TROJAN—RH12	4,521	4,521	.....
150	ELECTRONIC WARFARE DEVELOPMENT	8,922	8,922	.....
151	TRACTOR BEARS	23,170	23,170	.....
	TOTAL, ENGINEERING & MANUFACTURING DEVELOPMENT	3,192,689	3,016,828	- 175,861
	RDT&E MANAGEMENT SUPPORT			
152	THREAT SIMULATOR DEVELOPMENT	12,835	28,835	+ 16,000
153	TARGET SYSTEMS DEVELOPMENT	12,135	32,135	+ 20,000
154	MAJOR T&E INVESTMENT	82,996	182,996	+ 100,000
155	RAND ARROYO CENTER	19,821	19,821	.....
156	ARMY KWAJALEIN ATOLL	246,574	246,574	.....
157	CONCEPTS EXPERIMENTATION PROGRAM	30,430	30,430	.....
159	ARMY TEST RANGES AND FACILITIES	305,759	430,759	+ 125,000
160	ARMY TECHNICAL TEST INSTRUMENTATION AND TARGETS	62,379	84,879	+ 22,500
161	SURVIVABILITY/LETHALITY ANALYSIS	40,496	40,496	.....
162	AIRCRAFT CERTIFICATION	3,941	3,941	.....
163	METEOROLOGICAL SUPPORT TO RDT&E ACTIVITIES	9,767	9,767	.....
164	MATERIEL SYSTEMS ANALYSIS	21,226	21,226	.....
165	EXPLOITATION OF FOREIGN ITEMS	13,026	13,026	.....
166	SUPPORT OF OPERATIONAL TESTING	52,718	52,718	.....
167	ARMY EVALUATION CENTER	57,049	57,049	.....
168	ARMY MODELING AND SIMULATION X-CMD COLLABORATION AND INTEG	2,801	2,801	.....
169	PROGRAMWIDE ACTIVITIES	60,942	60,942	.....
170	TECHNICAL INFORMATION ACTIVITIES	29,050	29,050	.....
171	MUNITIONS STANDARDIZATION, EFFECTIVENESS AND SAFETY	42,332	56,332	+ 14,000
172	ENVIRONMENTAL QUALITY TECHNOLOGY MGMT SUPPORT	3,216	3,216	.....
173	MANAGEMENT HEADQUARTERS (RESEARCH AND DEVELOPMENT)	54,145	54,145	.....
174	MILITARY GROUND-BASED CREW TECHNOLOGY	4,896	4,896	.....
175	RONALD REAGAN BALLISTIC MISSILE DEFENSE TEST SITE	63,011	63,011	.....
176	COUNTERINTEL AND HUMAN INTEL MODERNIZATION	2,636	2,636	.....
177	ASSESSMENTS AND EVALUATIONS CYBER VULNERABILITIES	88,300	88,300	.....
	TOTAL, RDT&E MANAGEMENT SUPPORT	1,322,481	1,619,981	+ 297,500
	OPERATIONAL SYSTEMS DEVELOPMENT			
181	MLRS PRODUCT IMPROVEMENT PROGRAM	8,886	6,886	- 2,000
182	TRACTOR PULL	4,067	4,067	.....
183	ANTI-TAMPER TECHNOLOGY SUPPORT	4,254	4,254	.....
184	WEAPONS AND MUNITIONS PRODUCT IMPROVEMENT PROGRAMS	16,022	16,022	.....
185	TRACTOR SMOKE	4,577	4,577	.....
186	LONG RANGE PRECISION FIRES (LRPF)	186,475	159,475	- 27,000
187	APACHE PRODUCT IMPROVEMENT PROGRAM	31,049	24,049	- 7,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
188	BLACKHAWK RECAP/MODERNIZATION	35,240	35,240	.....
189	CHINOOK HELICOPTER PRODUCT IMPROVEMENT PROGRAM	157,822	153,822	- 4,000
190	FIXED WING AIRCRAFT	4,189	4,189	.....
191	IMPROVED TURBINE ENGINE PROGRAM	192,637	189,137	- 3,500
194	AVIATION ROCKET SYSTEM PRODUCT IMPROVEMENT AND DEVELOPMENT	60,860	41,860	- 19,000
195	UNMANNED AIRCRAFT SYSTEM UNIVERSAL PRODUCTS	52,019	38,519	- 13,500
196	FAMILY OF BIOMETRICS	2,400	2,400	.....
197	PATRIOT PRODUCT IMPROVEMENT	65,369	75,369	+ 10,000
198	AEROSTAT JOINT PROJECT OFFICE	1	.....	- 1
199	JOINT AUTOMATED DEEP OPERATION COORDINATION SYSTEM	30,954	30,954	.....
200	COMBAT VEHICLE IMPROVEMENT PROGRAMS	411,927	336,427	- 75,500
202	155MM SELF-PROPELLED HOWITZER IMPROVEMENTS	40,676	30,676	- 10,000
203	AIRCRAFT MODIFICATIONS/PRODUCT IMPROVEMENT PROGRAMS	17,706	17,706	.....
204	AIRCRAFT ENGINE COMPONENT IMPROVEMENT PROGRAM	146	146	.....
205	DIGITIZATION	6,316	6,316	.....
206	MISSILE/AIR DEFENSE PRODUCT IMPROVEMENT PROGRAM	1,643	1,643	.....
207	OTHER MISSILE PRODUCT IMPROVEMENT PROGRAMS	4,947	4,947	.....
208	TRACTOR CARD	34,050	34,050	.....
210	MATERIALS HANDLING EQUIPMENT	1,464	1,464	.....
211	ENVIRONMENTAL QUALITY TECHNOLOGY—OPERATIONAL SYSTEM	249	249	.....
212	LOWER TIER AIR AND MISSILE DEFENSE (AMD) SYSTEM	79,283	78,798	- 485
213	GUIDED MULTIPLE-LAUNCH ROCKET SYSTEM (GMLRS)	154,102	89,102	- 65,000
216	SECURITY AND INTELLIGENCE ACTIVITIES	12,280	12,280	.....
217	INFORMATION SYSTEMS SECURITY PROGRAM	68,533	46,017	- 22,516
218	GLOBAL COMBAT SUPPORT SYSTEM	68,619	48,884	- 19,735
220	WWMCCS/GLOBAL COMMAND AND CONTROL SYSTEM	2,034	2,034	.....
223	COMBINED ADVANCED APPLICATIONS	1,500	1,500	.....
224	INTEGRATED BROADCAST SERVICE (IBS)	450	450	.....
225	TACTICAL UNMANNED AERIAL VEHICLES	6,000	6,000	.....
226	AIRBORNE RECONNAISSANCE SYSTEMS	12,416	12,416	.....
227	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	38,667	27,667	- 11,000
229	RQ-11 UAV	6,180	6,180	.....
230	RQ-7 UAV	12,863	12,863	.....
231	BIOMETRICS ENABLED INTELLIGENCE	4,310	4,310	.....
233	END ITEM INDUSTRIAL PREPAREDNESS ACTIVITIES	53,958	88,758	+ 34,800
234	SATCOM GROUND ENVIRONMENT (SPACE)	12,119	12,119	.....
235	JOINT TACTICAL GROUND SYSTEM	7,400	7,400	.....
	TOTAL, OPERATIONAL SYSTEMS DEVELOPMENT	1,916,659	1,681,222	- 235,437
9999	CLASSIFIED PROGRAMS	5,955	5,955	.....
	TOTAL, RESEARCH, DEVELOPMENT, TEST & EVAL, ARMY	10,159,379	10,812,458	+ 653,079

COMMITTEE RECOMMENDED ADJUSTMENTS

The following table details the adjustments recommended by the Committee:

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
2	Defense Research Sciences	276,912	377,912	+ 101,000
	Basic research program increase .....	.....	.....	+ 100,000
	Program increase: UAV fuel systems enhancements ..	.....	.....	+ 1,000
4	University and Industry Research Centers	92,115	127,865	+ 35,750
	Basic research program increase .....	.....	.....	+ 25,000
	Program increase: Materials in extreme dynamic environments .....	.....	.....	+ 8,750
	Program increase: University assisted hypervelocity testing .....	.....	.....	+ 2,000
5	Materials Technology	28,600	58,600	+ 30,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Program increase: Advanced polymers			+ 5,000
	Program increase: Highly durable advanced polymers for lightweight armor			+ 5,000
	Program increase: Materials research for affordability, performance, and environmental sustainability			+ 10,000
	Program increase: Advanced materials processing			+ 10,000
6	Sensors and Electronic Survivability	32,366	85,866	+ 53,500
	Program increase			+ 5,000
	Program increase: Advanced space data exploitation and integration program			+ 9,500
	Program increase: Agile manufacturing materials processing			+ 15,000
	Program increase: Open campus initiative			+ 4,000
	Program increase: Small satellite technology development			+ 20,000
9	Aviation Technology	64,847	76,847	+ 12,000
	Program increase: Adaptive flight controls			+ 7,000
	Program increase: Aviation and missile technology transfer and innovation			+ 5,000
11	Missile Technology	50,183	75,183	+ 25,000
	Program increase: Air vehicle development and sustainment			+ 15,000
	Program increase: Enterprise science and technology prototyping			+ 10,000
12	Advanced Weapons Technology	29,502	34,502	+ 5,000
	Program increase: COE in high-energy laser and optical technology			+ 5,000
14	Combat Vehicle and Automotive Technology	70,450	95,450	+ 25,000
	Program increase: Advanced materials development for survivability			+ 15,000
	Program increase: Highly electrified vehicles and infrastructure connectivity			+ 4,000
	Program increase: Structural thermoplastics for vehicles			+ 6,000
18	Weapons and Munitions Technology	40,444	65,944	+ 25,500
	Program increase: Advanced warheads technology			+ 2,500
	Program increase: Medium caliber lightweight composite barrels			+ 10,000
	Program increase: Novel printed armaments components			+ 13,000
19	Electronics and Electronic Devices	58,283	83,283	+ 25,000
	Program increase: Silicon carbide research			+ 20,000
	Program increase: Tactical power generation and storage systems			+ 5,000
21	Countermeasures Systems	21,244	27,244	+ 6,000
	Program increase: Developing and improving counter-IED sensors			+ 3,000
	Program increase: Development of soil parameters			+ 3,000
22	Human Factors Engineering Technology	24,131	26,631	+ 2,500
	Program increase			+ 2,500
23	Environmental Quality Technology	13,242	21,242	+ 8,000
	Program increase: Mobile environmental containment sensors			+ 8,000
26	Military Engineering Technology	78,159	98,159	+ 20,000
	Program increase: Cellulose nanocomposites research			+ 15,000
	Program increase: Innovative construction materials for cold regions			+ 4,000
	Program increase: Vehicle-born IED screening			+ 1,000
28	Warfighter Technology	40,566	49,566	+ 9,000
	Program increase: Expeditionary mobile base camp technology			+ 9,000
31	Medical Advanced Technology	62,496	70,496	+ 8,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Program increase: Peer-reviewed military burn research program			+ 8,000
32	Aviation Advanced Technology	124,958	133,958	+ 9,000
	Program increase: Stretch broken composite material forms			+ 4,000
	Program increase: Surface tolerant adhesives			+ 5,000
33	Weapons and Munitions Advanced Technology	102,686	244,503	+ 141,817
	Program increase: Accelerate ERCA gun			+ 20,000
	Program increase: High energy laser			+ 20,000
	Program increase: Long range precision fires			+ 101,817
34	Combat Vehicle and Automotive Advanced Technology	119,739	166,239	+ 46,500
	Program increase: Airless tire technology demonstration			+ 4,000
	Program increase: HMMWV automotive enhancements			+ 10,000
	Program increase: HMMWV autonomy			+ 3,000
	Program increase: HMMWV power system			+ 2,000
	Program increase: HMMWV torque monitoring			+ 3,000
	Program increase: Modular scalable powertrain			+ 2,500
	Program increase: Next gen combat vehicle			+ 7,000
	Program increase: Combat vehicle weight reduction initiative			+ 10,000
	Program increase: Multi-sensor augmented reality system for tactical land vehicles			+ 5,000
35	Space Application Advanced Technology	13,000	51,000	+ 38,000
	Program increase: Network			+ 2,000
	Program increase: Assured positioning, navigation, and timing for space and missile defense assets			+ 6,000
	Program increase: Global communications research ..			+ 10,000
	Program increase: Tactical small launch			+ 20,000
40	Combating Terrorism—Technology Development	3,762	36,762	+ 33,000
	Program increase: Artificial intelligence enabled sensor networks			+ 8,000
	Program increase: Enhanced propulsion systems for UAS			+ 6,000
	Program increase: Lightweight, low power radar systems			+ 8,000
	Program increase: Long endurance UAV research			+ 8,000
	Program increase: Open source ISR research			+ 3,000
43	Electronic Warfare Technology	31,491	41,491	+ 10,000
	Program increase: Tactical cyber-electronic warfare readiness initiative			+ 10,000
44	Missile and Rocket Advanced Technology	61,132	86,132	+ 25,000
	Program increase: Cyber security			+ 15,000
	Program increase: Tactically mobile, shoot-on-the-move SHORAD demonstration			+ 10,000
46	High Performance Computing Modernization Program	183,322	218,322	+ 35,000
	Program increase			+ 35,000
47	Landmine Warfare and Barrier Advanced Technology	11,104	17,104	+ 6,000
	Program increase: Multi-sensor drone swarms for explosive hazard detection			+ 6,000
48	Joint Service Small Arms Program	5,885	22,805	+ 16,920
	Program increase: Soldier lethality			+ 16,920
50	Environmental Quality Technology Demonstrations	9,136	29,136	+ 20,000
	Program increase: Autonomous transport innovation			+ 5,000
	Program increase: Environmental sensors for explosives			+ 2,000
	Program increase: Rapid safe advanced carbon nanotechnology materials			+ 8,000
	Program increase: Smart bases			+ 5,000
51	Military Engineering Advanced Technology	25,864	95,464	+ 69,600
	Program increase: Additive manufacturing/3-D printing			+ 2,000
	Program increase: Advanced polymer development ..			+ 20,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Program increase: Bathymetric-topographic LiDAR research			+ 8,200
	Program increase: Centrifuge enabled research			+ 2,500
	Program increase: Energy technology research in cold and arctic regions			+ 4,000
	Program increase: ERDC collaboration			+ 2,000
	Program increase: Extreme terrain research			+ 4,000
	Program Increase: Natural gas technology			+ 4,000
	Program increase: Reliable distributed energy in austere environments			+ 3,000
	Program Increase: Research facility modernization ...			+ 2,000
	Program increase: Research in the permafrost environment			+ 4,000
	Program increase: Resilient energy systems			+ 1,000
	Program increase: Secure and resilient power generation in cold region environments			+ 5,000
	Program Increase: Silicon anode technology			+ 4,000
	Program increase: Transportation infrastructure evaluation system			+ 3,900
52	Advanced Tactical Computer Science and Sensor Technology	34,883	43,883	+ 9,000
	Program increase: Assured position, navigation, and timing			+ 9,000
54	Army Missile Defense Systems Integration	10,777	55,477	+ 44,700
	Program increase: Counter-UAS mission capabilities			+ 8,700
	Program increase: Electromagnetic attack and protect			+ 10,000
	Program increase: Inertial measurement unit hardware-in-the-loop			+ 11,000
	Program increase: Integrated environmental control and power			+ 15,000
56	Air and Missile Defense Systems Engineering	42,802	49,602	+ 6,800
	Program increase: Interoperability of integrated air and missile defense			+ 20,000
	Restoring acquisition accountability: ALPS lack of directed requirement			- 13,200
60	Armored System Modernization—Adv Dev	119,395	63,585	- 55,810
	Program increase: Armored advanced fuel cell prototypes			+ 5,000
	Restoring acquisition accountability: MFV prototyping acceleration ahead of need			- 60,810
66	Aviation—Adv Dev	10,793	86,193	+ 75,400
	Program increase: Future vertical lift			+ 75,400
67	Logistics and Engineer Equipment—Adv Dev	14,248	17,248	+ 3,000
	Program increase: Tactical electric program research for remote and forward operating bases			+ 3,000
68	Medical Systems—Adv Dev	34,284	37,284	+ 3,000
	Program increase: Transport telemedicine program ...			+ 3,000
70	Robotics Development	95,660	72,260	- 23,400
	Restoring acquisition accountability: RCV Phase 2 funding ahead of need			- 23,400
71	Cross Functional Team (CFT) Advanced Development & Prototyping	38,000	25,000	- 13,000
	Program increase: Early long range precision fires hypersonic capability			+ 25,000
	Restoring acquisition accountability: Lack of strategy			- 38,000
74	Lower Tier Air Missile Defense (LTAMD) Sensor	120,374	87,874	- 32,500
	Restoring acquisition accountability: TMRR contract excess funding			- 24,000
	Restoring acquisition accountability: Test funding ahead of need			- 8,500
76	Maneuver—Short Range Air Defense (M-SHORAD)	95,085	56,085	- 39,000
	Restoring acquisition accountability: Program growth ahead of acquisition strategy			- 39,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
81	Cyberspace Operations Forces and Force Support	65,817	47,417	-18,400
	Restoring acquisition accountability: Funding ahead of requirements finalization			-5,400
	Reduce duplication: CORA-P funded in line 177			-13,000
82	Assured Positioning, Navigation and Timing (PNT)	146,300	111,300	-35,000
	Improving funds management: Prior year carryover due to program delay			-35,000
85	Electronic Warfare Development	78,699	58,699	-20,000
	Restoring acquisition accountability: Funding excess to need			-20,000
89	Infantry Support Weapons	83,155	57,355	-25,800
	Program increase: Soldier enhancement program			+6,200
	Restoring acquisition accountability: NGSAR EMD funding ahead of need			-22,000
	Restoring acquisition accountability: Small arms fire control funding ahead of requirement			-10,000
91	JAVELIN	10,623	5,623	-5,000
	Restoring acquisition accountability: Lightweight CLU development delay			-5,000
95	Light Tactical Wheeled Vehicles	8,212	1,278	-6,934
	Restoring acquisition accountability: Excess GMV test funding			-2,705
	Restoring acquisition accountability: JLTV-RV test funding ahead of need			-4,229
97	Night Vision Systems—Eng Dev	139,614	138,614	-1,000
	Restoring acquisition accountability: ENVG-B follow-on test funding ahead of need			-1,000
98	Combat Feeding, Clothing, and Equipment	4,507	7,507	+3,000
	Program increase: Modular glove system			+3,000
99	Non-System Training Devices—Eng Dev	49,436	44,436	-5,000
	Insufficient budget justification: Unjustified request			-5,000
100	Air Defense Command, Control and Intelligence—Eng Dev	95,172	88,172	-7,000
	Program increase: All digital radar			+8,000
	Improving funds management: Prior year carryover			-15,000
102	Automatic Test Equipment Development	13,297	10,697	-2,600
	Improving funds management: Prior year carryover			-2,600
104	Brilliant Anti-Armor Submunition (BAT)	9,894	6,894	-3,000
	Improving funds management: Prior year carryover			-3,000
107	Weapons and Munitions—Eng Dev	183,100	184,959	+1,859
	Program increase: Test and evaluation of M999 155mm			+12,000
	Restoring acquisition accountability: NGSW ammo EMD funding ahead of need			-4,250
	Improving funds management: AMP fuze risk reduction excess to need			-5,891
111	Landmine Warfare/Barrier—Eng Dev	50,817	45,117	-5,700
	Improving funds management: Prior year carryover			-5,700
112	Army Tactical Command & Control Hardware & Software	178,693	163,693	-15,000
	Restoring acquisition accountability: TNOM funding ahead of need			-5,000
	Restoring acquisition accountability: CPI2 program delay			-10,000
117	Suite of Survivability Enhancement Systems—EMD	69,204	52,904	-16,300
	Restoring acquisition accountability: Army revised Stryker test requirement			-16,300
119	Information Technology Development	113,758	80,376	-33,382
	Insufficient budget justification: AcqBiz unjustified request			-14,382
	Improving funds management: Prior year carryover			-19,000
120	Integrated Personnel and Pay System—Army (IPPS-A)	166,603	155,103	-11,500
	Restoring acquisition accountability: Excess funding due to test delays			-10,000
	Restoring acquisition accountability: Program management growth			-1,500

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
128	Common Infrared Countermeasures (CIRCM)	51,178	25,178	-26,000
	Improving funds management: Prior year carryover due to program delay			-26,000
131	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	17,154	13,054	-4,100
	Improving funds management: Excess test funding due to program delay			-4,100
132	Defensive CYBER Tool Development	36,626	30,126	-6,500
	Improving funds management: Prior year carryover ...			-6,500
135	Missile Warning System Modernization (MWSM)	28,276	6,276	-22,000
	Restoring acquisition accountability: Funding early to need			-22,000
137	Indirect Fire Protection Capability Inc 2—Block 1	157,710	145,710	-12,000
	Insufficient budget justification: Unjustified request			-12,000
138	Ground Robotics	86,167	61,549	-24,618
	Transfer ground robotics MTRS standardization: Army-requested to OPA line 133			-4,618
	Restoring acquisition accountability: CRS-I contract delay			-12,000
	Improving funds management: SMET contract delay			-8,000
139	Emerging Technology Initiatives	42,866	68,266	+25,400
	Program increase: ISR quick reaction capability			+25,400
142	Army Integrated Air and Missile Defense (AIAMD)	277,607	322,607	+45,000
	Program increase: Accelerated integration to counter emerging threats			+30,000
	Program increase: Cyber security research			+15,000
144	Joint Light Tactical Vehicle (JLTV) ED	2,686		-2,686
	Restoring acquisition accountability: Funds excess to need			-2,686
145	Aviation Ground Support Equipment	2,706	7,706	+5,000
	Program increase: Next generation health monitoring system			+5,000
152	Threat Simulator Development	12,835	28,835	+16,000
	Program increase: Integrated threat force cyber threat simulators			+6,000
	Program increase: Threat cyberspace operations			+10,000
153	Target Systems Development	12,135	32,135	+20,000
	Program increase: Cyber virtualization center			+20,000
154	Major T&E Investment	82,996	182,996	+100,000
	Program increase			+100,000
159	Army Test Ranges and Facilities	305,759	430,759	+125,000
	Program increase			+100,000
	Program increase: Distributed environment for system-of-system cyber security testing			+10,000
	Program increase: Directed energy workloads management			+15,000
160	Army Technical Test Instrumentation and Targets	62,379	84,879	+22,500
	Program increase: Cyber security of space and missile defense assets			+22,500
171	Munitions Standardization, Effectiveness and Safety	42,332	56,332	+14,000
	Program increase: Life cycle pilot process			+10,000
	Program increase: Polymer cased small arms ammunition			+4,000
181	MLRS Product Improvement Program	8,886	6,886	-2,000
	Improving funds management: Prior year carryover ...			-2,000
186	Long Range Precision Fires (LRPF)	186,475	159,475	-27,000
	Improving funds management: TMRR excess growth			-25,000
	Restoring acquisition accountability: Program management excess growth			-2,000
187	Apache Product Improvement Program	31,049	24,049	-7,000
	Restoring acquisition accountability: Product development previously funded			-6,000
	Restoring acquisition accountability: Testing previously funded			-1,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
189	Chinook Product Improvement Program	157,822	153,822	- 4,000
	Restoring acquisition accountability: Program management excess			- 4,000
191	Improved Turbine Engine Program	192,637	189,137	- 3,500
	Restoring acquisition accountability: Test funding ahead of need			- 3,500
194	Aviation Rocket System Product Improvement and Development	60,860	41,860	- 19,000
	Improving funds management: Lightweight precision munition lack of strategy			- 19,000
195	Unmanned Aircraft System Universal Products	52,019	38,519	- 13,500
	Improving funds management: Prior year carryover due to program delay			- 13,500
197	Patriot Product Improvement	65,369	75,369	+ 10,000
	Program increase			+ 10,000
198	Aerostat Joint Project—COCOM Exercise	1		- 1
	Program termination			- 1
200	Combat Vehicle Improvement Programs	411,927	336,427	- 75,500
	Program increase: Advanced Abrams thermal management system and integration			+ 16,000
	Program increase: Certification of wireless intercom capabilities			+ 5,000
	Program increase: Improved recovery vehicle (M88A2 Hercules)			+ 18,000
	Program increase: Stryker power system			+ 3,000
	Improving funds management: Hercules prior year carryover			- 6,000
	Improving funds management: Abrams ECP V3 excess funding due to test delay			- 5,000
	Restoring acquisition accountability: Abrams ECP V4 excess growth			- 10,000
	Restoring acquisition accountability: Bradley ECP A5 excess			- 80,000
	Restoring acquisition accountability: Stryker 30mm ECP delay			- 16,500
202	155mm Self-Propelled Howitzer Improvements	40,676	30,676	- 10,000
	Improving funds management: Prior year carryover			- 10,000
212	Lower Tier Air and Missile Defense [AMD] System	79,283	78,798	- 485
	Insufficient budget justification: Unjustified request			- 485
213	Guided Multiple-Launch Rocket System [GMLRS]	154,102	89,102	- 65,000
	Restoring acquisition accountability: Extended range development contract delay			- 50,000
	Improving funds management: Test funding ahead of need			- 15,000
217	Information Systems Security Program	68,533	46,017	- 22,516
	Program increase: Cyber security operations center			+ 18,500
	Restoring acquisition accountability: Program delay			- 41,016
218	Global Combat Support System	68,619	48,884	- 19,735
	Restoring acquisition accountability: Business intelligence/Business warehouse funding ahead of need			- 8,584
	Restoring acquisition accountability: Army pre-positioned stock funding ahead of need			- 11,151
227	Distributed Common Ground/Surface Systems	38,667	27,667	- 11,000
	Restoring acquisition accountability: CD2 funding excess to need			- 5,000
	Improving funds management: Test funding excess to need			- 5,000
	Restoring acquisition accountability: CD3 funding ahead of need			- 1,000
233	End Item Industrial Preparedness Activities	53,958	88,758	+ 34,800
	Program increase: Engineering data synchronization software pilot program			+ 9,800

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Program increase: Nanoscale and microscale materials .....	.....	.....	+ 20,000
	Program increase: Power take off hybridization .....	.....	.....	+ 5,000

Soldier Fitness Program and Suicide Prevention Program.—The fiscal year 2019 budget request includes \$5,639,000 for the Soldier Fitness Program and Suicide Prevention Program. While the Committee is fully supportive of these programs, it is dismayed that, for the second year in a row, the budget justification materials for them lacked sufficient detail and substance. The Committee directs the Army to provide full justification for these programs with the fiscal year 2020 budget submission.

Manufacturing Technologies for Unmanned Aerial Systems [UAS].—The Committee encourages the Secretary of the Army to invest in technologies that vastly improve the mechanical durability of unmanned aerial propulsion systems and utilize multi-fuel capable, hybrid electric propulsion. Such technologies should focus on reducing the wear of components and lowering component weights through innovative computational design while also employing directed energy deposition processes based on rapid and predictive simulation tools.

Life Cycle Pilot Process.—The Committee commends the Army for its continuing work in Transformative Manufacturing Technology and strongly encourages the Secretary of the Army to dedicate resources to further the development and equipping of the national technical industrial base with these new and emerging transformative manufacturing and ammunition technologies.

Strategic Materials Research.—The Committee continues to recognize the importance of the Army Research Laboratory [ARL] in expanding research, education, and technology development efforts in materials and metals processing science and engineering, aiming to transform the affordability, performance and environmental sustainability of strategic materials. The Committee further notes that ARL’s Open Campus concept benefits the Army, the academic community, and industry through collaboration involving ARL’s research staff and facilities, leading to continued technological superiority for the U.S. warfighter. The Committee encourages the Army to consider accelerating expansion of its Open Campus approach to its Materials and Manufacturing Science laboratories in order to benefit strategic materials research.

Mobile Camouflage Systems.—The Committee notes that mobile camouflage systems may provide enhanced signature management protection, reduce heat and temperature inside and around combat vehicles, and yield fuel savings without interfering with the operation of the vehicles. The Committee is aware of the Army’s ongoing operational testing of mobile camouflage systems at the National Training Center and elsewhere and encourages further acceleration of those efforts.

Next Generation Body Armor.—The Committee commends the Army’s efforts in advanced research in next generation body armor and the use of cutting-edge material to improve individual protec-

tion, mobility, and survivability on the battlefield. The Committee understands that industry is also investing in this technology and encourages the Army to continue partnering with industry to lighten soldier load, increase individual protection, and enhance soldier survivability.

Material Development, Characterization, and Computational Modeling.—The Committee recognizes the importance of evaluating materials and technologies as well as designing and developing methodologies and models to enable enhanced lethality and survivability. Methods such as computational research allow for the development of models that predict the mechanical properties of materials that are used in research and development at the U.S. Army Research Laboratory [ARL]. These models and simulations, which are based on quantum mechanics, statistical mechanics principles and thermodynamic simulations, and are tested via cold spray synthesis and mechanical testing, provide a cost savings to the Department of Defense by simulating materials prior to testing them to ensure mechanical properties will work together. Additionally, these methodologies allow for the enhanced development of technologies such as lightweight armors, protective structures, kinetic energy active protection, ballistic shock and mine blast protection, helmet technologies to prevent traumatic brain injury, and numerous other uses. The Committee encourages ARL to continue the utilization of computational modeling and simulations research to achieve greater cost savings.

Adaptive Red Team Support.—The Committee supports the work of the Army’s Adaptive Red Team Technical Support and Operational Analysis program and understands it provides vital feedback on information technology system vulnerabilities and limitations. Highlighting these vulnerabilities has translated into more secure and resilient systems as well as increased production cost savings in the acquisition process. Therefore, the Committee encourages the Secretary of the Army to continue to invest in Adaptive Red Team programs.

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, NAVY

Appropriations, 2018	\$18,010,754,000
Budget estimate, 2019	18,481,666,000
Committee recommendation	18,992,064,000

The Committee recommends an appropriation of \$18,992,064,000. This is \$510,398,000 above the budget estimate.

COMMITTEE RECOMMENDED PROGRAM

The following table summarizes the budget estimate for this appropriation, the Committee recommendation, and the Committee recommended adjustments to the budget estimate:

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	RESEARCH, DEVELOPMENT, TEST & EVAL, NAVY			
	BASIC RESEARCH			
1	UNIVERSITY RESEARCH INITIATIVES	119,433	154,433	+ 35,000
2	IN-HOUSE LABORATORY INDEPENDENT RESEARCH	19,237	19,237	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
3	DEFENSE RESEARCH SCIENCES	458,708	564,208	+ 105,500
	TOTAL, BASIC RESEARCH	597,378	737,878	+ 140,500
	APPLIED RESEARCH			
4	POWER PROJECTION APPLIED RESEARCH	14,643	27,643	+ 13,000
5	FORCE PROTECTION APPLIED RESEARCH	124,049	177,549	+ 53,500
6	MARINE CORPS LANDING FORCE TECHNOLOGY	59,607	66,607	+ 7,000
7	COMMON PICTURE APPLIED RESEARCH	36,348	36,348	.....
8	WARFIGHTER SUSTAINMENT APPLIED RESEARCH	56,197	61,282	+ 5,085
9	ELECTROMAGNETIC SYSTEMS APPLIED RESEARCH	83,800	83,800	.....
10	OCEAN WARFIGHTING ENVIRONMENT APPLIED RESEARCH	42,998	79,998	+ 37,000
11	JOINT NON-LETHAL WEAPONS APPLIED RESEARCH	6,349	6,349	.....
12	UNDERSEA WARFARE APPLIED RESEARCH	58,049	78,049	+ 20,000
13	FUTURE NAVAL CAPABILITIES APPLIED RESEARCH	147,771	147,771	.....
14	MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH	37,545	37,545	.....
15	INNOVATIVE NAVAL PROTOTYPES (INP) APPLIED RESEARCH	159,697	159,697	.....
16	SCIENCE AND TECHNOLOGY MANAGEMENT—ONR HEAD- QUARTERS	64,418	64,418	.....
	TOTAL, APPLIED RESEARCH	891,471	1,027,056	+ 135,585
	ADVANCED TECHNOLOGY DEVELOPMENT			
19	FORCE PROTECTION ADVANCED TECHNOLOGY	2,423	36,557	+ 34,134
20	ELECTROMAGNETIC SYSTEMS ADVANCED TECHNOLOGY .....	.....	8,804	+ 8,804
21	MARINE CORPS ADVANCED TECHNOLOGY DEMONSTRATION [ATD]	150,245	177,245	+ 27,000
22	JOINT NON-LETHAL WEAPONS TECHNOLOGY DEVELOPMENT	13,313	13,313	.....
23	NAVY ADVANCED TECHNOLOGY DEVELOPMENT [ATD]	131,502	.....	- 131,502
24	FUTURE NAVAL CAPABILITIES ADVANCED TECHNOLOGY DEV	232,996	240,496	+ 7,500
25	MANUFACTURING TECHNOLOGY PROGRAM	58,657	58,657	.....
26	WARFIGHTER PROTECTION ADVANCED TECHNOLOGY .....	.....	9,877	+ 9,877
28	NAVY WARFIGHTING EXPERIMENTS AND DEMONSTRATIONS .....	.....	67,830	+ 67,830
29	MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY ..	.....	13,172	+ 13,172
30	INNOVATIVE NAVAL PROTOTYPES (INP) ADVANCED TECHNOLOGY ..	161,859	275,859	+ 114,000
	TOTAL, ADVANCED TECHNOLOGY DEVELOPMENT	750,995	901,810	+ 150,815
	DEMONSTRATION & VALIDATION			
31	AIR/OCEAN TACTICAL APPLICATIONS	29,747	29,747	.....
32	AVIATION SURVIVABILITY	7,050	7,050	.....
33	AIRCRAFT SYSTEMS	793	793	.....
34	ASW SYSTEMS DEVELOPMENT	7,058	7,058	.....
35	TACTICAL AIRBORNE RECONNAISSANCE	3,540	3,540	.....
36	ADVANCED COMBAT SYSTEMS TECHNOLOGY	59,741	56,831	- 2,910
37	SURFACE AND SHALLOW WATER MINE COUNTERMEASURES	62,727	122,827	+ 60,100
38	SURFACE SHIP TORPEDO DEFENSE	8,570	8,570	.....
39	CARRIER SYSTEMS DEVELOPMENT	5,440	5,440	.....
40	PILOT FISH	162,222	138,722	- 23,500
41	RETRACT LARCH	11,745	11,745	.....
42	RETRACT JUNIPER	114,265	114,265	.....
43	RADIOLOGICAL CONTROL	740	740	.....
44	SURFACE ASW	1,122	1,122	.....
45	ADVANCED SUBMARINE SYSTEM DEVELOPMENT	109,086	103,999	- 5,087
46	SUBMARINE TACTICAL WARFARE SYSTEMS	9,374	12,374	+ 3,000
47	SHIP CONCEPT ADVANCED DESIGN	89,419	116,419	+ 27,000
48	SHIP PRELIMINARY DESIGN & FEASIBILITY STUDIES	13,348	13,348	.....
49	ADVANCED NUCLEAR POWER SYSTEMS	256,137	256,137	.....
50	ADVANCED SURFACE MACHINERY SYSTEMS	22,109	27,109	+ 5,000
51	CHALK EAGLE	29,744	29,744	.....
52	LITTORAL COMBAT SHIP [LCS]	27,997	27,997	.....
53	COMBAT SYSTEM INTEGRATION	16,351	27,051	+ 10,700
54	OHIO REPLACEMENT PROGRAM	514,846	542,846	+ 28,000
55	LITTORAL COMBAT SHIP [LCS] MISSION MODULES	103,633	103,633	.....
56	AUTOMATED TEST AND RE-TEST	7,931	7,931	.....
57	FRIGATE DEVELOPMENT	134,772	134,772	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
58	CONVENTIONAL MUNITIONS	9,307	9,307	.....
60	MARINE CORPS GROUND COMBAT/SUPPORT SYSTEM	1,828	1,828	.....
61	JOINT SERVICE EXPLOSIVE ORDNANCE DEVELOPMENT	43,148	43,148	.....
62	OCEAN ENGINEERING TECHNOLOGY DEVELOPMENT	5,915	5,915	.....
63	ENVIRONMENTAL PROTECTION	19,811	19,811	.....
64	NAVY ENERGY PROGRAM	25,656	32,656	+ 7,000
65	FACILITIES IMPROVEMENT	5,301	5,301	.....
66	CHALK CORAL	267,985	267,985	.....
67	NAVY LOGISTIC PRODUCTIVITY	4,059	4,059	.....
68	RETRACT MAPLE	377,878	318,878	- 59,000
69	LINK PLUMERIA	381,770	381,770	.....
70	RETRACT ELM	60,535	60,535	.....
73	NATO RESEARCH AND DEVELOPMENT	9,652	9,652	.....
74	LAND ATTACK TECHNOLOGY	15,529	5,700	- 9,829
75	JOINT NONLETHAL WEAPONS TESTING	27,581	27,581	.....
76	JOINT PRECISION APPROACH AND LANDING SYSTEMS	101,566	101,566	.....
77	DIRECTED ENERGY AND ELECTRIC WEAPON SYSTEMS	223,344	131,914	- 91,430
78	F/A-18 INFRARED SEARCH AND TRACK (IRST)	108,700	108,700	.....
79	DIGITAL WARFARE OFFICE	26,691	26,691	.....
80	SMALL AND MEDIUM UNMANNED UNDERSEA VEHICLES	16,717	16,717	.....
81	UNMANNED UNDERSEA VEHICLE CORE TECHNOLOGIES	30,187	30,187	.....
82	RAPID PROTOTYPING, EXPERIMENTATION AND DEMONSTRATION	48,796	33,796	- 15,000
83	LARGE UNMANNED UNDERSEA VEHICLES	92,613	45,613	- 47,000
84	GERALD R. FORD CLASS NUCLEAR AIRCRAFT CARRIER	58,121	83,121	+ 25,000
86	LITTORAL AIRBORNE MCM	17,622	17,622	.....
87	SURFACE MINE COUNTERMEASURES	18,154	18,154	.....
88	TACTICAL AIR DIRECTIONAL INFRARED COUNTERMEASURES	47,278	47,278	.....
90	NEXT GENERATION LOGISTICS	11,081	6,135	- 4,946
92	RAPID TECHNOLOGY CAPABILITY PROTOTYPE	7,107	7,107	.....
93	LX (R)	5,549	5,549	.....
94	ADVANCED UNDERSEA PROTOTYPING	87,669	112,669	+ 25,000
95	PRECISION STRIKE WEAPONS DEVELOPMENT PROGRAM	132,818	119,918	- 12,900
96	SPACE & ELECTRONIC WARFARE [SEW] ARCHITECTURE/ENGINE	7,230	7,230	.....
97	OFFENSIVE ANTI-SURFACE WARFARE WEAPON DEVELOPMENT	143,062	143,062	.....
99	ASW SYSTEMS DEVELOPMENT—MIP	8,889	8,889	.....
100	ADVANCED TACTICAL UNMANNED AIRCRAFT SYSTEM	25,291	11,291	- 14,000
101	ADVANCED TACTICAL UNMANNED AIRCRAFT SYSTEM	9,300	9,300	.....
102	ELECTRONIC WARFARE DEVELOPMENT—MIP	466	466	.....
	TOTAL, DEMONSTRATION & VALIDATION	4,293,713	4,198,911	- 94,802
	ENGINEERING & MANUFACTURING DEVELOPMENT			
103	TRAINING SYSTEM AIRCRAFT	12,798	12,798	.....
104	OTHER HELO DEVELOPMENT	32,128	32,128	.....
105	AV-8B AIRCRAFT—ENG DEV	46,363	46,363	.....
107	STANDARDS DEVELOPMENT	3,771	3,771	.....
108	MULTI-MISSION HELICOPTER UPGRADE DEVELOPMENT	16,611	16,611	.....
109	AIR/OCEAN EQUIPMENT ENGINEERING	17,368	17,368	.....
110	P-3 MODERNIZATION PROGRAM	2,134	2,134	.....
111	WARFARE SUPPORT SYSTEM	9,729	9,729	.....
112	TACTICAL COMMAND SYSTEM	57,688	57,688	.....
113	ADVANCED HAWKEYE	223,565	238,065	+ 14,500
114	H-1 UPGRADES	58,097	58,097	.....
116	ACOUSTIC SEARCH SENSORS	42,485	42,485	.....
117	V-22A	143,079	143,079	.....
118	AIR CREW SYSTEMS DEVELOPMENT	20,980	30,980	+ 10,000
119	EA-18	147,419	242,719	+ 95,300
120	ELECTRONIC WARFARE DEVELOPMENT	89,824	115,224	+ 25,400
121	EXECUTIVE HELO DEVELOPMENT	245,064	245,064	.....
123	NEXT GENERATION JAMMER [NGJ]	459,529	459,529	.....
124	JOINT TACTICAL RADIO SYSTEM—NAVY [JTRS—Navy]	3,272	3,272	.....
125	NEXT GENERATION JAMMER [NGJ] INCREMENT II	115,253	99,253	- 16,000
126	SURFACE COMBATANT COMBAT SYSTEM ENGINEERING	397,403	396,403	- 1,000
127	LPD-17 CLASS SYSTEMS INTEGRATION	939	939	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
128	SMALL DIAMETER BOMB (SDB)	104,448	104,448	.....
129	STANDARD MISSILE IMPROVEMENTS	165,881	190,881	+ 25,000
130	AIRBORNE MCM	10,831	10,831	.....
131	NAVAL INTEGRATED FIRE CONTROL-COUNTER AIR SYSTEMS ENG	33,429	33,429	.....
132	ADVANCED ABOVE WATER SENSORS	35,635	35,635	.....
133	SSN-688 AND TRIDENT MODERNIZATION	126,932	126,932	.....
134	AIR CONTROL	62,448	62,448	.....
135	SHIPBOARD AVIATION SYSTEMS	9,710	13,710	+ 4,000
136	COMBAT INFORMATION CENTER CONVERSION	19,303	19,303	.....
137	AIR AND MISSILE DEFENSE RADAR (AMDR) SYSTEM	27,059	27,059	.....
138	ADVANCED ARRESTING GEAR (AAG)	184,106	184,106	.....
139	NEW DESIGN SSN	148,233	160,233	+ 12,000
140	SUBMARINE TACTICAL WARFARE SYSTEM	60,824	65,824	+ 5,000
141	SHIP CONTRACT DESIGN/LIVE FIRE T&E	60,062	71,062	+ 11,000
142	NAVY TACTICAL COMPUTER RESOURCES	4,642	4,642	.....
144	MINE DEVELOPMENT	25,756	25,756	.....
145	LIGHTWEIGHT TORPEDO DEVELOPMENT	95,147	63,147	- 32,000
146	JOINT SERVICE EXPLOSIVE ORDNANCE DEVELOPMENT	7,107	7,107	.....
147	PERSONNEL, TRAINING, SIMULATION, AND HUMAN FACTORS	6,539	6,539	.....
148	JOINT STANDOFF WEAPON SYSTEMS	441	441	.....
149	SHIP SELF DEFENSE (DETECT & CONTROL)	180,391	180,391	.....
150	SHIP SELF DEFENSE (ENGAGE: HARD KILL)	178,538	182,538	+ 4,000
151	SHIP SELF DEFENSE (ENGAGE: SOFT KILL/EW)	120,507	120,507	.....
152	INTELLIGENCE ENGINEERING	29,715	29,715	.....
153	MEDICAL DEVELOPMENT	8,095	8,095	.....
154	NAVIGATION/ID SYSTEM	121,026	121,026	.....
155	JOINT STRIKE FIGHTER (JSF)—EMD	66,566	66,566	.....
156	JOINT STRIKE FIGHTER (JSF)	65,494	65,494	.....
159	INFORMATION TECHNOLOGY DEVELOPMENT	14,005	14,005	.....
160	INFORMATION TECHNOLOGY DEVELOPMENT	268,567	218,567	- 50,000
161	ANTI-TAMPER TECHNOLOGY SUPPORT	5,618	5,618	.....
162	CH-53K	326,945	331,945	+ 5,000
164	MISSION PLANNING	32,714	32,714	.....
165	COMMON AVIONICS	51,486	51,486	.....
166	SHIP TO SHORE CONNECTOR (SSC)	1,444	1,444	.....
167	T-AO (X)	1,298	1,298	.....
168	UNMANNED CARRIER AVIATION	718,942	668,942	- 50,000
169	JOINT AIR-TO-GROUND MISSILE (JAGM)	6,759	16,559	+ 9,800
171	MULTI-MISSION MARITIME AIRCRAFT [MMA]	37,296	37,296	.....
172	MULTI-MISSION MARITIME AIRCRAFT [MMA] INCREMENT 3	160,389	160,389	.....
173	MARINE CORPS ASSAULT VEHICLES SYSTEM DEVELOPMENT AND DEMO	98,223	48,923	- 49,300
174	JOINT LIGHT TACTICAL VEHICLE (JLTV) SYSTEM DEVELOPMENT AND DEMO	2,260	.....	- 2,260
175	DDG-1000	161,264	140,264	- 21,000
180	TACTICAL CRYPTOLOGIC SYSTEMS	44,098	52,998	+ 8,900
182	CYBER OPERATIONS TECHNOLOGY DEVELOPMENT	6,808	6,808	.....
	TOTAL, ENGINEERING & MANUFACTURING DEVELOPMENT	6,042,480	6,050,820	+ 8,340
	RDT&E MANAGEMENT SUPPORT			
183	THREAT SIMULATOR DEVELOPMENT	94,576	94,576	.....
184	TARGET SYSTEMS DEVELOPMENT	10,981	10,981	.....
185	MAJOR T&E INVESTMENT	77,014	183,014	+ 106,000
186	JOINT THEATER AIR AND MISSILE DEFENSE ORGANIZATION	48	48	.....
187	STUDIES AND ANALYSIS SUPPORT—NAVY	3,942	3,942	.....
188	CENTER FOR NAVAL ANALYSES	48,797	48,797	.....
189	NEXT GENERATION FIGHTER	5,000	5,000	.....
191	TECHNICAL INFORMATION SERVICES	1,029	1,029	.....
192	MANAGEMENT, TECHNICAL & INTERNATIONAL SUPPORT	87,565	87,565	.....
193	STRATEGIC TECHNICAL SUPPORT	4,231	4,231	.....
194	RDT&E SCIENCE AND TECHNOLOGY MANAGEMENT	1,072	1,072	.....
195	RDT&E SHIP AND AIRCRAFT SUPPORT	97,471	97,471	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
196	TEST AND EVALUATION SUPPORT	373,834	473,834	+ 100,000
197	OPERATIONAL TEST AND EVALUATION CAPABILITY	21,554	21,554	.....
198	NAVY SPACE AND ELECTRONIC WARFARE [SEW] SUPPORT	16,227	16,227	.....
200	MARINE CORPS PROGRAM WIDE SUPPORT	24,303	24,303	.....
201	MANAGEMENT HEADQUARTERS—R&D	43,262	43,262	.....
202	WARFARE INNOVATION MANAGEMENT	41,918	41,918	.....
203	ASSESSMENTS AND EVALUATIONS CYBER VULNERABILITIES	7,000	7,000	.....
204	ASSESSMENTS AND EVALUATIONS CYBER VULNERABILITIES	48,800	48,800	.....
205	INSIDER THREAT	1,682	1,682	.....
206	MANAGEMENT HEADQUARTERS (DEPARTMENTAL SUPPORT ACTIVITIES)	1,579	1,579	.....
208	SEW SURVEILLANCE/RECONNAISSANCE SUPPORT	8,684	8,684	.....
	TOTAL, RDT&E MANAGEMENT SUPPORT	1,020,569	1,226,569	+ 206,000
	OPERATIONAL SYSTEMS DEVELOPMENT			
210	HARPOON MODIFICATIONS	5,426	5,426	.....
211	F-35 C2D2	259,122	199,560	- 59,562
212	F-35 C2D2	252,360	194,352	- 58,008
213	COOPERATIVE ENGAGEMENT CAPABILITY (CEC)	130,515	130,515	.....
214	DEPLOYABLE JOINT COMMAND AND CONTROL	3,127	3,127	.....
215	STRATEGIC SUB & WEAPONS SYSTEM SUPPORT	157,679	167,879	+ 10,200
216	SSBN SECURITY TECHNOLOGY PROGRAM	43,198	43,198	.....
217	SUBMARINE ACOUSTIC WARFARE DEVELOPMENT	11,311	11,311	.....
218	NAVY STRATEGIC COMMUNICATIONS	39,313	39,313	.....
219	F/A-18 SQUADRONS	193,086	202,886	+ 9,800
220	FLEET TACTICAL DEVELOPMENT	25,014	1,344	- 23,670
221	SURFACE SUPPORT	11,661	11,661	.....
222	TOMAHAWK AND TOMAHAWK MISSION PLANNING CENTER (TMPC)	282,395	282,395	.....
223	INTEGRATED SURVEILLANCE SYSTEM	36,959	71,959	+ 35,000
224	SHIP-TOWED ARRAY SURVEILLANCE SYSTEMS	15,454	15,454	.....
225	AMPHIBIOUS TACTICAL SUPPORT UNITS	6,073	6,073	.....
226	GROUND/AIR TASK ORIENTED RADAR	45,029	45,029	.....
227	CONSOLIDATED TRAINING SYSTEMS DEVELOPMENT	104,903	104,903	.....
228	CRYPTOLOGIC DIRECT SUPPORT	4,544	4,544	.....
229	ELECTRONIC WARFARE [EW] READINESS SUPPORT	66,889	66,889	.....
230	HARM IMPROVEMENT	120,762	120,762	.....
231	TACTICAL DATA LINKS	104,696	116,696	+ 12,000
232	SURFACE ASW COMBAT SYSTEM INTEGRATION	28,421	28,421	.....
233	MK-48 ADCAP	94,155	68,255	- 25,900
234	AVIATION IMPROVEMENTS	121,805	138,805	+ 17,000
235	OPERATIONAL NUCLEAR POWER SYSTEMS	117,028	117,028	.....
236	MARINE CORPS COMMUNICATIONS SYSTEMS	174,779	174,779	.....
237	COMMON AVIATION COMMAND AND CONTROL SYSTEM	4,826	4,826	.....
238	MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYSTEMS	97,152	97,152	.....
239	MARINE CORPS COMBAT SERVICES SUPPORT	30,156	30,156	.....
240	USMC INTELLIGENCE/ELECTRONIC WARFARE SYSTEMS [MIP]	39,976	39,976	.....
241	AMPHIBIOUS ASSAULT VEHICLE	22,637	22,637	.....
242	TACTICAL AIM MISSILES	40,121	40,121	.....
243	ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM)	32,473	27,473	- 5,000
249	CONSOLIDATED AFLOAT NETWORK ENTERPRISE SERVICES	23,697	23,697	.....
250	INFORMATION SYSTEMS SECURITY PROGRAM	44,228	44,228	.....
252	JOINT MILITARY INTELLIGENCE PROGRAMS	6,081	6,081	.....
253	TACTICAL UNMANNED AERIAL VEHICLES	8,529	8,529	.....
254	UAS INTEGRATION AND INTEROPERABILITY	41,212	41,212	.....
255	DISTRIBUTED COMMON GROUND SYSTEMS/SURFACE SYSTEMS ..	7,687	7,687	.....
256	DISTRIBUTED COMMON GROUND SYSTEMS/SURFACE SYSTEMS ..	42,846	42,846	.....
257	MQ-4C TRITON	14,395	14,395	.....
258	MQ-8 UAV	9,843	24,143	+ 14,300
259	RQ-11 UAV	524	524	.....
260	SMALL (LEVEL 0) TACTICAL UAS (STUASLO)	5,360	5,360	.....
261	RQ-21A	10,914	10,914	.....
262	MULTI-INTELLIGENCE SENSOR DEVELOPMENT	81,231	81,231	.....
263	UNMANNED AERIAL SYSTEMS (UAS) PAYLOADS [MIP]	5,956	5,956	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
264	RQ-4 MODERNIZATION	219,894	219,894	.....
265	MODELING AND SIMULATION SUPPORT	7,097	7,097	.....
266	DEPOT MAINTENANCE (NON-IF)	36,560	46,560	+ 10,000
267	MARITIME TECHNOLOGY (MARITECH)	7,284	27,284	+ 20,000
268	SATELLITE COMMUNICATIONS (SPACE)	39,174	39,174	.....
	TOTAL, OPERATIONAL SYSTEMS DEVELOPMENT	3,335,557	3,291,717	- 43,840
9999	CLASSIFIED PROGRAMS	1,549,503	1,557,303	+ 7,800
	TOTAL, RESEARCH, DEVELOPMENT, TEST & EVAL, NAVY	18,481,666	18,992,064	+ 510,398

COMMITTEE RECOMMENDED ADJUSTMENTS

The following table details the adjustments recommended by the Committee:

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
1	University Research Initiatives	119,433	154,433	+ 35,000
	Basic research program increase .....	.....	.....	+ 25,000
	Program increase: Aircraft fleet readiness and sustainment .....	.....	.....	+ 10,000
3	Defense Research Sciences	458,708	564,208	+ 105,500
	Basic research program increase .....	.....	.....	+ 100,000
	Program increase: Navy ROTC cybersecurity training program .....	.....	.....	+ 5,500
4	Power Projection Applied Research	14,643	27,643	+ 13,000
	Program increase: Directed energy .....	.....	.....	+ 4,000
	Program increase: High performance microwave systems for counter-UAS defense .....	.....	.....	+ 9,000
5	Force Protection Applied Research	124,049	177,549	+ 53,500
	Program increase: Advanced energetics research .....	.....	.....	+ 7,500
	Program increase: Advanced hull form development and demonstration .....	.....	.....	+ 8,000
	Program increase: Hybrid composite structures research for enhanced mobility .....	.....	.....	+ 5,000
	Program increase: Navy alternative energy research .....	.....	.....	+ 25,000
	Program increase: Power generation and storage research .....	.....	.....	+ 5,000
	Program increase: Standoff detection of buried hazards and munitions .....	.....	.....	+ 3,000
6	Marine Corps Landing Force Technology	59,607	66,607	+ 7,000
	Program increase: Interdisciplinary expeditionary cybersecurity research .....	.....	.....	+ 5,000
	Program increase: Marine Corps asset life-cycle management .....	.....	.....	+ 2,000
8	Warfighter Sustainment Applied Research	56,197	61,282	+ 5,085
	Transfer from line 23: Retain previous budget structure .....	.....	.....	+ 2,685
	Program increase .....	.....	.....	+ 2,400
10	Ocean Warfighting Environment Applied Research	42,998	79,998	+ 37,000
	Program increase: Acoustics research .....	.....	.....	+ 2,000
	Program increase: Multi-modal detection research .....	.....	.....	+ 10,000
	Program increase: Naval Special Warfare superiority in undersea and maritime environments .....	.....	.....	+ 10,000
	Program increase: Persistent maritime surveillance .....	.....	.....	+ 15,000
12	Undersea Warfare Applied Research	58,049	78,049	+ 20,000
	Program increase .....	.....	.....	+ 20,000
19	Force Protection Advanced Technology	2,423	36,557	+ 34,134
	Transfer from line 23: Retain previous budget structure .....	.....	.....	+ 34,134
20	Electromagnetic Systems Advanced Technology .....	.....	8,804	+ 8,804
	Transfer from line 23: Retain previous budget structure .....	.....	.....	+ 8,804

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
21	USMC Advanced Technology Demonstration [ATD]	150,245	177,245	+ 27,000
	Program increase: Common unmanned aerial vehicle simulation system			+ 10,000
	Program increase: Flight motion simulator and testing of UAVs			+ 6,000
	Program increase: Modular advanced armed robotic system 2.0			+ 4,000
	Program increase: UAS air-delivered extended range munitions demo			+ 7,000
23	Navy Advanced Technology Development [ATD]	131,502		- 131,502
	Transfer to line 19: Retain previous budget structure			- 34,134
	Transfer to line 20: Retain previous budget structure			- 8,804
	Transfer to line 26: Retain previous budget structure			- 4,877
	Transfer to line 28: Retain previous budget structure			- 67,830
	Transfer to line 29: Retain previous budget structure			- 13,172
	Transfer to line 8: Retain previous budget structure			- 2,685
24	Future Naval Capabilities Advanced Technology Development	232,996	240,496	+ 7,500
	Program increase: Advanced development of high yield conventional energetics			+ 7,500
26	Warfighter Protection Advanced Technology		9,877	+ 9,877
	Transfer from line 23: Retain previous budget structure			+ 4,877
	Program increase: Novel therapeutic interventions research			+ 5,000
28	Navy Warfighting Experiments and Demonstrations		67,830	+ 67,830
	Transfer from line 23: Retain previous budget structure			+ 67,830
29	Mine and Expeditionary Warfare Advanced Technology		13,172	+ 13,172
	Transfer from line 23: Retain previous budget structure			+ 13,172
30	Innovative Naval Prototypes (INP) Advanced Technology Development	161,859	275,859	+ 114,000
	Program increase: Electromagnetic railgun			+ 15,000
	Program increase: Rail gun with hypervelocity projectile			+ 99,000
36	Advanced Combat Systems Technology	59,741	56,831	- 2,910
	Maintaining program affordability: Project 3422 unjustified program growth			- 2,910
37	Surface and Shallow Water Mine Countermeasures	62,727	122,827	+ 60,100
	Program increase: Medium displacement unmanned surface vehicle			+ 42,000
	Program increase: Navy identified MCM USV requirement			+ 14,100
	Program increase: Navy identified UISS requirement			+ 4,000
40	PILOT FISH	162,222	138,722	- 23,500
	Program adjustment			- 23,500
45	Advanced Submarine System Development	109,086	103,999	- 5,087
	Project 2096: SL-UKAS program termination			- 5,087
46	Submarine Tactical Warfare Systems	9,374	12,374	+ 3,000
	Program increase: Advanced submarine electronic warfare systems			+ 3,000
47	Ship Concept Advanced Design	89,419	116,419	+ 27,000
	Program increase: CHAMP acceleration			+ 18,000
	Program increase: Cyber Boundary Defense—CPSD cyber security cap devel			+ 9,000
50	Advanced Surface Machinery Systems	22,109	27,109	+ 5,000
	Program increase: Silicon carbide power electronics			+ 5,000
53	Combat System Integration	16,351	27,051	+ 10,700
	Program increase: Cyber Boundary Defense—Strike Force Interoperability			+ 10,700
54	Ohio Replacement	514,846	542,846	+ 28,000
	Program increase: Advanced materials propeller program			+ 15,000
	Program increase: Naval Propulsion Foundry Center facility power upgrades			+ 13,000
64	Navy Energy Program	25,656	32,656	+ 7,000
	Program increase: Marine hydrokinetic energy			+ 7,000
68	RETRACT MAPLE	377,878	318,878	- 59,000
	Program adjustment			- 59,000
74	Land Attack Technology	15,529	5,700	- 9,829

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Restoring acquisition accountability: Project 3401 lack of program funding			- 14,829
	Program increase: Guided projectile			+ 5,000
77	Directed Energy and Electric Weapon Systems	223,344	131,914	- 91,430
	Restoring acquisition accountability: Project 3402 additional prototypes			- 106,430
	Program increase: Electromagnetic railgun			+ 15,000
82	Rapid Prototyping, Experimentation and Demonstration	48,796	33,796	- 15,000
	Insufficient budget justification: TBD initiatives program adjustment			- 15,000
83	Large Unmanned Undersea Vehicles	92,613	45,613	- 47,000
	Transfer funding to XLUUV: Transfer to line 94 for updated acquisition strategy			- 25,000
	Restoring acquisition accountability: Change in acquisition strategy to accelerate delta design			- 22,000
84	Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78—80) ...	58,121	83,121	+ 25,000
	Transfer funding from SCN: CVN 78 Full Ship Shock Trial			+ 25,000
90	Expeditionary Logistics	11,081	6,135	- 4,946
	Program termination: Project 2743			- 4,946
94	Advanced Undersea Prototyping	87,669	112,669	+ 25,000
	Transfer funding from LDUUV: Updated acquisition strategy			+ 25,000
95	Precision Strike Weapons Development Program	132,818	119,918	- 12,900
	Restoring acquisition accountability: Project 3378 schedule delays			- 12,900
97	Offensive Anti-Surface Warfare Weapon Development	143,062	143,062	
	Restoring acquisition accountability: Additional capabilities program adjustment —transfer to fully fund operational test requirements for additional capabilities			[-20,000]
	Restoring acquisition accountability: Transfer from additional capabilities to fully fund operational test requirements for additional capabilities			[+ 20,000]
100	Advanced Tactical Unmanned Aircraft System	25,291	11,291	- 14,000
	Restoring acquisition accountability: Project 3135 program adjustment			- 14,000
113	Advanced Hawkeye	223,565	238,065	+ 14,500
	Improving funds management: Excess carryover			- 25,000
	Program increase: Cyber Boundary Defense—E-2D AHE			+ 27,500
	Program increase: E-2D Hawkeye advanced radar			+ 12,000
118	Air Crew Systems Development	20,980	30,980	+ 10,000
	Program increase: Advance aircrew physiological monitoring			+ 10,000
119	EA-18	147,419	242,719	+ 95,300
	Program increase: EA-18G reactive electronic attack measures research			+ 95,300
120	Electronic Warfare Development	89,824	115,224	+ 25,400
	Program termination: UAS EW Payload			- 6,200
	Program increase: EA-18G offensive airborne electronic attack special mission pod			+ 31,600
125	Next Generation Jammer [NGJ] Increment II	115,253	99,253	- 16,000
	Restoring acquisition accountability: Technology demonstration contracts award delays			- 16,000
126	Surface Combatant Combat System Engineering	397,403	396,403	- 1,000
	Restoring acquisition accountability: Far Term Interoperability Improvement Plan unjustified growth			- 11,000
	AEGIS force-level interoperability definition and analysis			+ 10,000
129	Standard Missile Improvements	165,881	190,881	+ 25,000
	Program increase: SM-6 electronics unit			+ 25,000
135	Shipboard Aviation Systems	9,710	13,710	+ 4,000
	Program increase: Improving aircraft carrier readiness ...			+ 4,000
139	New Design SSN	148,233	160,233	+ 12,000
	Program increase: New design SSN			+ 12,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
140	Submarine Tactical Warfare System	60,824	65,824	+ 5,000
	Program increase: Submarine tactical warfare system ...			+ 5,000
141	Ship Contract Design/ Live Fire T&E	60,062	71,062	+ 11,000
	Program increase: DDG 51 advance degaussing mine protection system retrofit			+ 5,000
	Program increase: Planning to support FY 2021 award of LHA-9			+ 6,000
145	Lightweight Torpedo Development	95,147	63,147	- 32,000
	Restoring acquisition accountability: Project 3418 post-system design and engineering funds early to need ...			- 32,000
150	Ship Self Defense (Engage: Hard Kill)	178,538	182,538	+ 4,000
	Program increase: Condition based maintenance			+ 4,000
160	Information Technology Development	268,567	218,567	- 50,000
	Improving funds management: Project 2905 excess program growth			- 35,000
	Improving funds management: Project 3432 excess program growth and concurrency			- 25,000
	Program increase: Advanced radar condition based maintenance			+ 10,000
162	CH-53K RDTE	326,945	331,945	+ 5,000
	Program increase: Common lightweight cargo system ...			+ 5,000
168	Unmanned Carrier Aviation (UCA)	718,942	668,942	- 50,000
	Improving funds management: Test equipment early to need			- 50,000
169	Joint Air-to-Ground Missile (JAGM)	6,759	16,559	+ 9,800
	Program increase: Marine Corps joint air-to-ground missile for fixed wing aircraft			+ 9,800
173	Marine Corps Assault Vehicles System Development & Demonstration	98,223	48,923	- 49,300
	Restoring acquisition accountability: Project 0026 excess concurrency			- 49,300
174	Joint Light Tactical Vehicle (JLTV) System Development & Demonstration	2,260		- 2,260
	Improving funds management: Funds excess to need			- 2,260
175	DDG-1000	161,264	140,264	- 21,000
	Restoring acquisition accountability: Program adjustment due to lack of acquisition and test strategies ...			- 21,000
180	Tactical Cryptologic Systems	44,098	52,998	+ 8,900
	Program increase: Integrated fires acceleration			+ 8,900
185	Major T&E Investment	77,014	183,014	+ 106,000
	Program increase			+ 100,000
	Program increase: Ground based sense-and-avoid			+ 6,000
196	Test and Evaluation Support	373,834	473,834	+ 100,000
	Program increase			+ 100,000
211	Operational F-35 C2D2	259,122	199,560	- 59,562
	Restoring acquisition accountability: C2D2 Phase 2 contract award delays			- 18,384
	Restoring acquisition accountability: C2D2 flight test contract award delays			- 5,335
	Improving funds management: ECASE excess growth			- 7,904
	Improving funds management: Developmental Foundation excess growth			- 24,554
	Improving funds management: Fixed JPO costs excess growth			- 3,385
212	Operational F-35 C2D2	252,360	194,352	- 58,008
	Restoring acquisition accountability: C2D2 Phase 2 contract award delays			- 17,904
	Restoring acquisition accountability: C2D2 flight test contract award delays			- 5,196
	Improving funds management: ECASE excess growth			- 7,697
	Improving funds management: Developmental Foundation excess growth			- 23,913
	Improving funds management: Fixed JPO costs excess growth			- 3,297

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
215	Strategic Sub & Weapons System Support	157,679	167,879	+ 10,200
	Program increase: Autonomous strategic force protection sensor network			+ 2,700
	Program increase: Model based engineering for strategic weapons programs			+ 7,500
219	F/A-18 Squadrons	193,086	202,886	+ 9,800
	Program increase: Navy joint air-to-ground missile for fixed wing aircraft			+ 9,800
220	Fleet Telecommunications (Tactical)	25,014	1,344	- 23,670
	Program termination: High frequency over-the-horizon robust enterprise			- 23,670
223	Integrated Surveillance System	36,959	71,959	+ 35,000
	Program increase: Additional TRAPS units			+ 35,000
231	Tactical Data Links	104,696	116,696	+ 12,000
	Program increase: Tactical targeting network technology acceleration			+ 12,000
233	MK-48 ADCAP	94,155	68,255	- 25,900
	Improving funds management: TI-1 phasing			- 25,900
234	Aviation Improvements	121,805	138,805	+ 17,000
	Program increase: Cyber Boundary Defense—portable electronic maintenance aids			+ 2,000
	Program increase: F/A-18E/F engine enhancements			+ 15,000
243	Advanced Medium Range Air-to-Air Missile (AMRAAM)	32,473	27,473	- 5,000
	Restoring acquisition accountability: Systems improvement program acceleration and growth			- 5,000
258	MQ-8 UAV	9,843	24,143	+ 14,300
	Program increase: Radar integration			+ 5,500
	Program increase: Weapons capability integration			+ 8,800
266	Depot Maintenance (Non-IF)	36,560	46,560	+ 10,000
	Program increase: MH-60 SLAP			+ 10,000
267	Maritime Technology (MARITECH)	7,284	27,284	+ 20,000
	Program increase: Advanced additive technologies for sustainment of Navy assets			+ 20,000
XXX	Classified Programs	1,549,503	1,557,303	+ 7,800
	Classified adjustment			+ 7,800

Accelerated Acquisitions.—The fiscal year 2019 President’s budget request includes \$1,402,333,000, an increase of 150 percent over amounts enacted in fiscal year 2018, for programs designated as accelerated acquisitions in accordance with Chief of Naval Operations and Secretary of the Navy Instructions 5000.53 and 5000.42, respectively. The Committee supports efforts to rapidly deliver capability to the Warfighter in a responsible manner and recommends \$1,204,903,000 for these programs in fiscal year 2019.

The Committee notes ongoing efforts by the Navy to reorganize its internal processes as it relates to the alignment of requirements, acquisition strategies and budgets for accelerated acquisition programs and expects this will lead to improved coordination among all stakeholders. The Committee is concerned by repeated instances in which the designation as an accelerated acquisition program has apparently led to imprudent program management decisions affecting contracting actions and funding execution. Therefore, the Committee directs the Assistant Secretary of the Navy (Research, Development and Acquisition) and the Assistant Secretary of the Navy (Financial Management and Comptroller) to report to the congressional defense committees, not later than 30 days after enactment of this Act, on acquisition strategy management and fiscal controls in place to ensure the appropriate manage-

ment of resources for Navy accelerated acquisition programs. Further, the Assistant Secretary of the Navy (Research, Development and Acquisition) is directed to provide, with submission of the fiscal year 2020 President's budget request, to the congressional defense committees the acquisition strategy for each designated accelerated acquisition program, and the Assistant Secretary of the Navy (Financial Management and Comptroller) is directed to certify that the fiscal year 2020 President's budget fully funds such acquisition strategies, to include the associated test requirements identified in the test plan for each program, as agreed to by the Chief of Naval Operations, the Assistant Secretary of the Navy (Research, Development and Acquisition) and the Director, Operational Test and Evaluation per previous congressional direction. Finally, the Assistant Secretary of the Navy (Research, Development and Acquisition) is directed to identify to the congressional defense committees any additional training requirements levied on the acquisition workforce associated with the execution of accelerated acquisition programs.

Office of Naval Research Budget Structure.—The fiscal year 2019 President's budget request includes \$2,239,844,000 for science and technology research. The Committee recognizes the criticality of investing in Navy foundational research to ensure U.S. technical superiority in the coming decades and recommends \$2,666,744,000 for Navy science and technology research, an increase of \$426,900,000 over the budget request.

The Committee notes that the budget request proposes the consolidation of several program elements into a single, larger program element that would provide unprecedented programmatic and fiscal flexibility for advanced technology development. The Committee notes its support for the consolidation of multiple program elements and the increased flexibility associated with that realignment in previous years; however, the Committee is concerned that a further realignment of program elements would erode programmatic and fiscal transparency, and reorient foundational long-term science and technology research to near-term priorities. Therefore, the Committee rejects the proposal to consolidate multiple program elements and establish a single new program element in fiscal year 2019 and recommends retaining the existing program element budget structure for naval research. The Assistant Secretary of the Navy (Financial Management and Comptroller) is directed to follow this budget structure in future budget submissions.

Solid State Laser—Technology Maturation.—The Committee notes and supports the Navy's increased investment in several directed energy programs, to include the Solid State—Technology Maturation [SSL—TM] program, which is intended to accelerate the evaluation of the military utility of laser weapons across a range of Navy mission applications by fielding initial capabilities on surface ships. The Committee notes that since its inception, the SSL—TM program scope has expanded and development costs have tripled. Further, cost overruns have occurred at multiple program levels, and significant concurrency between the development and fielding efforts are creating further risk to cost and schedule. Therefore, the Committee directs the Government Accountability Office [GAO]

to provide to the congressional defense committees, not later than 90 days after enactment of this Act, a report reviewing the SSL-TM program. At a minimum, the report should review: (1) program requirements, including changes thereto; (2) technology readiness levels including maturity relative to requirements; (3) the current acquisition strategy and program baseline(s); (4) the SSL-TM test strategy and associated resourcing; (5) contract strategy, and (6) the program management structure.

Common Hull Auxiliary Multi-Mission Platform [CHAMP].—The fiscal year 2019 President’s budget request includes \$18,000,000 to initiate industry studies on common hull concepts and acquisition approaches to replace aging mission-specific sealift and auxiliary ships that provide hospital services, aviation support, submarine tending, command and control, or sealift. The Committee understands that CHAMP is intended to reduce life cycle costs, leverage reconfigurable force packages and stabilize the industrial base. Based on information provided by the Navy, the Committee further understands that current Navy plans for the acquisition of CHAMP could be accelerated by as much as 5 years, and therefore recommends an additional \$18,000,000 for industry studies and requirements definition. The Assistant Secretary of the Navy (Research, Development and Acquisition) is directed to provide to the congressional defense committees, with the fiscal year 2020 President’s budget, an updated acquisition strategy for CHAMP, to include requirements, acquisition milestones and cost estimates, as informed by industry studies. To stabilize the domestic shipbuilding industrial base, including the supply chain, the Committee encourages the Navy to consider the domestic sourcing requirements historically placed on sealift and auxiliary ships to CHAMP.

Future Surface Combatant.—The fiscal year 2019 President’s budget request includes \$37,267,000 in fiscal year 2019, and \$35,230,000 in fiscal year 2020 for the development of future surface combatants [FSC] requirements and an Analysis of Alternatives [AoA]. The Committee notes the extensive scope of the FSC AoA and directs the Director, Surface Warfare to submit with the fiscal year 2020 President’s budget request an updated Surface Capability Evolution Plan [SCEP] to the congressional defense committees. Further, the Assistant Secretary of the Navy (Research, Development and Acquisition) is directed to provide with the fiscal year 2020 President’s budget request the acquisition strategies for each element of the SCEP, and the Assistant Secretary of the Navy (Financial Management and Comptroller) is directed to provide the cost estimate for each element of the SCEP and to identify the funds included in the budget request in support of these acquisition strategies.

F/A-18 and EA-18G Research and Development Efforts.—The fiscal year 2019 President’s budget includes \$578,605,000 for various efforts to modernize and upgrade the F/A-18 and EA-18G, including F/A-18 Block III development which consists of 5 distinct efforts, Infrared Search and Track systems, EA-18G systems development, Multi-System Integration, physiological episode mitigation, F/A-18 radar upgrades, and F/A-18E/F service life assessment and extension programs. The Committee notes the improved briefing materials provided in support of the budget request, as requested

by the Committee, but believes that further improvement, to include timeliness in providing requested materials, could be achieved. Therefore, the Program Manager, PMA-265, is directed to provide supplemental budget materials, as previously requested by the Committee, with the budget briefing materials in support of future budget requests.

*Large Displacement Unmanned Undersea Vehicle [LDUUV].—*The fiscal year 2019 President's budget includes \$92,613,000 to initiate the fabrication of two Phase I prototype LDUUVs. Subsequent to the budget submission, the Navy informed the Committee of plans to revise its LDUUV acquisition strategy and accelerate the LDUUV program by removing Phase II from the acquisition strategy and transitioning the Phase I design to industry 5 years earlier than previously planned, which eliminates the need for Phase II funding. The Committee supports the proposed acceleration of the program; however is concerned that the revised program schedule may be unaffordable. Therefore, the Committee recommends reducing the scope of the Phase I effort and further accelerating the transition of the LDUUV design to industry. The Assistant Secretary of the Navy (Research, Development and Acquisition) is directed to provide the congressional defense committees, with the fiscal year 2020 President's budget request, an updated LDUUV acquisition strategy, and the Assistant Secretary of the Navy (Financial Management and Comptroller) is directed to provide updated cost estimates for the LDUUV program and to certify full funding in the budget request for the revised acquisition strategy.

CVN 78 Full Ship Shock Trials.—The fiscal year 2019 President's budget request includes no funds to conduct Full Ship Shock Trials [FSST] on CVN 78. The Committee notes that full-scale ship shock trials on CVN 78 were included in the original CVN 78 test plans and that the need for FSST was subsequently reaffirmed by the Director, Operational Test and Evaluation, the then-Under Secretary of Defense (Acquisition, Technology and Logistics) and Congress. The Committee notes that subsequent to the fiscal year 2019 President's budget submission, the Secretary of Defense denied a request by the Navy to waive CVN 78 FSST in accordance with section 121(b) of the Fiscal Year 2018 National Defense Authorization Act, and that the Navy now plans to conduct FSST on CVN 78, as directed. The Committee understands that this requires \$25,000,000 in fiscal year 2019 and recommends transferring those funds from other CVN programs, as delineated in the tables for Committee Recommended Adjustments for the Research, Development, Test and Evaluation, Navy and Shipbuilding and Conversion, Navy accounts. The Committee further understands that the Navy will fully budget for additional CVN 78 FSST requirements in the fiscal year 2020 President's budget request.

CVN 78 Sortie Generation Rate.—The Committee notes that the sortie generation rate [SGR] is a significant driver of the CVN 78 design. The Committee understands that the reliability of key systems may impact SGR and that the SGR demonstration schedule and execution are under review. The Program Executive Officer, Aircraft Carriers, in coordination with the Director, Operational Test and Evaluation is directed to provide, with the fiscal year 2020 President's budget request, to the congressional defense com-

mittees an updated plan for the SGR demonstration schedule and test requirements. The Assistant Secretary of the Navy (Financial Management and Comptroller) is directed to certify SGR demonstration full funding with the fiscal year 2020 President's budget request.

Extra Large Unmanned Underwater Vehicle.—The fiscal year 2019 President's budget request includes \$117,856,000 in various program elements for the development of Extra Large Unmanned Underwater Vehicles [XLUUV] and associated payloads in response to a Joint Emergent Operational Need [JEON] from U.S. Pacific Command. The Committee notes that two competitive design contracts were awarded by the Navy for Phase 1 of the program and that the Navy had planned to conduct a competitive selection for Phase 2 in 2018. Subsequent to the submission of the fiscal year 2019 President's budget request, the Navy revised its acquisition strategy and informed the Committee that the Navy now plans to award Phase 2 fabrication contracts to both vendors. The Committee understands that this requires \$25,000,000 in fiscal year 2019 above the budget request and that additional funds will be required in fiscal years 2020—2023, which the Navy will include in the fiscal year 2020 President's budget request. The Committee agrees with the revised acquisition strategy to allow for greater competition and recommends \$25,000,000 above the budget request in fiscal year 2019, as required. The Assistant Secretary of the Navy (Financial Management and Comptroller) is directed to certify, with the fiscal year 2020 President's budget request, full funding for the Navy's revised acquisition strategy.

Offensive Anti-Surface Warfare Increment I/Long Range Anti-Ship Missile Operational Test.—The Offensive Anti-Surface Warfare [OASuW] Increment I/Long Range Anti-Ship Missile [LRASM] will provide an early operational capability in 2018 in support of an Urgent Operational Needs Statement [UONS] from US. Pacific Fleet. The Committee notes that in the fiscal year 2019 President's budget request, the Navy has included \$129,400,000 in fiscal years 2019 and 2020 for OASuW Increment I/LRASM capability improvements, which the Committee fully supports. However, the Committee is concerned that the Navy has not agreed to a test plan for these capability improvements with the Director, Operational Test and Evaluation, nor budgeted for any operational test requirements.

The Committee does not agree with this approach and directs that of the funds requested in fiscal year 2019 for OASuW Increment I/LRASM capability improvements, no less than \$20,000,000 be applied toward operational test. Further, the Committee directs the Director, Operational Test and Evaluation, in coordination with the Deputy Chief of Naval Operations for Warfare Systems to provide to the congressional defense committees, with the fiscal year 2020 President's budget request, a plan for OASuW Increment I/LRASM full independent operational test [IOT&E]; the Assistant Secretary of the Navy (Research, Development and Acquisition) is directed to submit an acquisition strategy that supports that test strategy; and the Assistant Secretary of the Navy (Financial Management and Comptroller) is directed to certify that the fiscal year 2020 President's budget request for OASuW Increment I/LRASM

fully funds the development of capability improvements and the associated operational test strategy. Finally, the Committee directs that not more than \$25,000,000 may be obligated for OASuW Increment I/LRASM capability improvements in fiscal year 2019 until the Deputy Chief of Naval Operations for Warfare Systems certifies the requirements for capability improvements to the congressional defense committees.

Next Generation Jammer Low Band.—The fiscal year 2019 President's budget request includes \$99,253,000 for the Next Generation Jammer Low Band program to continue the execution of up to three Demonstration of Existing Technology [DET] contracts, which the Navy plans to award in 2018. The Committee understands that the DET contracts will inform the acquisition strategy for the program and that the Navy is considering applying certain acceleration acquisition authorities. The Assistant Secretary of the Navy (Research, Development and Acquisition) is directed to provide to the congressional defense committees, with the fiscal year 2020 President's budget request, the acquisition strategies under consideration for further development of Next Generation Jammer Low Band.

AEGIS Modernization.—The fiscal year 2019 President's budget request includes \$396,403,000 to develop modifications to the AEGIS Weapon system and integrate combat capabilities developed by the Navy and the Missile Defense Agency into the AEGIS Combat System, an increase of \$44,874,000 over amounts appropriated in fiscal year 2018. The Committee notes the improved joint briefing materials provided by the Navy and the Missile Defense Agency in support of the budget request and directs the Program Executive Officer, Integrated Warfare Systems, and the Director, Missile Defense Agency to continue to provide these materials, as subsequently modified per congressional request, in future budget briefings.

Manpower, Personnel, Training and Education Transformation Program.—The fiscal year 2019 President's budget request includes \$99,300,000 for Manpower, Personnel, Training and Education [MPT&E] transformation, an increase of \$73,200,000 over amounts appropriated for fiscal year 2018. The Committee notes progress made by the Navy in managing this program; however, the Committee also notes that the MPT&E transformation requirements, acquisition strategy and a holistic cost estimate remain to be completed. The Committee recommends \$64,300,000, an increase of \$40,100,000 over amounts appropriated in fiscal year 2018, to allow for continued program progress and directs the Assistant Secretary of the Navy (Research, Development and Acquisition) to provide with the fiscal year 2020 President's request the MPT&E acquisition strategy and the Assistant Secretary of the Navy (Financial Management and Comptroller) to provide the associated cost estimate.

Amphibious Combat Vehicle 1.2.—The fiscal year 2019 President's budget request includes \$55,800,000 for the Amphibious Combat Vehicle [ACV] 1.2 program, an increase of \$26,400,000 over amounts previously programmed for that effort for fiscal year 2019. The Committee notes the significant ACV 1.2 program concurrency with the ACV 1.1 development and production program,

to include the modification of ACV 1.1 test vehicles for ACV 1.2 developmental test. Noting the Marine Corps' historical struggles with replacing its amphibious assault vehicle fleet, the Committee is concerned with the programmatic and cost risk this strategy brings to both the ACV 1.1 and 1.2 programs. The Committee directs the Assistant Secretary of the Navy (Research, Development, and Acquisition) to submit, not later than 30 days after Milestone C for ACV 1.1, an updated cost and schedule estimate for ACV 1.2.

DDG 1000 Mission Change.—The fiscal year 2019 President's request includes \$40,852,000 in fiscal year 2019 and \$396,194,000 over the next 5 years in research, development, test and evaluation for development efforts in support of new DDG 1000 mission requirements. The Committee notes that the requirements, schedules and revised Test and Evaluation Master Plan in support of the new DDG 1000 mission are not yet complete and therefore recommends a reduction of \$21,000,000.

Hydrographic Survey System Upgrade for Diver Propulsion Devices.—The Committee understands the Marine Corps is seeking to upgrade existing diver propulsion devices [DPD] assets to enable precise navigation and autonomous hydrographic survey. The Committee encourages the Secretary of the Navy to develop an autonomous hydrographic survey capability for the DPD which provides other advanced capabilities through retrofitting of existing DPD units, and supports autonomous hydrographic survey for inspection and analysis of critical littoral waterways.

Aircraft Fleet Readiness and Sustainment.—The Committee remains concerned with the challenges faced by the Navy and Marine Corps to maintain the readiness of their air vehicle fleets, and extend the useful life of aging aircraft. The Committee notes the valuable role university research institutions can provide in conducting research and development that translates into technological capabilities to address these readiness gaps. Therefore, the Committee recommends \$10,000,000 for aircraft fleet readiness and sustainment research conducted at universities with state-of-the-art capabilities in structures and materials to support these efforts.

Advanced Hull Form Development and Demonstration.—The Committee has supported the Navy's investment in sophisticated computer hydrodynamic modeling and simulation tools for the design, testing, and analysis of high-performance and high-efficiency hull forms of small planing boats. The Committee recommends \$8,000,000 for an advanced hull form development and prototype demonstration and at-sea testing initiative to accelerate the development and transition of advanced hull designs, particularly hull forms that reduce injury to craft operators and warfighters.

Power Generation and Storage Research.—The Committee continues to support Navy investments in power generation and energy storage research, and recommends an increase of \$5,000,000 for that purpose. The Committee understands that development and deployment of lithium-ion batteries are critical to Department of Defense missions, but that safety incidents restrict their operational use. Therefore, the Committee believes that the development and qualification of materials technologies, including non-flammable electrolytes, to reduce the risk of thermal runaway and

improve safety in lithium-ion batteries should be a research priority.

Marine Corps Asset Life-Cycle Management.—The Committee supports the Marine Corps' efforts to substantially reduce costs associated with routine maintenance and recommends \$2,000,000 for further research and development in the areas of remanufacturing and vehicle behavior monitoring.

Maritime Robotics Technology.—The Committee notes the Department of the Navy investments to develop autonomous systems and capabilities in support of future naval capabilities. The Committee encourages the Navy to continue its support for the cost-effective development of maritime robotic systems, including research, testing, and demonstration of unmanned underwater vehicle security and surveillance systems, robotic inspection and survey tools for vessels and port facilities, munition retrieval, environmental monitoring, including acoustic and non-acoustic detection capability improvements, shared autonomy, adaptive decision-making, docking, 3-D imaging, power and data transfer. The Committee believes that university-based research and innovation centered on the development of maritime robotic technology could be essential in maintaining competitive advantage in the future.

Silicon Carbide Power Electronics.—The Committee supports the Navy's investment to develop advanced power and energy technology to meet requirements for higher electric power loads through efficient means. The Committee understands that use of silicon carbide power modules may reduce the size and weight of power conversion modules and other electronic systems necessary for advanced sensors and weapon systems. The Committee recommends \$5,000,000 for silicon carbide power electronics research and encourages the Secretary of the Navy to continue to invest in advanced power and energy technology and accelerate the qualification of silicon carbide power modules to be used on highpower, mission critical Navy platforms.

Improving Performance of Military Platforms.—Turbulent boundary layers form in the air or in water along the surfaces of all aircraft and marine platforms, and produce a force that opposes the motion of the vehicle. The Committee understands that mitigating such drag is central to the goals of reducing fuel consumption and optimizing performance of military platforms, such as ships, submarines, and transport and fighter aircraft. However, the Committee notes that there exists only limited domestic capability to experimentally study these phenomena. Therefore, the Committee encourages the Chief of Naval Research to examine the Navy's infrastructure and technical capabilities to experimentally quantify aircraft and marine platforms relevant turbulent boundary layers at high spatial and temporal resolution, and to address any identified gaps in experimental and modeling capabilities.

E2-D Hawkeye Advanced Radar.—The Committee recognizes the importance for the Navy to improve the airborne surveillance and battle management command and control systems of the E-2D Hawkeye to protect against sophisticated adversaries with anti-ship cruise and ballistic missiles. Therefore, the Committee recommends \$12,000,000 to continue improving the radar capability of the E-2D Hawkeye. Further, to stay ahead of the evolving threat,

the Committee directs the Deputy Chief of Naval Operations for Warfare Systems to complete a comprehensive review of the E-2D radar to determine if there are unmet requirements for an Advanced Radar that could improve airborne surveillance and battle management command and control systems of the E-2D Hawkeye, and to report to the congressional defense committees not later than 90 days after enactment of this act on the findings of such review.

Advanced Additive Technologies For Sustainment of Navy Assets.—The Committee recognizes the need to accelerate the delivery of technical capabilities to support the warfighter and to advance technologies that will modernize and sustain military systems in an efficient, cost-effective manner. The Committee recommends \$20,000,000 to support the development of advanced additive technologies for sustainment of Navy assets, including cold spray.

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, AIR FORCE

Appropriations, 2018	\$37,428,078,000
Budget estimate, 2019	40,178,343,000
Committee recommendation	40,896,667,000

The Committee recommends an appropriation of \$40,896,667,000. This is \$718,324,000 above the budget estimate.

COMMITTEE RECOMMENDED PROGRAM

The following table summarizes the budget estimate for this appropriation, the Committee recommendation, and the Committee recommended adjustments to the budget estimate:

(In thousands of dollars)

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	RESEARCH, DEVELOPMENT, TEST & EVAL, AIR FORCE			
	BASIC RESEARCH			
1	DEFENSE RESEARCH SCIENCES	348,322	448,322	+ 100,000
2	UNIVERSITY RESEARCH INITIATIVES	154,991	179,991	+ 25,000
3	HIGH ENERGY LASER RESEARCH INITIATIVES	14,506	14,506	.....
	TOTAL, BASIC RESEARCH	517,819	642,819	+ 125,000
	APPLIED RESEARCH			
4	MATERIALS	125,373	161,373	+ 36,000
5	AEROSPACE VEHICLE TECHNOLOGIES	130,547	147,047	+ 16,500
6	HUMAN EFFECTIVENESS APPLIED RESEARCH	112,518	114,018	+ 1,500
7	AEROSPACE PROPULSION	190,919	230,419	+ 39,500
8	AEROSPACE SENSORS	166,534	171,534	+ 5,000
9	SCIENCE AND TECHNOLOGY MANAGEMENT—MAJOR HEAD- QUARTERS	8,288	8,288	.....
11	CONVENTIONAL MUNITIONS	112,841	112,841	.....
12	DIRECTED ENERGY TECHNOLOGY	141,898	141,898	.....
13	DOMINANT INFORMATION SCIENCES AND METHODS	162,420	175,420	+ 13,000
14	HIGH ENERGY LASER RESEARCH	43,359	45,859	+ 2,500
15	SPACE TECHNOLOGY	117,645	121,645	+ 4,000
	TOTAL, APPLIED RESEARCH	1,312,342	1,430,342	+ 118,000
	ADVANCED TECHNOLOGY DEVELOPMENT			
16	ADVANCED MATERIALS FOR WEAPON SYSTEMS	34,426	42,926	+ 8,500
17	SUSTAINMENT SCIENCE AND TECHNOLOGY (S&T)	15,150	15,150	.....
18	ADVANCED AEROSPACE SENSORS	39,968	44,968	+ 5,000
19	AEROSPACE TECHNOLOGY DEV/DEMO	121,002	126,002	+ 5,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
20	AEROSPACE PROPULSION AND POWER TECHNOLOGY	115,462	141,462	+ 26,000
21	ELECTRONIC COMBAT TECHNOLOGY	55,319	55,319	.....
22	ADVANCED SPACECRAFT TECHNOLOGY	54,895	70,895	+ 16,000
23	MAUI SPACE SURVEILLANCE SYSTEM [MSSS]	10,674	10,674	.....
24	HUMAN EFFECTIVENESS ADVANCED TECHNOLOGY DEVELOPMENT	36,463	36,463	.....
25	CONVENTIONAL WEAPONS TECHNOLOGY	194,981	204,981	+ 10,000
26	ADVANCED WEAPONS TECHNOLOGY	43,368	53,368	+ 10,000
27	MANUFACTURING TECHNOLOGY PROGRAM	42,025	65,825	+ 23,800
28	BATTLESPACE KNOWLEDGE DEVELOPMENT & DEMONSTRATION ..	51,064	51,064	.....
	TOTAL, ADVANCED TECHNOLOGY DEVELOPMENT	814,797	919,097	+ 104,300
	ADVANCED COMPONENT DEVELOPMENT			
30	INTELLIGENCE ADVANCED DEVELOPMENT	5,568	5,568	.....
32	COMBAT IDENTIFICATION TECHNOLOGY	18,194	18,194	.....
33	NATO RESEARCH AND DEVELOPMENT	2,305	2,305	.....
35	INTERCONTINENTAL BALLISTIC MISSILE	41,856	41,856	.....
36	POLLUTION PREVENTION—DEM/VAL .....	.....	200	+ 200
37	LONG RANGE STRIKE	2,314,196	2,276,496	− 37,700
38	INTEGRATED AVIONICS PLANNING AND DEVELOPMENT	14,894	81,271	+ 66,377
39	ADVANCED TECHNOLOGY AND SENSORS	34,585	34,585	.....
40	NATIONAL AIRBORNE OPS CENTER [NAOC] RECAP	9,740	7,440	− 2,300
41	TECHNOLOGY TRANSFER	12,960	16,960	+ 4,000
42	HARD AND DEEPLY BURIED TARGET DEFEAT SYSTEM	71,501	32,501	− 39,000
43	CYBER RESILIENCY OF WEAPON SYSTEMS—ACS	62,618	62,618	.....
46	DEPLOYMENT AND DISTRIBUTION ENTERPRISE R&D	28,350	28,350	.....
48	TECH TRANSITION PROGRAM	1,186,075	195,462	− 990,613
48A	ADVANCED ENGINE DEVELOPMENT .....	.....	651,355	+ 651,355
48B	HYPERSONICS PROTOTYPING .....	.....	558,058	+ 558,058
48C	DIRECTED ENERGY PROTOTYPING .....	.....	150,000	+ 150,000
49	GROUND BASED STRATEGIC DETERRENT	345,041	345,041	.....
50	NEXT GENERATION AIR DOMINANCE	503,997	392,997	− 111,000
51	THREE DIMENSIONAL LONG-RANGE RADAR	40,326	25,426	− 14,900
52	UNIFIED PLATFORM (UP)	29,800	29,800	.....
54	COMMON DATA LINK EXECUTIVE AGENT (CDL EA)	41,880	41,880	.....
55	MISSION PARTNER ENVIRONMENTS	10,074	10,074	.....
56	CYBER OPERATIONS TECHNOLOGY DEVELOPMENT	253,825	253,825	.....
57	ENABLED CYBER ACTIVITIES	16,325	16,325	.....
59	CONTRACTING INFORMATION TECHNOLOGY SYSTEM	17,577	17,577	.....
60	NAVSTAR GLOBAL POSITIONING SYSTEM (USER EQUIPMENT) (SPACE)	286,629	256,629	− 30,000
61	EO/IR WEATHER SYSTEMS	7,940	7,940	.....
62	WEATHER SYSTEM FOLLOW-ON	138,052	138,052	.....
63	SPACE SITUATION AWARENESS SYSTEMS	39,338	29,338	− 10,000
64	MIDTERM POLAR MILSATCOM SYSTEM	383,113	383,113	.....
65	SPACE CONTROL TECHNOLOGY	91,018	76,018	− 15,000
66	SPACE SECURITY AND DEFENSE PROGRAM	45,542	45,542	.....
67	PROTECTED TACTICAL ENTERPRISE SERVICE (PTES)	51,419	46,419	− 5,000
68	PROTECTED TACTICAL SERVICE (PTS)	29,776	29,776	.....
69	PROTECTED SATCOM SERVICES (PSCS)—AGGREGATED	29,379	29,379	.....
70	OPERATIONALLY RESPONSIVE SPACE	366,050	371,050	+ 5,000
	TOTAL, ADVANCED COMPONENT DEVELOPMENT	6,529,943	6,709,420	+ 179,477
	ENGINEERING & MANUFACTURING DEVELOPMENT			
71	FUTURE ADVANCED WEAPON ANALYSIS & PROGRAMS	39,602	39,602	.....
72	INTEGRATED AVIONICS PLANNING AND DEVELOPMENT	58,531	58,531	.....
73	NUCLEAR WEAPONS SUPPORT	4,468	4,468	.....
74	ELECTRONIC WARFARE DEVELOPMENT	1,909	1,909	.....
75	TACTICAL DATA NETWORKS ENTERPRISE	207,746	257,746	+ 50,000
76	PHYSICAL SECURITY EQUIPMENT	14,421	14,421	.....
74	SMALL DIAMETER BOMB [SDB]	73,158	78,158	+ 5,000
81	AIRBORNE ELECTRONIC ATTACK	7,153	7,153	.....
83	ARMAMENT/ORDNANCE DEVELOPMENT	58,590	58,590	.....
84	SUBMUNITIONS	2,990	2,990	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
85	AGILE COMBAT SUPPORT	20,028	23,528	+ 3,500
86	JOINT DIRECT ATTACK MUNITION	15,787	.....	- 15,787
87	LIFE SUPPORT SYSTEMS	8,919	8,919	.....
88	COMBAT TRAINING RANGES	35,895	43,895	+ 8,000
89	F-35—EMD	69,001	69,001	.....
91	LONG RANGE STANDOFF WEAPON	614,920	624,920	+ 10,000
92	ICBM FUZE MODERNIZATION	172,902	172,902	.....
97	KC-46	88,170	80,170	- 8,000
98	ADVANCED PILOT TRAINING	265,465	265,465	.....
99	COMBAT RESCUE HELICOPTER	457,652	384,652	- 73,000
105	ACQUISITION WORKFORCE—GLOBAL BATTLE MANAGEMENT	3,617	3,617	.....
106	B-2 DEFENSIVE MANAGEMENT SYSTEM	261,758	261,758	.....
107	NUCLEAR WEAPONS MODERNIZATION	91,907	84,907	- 7,000
108	F-15 EPAWSS	137,095	137,095	.....
109	STAND IN ATTACK WEAPON	43,175	14,975	- 28,200
110	ADVANCED COMMUNICATIONS SYSTEMS	14,888	14,888	.....
111	FULL COMBAT MISSION TRAINING	1,015	1,015	.....
112	NEXTGEN JSTARS .....	.....	30,000	+ 30,000
116	C-32 EXECUTIVE TRANSPORT RECAPITALIZATION	7,943	7,943	.....
117	PRESIDENTIAL AIRCRAFT REPLACEMENT	673,032	616,372	- 56,660
118	AUTOMATED TEST SYSTEMS	13,653	13,653	.....
119	COMBAT SURVIVOR EVADER LOCATOR	939	939	.....
120	GPS IIIC	451,889	401,889	- 50,000
121	SPACE SITUATION AWARENESS OPERATIONS	46,668	46,668	.....
122	COUNTERSPACE SYSTEMS	20,676	20,676	.....
123	SPACE SITUATION AWARENESS SYSTEMS	134,463	134,463	.....
124	SPACE FENCE	20,215	20,215	.....
125	ADVANCED EHF MILSATCOM (SPACE)	151,506	151,506	.....
126	POLAR MILSATCOM (SPACE)	27,337	27,337	.....
127	WIDEBAND GLOBAL SATCOM (SPACE)	3,970	53,470	+ 49,500
128	SPACE BASED INFRARED SYSTEM [SBIRS] HIGH EMD	60,565	60,565	.....
129	NEXT-GEN OPIR	643,126	743,126	+ 100,000
130	EVOLVED EXPENDABLE LAUNCH VEHICLE PROGRAM (SPACE)—EMD	245,447	445,447	+ 200,000
	TOTAL, ENGINEERING & MANUFACTURING DEVELOPMENT	5,272,191	5,489,544	+ 217,353
	RDT&E MANAGEMENT SUPPORT			
131	THREAT SIMULATOR DEVELOPMENT	34,256	34,256	.....
132	MAJOR T&E INVESTMENT	91,844	266,844	+ 175,000
133	RAND PROJECT AIR FORCE	34,614	34,614	.....
135	INITIAL OPERATIONAL TEST & EVALUATION	18,043	18,043	.....
136	TEST AND EVALUATION SUPPORT	692,784	697,784	+ 5,000
137	ACQ WORKFORCE—GLOBAL POWER	233,924	226,075	- 7,849
138	ACQ WORKFORCE—GLOBAL VIG & COMBAT SYS	263,488	243,853	- 19,635
139	ACQ WORKFORCE—GLOBAL REACH	153,591	145,230	- 8,361
140	ACQ WORKFORCE—CYBER, NETWORK, & BUS SYS	232,315	217,900	- 14,415
141	ACQ WORKFORCE—GLOBAL BATTLE MGMT	169,868	157,472	- 12,396
142	ACQ WORKFORCE—CAPABILITY INTEGRATION	226,219	221,126	- 5,093
143	ACQ WORKFORCE—ADVANCED PRGM TECHNOLOGY	38,400	32,796	- 5,604
144	ACQ WORKFORCE—NUCLEAR SYSTEMS	125,761	123,175	- 2,586
147	MANAGEMENT HQ—R&D	10,642	9,815	- 827
148	FACILITIES RESTORATION & MODERNIZATION—TEST & EVAL	162,216	262,216	+ 100,000
149	FACILITIES SUSTAINMENT—TEST AND EVALUATION SUPPORT	28,888	28,888	.....
150	REQUIREMENTS ANALYSIS AND MATURATION	35,285	48,285	+ 13,000
153	ENTERPRISE INFORMATION SERVICES (EIS)	20,545	20,545	.....
154	ACQUISITION AND MANAGEMENT SUPPORT	12,367	12,367	.....
155	GENERAL SKILL TRAINING	1,448	1,448	.....
157	INTERNATIONAL ACTIVITIES	3,998	3,998	.....
158	SPACE TEST AND TRAINING RANGE DEVELOPMENT	23,254	23,254	.....
159	SPACE AND MISSILE CENTER (SMC) CIVILIAN WORKFORCE	169,912	169,912	.....
160	SPACE & MISSILE SYSTEMS CENTER—MHA	10,508	10,508	.....
161	ROCKET SYSTEMS LAUNCH PROGRAM (SPACE)	19,721	19,721	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
162	SPACE TEST PROGRAM (STP)	25,620	25,620	.....
	TOTAL, RDT&E MANAGEMENT SUPPORT	2,839,511	3,055,745	+ 216,234
	OPERATIONAL SYSTEMS DEVELOPMENT			
165	SPECIALIZED UNDERGRADUATE FLIGHT TRAINING	11,344	11,344	.....
167	AIR FORCE INTEGRATED MILITARY HUMAN RESOURCES SYSTEM	47,287	41,102	- 6,185
168	ANTI-TAMPER TECHNOLOGY EXECUTIVE AGENCY	32,770	32,770	.....
169	FOREIGN MATERIEL ACQUISITION AND EXPLOITATION	68,368	68,368	.....
170	HC/MC-130 RECAP RDT&E	32,574	32,574	.....
171	NC3 INTEGRATION	26,112	19,312	- 6,800
172	ASSESSMENTS AND EVALUATIONS CYBER VULNERABILITIES	99,100	75,950	- 23,150
173	B-52 SQUADRONS	280,414	329,173	+ 48,759
174	AIR-LAUNCHED CRUISE MISSILE [ALCM]	5,955	5,955	.....
175	B-1B SQUADRONS	76,030	63,230	- 12,800
176	B-2 SQUADRONS	105,561	105,561	.....
177	MINUTEMAN SQUADRONS	156,047	156,047	.....
179	WORLDWIDE JOINT STRATEGIC COMMUNICATIONS	10,442	18,442	+ 8,000
180	INTEGRATED STRATEGIC PLANNING & ANALYSIS NETWORK	22,833	22,833	.....
181	ICBM REENTRY VEHICLES	18,412	18,412	.....
183	UH-1N REPLACEMENT PROGRAM	288,022	288,022	.....
184	REGION/SECTOR OPERATION CONTROL CENTER MODERNIZATION	9,252	9,252	.....
186	MQ-9 UAV	115,345	115,345	.....
188	A-10 SQUADRONS	26,738	26,738	.....
189	F-16 SQUADRONS	191,564	185,864	- 5,700
190	F-15E SQUADRONS	192,883	176,483	- 16,400
191	MANNED DESTRUCTIVE SUPPRESSION	15,238	15,238	.....
192	F-22 SQUADRONS	603,553	588,453	- 15,100
193	F-35 SQUADRONS	549,501	428,315	- 121,186
194	TACTICAL AIM MISSILES	37,230	37,230	.....
195	ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM)	61,393	51,293	- 10,100
196	COMBAT RESCUE—PARARESCUE	647	647	.....
198	PRECISION ATTACK SYSTEMS PROCUREMENT	14,891	14,891	.....
199	COMPASS CALL	13,901	13,901	.....
200	AIRCRAFT ENGINE COMPONENT IMPROVEMENT PROGRAM	121,203	121,203	.....
202	JOINT AIR-TO-SURFACE STANDOFF MISSILE [JASSM]	60,062	42,472	- 17,590
203	AIR AND SPACE OPERATIONS CENTER [AOC]	106,102	106,102	.....
204	CONTROL AND REPORTING CENTER [CRC]	6,413	10,413	+ 4,000
205	AIRBORNE WARNING AND CONTROL SYSTEM [AWACS]	120,664	130,664	+ 10,000
206	TACTICAL AIRBORNE CONTROL SYSTEMS	2,659	2,659	.....
208	COMBAT AIR INTELLIGENCE SYSTEM ACTIVITIES	10,316	10,316	.....
209	TACTICAL AIR CONTROL PARTY—MOD	6,149	6,149	.....
210	C2ISR TACTICAL DATA LINK	1,738	1,738	.....
211	DCAVES	13,297	13,297	.....
212	NATIONAL TECHNICAL NUCLEAR FORENSICS	1,788	1,788	.....
213	JOINT SURVEILLANCE/TARGETATTACK RADAR SYSTEM [JSTARS] ..	14,888	.....	- 14,888
214	SEEK EAGLE	24,699	24,699	.....
215	USAF MODELING AND SIMULATION	17,078	17,078	.....
216	WARGAMING AND SIMULATION CENTERS	6,141	6,141	.....
218	DISTRIBUTED TRAINING AND EXERCISES	4,225	4,225	.....
219	MISSION PLANNING SYSTEMS	63,653	63,653	.....
220	TACTICAL DECEPTION	6,949	6,949	.....
221	AF OFFENSIVE CYBERSPACE OPERATIONS	40,526	40,526	.....
222	AF DEFENSIVE CYBERSPACE OPERATIONS	24,166	39,166	+ 15,000
223	JOINT CYBER COMMAND AND CONTROL [JCC2]	13,000	13,000	.....
224	UNIFIED PLATFORM (UP)	28,759	21,559	- 7,200
229	GLOBAL SENSOR INTEGRATED ON NETWORK (GSIN)	3,579	3,579	.....
230	NUCLEAR PLANNING AND EXECUTION SYSTEM (NPES)	29,620	29,620	.....
237	AIR FORCE SPACE AND CYBER NON-TRADITIONAL ISR FOR BATTLESPACE AWARENESS	6,633	6,633	.....
238	E-4B NATIONAL AIRBORNE OPERATIONS CENTER [NAOC]	57,758	57,758	.....
240	MINIMUM ESSENTIAL EMERGENCY COMMUNICATIONS NETWORK	99,088	67,088	- 32,000
241	HIGH FREQUENCY RADIO SYSTEMS	51,612	51,612	.....
242	INFORMATION SYSTEMS SECURITY PROGRAM	34,612	34,612	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
244	GLOBAL FORCE MANAGEMENT—DATA INITIATIVE	2,170	2,170	.....
246	AIRBORNE SIGINT ENTERPRISE	106,873	109,873	+ 3,000
247	COMMERCIAL ECONOMIC ANALYSIS	3,472	3,472	.....
250	C2 AIR OPERATIONS SUITE—C2 INFO SERVICES	8,608	8,608	.....
251	CCMD INTELLIGENCE INFORMATION TECHNOLOGY	1,586	1,586	.....
252	GLOBAL AIR TRAFFIC MANAGEMENT (GATM)	4,492	4,492	.....
254	WEATHER SERVICE	26,942	31,942	+ 5,000
255	AIR TRAFFIC CONTROL, APPROACH, & LANDING SYSTEM (ATC) ..	6,271	11,271	+ 5,000
256	AERIAL TARGETS	8,383	8,383	.....
259	SECURITY AND INVESTIGATIVE ACTIVITIES	418	418	.....
261	DEFENSE JOINT COUNTERINTELLIGENCE ACTIVITIES	3,845	3,845	.....
268	DRAGON U-2	48,518	58,518	+ 10,000
269	ENDURANCE UNMANNED AERIAL VEHICLES .....	.....	15,000	+ 15,000
270	AIRBORNE RECONNAISSANCE SYSTEMS	175,334	175,334	.....
271	MANNED RECONNAISSANCE SYSTEMS	14,223	14,223	.....
272	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	24,554	24,554	.....
273	RQ-4 UAV	221,690	221,690	.....
274	NETWORK-CENTRIC COLLABORATIVE TARGET (TIARA)	14,288	14,288	.....
275	NATO AGS	51,527	51,527	.....
276	SUPPORT TO DCGS ENTERPRISE	26,579	26,579	.....
278	INTERNATIONAL INTELLIGENCE TECHNOLOGY AND ARCHITECTURES	8,464	8,464	.....
280	RAPID CYBER ACQUISITION	4,303	4,303	.....
284	PERSONNEL RECOVERY COMMAND & CTRL (PRC2)	2,466	2,466	.....
285	INTELLIGENCE MISSION DATA (IMD)	4,117	4,117	.....
287	C-130 AIRLIFT SQUADRON	105,988	105,988	.....
288	C-5 AIRLIFT SQUADRONS	25,071	25,071	.....
289	C-17 AIRCRAFT	48,299	48,299	.....
290	C-130J PROGRAM	15,409	15,409	.....
291	LARGE AIRCRAFT IR COUNTERMEASURES (LAIRCM)	4,334	4,334	.....
292	KC-135S	3,493	3,493	.....
293	KC-10S	6,569	6,569	.....
294	OPERATIONAL SUPPORT AIRLIFT	3,172	3,172	.....
295	CV-22	18,502	18,502	.....
296	AMC COMMAND AND CONTROL SYSTEM	1,688	1,688	.....
297	SPECIAL TACTICS / COMBAT CONTROL	2,541	2,541	.....
298	DEPOT MAINTENANCE (NON-IF)	1,897	1,897	.....
299	MAINTENANCE, REPAIR & OVERHAUL SYSTEM	50,933	50,933	.....
300	LOGISTICS INFORMATION TECHNOLOGY (LOGIT)	13,787	13,787	.....
301	SUPPORT SYSTEMS DEVELOPMENT	4,497	4,497	.....
302	OTHER FLIGHT TRAINING	2,022	2,022	.....
303	OTHER PERSONNEL ACTIVITIES	108	108	.....
304	JOINT PERSONNEL RECOVERY AGENCY	2,023	2,023	.....
305	CIVILIAN COMPENSATION PROGRAM	3,772	3,772	.....
306	PERSONNEL ADMINISTRATION	6,358	6,358	.....
307	AIR FORCE STUDIES AND ANALYSIS AGENCY	1,418	1,418	.....
308	FINANCIAL MANAGEMENT INFORMATION SYSTEMS DEVELOPMENT ..	99,734	93,834	- 5,900
309	SERVICE SUPPORT TO STRATCOM—SPACE ACTIVITIES	14,161	14,161	.....
310	AF TENCAP	26,986	26,986	.....
311	FAMILY OF ADVANCED BLOS TERMINALS (FAB-T)	80,168	60,168	- 20,000
312	SATELLITE CONTROL NETWORK (SPACE)	17,808	27,808	+ 10,000
314	NAVSTAR GLOBAL POSITIONING SYSTEM (SPACE AND CONTROL SEGMENTS)	8,937	8,937	.....
315	SPACE AND MISSILE TEST AND EVALUATION CENTER	59,935	59,935	.....
316	SPACE INNOVATION, INTEGRATION AND RAPID TECHNOLOGY DEVELOPMENT	21,019	21,019	.....
317	INTEGRATED BROADCAST SERVICE (IBS)	8,568	8,568	.....
318	SPACELIFT RANGE SYSTEM (SPACE)	10,641	20,641	+ 10,000
319	GPS III SPACE SEGMENT	144,543	144,543	.....
320	SPACE SUPERIORITY INTELLIGENCE	16,278	16,278	.....
321	JSPOC MISSION SYSTEM	72,256	72,256	.....
322	NATIONAL SPACE DEFENSE CENTER	42,209	42,209	.....
325	NUDET DETECTION SYSTEM (SPACE)	19,778	19,778	.....
326	SPACE SITUATION AWARENESS OPERATIONS	19,572	19,572	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
327	GLOBAL POSITIONING SYSTEM III—OPERATIONAL CONTROL SEGMENT	513,235	513,235	.....
	TOTAL, OPERATIONAL SYSTEMS DEVELOPMENT	6,357,616	6,186,376	- 171,240
9999	CLASSIFIED PROGRAMS	16,534,124	16,463,324	- 70,800
	TOTAL, RESEARCH, DEVELOPMENT, TEST & EVAL, AIR FORCE	40,178,343	40,896,667	+ 718,324

COMMITTEE RECOMMENDED ADJUSTMENTS

The following table details the adjustments recommended by the Committee:

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
1	Defense Research Sciences	348,322	448,322	100,000
	Basic research program increase			+ 100,000
2	University Research Initiatives	154,991	179,991	25,000
	Basic research program increase			+ 25,000
4	Materials	125,373	161,373	36,000
	Program increase: Certification of advanced composites			+ 15,000
	Program increase: Coating technologies			+ 10,000
	Program increase: High performance materials			+ 8,000
	Program increase: Turbine airfoil demonstration			+ 3,000
5	Aerospace Vehicle Technologies	130,547	147,047	16,500
	Program increase: Human-machine teaming			+ 4,000
	Program increase: Hypersonic wind tunnels			+ 5,000
	Program increase: Hypersonic vehicle structures			+ 7,500
6	Human Effectiveness Applied Research	112,518	114,018	1,500
	Program increase: Warfighter physiology program			+ 1,500
7	Aerospace Propulsion	190,919	230,419	39,500
	Program increase: Thermal management technologies			+ 6,000
	Program increase: Centers of excellence			+ 5,000
	Program increase: Next generation hall thrusters			+ 10,000
	Program increase: Next generation heat exchangers			+ 6,500
	Program Increase: MADDIE—modular arrays for energy			+ 12,000
8	Aerospace Sensors	166,534	171,534	5,000
	Program increase: Air Force Minority Leaders Program			+ 5,000
13	Dominant Information Sciences and Methods	162,420	175,420	13,000
	Program increase: Cyber testbed for unidentified c-UAS			+ 5,500
	Program increase: Quantum computing CoE			+ 7,500
14	High Energy Laser Research	43,359	45,859	2,500
	Program increase: Directed energy research			+ 2,500
15	Space Technology	117,645	121,645	4,000
	Program increase: Advanced materials and process for magnetic graphene memory systems			+ 4,000
16	Advanced Materials for Weapon Systems	34,426	42,926	8,500
	Program increase: Metals affordability research			+ 8,500
18	Advanced Aerospace Sensors	39,968	44,968	5,000
	Program increase: Sensor integration			+ 5,000
19	Aerospace Technology Dev/Demo	121,002	126,002	5,000
	Program increase: Aircraft winglets and drag reduction devices			+ 5,000
20	Aerospace Propulsion and Power Technology	115,462	141,462	26,000
	Program increase: Chemical apogee engines			+ 2,500

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Program increase: Upper stage engine maturation ..			+ 8,500
	Program increase: Silicon carbide research			+ 15,000
22	Advanced Spacecraft Technology	54,895	70,895	16,000
	Program increase: Radiation hardened microelec- tronic processors			+ 6,000
	Program increase: Space laser communications sys- tems			+ 10,000
25	Conventional Weapons Technology	194,981	204,981	10,000
	Program increase: Rotary launcher development			+ 10,000
26	Advanced Weapons Technology	43,368	53,368	10,000
	Program increase: Demonstrator laser weapon sys- tem			+ 10,000
27	Manufacturing Technology Program	42,025	65,825	23,800
	Program increase: F-35 battery technology			+ 9,800
	Program increase: Materials development research			+ 10,000
	Program increase: Modeling technology for small turbine engines			+ 4,000
36	Pollution Prevention—Dem/Val		200	200
	Program increase: Alternative energy aircraft tugs ..			+ 200
37	Long Range Strike—Bomber	2,314,196	2,276,496	- 37,700
	Classified adjustment			- 37,700
38	Integrated Avionics Planning and Development	14,894	81,271	66,377
	Transfer: Air Force requested from RDTE lines 42, 86, and 202			+ 66,377
40	National Airborne Ops Center (NAOC) Recap	9,740	7,440	- 2,300
	Restoring acquisition accountability: Materiel solu- tion analysis funding early to need			- 2,300
41	Technology Transfer	12,960	16,960	4,000
	Program increase: Technology partnerships			+ 4,000
42	Hard and Deeply Buried Target Defeat System (HDBTDS) Program	71,501	32,501	- 39,000
	Transfer: Air Force requested to RDTE line 38			- 33,000
	Restoring acquisition accountability: Advanced 5,000 pound penetrator test and evaluation funding early to need			- 6,000
48	Tech Transition Program	1,186,075	195,462	- 990,613
	Transfer to lines 48a and 48b			- 1,048,413
	Program increase: Alternative energy research			+ 5,000
	Program increase: Rapid sustainment initiative			+ 42,800
	Program increase: Technology transition initiatives			+ 10,000
48a	Advanced Engine Development		651,355	+ 651,355
	Transfer from line 48			+ 790,355
	Maintain program affordability: Unjustified growth in Adaptive Engine Transition Program			- 139,000
48b	Hypersonics Prototyping		558,058	558,058
	Transfer from line 48			+ 258,058
	Program increase: Air-launched rapid response weapon			+ 79,700
	Program increase: Hypersonic conventional strike weapon			+ 220,300
48c	Directed Energy Prototyping		150,000	150,000
	Program increase: Directed energy prototyping			+ 150,000
50	Next Generation Air Dominance	503,997	392,997	- 111,000
	Classified adjustment			- 111,000
51	Three Dimensional Long-Range Radar (3DELRR)	40,326	25,426	- 14,900
	Maintain program affordability: EMD unit funding excess to need			- 14,900
60	NAVSTAR Global Positioning System (User Equipment) (SPACE)	286,629	256,629	- 30,000
	Improving funds management: Increment 2 devel- opment funded in Public Law 115-141			- 30,000
63	Space Situation Awareness Systems	39,338	29,338	- 10,000
	Contradiction in justification books/briefs			- 10,000
65	Space Control Technology	91,018	76,018	- 15,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Improving funds management: Space defense force packaging funded in Public Law 115-141			- 15,000
67	Protected Tactical Enterprise Service (PTES)	51,419	46,419	- 5,000
	Restoring acquisition accountability: Schedule slip			- 5,000
70	Operationally Responsive Space	366,050	371,050	5,000
	Restoring acquisition accountability: Phasing—Solar Power Project Air Demonstration			- 105,000
	Program increase: Blackjack			+ 110,000
75	Tactical Data Networks Enterprise	207,746	257,746	50,000
	Program increase: Accelerate 21st Century battle management command and control			+ 50,000
77	Small Diameter Bomb [SDB] —EMD	73,158	78,158	5,000
	Program increase: Precise navigation			+ 5,000
85	Agile Combat Support	20,028	23,528	3,500
	Program increase: Explosion resistant window technology			+ 3,500
86	Joint Direct Attack Munition	15,787		- 15,787
	Transfer: Air Force requested to RDTE line 38			- 15,787
88	Combat Training Ranges	35,895	43,895	8,000
	Program increase: F-35 advanced threat simulator			+ 8,000
91	Long Range Standoff Weapon	614,920	624,920	10,000
	Program increase			+ 10,000
97	KC-46	88,170	80,170	- 8,000
	Improving funds management: Forward financed			- 8,000
99	Combat Rescue Helicopter	457,652	384,652	- 73,000
	Maintain program affordability: Development funding excess to need			- 73,000
107	Nuclear Weapons Modernization	91,907	84,907	- 7,000
	Maintain program affordability: Test support excess to need			- 7,000
109	Stand In Attack Weapon	43,175	14,975	- 28,200
	Restoring acquisition accountability: Unclear acquisition strategy			- 28,200
115	JSTARS Recap		30,000	30,000
	Program increase: Continue JSTARS recap GMTI radar development			+ 30,000
117	Presidential Aircraft Recapitalization (PAR)	673,032	616,372	- 56,660
	Restoring acquisition accountability: EMD Hot Start unjustified			- 5,100
	Maintain program affordability: EMD funding unjustified			- 51,560
120	GPS IIIC	451,889	401,889	- 50,000
	Restoring acquisition accountability: Acquisition strategy undefined			- 50,000
127	Wideband Global SATCOM (SPACE)	3,970	53,470	49,500
	Transfer: Pathfinder #5 from SPAF Line 5			+ 49,500
129	Next-Generation OPIR	643,126	743,126	100,000
	Program increase: Accelerate sensor development			+ 100,000
130	Evolved Expendable Launch Vehicle Program (SPACE)—EMD	245,447	445,447	200,000
	Program increase			+ 200,000
132	Major T&E Investment	91,844	266,844	175,000
	Program increase			+ 150,000
	Program increase: Eastern Gulf test and training range			+ 10,000
	Program increase: Instrumentation technology			+ 10,000
	Program increase: UAV electronic warfare capabilities			+ 5,000
136	Test and Evaluation Support	692,784	697,784	5,000
	Program increase: Avionics cyber range			+ 5,000
137	Acq Workforce- Global Power	233,924	226,075	- 7,849
	Maintain program affordability: Unjustified growth			- 7,849
138	Acq Workforce- Global Vig & Combat Sys	263,488	243,853	- 19,635
	Maintain program affordability: Unjustified growth			- 19,635

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
139	Acq Workforce- Global Reach	153,591	145,230	- 8,361
	Maintain program affordability: Unjustified growth			- 8,361
140	Acq Workforce- Cyber, Network, & Bus Sys	232,315	217,900	- 14,415
	Maintain program affordability: Unjustified growth			- 14,415
141	Acq Workforce- Global Battle Mgmt	169,868	157,472	- 12,396
	Maintain program affordability: Unjustified growth			- 12,396
142	Acq Workforce- Capability Integration	226,219	221,126	- 5,093
	Maintain program affordability: Unjustified growth			- 5,093
143	Acq Workforce- Advanced Prgm Technology	38,400	32,796	- 5,604
	Maintain program affordability: Unjustified growth			- 5,604
144	Acq Workforce- Nuclear Systems	125,761	123,175	- 2,586
	Maintain program affordability: Unjustified growth			- 2,586
147	Management HQ—R&D	10,642	9,815	- 827
	Maintain program affordability: Unjustified growth			- 827
148	Facilities Restoration and Modernization—Test and Evaluation Support	162,216	262,216	100,000
	Program increase			+ 100,000
150	Requirements Analysis and Maturation	35,285	48,285	13,000
	Program increase: Nuclear modernization analytics			+ 8,000
	Program increase: Nuclear deterrence research			+ 5,000
167	AF Integrated Personnel and Pay System (AF-IPPS)	47,287	41,102	- 6,185
	Maintain program affordability: Management services excess to need			- 6,185
171	NC3 Integration	26,112	19,312	- 6,800
	Maintain program affordability: Unjustified growth in direct mission support			- 6,800
172	Assessments and Evaluations Cyber Vulnerabilities	99,100	75,950	- 23,150
	Maintain program affordability: Unjustified growth in infrastructure pilot programs			- 23,150
173	B-52 Squadrons	280,414	329,173	48,759
	Transfer crypto modernization: Air Force—requested from APAF line 21			+ 14,759
	Program increase: B-52 infrared threat defense UON			+ 24,000
	Program increase: B-52 mission data recorder			+ 10,000
175	B-1B Squadrons	76,030	63,230	- 12,800
	Maintain program affordability: Fully integrated targeting pod funding excess to need			- 12,800
179	Worldwide Joint Strategic Communications	10,442	18,442	8,000
	Program increase: NC3 architecture			+ 8,000
189	F-16 Squadrons	191,564	185,864	- 5,700
	Restoring acquisition accountability: Communications suite upgrade early to need			- 5,700
190	F-15E Squadrons	192,883	176,483	- 16,400
	Maintain program affordability: Operational flight plan funding excess to need			- 41,400
	Program increase: Electronic warfare receiver upgrades			+ 25,000
192	F-22A Squadrons	603,553	588,453	- 15,100
	Restoring acquisition accountability: Navigation systems program delay			- 15,100
193	F-35 Squadrons	549,501	428,315	- 121,186
	Restoring acquisition accountability: C2D2 Phase 2 contract award delays			- 33,492
	Restoring acquisition accountability: C2D2 flight test contract award delays			- 9,719
	Improving funds management: ECASE excess growth			- 14,399
	Improving funds management: Developmental Foundation excess growth			- 44,733
	Improving funds management: Fixed JPO costs excess growth			- 6,168
	Improving funds management: DCA excess growth			- 12,675
195	Advanced Medium Range Air-to-Air Missile (AMRAAM) ...	61,393	51,293	- 10,100

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Restoring acquisition accountability: SIP 4 early to need			- 10,100
202	Joint Air-to-Surface Standoff Missile [JASSM]	60,062	42,472	- 17,590
	Transfer: Air Force requested to RDTE line 38			- 17,590
204	Control and Reporting Center [CRC]	6,413	10,413	4,000
	Program increase: Fund CRC Mode 5 implementation			+ 4,000
205	Airborne Warning and Control System [AWACS]	120,664	130,664	10,000
	Program increase: Accelerate 21st Century battle management command and control			+ 10,000
213	Joint Surveillance/Target Attack Radar System [JSTARS] ..	14,888		- 14,888
	Transfer common data link program: Air Force-requested to APAF line 59			- 14,888
222	AF Defensive Cyberspace Operations	24,166	39,166	15,000
	Program increase: Internet of Things protective technologies			+ 7,500
	Program increase: Transportation cyber research ..			+ 7,500
224	Unified Platform (UP)	28,759	21,559	- 7,200
	Restoring acquisition accountability: Lack of justification on foundational efforts			- 7,200
240	Minimum Essential Emergency Communications Network (MEECN)	99,088	67,088	- 32,000
	Maintain program affordability: Unjustified growth in Global Aircrew Strategic Network Terminal Inc 2			- 32,000
246	Airborne SIGINT Enterprise	106,873	109,873	3,000
	Program increase: SIGINT sensor development			+ 3,000
254	Weather Service	26,942	31,942	5,000
	Program increase: Commercial weather system follow-on ..			+ 5,000
255	Air Traffic Control, Approach, and Landing System (ATCALS)	6,271	11,271	5,000
	Program increase: Air traffic management of UAS operations			+ 5,000
268	Dragon U-2	48,518	58,518	10,000
	Program increase: Sensor development			+ 10,000
269	Endurance Unmanned Aerial Vehicles		15,000	15,000
	Program increase: Ultra-long endurance aircraft ...			+ 15,000
308	Financial Management Information Systems Development	99,734	93,834	- 5,900
	Maintain program affordability: Increment 2 excess to need			- 5,900
311	Family of Advanced BLoS Terminals (FAB-T)	80,168	60,168	- 20,000
	Restoring acquisition accountability: FET terminals early to need			- 20,000
312	Satellite Control Network (SPACE)	17,808	27,808	10,000
	Program increase: Commercial augmentation service			+ 10,000
318	Spacelift Range System (SPACE)	10,641	20,641	10,000
	Program increase: Space launch range services and capability			+ 10,000
999	Classified Programs	16,534,124	16,463,324	- 70,800
	Classified adjustment			- 70,800

Advanced Composites.—The Committee recognizes the unique role of the Air Force in developing advanced composites for next generation air and space vehicles. The Committee also recognizes the contribution of university research institutions to the Air Force in understanding the technology, processes, and materials used in advanced composites manufacturing as well as addressing shortages of qualified scientists and engineers. The Committee recommends additional funding in applied research and encourages the Air Force to continue to support the test, evaluation, and cer-

tification of advanced composites at academic institutions with proven capabilities in aviation and aerospace.

Technology Transfer.—The Committee recognizes the importance of technology transfer between the Federal Government and non-Federal entities, such as academia, nonprofit organizations, and State and local governments. Technology transfer lowers the cost of new defense-related technology development and ensures that taxpayer investments in research and development benefit the economy and the industrial base. The Committee encourages the Department of Defense to continue placing an increased focus on technology transfer programs by allocating sufficient funding and leveraging the work being performed by Federal laboratories.

Prototyping and Experimentation.—The fiscal year 2019 President's budget request includes \$1,186,075,000 in the Technology Transition Program to demonstrate, prototype, and experiment with innovative technologies and concepts to accelerate their transition to acquisition programs and eventual operational use. Specifically, the Technology Transition Program includes the Adaptive Engine Transition Program [AETP], hypersonics prototyping, smaller lifecycle developmental prototyping efforts, and experimentation campaigns. The Committee remains supportive of these activities, but is concerned about the amount of transparency and budget documentation provided in the budget request. Therefore, the Committee recommendation includes separate budget lines and program elements for the larger activities within the Technology Transition Program, to include AETP, hypersonics prototyping, and directed energy prototyping. The Committee recommends keeping the shorter-term prototyping and experimentation activities in the Technology Transition Program for greater flexibility to explore new ideas, concepts, and technologies. The Committee continues to expect timely and complete communication from the Air Force on prototyping and experimentation activities to include objectives and requirements, transition plans, technology and manufacturing readiness levels, test activities, costs, schedules, and performance metrics.

Air Force Alternative Energy Research.—The Committee is concerned that the Air Force is under-emphasizing the transition of alternative energy research into Air Force enterprise requirements. Therefore, the Committee directs the Secretary of the Air Force to report to the congressional defense committees not later than 90 days after enactment of this act detailing how the Air Force aligns its alternative energy research agenda with enterprise requirements. The report should include the metrics used to evaluate how the expenditure of funds serve the goals identified in its Energy Flight Plan: 2017–2036 and how the Air Force plans to transition existing alternative energy research, development, test and evaluation projects to meet Air Force energy requirements.

Advanced Pilot Training Program.—The fiscal year 2019 President's budget request includes \$265,465,000 to develop the Advanced Pilot Trainer, a modern system to train 4th and 5th generation pilots. The Committee understands that the Air Force plans to complete source selection and award the engineering, manufacturing, and development [EMD] contract in the summer of 2018. Given the age and the cost of sustaining the legacy T–38C pilot

training system as well as the Air Force's growing pilot shortage, the Committee encourages the Air Force to not further delay the award of the EMD contract and subsequently consider options to accelerate the program after contract award.

SPACE PROGRAMS

Space Acquisition Strategy.—The Committee supports the Air Force's plans to develop more capable and defensible satellites and appreciates the intention to be faster, more agile, and more innovative. The Committee also understands that there will be risks and tradeoffs with such a shift in strategy that will mean less predictability and possibly failures. The Committee's concerns, articulated in the Department of Defense Appropriations Act, 2018 (Public Law 115–141), are not about the risks involved with innovation or speed, but rather the risks involved with redeveloping nearly every major space system simultaneously. As noted last year, the Air Force is beginning development efforts for space situation awareness; position, navigation, and timing; weather; overhead persistent infrared; wide-band communications; and protected communications, with major changes to the program of record planned in nearly every case. The Committee remains concerned that the decision to accept less predictability and the possibility of failure in all of these programs simultaneously may pose unacceptable risks to constellation sustainment. These risks may be compounded in an environment where the acquisition workforce, rooted in contemplation and caution, is asked to shift its culture toward speed and agility for so many efforts. Moreover, the Committee is concerned that the funding peaks and troughs that will likely result from simultaneous architecture recapitalization may not take into account budget realities and may risk sustainment of the industrial base at levels adequate for future program needs. The Committee looks forward to receiving the report directed last year that will provide an assessment of these issues and looks forward to working with the Department to achieve the best way forward for the future of these space programs.

Next-Generation Overhead Persistent Infrared.—The fiscal year 2019 President's budget request includes \$643,126,000 for Next-Generation Overhead Persistent Infrared [OPIR], the successor to the Space Based Infrared System [SBIRS]. This is in addition to the \$327,002,000 appropriated in the Department of Defense Appropriations Act, 2018 (Public Law 115–141) for the start of Next-Gen OPIR, following a shift in the Air Force strategy away from a prior plan to purchase additional SBIRS space vehicles. The Committee is supportive of the Air Force's efforts to provide improved missile warning capabilities that are more survivable against emerging threats. However, the Committee has concerns about several shifts in the program plans over the past year, delays in providing a spend plan for the program, and requests for additional funds so soon after the program's start. The Committee is hopeful that these initial hiccups do not signal challenges ahead in meeting the aggressive timelines laid out by the Department. The Committee agrees with Air Force and Department leadership that Next-Gen OPIR will be a pacesetter for rapid acquisition of space programs. Therefore, despite these concerns, the Committee rec-

ommends fully funding the Air Force budget request. In addition, the Committee recommends an additional \$100,000,000 for advanced sensor development. The Committee reiterates guidance from last year that OPIR is designated as a congressional special interest item and continues to direct the Secretary of the Air Force to provide quarterly briefings to the congressional defense committees detailing progress against cost and schedule milestones.

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE

Appropriations, 2018	\$22,010,975,000
Budget estimate, 2019	22,016,553,000
Committee recommendation	24,049,621,000

The Committee recommends an appropriation of \$24,049,621,000. This is \$2,033,068,000 above the budget estimate.

COMMITTEE RECOMMENDED PROGRAM

The following table summarizes the budget estimate for this appropriation, the Committee recommendation, and the Committee recommended adjustments to the budget estimate:

(In thousands of dollars)

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	RESEARCH, DEVELOPMENT, TEST & EVAL, DEFENSE-WIDE			
	BASIC RESEARCH			
1	DTRA UNIVERSITY STRATEGIC PARTNERSHIP BASIC RESEARCH ..	37,023	37,023	.....
2	DEFENSE RESEARCH SCIENCES	422,130	422,680	+ 550
3	BASIC RESEARCH INITIATIVES	42,702	54,702	+ 12,000
4	BASIC OPERATIONAL MEDICAL RESEARCH SCIENCE	47,825	45,275	- 2,550
5	NATIONAL DEFENSE EDUCATION PROGRAM	85,919	200,919	+ 115,000
6	HISTORICALLY BLACK COLLEGES & UNIV (HBCU)	30,412	32,412	+ 2,000
7	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	42,103	42,103	.....
	TOTAL, BASIC RESEARCH	708,114	835,114	+ 127,000
	APPLIED RESEARCH			
8	JOINT MUNITIONS TECHNOLOGY	19,170	21,670	+ 2,500
9	BIOMEDICAL TECHNOLOGY	101,300	86,700	- 14,600
11	LINCOLN LABORATORY RESEARCH PROGRAM	51,596	51,596	.....
12	APPLIED RESEARCH FOR ADVANCEMENT S&T PRIORITIES	60,688	60,688	.....
13	INFORMATION AND COMMUNICATIONS TECHNOLOGY	395,317	379,817	- 15,500
14	BIOLOGICAL WARFARE DEFENSE	38,640	38,640	.....
15	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	192,674	192,674	.....
16	CYBER SECURITY RESEARCH	14,969	14,969	.....
17	TACTICAL TECHNOLOGY	335,466	321,966	- 13,500
18	MATERIALS AND BIOLOGICAL TECHNOLOGY	226,898	218,898	- 8,000
19	ELECTRONICS TECHNOLOGY	333,847	363,847	+ 30,000
20	WEAPONS OF MASS DESTRUCTION DEFEAT TECHNOLOGIES	161,151	157,151	- 4,000
21	SOFTWARE ENGINEERING INSTITUTE	9,300	9,300	.....
22	SPECIAL OPERATIONS TECHNOLOGY DEVELOPMENT	35,921	35,921	.....
	TOTAL, APPLIED RESEARCH	1,976,937	1,953,837	- 23,100
	ADVANCED TECHNOLOGY DEVELOPMENT			
23	JOINT MUNITIONS ADVANCED TECH INSENSITIVE MUNITIONS AD	25,598	25,598	.....
24	COMBATING TERRORISM TECHNOLOGY SUPPORT	125,271	120,271	- 5,000
25	FOREIGN COMPARATIVE TESTING	24,532	22,332	- 2,200
27	COUNTERPROLIFERATION INITIATIVES—PROLIF PREV & DEFEAT	299,858	270,858	- 29,000
28	ADVANCED CONCEPTS AND PERFORMANCE ASSESSMENT	13,017	13,017	.....
29	WEAPONS TECHNOLOGY .....	.....	13,400	+ 13,400
31	ADVANCED RESEARCH	20,365	42,565	+ 22,200
32	JOINT DOD-DOE MUNITIONS TECHNOLOGY DEVELOPMENT	18,644	18,644	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
34	ADVANCED AEROSPACE SYSTEMS	277,603	327,603	+ 50,000
35	SPACE PROGRAMS AND TECHNOLOGY	254,671	249,671	- 5,000
36	ANALYTIC ASSESSMENTS	19,472	18,472	- 1,000
37	ADVANCED INNOVATIVE ANALYSIS AND CONCEPTS	37,263	37,263	.....
38	ADVANCED INNOVATIVE ANALYSIS AND CONCEPTS—MHA	13,621	13,621	.....
39	COMMON KILL VEHICLE TECHNOLOGY	189,753	56,753	- 133,000
40	DEFENSE INNOVATION UNIT EXPERIMENTAL (DIUX)	29,364	29,364	.....
41	TECHNOLOGY INNOVATION	83,143	83,143	.....
42	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM—ADVANCED DEV	142,826	142,826	.....
43	RETRACT LARCH	161,128	161,128	.....
44	JOINT ELECTRONIC ADVANCED TECHNOLOGY	12,918	12,918	.....
45	JOINT CAPABILITY TECHNOLOGY DEMONSTRATIONS	106,049	93,049	- 13,000
46	NETWORKED COMMUNICATIONS CAPABILITIES	12,696	12,696	.....
47	DEFENSE-WIDE MANUFACTURING SCIENCE AND TECHNOLOGY PROG	114,637	159,887	+ 45,250
48	MANUFACTURING TECHNOLOGY PROGRAM	49,667	67,167	+ 17,500
49	EMERGING CAPABILITIES TECHNOLOGY DEVELOPMENT	48,338	60,838	+ 12,500
50	GENERIC LOGISTICS R&D TECHNOLOGY DEMONSTRATIONS	11,778	19,778	+ 8,000
52	STRATEGIC ENVIRONMENTAL RESEARCH PROGRAM	76,514	86,514	+ 10,000
53	MICROELECTRONIC TECHNOLOGY DEVELOPMENT AND SUPPORT	168,931	203,931	+ 35,000
54	JOINT WARFIGHTING PROGRAM	5,992	5,992	.....
55	ADVANCED ELECTRONICS TECHNOLOGIES	111,099	118,599	+ 7,500
56	COMMAND, CONTROL AND COMMUNICATIONS SYSTEMS	185,984	185,984	.....
57	NETWORK-CENTRIC WARFARE TECHNOLOGY	438,569	434,069	- 4,500
58	SENSOR TECHNOLOGY	190,128	173,601	- 16,527
59	DISTRIBUTED LEARNING ADVANCED TECHNOLOGY DEVELOPMENT	13,564	11,564	- 2,000
60	SOFTWARE ENGINEERING INSTITUTE	15,050	15,050	.....
61	QUICK REACTION SPECIAL PROJECTS	69,626	59,626	- 10,000
62	ENGINEERING SCIENCE AND TECHNOLOGY	19,415	19,415	.....
63	HIGH ENERGY LASER ADVANCED TECHNOLOGY PROGRAM	69,533	69,533	.....
64	TEST & EVALUATION SCIENCE & TECHNOLOGY	96,389	132,389	+ 36,000
65	OPERATIONAL ENERGY CAPABILITY IMPROVEMENT	40,582	40,582	.....
66	CWMD SYSTEMS	26,644	26,644	.....
67	SPECIAL OPERATIONS ADVANCED TECHNOLOGY DEVELOPMENT ..	79,380	79,380	.....
	TOTAL, ADVANCED TECHNOLOGY DEVELOPMENT	3,699,612	3,735,735	+ 36,123
	DEMONSTRATION & VALIDATION			
68	NUCLEAR AND CONVENTIONAL PHYSICAL SECURITY EQUIPMENT	28,140	28,140	.....
69	WALKOFF	92,222	92,222	.....
70	ACQUISITION ENTERPRISE DATA AND INFORMATION SERVICES ...	2,506	2,506	.....
71	ENVIRONMENTAL SECURITY TECHNICAL CERTIFICATION PROGRAM	40,016	42,016	+ 2,000
72	BALLISTIC MISSILE DEFENSE TERMINAL DEFENSE SEGMENT	214,173	398,273	+ 184,100
73	BALLISTIC MISSILE DEFENSE MIDCOURSE DEFENSE SEGMENT ...	926,359	803,359	- 123,000
74	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	129,886	113,496	- 16,390
75	BALLISTIC MISSILE DEFENSE SENSORS	220,876	359,176	+ 138,300
76	BALLISTIC MISSILE DEFENSE ENABLING PROGRAMS	540,926	638,426	+ 97,500
77	SPECIAL PROGRAMS—MDA	422,348	422,348	.....
78	AEGIS BMD	767,539	773,520	+ 5,981
	BALLISTIC MISSILE DEFENSE COMMAND AND CONTROL, BATTLE MANAGEMENT	475,168	565,368	+ 90,200
82	BALLISTIC MISSILE DEFENSE JOINT WARFIGHTER SUPPORT	48,767	48,767	.....
83	BALLISTIC MISSILE DEFENSE INTERGRATION AND OPERATIONS. CENTER (MDIOC)	54,925	54,925	.....
84	REGARDING TRENCH	16,916	16,916	.....
85	SEA BASED X-BAND RADAR (SBX)	149,715	136,715	- 13,000
86	ISRAELI COOPERATIVE PROGRAMS	300,000	300,000	.....
87	BALLISTIC MISSILE DEFENSE TEST	365,681	518,848	+ 153,167
88	BALLISTIC MISSILE DEFENSE TARGETS	517,852	561,352	+ 43,500
89	HUMANITARIAN DEMINING	11,347	11,347	.....
90	COALITION WARFARE	8,528	8,528	.....
91	DEPARTMENT OF DEFENSE CORROSION PROGRAM	3,477	8,477	+ 5,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
92	TECHNOLOGY MATURATION INITIATIVES	148,822	316,822	+ 168,000
93	MISSILE DEFEAT PROJECT	58,607	43,607	- 15,000
	COUNTER IMPROVISED-THREAT DEMONSTRATION, PROTOTYPE DEVELOPMENT, AND TESTING	12,993	.....	- 12,993
94	HYPERSONIC DEFENSE	120,444	130,944	+ 10,500
95	ADVANCED INNOVATIVE TECHNOLOGIES	1,431,702	1,496,336	+ 64,634
96	JOINT ARTIFICIAL INTELLIGENCE CENTER .....	.....	83,000	+ 83,000
96A	TRUSTED AND ASSURED MICROELECTRONICS	233,142	595,642	+ 362,500
97	RAPID PROTOTYPING PROGRAM	99,333	99,333	.....
98	DOD UNMANNED AIRCRAFT SYSTEM (UAS) COMMON DEVELOPMENT	3,781	7,781	+ 4,000
99	PACIFIC DISCRIMINATING RADAR	95,765	73,147	- 22,618
100	WARGAMING AND SUPPORT FOR STRATEGIC ANALYSIS (SSA)	3,768	3,768	.....
101	JOINT C5 CAPABILITY DEVELOPMENT, INTEGRATION AND INTEROPERABILITY	22,435	22,435	.....
102	LONG RANGE DISCRIMINATION RADAR	164,562	164,562	.....
103	IMPROVED HOMELAND DEFENSE INTERCEPTORS	561,220	421,820	- 139,400
104	BMD TERMINAL DEFENSE SEGMENT TEST	61,017	61,017	.....
105	AEGIS BMD TEST	95,756	95,756	.....
106	BALLISTIC MISSILE DEFENSE SENSOR TEST	81,001	81,001	.....
107	LAND-BASED SM-3 [LBSM3]	27,692	27,692	.....
108	BALLISTIC MISSILE DEFENSE MIDCOURSE DEFENSE SEGMENT TEST	81,934	72,634	- 9,300
109	MULTI-OBJECT KILL VEHICLE	8,256	3,256	- 5,000
110	ENTERPRISE INFORMATION TECHNOLOGY SYSTEMS	2,600	2,600	.....
111	JOINT ELECTROMAGNETIC TECHNOLOGY [JET] PROGRAM	3,104	3,104	.....
112	CYBER SECURITY INITIATIVE	985	985	.....
113	SPACE TRACKING AND SURVEILLANCE SYSTEM	36,955	36,955	.....
114	BALLISTIC MISSILE DEFENSE SYSEM SPACE PROGRAMS	16,484	121,984	+ 105,500
	TOTAL, DEMONSTRATION & VALIDATION	8,709,725	9,870,906	+ 1,161,181
	ENGINEERING & MANUFACTURING DEVELOPMENT			
115	NUCLEAR AND CONVENTIONAL PHYSICAL SECURITY EQUIPMENT	8,333	8,333	.....
116	PROMPT GLOBAL STRIKE CAPABILITY DEVELOPMENT	263,414	615,914	+ 352,500
117	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	388,701	329,909	- 58,792
118	JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM [JTIDS]	19,503	29,503	+ 10,000
119	WEAPONS OF MASS DESTRUCTION DEFEAT CAPABILITIES	6,163	6,163	.....
120	INFORMATION TECHNOLOGY DEVELOPMENT	11,988	11,988	.....
121	HOMELAND PERSONNEL SECURITY INITIATIVE	296	296	.....
122	DEFENSE EXPORTABILITY PROGRAM	1,489	1,489	.....
123	OUSD(C) IT DEVELOPMENT INITIATIVES	9,590	9,590	.....
124	DOD ENTERPRISE SYSTEMS DEVELOPMENT AND DEMONSTRATION	3,173	3,173	.....
125	DCMO POLICY AND INTEGRATION	2,105	2,105	.....
126	DEFENSE AGENCY INITIATIVES FINANCIAL SYSTEM	21,156	21,156	.....
127	DEFENSE RETIRED AND ANNUITANT PAY SYSTEM (DRAS)	10,731	10,731	.....
128	DEFENSE-WIDE ELECTRONIC PROCUREMENT CAPABILITIES	6,374	6,374	.....
129	TRUSTED & ASSURED MICROELECTRONICS	56,178	98,678	+ 42,500
130	GLOBAL COMBAT SUPPORT SYSTEM	2,512	2,512	.....
131	DOD ENTERPRISE ENERGY INFORMATION MANAGEMENT (EIM)	2,435	2,435	.....
132	CWMD SYSTEMS: SYSTEM DEVELOPMENT AND DEMONSTRATION	17,048	17,048	.....
	TOTAL, ENGINEERING & MANUFACTURING DEVELOPMENT	831,189	1,177,397	+ 346,208
	RDT&E MANAGEMENT SUPPORT			
133	DEFENSE READINESS REPORTING SYSTEM [DRRS]	6,661	6,661	.....
134	JOINT SYSTEMS ARCHITECTURE DEVELOPMENT	4,088	4,088	.....
135	CENTRAL TEST AND EVALUATION INVESTMENT DEVELOPMENT	258,796	278,096	+ 19,300
136	ASSESSMENTS AND EVALUATIONS	31,356	31,356	.....
137	MISSION SUPPORT	65,646	65,646	.....
138	JOINT MISSION ENVIRONMENT TEST CAPABILITY [JMETC]	84,184	89,184	+ 5,000
139	TECHNICAL STUDIES, SUPPORT AND ANALYSIS	22,576	22,576	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
144	JOINT INTEGRATED AIR AND MISSILE DEFENSE ORGANIZATION ...	52,565	52,565	.....
145	CLASSIFIED PROGRAM USD(P) .....	.....	100,000	+ 100,000
146	SYSTEMS ENGINEERING	38,872	38,872	.....
147	STUDIES AND ANALYSIS SUPPORT	3,534	3,534	.....
148	NUCLEAR MATTERS—PHYSICAL SECURITY	5,050	5,050	.....
149	SUPPORT TO NETWORKS AND INFORMATION INTEGRATION	11,450	11,450	.....
150	GENERAL SUPPORT TO USD (INTELLIGENCE)	1,693	5,693	+ 4,000
151	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	102,883	102,883	.....
159	SMALL BUSINESS INNOVATION RESEARCH/TECHNOLOGY TRANSFER	2,545	2,545	.....
160	DEFENSE TECHNOLOGY ANALYSIS	24,487	27,487	+ 3,000
161	DEFENSE TECHNICAL INFORMATION CENTER (DTIC)	56,853	56,853	.....
162	R&D IN SUPPORT OF DOD ENLISTMENT, TESTING & EVALUATION	24,914	24,914	.....
163	DEVELOPMENT TEST AND EVALUATION	20,179	25,179	+ 5,000
164	MANAGEMENT HEADQUARTERS (RESEARCH & DEVELOPMENT) ...	13,643	13,643	.....
165	MANAGEMENT HEADQUARTERS DEFENSE TECHNICAL INFORMATION CENTER (DTIC)	4,124	4,124	.....
166	BUDGET AND PROGRAM ASSESSMENTS	5,768	5,768	.....
167	ODNA TECHNOLOGY AND RESOURCE ANALYSIS	1,030	1,030	.....
168	DEFENSE DIGITAL SERVICE (DDS) DEVELOPMENT SUPPORT	1,000	1,000	.....
169	ASSESSMENTS AND EVALUATIONS CYBER VULNERABILITIES	3,400	3,400	.....
170	ASSESSMENTS AND EVALUATIONS CYBER VULNERABILITIES	4,000	4,000	.....
171	DEFENSE OPERATIONS SECURITY (OPSEC)	3,008	10,008	+ 7,000
172	JOINT STAFF ANALYTICAL SUPPORT	6,658	6,658	.....
175	SUPPORT TO INFORMATION OPERATIONS (IO) CAPABILITIES	652	652	.....
176	DEFENSE MILITARY DECEPTION PROGRAM OFFICE	1,005	1,005	.....
177	COMBINED ADVANCED APPLICATIONS	21,363	16,363	- 5,000
180	INTELLIGENCE CAPABILITIES AND INNOVATION INVESTMENTS	109,529	259,529	+ 150,000
181	CWMD SYSTEMS: RDT&E MANAGEMENT SUPPORT	1,244	1,244	.....
184	COCOM EXERCISE ENGAGEMENT AND TRAINING TRANSFORMATION	42,940	42,940	.....
185	MANAGEMENT HEADQUARTERS—MDA	28,626	28,626	.....
187	JOINT SERVICE PROVIDER (JSP)	5,104	5,104	.....
9999	CLASSIFIED PROGRAMS	45,604	45,604	.....
	TOTAL, RDT&E MANAGEMENT SUPPORT	1,117,030	1,405,330	+ 288,300
	OPERATIONAL SYSTEMS DEVELOPMENT			
189	ENTERPRISE SECURITY SYSTEM (ESS)	9,750	9,750	.....
190	REGIONAL INTERNATIONAL OUTREACH & PARTNERSHIP FOR PEAC	1,855	1,855	.....
191	OVERSEAS HUMANITARIAN ASSISTANCE SHARED INFORMATION SY	304	304	.....
192	INDUSTRIAL BASE ANALYSIS AND SUSTAINMENT SUPPORT	10,376	63,876	+ 53,500
193	OPERATIONAL SYSTEMS DEVELOPMENT	5,915	5,915	.....
194	GLOBAL THEATER SECURITY COOPERATION MANAGEMENT	5,869	5,869	.....
195	CHEMICAL AND BIOLOGICAL DEFENSE (OPERATIONAL SYSTEMS D	48,741	42,385	- 6,356
196	PLANNING AND DECISION AID SYSTEM	3,037	3,037	.....
197	C4I INTEROPERABILITY	62,814	62,814	.....
203	DEFENSE INFO INFRASTRUCTURE ENGINEERING & INTEGRATION	16,561	16,561	.....
204	LONG HAUL COMMUNICATIONS (DCS)	14,769	14,769	.....
205	MINIMUM ESSENTIAL EMERGENCY COMMUNICATIONS NETWORK	17,579	17,579	.....
207	KEY MANAGEMENT INFRASTRUCTURE (KMI)	31,737	31,737	.....
208	INFORMATION SYSTEMS SECURITY PROGRAM	7,940	7,940	.....
209	INFORMATION SYSTEMS SECURITY PROGRAM	229,252	229,252	.....
210	INFORMATION SYSTEMS SECURITY PROGRAM	19,611	19,611	.....
211	GLOBAL COMMAND AND CONTROL SYSTEM	46,900	46,900	.....
212	JOINT SPECTRUM CENTER (DEFENSE SPECTRUM ORGANIZATION)	7,570	7,570	.....
213	JOINT INFORMATION ENVIRONMENT (JIE)	7,947	7,947	.....
215	FEDERAL INVESTIGATIVE SERVICES INFORMATION TECHNOLOGY	39,400	39,400	.....
224	POLICY R&D PROGRAMS	6,262	6,262	.....
225	NET CENTRICITY	16,780	16,780	.....
227	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	6,286	6,286	.....

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
230	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	2,970	2,970	.....
233	INSIDER THREAT	5,954	5,954	.....
234	HOMELAND DEFENSE TECHNOLOGY TRANSFER PROGRAM	2,198	1,198	- 1,000
240	INTELLIGENCE MISSION DATA (IMD)	6,889	6,889	.....
242	LOGISTICS SUPPORT ACTIVITIES	1,317	1,317	.....
243	PACIFIC DISASTER CENTERS	1,770	1,770	.....
244	DEFENSE PROPERTY ACCOUNTABILITY SYSTEM	1,805	1,805	.....
246	MQ-9 UAV	18,403	18,403	.....
248	AVIATION SYSTEMS	184,993	182,862	- 2,131
249	SPECIAL OPERATIONS INTELLIGENCE SYSTEMS DEVELOPMENT ...	10,625	10,625	.....
250	SOF OPERATIONAL ENHANCEMENTS	102,307	102,307	.....
251	WARRIOR SYSTEMS	46,942	55,642	+ 8,700
252	SPECIAL PROGRAMS	2,479	2,479	.....
253	UNMANNED ISR	27,270	33,270	+ 6,000
254	SOF TACTICAL VEHICLES	1,121	1,121	.....
255	SOF MARITIME SYSTEMS	42,471	42,471	.....
256	SOF GLOBAL VIDEO SURVEILLANCE ACTIVITIES	4,780	4,780	.....
257	SOF OPERATIONAL ENHANCEMENTS INTELLIGENCE	12,176	12,176	.....
258	TELEPORT PROGRAM	2,323	723	- 1,600
300	NATIONAL SECURITY INNOVATION ACTIVITIES .....	.....	75,000	+ 75,000
	TOTAL, OPERATIONAL SYSTEMS DEVELOPMENT	1,096,048	1,228,161	+ 132,113
999	CLASSIFIED PROGRAMS	3,877,898	3,843,141	- 34,757
	TOTAL, RESEARCH, DEVELOPMENT, TEST & EVAL, DEF- WIDE	22,016,553	24,049,621	+ 2,033,068

COMMITTEE RECOMMENDED ADJUSTMENTS

The following table details the adjustments recommended by the Committee:

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
2	Defense Research Sciences	422,130	422,680	+ 550
	Program increase: DARPA foundational and applied artificial intelligence .....	.....	.....	+ 15,000
	Improving Funds Management: Program delays .....	.....	.....	- 14,450
3	Basic Research Initiatives	42,702	54,702	+ 12,000
	Program increase: DEPCOR .....	.....	.....	+ 12,000
4	Basic Operational Medical Research Science	47,825	45,275	- 2,550
	Improving Funds Management: Program delays .....	.....	.....	- 12,550
	Program increase: TBI Treatment for blast injuries .....	.....	.....	+ 10,000
5	National Defense Education Program	85,919	200,919	+ 115,000
	Basic research program increase .....	.....	.....	+ 100,000
	Program increase: Manufacturing engineering education program .....	.....	.....	+ 15,000
6	Historically Black Colleges and Universities/Minority Institutions	30,412	32,412	+ 2,000
	Program increase .....	.....	.....	+ 2,000
8	Joint Munitions Technology	19,170	21,670	+ 2,500
	Program increase: Insensitive munitions .....	.....	.....	+ 2,500
9	Biomedical Technology	101,300	86,700	- 14,600
	Improving Funds Management: Program delays .....	.....	.....	- 14,600
13	Information & Communications Technology	395,317	379,817	- 15,500
	Program increase: DARPA foundational and applied artificial intelligence .....	.....	.....	+ 35,000
	Improving Funds Management: Program delays .....	.....	.....	- 50,500
17	Tactical Technology	335,466	321,966	- 13,500
	Improving Funds Management: Program delays .....	.....	.....	- 16,000
	Program increase .....	.....	.....	+ 2,500
18	Materials and Biological Technology	226,898	218,898	- 8,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Improving Funds Management: Program delays			- 8,000
19	Electronics Technology	333,847	363,847	+ 30,000
	Program increase: DARPA electronics resurgence initiative			+ 30,000
20	Counter Weapons of Mass Destruction Applied Research	161,151	157,151	- 4,000
	JIDO unjustified base budget request			- 4,000
24	Combating Terrorism Technology Support	125,271	120,271	- 5,000
	Improving funds management: Unjustified growth			- 30,000
	Transfer funding from RDDW OCO Line 24: Anti-Tunneling			+ 25,000
25	Foreign Comparative Testing	24,532	22,332	- 2,200
	Improving funds management: Prior year carryover			- 2,200
27	Counter Weapons of Mass Destruction Advanced Technology Development	299,858	270,858	- 29,000
	JIDO unjustified base budget request			- 29,000
29	Weapons Technology		13,400	+ 13,400
	Program increase: Hypersonic Defense			+ 13,400
31	Advanced Research	20,365	42,565	+ 22,200
	Program increase: Hypersonic Defense			+ 22,200
34	Advanced Aerospace Systems	277,603	327,603	+ 50,000
	Program increase: Hypersonics weapons programs development and transition			+ 50,000
35	Space Programs and Technology	254,671	249,671	- 5,000
	Insufficient budget justification: RASR			- 5,000
36	Analytic Assessments	19,472	18,472	- 1,000
	Improving funds management: Prior year carryover			- 1,000
39	Common Kill Vehicle Technology	189,753	56,753	- 133,000
	Transfer to line 92 for low power laser demonstrator prototypes post-PDR risk reduction through CDR only			- 78,000
	Restoring acquisition accountability: program adjustment			- 55,000
45	Joint Capability Technology Demonstrations	106,049	93,049	- 13,000
	Improving funds management: Prior year carryover			- 13,000
47	Defense-Wide Manufacturing Science and Technology Program	114,637	159,887	+ 45,250
	Program increase: Manufacturing engineering programs			+ 5,000
	Program increase: Manufacturing innovation institutes			+ 10,250
	Program increase: Advanced manufacturing			+ 30,000
48	Manufacturing Technology Program	49,667	67,167	+ 17,500
	Program increase			+ 2,500
	Program increase: All solid-state battery development			+ 10,000
	Program increase: Digital innovative design for reliable casting performance			+ 5,000
49	Emerging Capabilities Technology Development	48,338	60,838	+ 12,500
	Improving funds management: Prior year carryover			- 5,000
	Program increase: Disruptive technology and operational concept for air and missile defense			+ 7,500
	Program increase: High-altitude optical reconnaissance unit and sensors			+ 10,000
50	Generic Logistics R&D Technology Demonstrations	11,778	19,778	+ 8,000
	Program increase: Liquid hydrocarbon fuels			+ 7,000
	Program increase			+ 1,000
52	Strategic Environmental Research Program	76,514	86,514	+ 10,000
	Readiness Increase			+ 10,000
53	Microelectronics Technology Development and Support	168,931	203,931	+ 35,000
	Program increase: Trusted foundry			+ 30,000
	Program increase: Tunable filter, support for microelectronics development			+ 5,000
55	Advanced Electronics Technologies	111,099	118,599	+ 7,500
	Program increase: Support for the electronics resurgence initiative			+ 7,500
57	Network-Centric Warfare Technology	438,569	434,069	- 4,500
	Improving Funds Management: Program delays			- 4,500
58	Sensor Technology	190,128	173,601	- 16,527
	Improving Funds Management: Program delays			- 18,027
	Program increase: Sensors and processing systems technology			+ 1,500
59	Distributed Learning Advanced Technology Development	13,564	11,564	- 2,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Improving funds management: Prior year carryover			- 2,000
61	Quick Reaction Special Projects	69,626	59,626	- 10,000
	Improving funds management: Prior year carryover			- 10,000
64	Test & Evaluation Science & Technology	96,389	132,389	+ 36,000
	Program Increase: Additive manufacturing for hypersonic affordability			+ 5,000
	Program Increase: Advanced technology development			+ 16,000
	Program increase: Hypersonics and directed energy test ..			+ 10,000
	Program increase: Workforce development			+ 5,000
65	Operational Energy Capability Improvement	40,582	40,582	
	Improving funds management: Prior year carryover			- 5,000
	Program increase			+ 5,000
71	Environmental Security Technical Certification Program	40,016	42,016	+ 2,000
	Program increase: Technology demonstration program			+ 2,000
72	Ballistic Missile Defense Terminal Defense Segment	214,173	398,273	+ 184,100
	Program increase: USFK JEON			+ 184,100
73	Ballistic Missile Defense Midcourse Defense Segment	926,359	803,359	- 123,000
	Improving funds management: Boosters with RKV's funded in Public Law 115-141			- 52,000
	Improving funds management: NRE funded in Public Law 115-141			- 65,000
	Transfer funding for missile field components to Procurement, Defense-wide, line 27 for proper execution: Transfer requested by Missile Defense Agency			- 41,000
	Program increase: Cybersecurity			+ 10,000
	Program increase: Discrimination capabilities			+ 25,000
74	Chemical and Biological Defense Program—Dem/Val	129,886	113,496	- 16,390
	Improving Funds Management: Program delays			- 16,390
75	Ballistic Missile Defense Sensors	220,876	359,176	+ 138,300
	Program increase: Cybersecurity			+ 5,000
	Program increase: Discrimination capabilities			+ 93,000
	Program increase: Systems engineering			+ 16,300
	Program increase: USFK JEON			+ 24,000
76	BMD Enabling Programs	540,926	638,426	+ 97,500
	Program increase: Cyber assessment			+ 16,200
	Program increase: Cybersecurity			+ 40,000
	Program increase: Discrimination capabilities			+ 4,000
	Program increase: Facilities, sustainment, restoration and modernization			+ 3,200
	Program increase: Systems engineering			+ 34,100
78	AEGIS BMD	767,539	773,520	+ 5,981
	Program increase: Discrimination capabilities			+ 4,000
	Program increase: Facilities, sustainment, restoration and modernization			+ 1,981
81	Ballistic Missile Defense Command and Control, Battle Management and Communication	475,168	565,368	+ 90,200
	Restoring acquisition accountability: Spiral 8.2-3 scope adjustment			- 6,200
	Restoring acquisition accountability: BMDS Increment 8 early to need			- 7,100
	Program increase: Cybersecurity			+ 10,000
	Program increase: Mobile sensor integration			+ 93,500
85	Sea Based X-Band Radar [SBX]	149,715	136,715	- 13,000
	Improving funds management: Software upgrades funded in Public Law 115-141			- 13,000
87	Ballistic Missile Defense Test	365,681	518,848	+ 153,167
	Program increase: Cybersecurity			+ 20,000
	Program increase: Facilities, sustainment, restoration and modernization			+ 29,000
	Program increase: HALO			+ 32,267
	Program increase: USFK JEON			+ 71,900
88	Ballistic Missile Defense Targets	517,852	561,352	+ 43,500
	Improving funds management: Boosters with RKV's funded in Public Law 115-141			- 36,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
	Program increase: Cybersecurity			+ 5,000
	Program increase: Special programs target			+ 70,000
	Program increase: USFK JEON			+ 4,500
91	Department of Defense Corrosion Program	3,477	8,477	+ 5,000
	Program increase			+ 5,000
92	Technology Maturation Initiatives	148,822	316,822	+ 168,000
	Transfer from line 39 for low power laser demonstrator prototypes post-PDR risk reduction through PDR only ..			+ 78,000
	Program increase: Cybersecurity			+ 5,000
	Program increase: Laser scaling for boost phase intercept ..			+ 85,000
93	Missile Defeat Project	58,607	43,607	- 15,000
	Classified Adjustment			- 15,000
94	Counter Improvised-Threat Demonstration, Prototype Develop- ment, and Testing	12,993		- 12,993
	JIDO unjustified base budget request			- 12,993
95	Hypersonic Defense	120,444	130,944	+ 10,500
	Program increase: Hypersonic Defense			+ 10,500
96	Advanced Innovative Technologies	1,431,702	1,496,336	+ 64,634
	Classified Adjustment			- 24,366
	Program increase: Machine learning and advanced manu- facturing			+ 25,000
	Program increase: Rail gun with hypervelocity projectile ..			+ 14,000
	Program increase: Quartermaster Pathfinder			+ 50,000
96A	Joint Artificial Intelligence Center		83,000	+ 83,000
	Program increase: Artificial intelligence			+ 83,000
97	Trusted & Assured Microelectronics	233,142	595,642	+ 362,500
	Program increase: Next generation microelectronics			+ 347,000
	Program increase: Joint federated assurance center			+ 10,000
	Program increase: New trust approach development			+ 5,500
99	Department of Defense (DoD) Unmanned System Common De- velopment	3,781	7,781	+ 4,000
	Program increase: Unmanned traffic management			+ 4,000
100	Pacific Discriminating Radar	95,765	73,147	- 22,618
	Restoring acquisition accountability: MD51 early to need ..			- 22,618
105	Improved Homeland Defense Interceptors	561,220	421,820	- 139,400
	Improving funds management: Boosters with RKVs funded in Public Law 115-141			- 139,400
111	Ballistic Missile Defense Midcourse Segment Test	81,934	72,634	- 9,300
	Improving funds management: Boosters with RKVs funded in Public Law 115-141			- 9,300
112	Multi-Object Kill Vehicle	8,256	3,256	- 5,000
	Restoring acquisition accountability: Program adjustment ..			- 5,000
117	Ballistic Missile Defense System Space Programs	16,484	121,984	+ 105,500
	Program increase: Cybersecurity			+ 5,000
	Program increase: Missile Defense Tracking System			+ 100,500
119	Prompt Global Strike Capability Development	263,414	615,914	+ 352,500
	Program increase: Program acceleration			+ 345,000
	Program increase			+ 7,500
120	Chemical and Biological Defense Program—EMD	388,701	329,909	- 58,792
	Improving Funds Management: Program delays			- 58,792
121	Joint Tactical Information Distribution System [JTIDS]	19,503	29,503	+ 10,000
	Program increase: Integrated kinetic and non-kinetic nodal analysis			+ 10,000
133	Trusted & Assured Microelectronics	56,178	98,678	+ 42,500
	Program increase: Next generation microelectronics			+ 40,000
	Program increase: New trust approach development			+ 2,500
139	Central Test and Evaluation Investment Development (CTEIP) ..	258,796	278,096	+ 19,300
	Program increase: Advanced hypersonic wind tunnel ex- perimentation			+ 10,000
	Program increase: Defense threat center of excellence			+ 9,300
142	Joint Mission Environment Test Capability [JMETC]	84,184	89,184	+ 5,000
	Program Increase: Cyber range capacity and development ..			+ 5,000
145	Classified Program USD(P)		100,000	+ 100,000
	Classified adjustment			+ 100,000

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
150	General Support to USD (Intelligence)	1,693	5,693	+ 4,000
	Program increase: Academic support			+ 4,000
160	Defense Technology Analysis	24,487	27,487	+ 3,000
	Program increase: Defense lab transfer and transition manufacturing			+ 3,000
163	Development Test and Evaluation	20,179	25,179	+ 5,000
	Program increase: Improve software testing capabilities ..			+ 5,000
171	Defense Operations Security Initiative (DOSI)	3,008	10,008	+ 7,000
	Program increase: Defense operations security initiative ..			+ 7,000
177	Combined Advanced Applications	21,363	16,363	- 5,000
	Improving funds management: Requirement previously funded			- 5,000
180	Intelligence Capabilities and Innovation Investments	109,529	259,529	+ 150,000
	Program increase: Artificial intelligence—Project Maven ..			+ 150,000
192	Industrial Base Analysis and Sustainment Support	10,376	63,876	+ 53,500
	Program increase			+ 3,500
	Program Increase: Expand manufacturing capability for cold rolled aluminum			+ 10,000
	Program increase: National security technology accelerator			+ 15,000
	Program Increase: Large scale classified electron beam welding			+ 15,000
	Program increase: Risk reduction for tungsten defense products			+ 10,000
195	Chemical and Biological Defense (Operational Systems Development)	48,741	42,385	- 6,356
	Improving Funds Management: Program delays			- 6,356
234	Homeland Defense Technology Transfer Program	2,198	1,198	- 1,000
	Improving funds management: Prior year carryover			- 1,000
248	Aviation Systems	184,993	182,862	- 2,131
	Improving Funds Management: TFTA Training System Development early to need			- 3,879
	Insufficient budget justification: EC-130J risk reduction ..			- 1,252
	Program increase: VTOL UAS research			+ 3,000
251	Warrior Systems	46,942	55,642	+ 8,700
	Improving Funds Management: Ordnance Items DTE excess growth			- 4,000
	Improving Funds Management: CUAS Test and Evaluation excess growth			- 3,800
	Program Increase: Rotary wing aviation helmet			+ 1,500
	Program increase: Small glide munition UAS integration ..			+ 15,000
253	Unmanned ISR	27,270	33,270	+ 6,000
	Program increase: UAS anti-icing			+ 6,000
258	Teleport Program	2,323	723	- 1,600
	Improving funds management: Unjustified growth			- 1,600
300	National Security Innovation Activities		75,000	+ 75,000
	Program increase: Capital investment—Section 217 of Senate NDAA			+ 75,000
999	Classified Programs	3,877,898	3,843,141	- 34,757
	Classified adjustment			- 34,757

Trusted Microelectronics.—In the fiscal year 2019 budget submission, the Department requested \$587,320,000 for trusted and assured microelectronics and DARPA’s Electronics Resurgence Initiative. The Committee is pleased to see the Department prioritize programs that will ensure access to trusted microelectronics and develop manufacturing processes for next generation chips. However, the Committee notes that additional funds are needed in fiscal year 2019 for the United States to maintain global microelectronics leadership and added \$447,000,000 above the President’s budget request to accelerate multiple efforts. Therefore, the Com-

mittee directs the Under Secretary of Defense (Research and Engineering) to provide a report to the congressional defense committees not later than 180 days after enactment of this act which details a plan for using increased resources to accelerate the trusted microelectronics strategy and roadmap. The report shall also include a definition of the scope of the microelectronics problem; an update on domestic manufacturing capability and infrastructure needed to provide legacy and future chips for our weapons systems; and testing protocols that the Department is utilizing to ensure current microelectronics have achieved security assurance.

Artificial Intelligence.—The Committee understands the importance of investing in high priority advanced technology areas such as artificial intelligence [AI] and machine learning in order to maintain the United States' military superiority and technological edge over near-peer adversaries. Accordingly, the Committee adds \$308,000,000 in addition to amounts requested in the fiscal year 2019 budget submission to achieve dominant AI capabilities, including an additional \$150,000,000 for the algorithmic warfare cross function team also known as Project Maven and \$83,000,000 to establish a Joint Artificial Intelligence Center. The Committee believes these critical investments will accelerate the pursuit of state of the art AI systems that can be rapidly adapted to the warfighting mission needs of the Department. Therefore, the Committee directs the Under Secretary of Defense (Research and Engineering) to brief the congressional defense committees with a comprehensive plan to execute additional funding provided for AI and machine learning not later than 180 days after enactment of this act and strongly encourages the Department to establish long-term, strategic partnerships with non-traditional defense contractors that operate outside of the traditional defense industrial base.

Short-Wave Infrared Cameras.—The Committee is aware of recent advances in ultra-fast short-wave infrared camera technology that rapidly capture images and detect threats with extreme sensitivity and precision. New advances in machine vision, powered by rapidly growing artificial intelligence and neuromorphic technologies can absorb and process data at much higher rates. The Committee encourages the Secretary of Defense to increase its research investments into these areas with the goal of creating new threat identification systems.

Manufacturing Technology Program.—The Committee understands that metal castings play a significant role in ensuring warfighter preparedness and that investment is needed in castings technology to maintain technological superiority in the advanced manufacturing industry. Therefore, the Committee provides an additional \$5,000,000 for the Manufacturing Technology Program and encourages the Secretary of Defense to invest in metal castings technology.

All Solid-State Battery Technology.—The Committee recognizes that development of all solid-state battery technology could dramatically increase the energy density of current batteries while providing a safer power system by eliminating the need for a flammable electrolyte and reducing the complexity of the battery management system. Batteries with higher energy densities would improve a soldier's warfighting capability by reducing the weight of

multiple batteries required for combat operations. The Committee encourages the Secretary of Defense to continue investments that improve battery densities thereby reducing the weight carried by soldiers in the field.

Strategic and Critical Minerals.—The Committee understands that the United States is reliant on the importation of strategic and critical minerals that are essential to national defense and believes that the Department of Defense should be integrated into the comprehensive Federal strategy as directed by Executive Order 13817. Therefore, the Committee directs the Under Secretary of Defense (Research and Engineering) and the Director of the Defense Logistics Agency to produce a joint report to the congressional defense committees not later than 180 days after enactment of this act which details Department of Defense acquisition programs that require strategic and critical minerals, foreign sources of these minerals, and current supply levels of critical minerals in US stockpiles available for Department usage. In addition, the report should describe Department agencies that are capable of performing topographic, geologic, and geophysical mapping of the United States and a list of strategic and critical minerals that should be prioritized for mapping in order to enhance supply chain security.

Manufacturing Engineering Programs.—The Committee recognizes that the United States must maintain a technically trained workforce to meet the defense industrial base requirements of the Department of Defense. Therefore, the Committee recommends an additional \$5,000,000 above the fiscal year 2019 President’s budget request for manufacturing engineering grants and encourages the Secretary of Defense to prioritize funding under this program to support community colleges and technical schools.

National Defense Education Program.—The Committee understands that the Nation’s global economic competitiveness and national security are dependent on a strong foundation in science, technology, engineering and math and believes that increased investment is needed by the Department in these fields. Therefore, the Committee provides an increase in basic research funds for the National Defense Education Program and encourages the Department to partner with the Goldwater Foundation for additional education scholarships.

OPERATIONAL TEST AND EVALUATION, DEFENSE

Appropriations, 2018	\$210,900,000
Budget estimate, 2019	221,009,000
Committee recommendation	381,009,000

The Committee recommends an appropriation of \$381,009,000. This is \$160,000,000 above the budget estimate.

COMMITTEE RECOMMENDED ADJUSTMENTS

The following table details the adjustments recommended by the Committee:

[In thousands of dollars]

Line	Item	2019 budget estimate	Committee recommendation	Change from budget estimate
1	Operational Test and Evaluation	85,685	85,685	.....
2	Live Fire Test and Evaluation	64,332	64,332	.....
3	Operational Test Activities and Analyses	70,992	230,992	+ 160,000
	Program increase for T&E infrastructure .....	.....	.....	+ 150,000
	Program increase: Advanced satellite navigation receiver .....	.....	.....	+ 10,000
	Total, Operational Test and Evaluation, Defense	221,009	381,009	+ 160,000

Cyber Red Team Testing.—The Committee recognizes the Department's efforts to enhance and develop cyber threat emulation capabilities through the use of cyber Red Teams. The Committee is concerned with the volume of cyber intrusions that threaten our weapons systems and remains concerned with the inability of the Department of Defense to get ahead of this constant evolving threat. Therefore, the Committee directs the Director, Office of Operational Test and Evaluation, in consultation with the Secretary of Defense, to provide a report to the congressional defense committees not later than 90 days of enactment of this act on the cyber vulnerabilities of the nation's critical weapons systems. The classified report should outline the identified threats along with the resources required to mitigate such threats. Further, in cases where vulnerabilities were determined for a weapons system, the Director shall provide an explanation of what actions have been taken to date to address such deficiencies.