FROM: Gregory Wischer

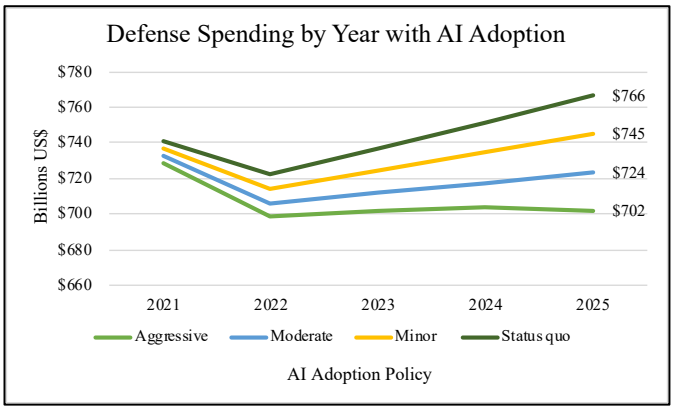
DATE: 15 December 2020

RE: **AI Solutions to DoD Budget Cuts: Options, Feasibility, and Risks**

Overview

AI Adoption Policy Savings FY2021–25 (billions US$)	
Aggressive	181.1
Moderate	125.1
Minor	62.6
Status quo	0

- **Key point**: The US Defense Department (DoD) will likely face budget constraints resulting from COVID-19 relief spending, but DoD can mitigate cuts to key capabilities with savings generated by enterprise artificial intelligence (AI) systems in back office operations.[1]
- **Situation:** The US Government (USG) has spent nearly $4 trillion on economic relief measures[2]—with likely another $908 billion soon.[3] The DoD will likely face spending cuts amidst higher spending needs:
  - **Decreased budget:** (1) overall DoD spending cuts and (2) public health prioritization at DoD
  - **Increased needs:** (1) non-China defense supply chains and (2) military modernization
- **Risk:** Budget cuts to key military platforms and technology will weaken US strength vis-à-vis China.
- **Solution:** Increase efficiency, leading to increased savings and productivity**.**
- **Policy option:** Adopt AI across DoD's Core Business Operations (i.e., overhead), which compose around 20 percent of the annual defense budget.
- **Feasibility:** AI adoption aligns with DoD's mission, but it faces institutional resistance.
- **Concerns:** If DoD AI acquisition does not require access to companies' AI source code or algorithm design, DoD will be exposed to security risks from both nation states and private actors. DoD needs to bolster processes for AI verification, validation, testing, and evaluation.



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[1] Danielle C. Tarraf et al., *The Department of Defense Posture for Artificial Intelligence: Assessment and Recommendations* (Santa Monica, CA: RAND Corporation, 2019), 25, https://www.rand.org/content/dam/rand/pubs/research_reports/RR4200/RR4229/RAND_RR4229.pdf. Enterprise artificial intelligence includes AI "where the tempo for information-processing and decisionmaking is relatively relaxed; and where, should failures occur, recovering from them should be possible with limited lasting damage."

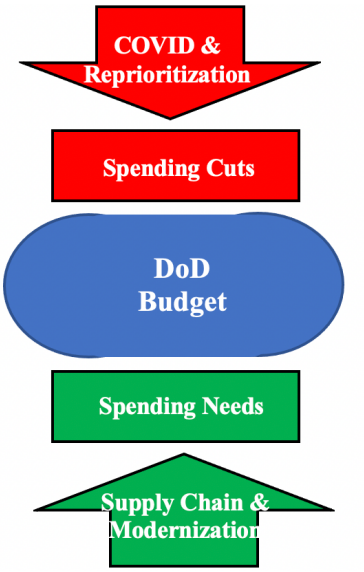
[2] Peter Whoriskey, Douglas MacMillan and Jonathan O'Connell, " 'Doomed to Fail': Why a $4 Trillion Bailout Couldn't Revive the American Economy," *Washington Post*, October 5, 2020, https://www.washingtonpost.com/graphics/2020/business/coronavirus-bailout-spending/.

[3] Jeff Stein, "What's in the $908 Billion Economic Relief Proposal," *Washington Post*, December 3, 2020, https://www.washingtonpost.com/us-policy/2020/12/03/what-is-in-congressional-bailout-deal-stimulus-checks/.

Background

DoD will likely face budget constraints stemming from COVID-19 relief spending. The USG has spent nearly $4 trillion[4]—with another $908 billion likely.[5] This spending and public health crisis will likely lead to overall defense budget cuts and possibly public health prioritization at DoD—amidst greater spending needs for non-China defense supply chains and military modernization.

Overall budget cuts. RAND Corporation states that economic relief spending "could have significant medium-term implications for the defense budget and that *there will be a need for the U.S. Department of Defense (DoD) to find efficiencies*."[6] If future defense sequestration tracks similar to defense cuts after the 2008–09 financial crisis, cuts will likely occur around 2023–24.[7]



Public health prioritization. Congress may divert defense spending toward pandemic-related DoD programs (e.g., pandemic preparedness, research) and away from traditional DoD programs.[8]

Non-China defense supply chains. The USG will likely face higher acquisition costs as a result of decoupling its supply chain links with China, increasing defense acquisition costs.[9]

Military modernization. DoD is pursuing major modernization programs to compete with China, including Battle Force 2045, which seeks to field 355 manned and unmanned ships by mid-2030 and 500 ships by 2045.[10]

Risks

Cuts to key capabilities will weaken US strength vis-à-vis China. Spending cuts could threaten US troop readiness, investment in key platforms and technologies, and the force posture shift from the Middle East to the Indo-Pacific. Michael Mazza, analyst at the American Enterprise Institute, writes, "Washington's longer-

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[4] Whoriskey, MacMillan and O'Connell, " 'Doomed to Fail.' "
[5] Stein, "Relief Proposal."
[6] Daniel Egel at al., "Defense Budget Implications of the COVID-19 Pandemic," *The RAND Blog*, April 7, 2020, https://www.rand.org/blog/2020/04/defense-budget-implications-of-the-covid-19-pandemic.html.
[7] Egel at al., "Defense Budget." After the Great Recession (2008–09) and significant economic stimulus, the Budget Control Act was enacted in August 2011, and defense sequestration began in January 2013.
[8] David Barno and Nora Bensahel, "After the Pandemic: America and National Security in a Changed World," *War on the Rocks*, March 31, 2020, https://warontherocks.com/2020/03/after-the-pandemic-america-and-national-security-in-a-changed-world/.
[9] Egel at al., "Defense Budget."
[10] David B. Larter and Aaron Mehta, "The Pentagon Is Eyeing a 500-Ship Navy, Documents Reveal," *Defense News*, September 24, 2020, https://www.defensenews.com/naval/2020/09/24/the-pentagon-is-eyeing-a-500-ship-navy-documents-reveal/. This includes an attack submarine force of 70–80 ships, an increase from the current force of 51. The Navy also has proposed cutting four aircraft carriers to free spending for more smaller ships.

term ability to effectively wage strategic competition with China will face constraints" if budgets are flat (less than 3 percent real annual growth).[11]

The DoD has traditionally held that 3–5 percent real growth is necessary to maintain US military modernization programs, particularly as the DoD shifts toward great power competition,[12] but General Mark Milley, chairman of the Joint Chiefs of Staffs, said he expects DoD's future budgets to experience only 2 percent annual real growth.[13]

Policy Options

DoD can mitigate cuts to key capabilities with savings generated by enterprise AI systems in back office operations.[14] DoD spends approximately 20 percent of its total budget on overhead,[15] which employs over 1 million people.[16] This includes its Core Business Operations—human resources; health-care management; supply chain and logistics; acquisition and procurement; and financial-flow management—that perform high automation potential activities.

DoD's Joint Artificial Intelligence Center states, "DoD business operations often rely on outdated technology or manually intensive, error prone, costly, and slow processes, resulting in a wealth of unexploited data resources, wasted labor hours, and gross inefficiencies. The potential for AI to transform DoD extends from the front lines to the back office."[17]

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[11] Michael Mazza, "COVID-19 and New Realities in the Taiwan Strait: Four Scenarios," American Enterprise Institute, March 25, 2020, https://www.aei.org/articles/covid-19-and-new-realities-in-the-taiwan-strait-four-scenarios/.

[12] Katie Bo Williams and Marcus Weisgerber, "Exclusive: Details Revealed in Trump's Lame-Duck Pentagon Budget Draft," *Defense One*, December 1, 2020, https://www.defenseone.com/policy/2020/12/exclusive-details-revealed-trumps-lame-duck-pentagon-budget-draft/170410/.

[13] Aaron Mehta, "Milley: Budget 'Reality Check' May Impact Foreign Exercises, Basing Plans," *Defense News*, December 2, 2020, https://www.defensenews.com/pentagon/2020/12/02/milley-budget-reality-check-may-impact-foreign-exercises-basing-plans/.

[14] Tarraf et al., *Posture for Artificial Intelligence*, 25.

[15] Craig Whitlock and Bob Woodward, "Pentagon Buries Evidence of $125 Billion in Bureaucratic Waste," *Washington Post*, December 5, 2016, https://www.washingtonpost.com/investigations/pentagon-buries-evidence-of-125-billion-in-bureaucratic-waste/2016/12/05/e0668c76-9af6-11e6-a0ed-ab0774c1eaa5_story.html; Defense Business Board, "Transforming DoD's Core Business Processes for Revolutionary Change," public meeting, January 22, 2015, 3, 6, 20, https://dbb.defense.gov/Portals/35/Documents/Meetings/2015/2015-01/CBP%20Task%20Group%20Out-brief%20Slides_FINAL.pdf. In August 2014, McKinsey & Company estimated that DoD spends $75–$100 billion annually, or 15–20 percent of total annual expenses on Core Business Operations (i.e., overhead). In June 2015, Navy Secretary Ray Mabus said that 20 percent of the defense budget went to "pure overhead." Notably, in January 2015, the Defense Business Board reported that DoD spends 22.8 percent of its annual budget on overhead. In FY2016, Core Business Operations were $133.1 billion, and the overall defense budget was $583.5 billion. The Defense Business Board identified $125 billion in possible savings over five years, largely from "early retirements and reducing services from contractors." The report also found $5–$9 billion in potential savings from IT Optimization productivity gains.

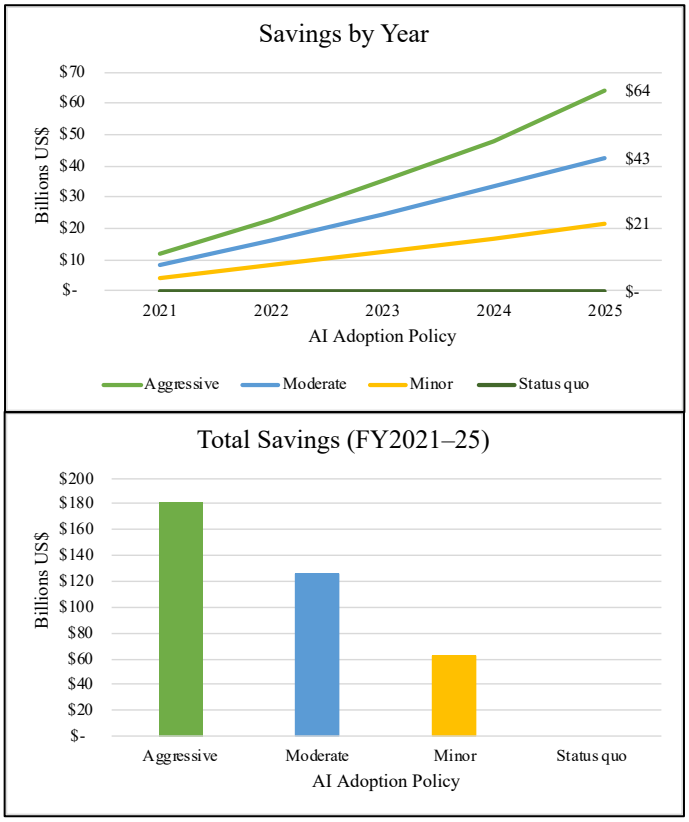
[16] Whitlock and Woodward, "Pentagon Buries Evidence"; Defense Business Board, "Transforming DoD's Core," 6. This included 298,000 military, 448,000 civilians, and 268,000 contractor personnel. The personnel totals were segmented by the following Core Business Operations: supply chain and logistics, 457,000; acquisition and procurement, 207,000; real property management, 192,000; human resources management, 192,000; financial flow management, 41,000; and healthcare management, 30,000.

[17] "Mission Initiatives: Business Process Transformation," Joint Artificial Intelligence Center, Department of Defense, accessed December 15, 2020, https://www.ai.mil/mi_business_process_transformation.html.

Notably, RAND assesses that **DoD can readily adopt commercially available enterprise AI.**[18] This includes AI-enabled human resources and financial management systems.[19] Importantly, these AI systems have already been widely deployed and proved effective. RAND notes, "Similar technology solutions could be adopted, tailored, or specifically developed, depending on DoD's needs."[20]

Savings. AI systems can perform peripheral tasks (e.g., filling out documents), middle-skilled tasks (e.g., clerking), and high-volume tasks (e.g., data entry),[21] enabling savings by downsizing personnel.[22]

Productivity. AI can increase productivity by granting employees more time on "core work." Federal employees spend 21 percent of work time on "supplemental work" (i.e., tasks with high automation potential).[23]



AI Adoption Options

DoD's Core Business Operations have an automation potential of 35–43 percent.[24] Subsequently, DoD's savings will vary based on how quickly and to what extent it adopts enterprise AI systems. The following options have different AI adoption rates and consequently savings. See the figures on the right for savings potential. For in-depth information on the calculation method, see the Appendix.

- **Aggressive:** DoD adopts AI at 100 percent of automation potential by end of year FY2025.
- **Moderate:** DoD adopts AI at 66 percent of automation potential by the end of year FY2025.
- **Minor**: DoD adopts AI at 33 percent of automation potential by the end of year FY2025.
- **Status quo:** DoD does not adopt any AI between FY2021–25.

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[18] Tarraf et al., *Posture for Artificial Intelligence*, 32–33. "Some enterprise AI applications currently represent low-hanging fruit for DoD."
[19] Tarraf et al., *Posture for Artificial Intelligence*, 25.
[20] Tarraf et al., *Posture for Artificial Intelligence*, 30.
[21] Peter Viechnicki and William D. Eggers, "How Much Time and Money Can AI Save Government?" Deloitte Center for Government Insight, April 26, 2017, 6, 9–13, https://www2.deloitte.com/content/dam/insights/us/articles/3834_How-much-time-and-money-can-AI-save-government/DUP_How-much-time-and-money-can-AI-save-government.pdf. "For both federal and state workers, by far the most time-consuming activity is documenting and recording information, a task capturing 10 percent of both federal and state government work hours."
[22] Downsizing includes layoffs and early retirements.
[23] Viechnicki and Eggers, "How Much Time," 8.
[24] James Manyika, *A Future That Works: Automation, Employment, and Productivity: Executive Summary* (New York: McKinsey & Company, January 2017), 7, https://www.mckinsey.com/~/media/mckinsey/featured%20insights/Digital%20Disruption/Harnessing%20automation%20for%20a%20future%20that%20works/MGI-A-future-that-works-Executive-summary.ash.

Feasibility

Mission alignment. AI adoption in DoD is mission-aligned. One of DoD's AI goals is "to leverage AI to achieve efficiency and cost savings in the Pentagon's business functions."[25] Furthermore, in June 2018, DoD created the Joint Artificial Intelligence Center, which seeks to "transform DoD business processes through AI technologies that unleash the strategic power of DoD's information to increase productivity and reduce costs."[26]

Institutional opposition. AI adoption faces institutional opposition. Job cuts and smaller intra-department budgets will likely face bureaucratic hurdles. RAND says adoption "requires large organizational shifts and commitment from leadership rather than incremental changes."[27] However, DoD military leadership appears willing to adopt systems that create savings. When asked about potential budget cuts, General Milley said, "Hard looks, real hard looks at everything that we do, I think is warranted."[28]

Concerns

Adopting commercially available AI systems creates risks related to verification, validation, testing, and evaluation.

- Verification and validation analyzes the AI system's design to determine safety.[29]
- Testing and evaluation tests the AI system against mission requirements to determine performance.[30]

Due to intellectually property concerns, companies may be unwilling to pursue DoD AI contracts that require source code and algorithm disclosure.[31] If DoD AI acquisition does not require access to companies' AI source code or algorithm design, DoD will be exposed to security risks from both nation states and private actors that could expose DoD back office operations, which encompass classified and personal identifying information. RAND notes, "The current state of AI VVT&E is nowhere close to ensuring the performance and safety of AI applications."[32] DoD needs to bolster processes for AI verification, validation, testing, and evaluation before it can safely acquire and employ enterprise AI systems.

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[25] Tarraf et al., *Posture for Artificial Intelligence*, 2.
[26] "Mission Initiatives," Joint Artificial Intelligence Center; "Leading the JAIC's Intelligent Business Automation, Augmentation, and Analytics Mission Initiative, Joint Artificial Intelligence Blog, March 4, 2020, https://www.ai.mil/blog_03_04_20.html. Rachael Martin, lead for the Joint Artificial Intelligence Center's Intelligent Business Automation, Augmentation, and Analytics Mission Initiative, said, "Recent advances in automation and AI afford us the opportunity to transform the Department's industrial-age bureaucratic processes into digital workstreams that realizes cost savings and delivers more impactful support to the warfighter."
[27] Tarraf et al., *Posture for Artificial Intelligence*, 38. "In sum, pursuing enterprise AI at scale would require appropriate investments in both enterprise AI use cases and applications and significant investments in infrastructure and enablers."
[28] Mehta, "Milley."
[29] Tarraf et al., *Posture for Artificial Intelligence*, 36.
[30] Tarraf et al., *Posture for Artificial Intelligence*, 36.
[31] Tarraf et al., *Posture for Artificial Intelligence*, 115.
[32] Tarraf et al., *Posture for Artificial Intelligence*, 36.

Appendix

My original memo detailed the challenge of DoD AI acquisition. However, DoD recently announced a new streamlined software acquisition process. It is unknown whether this will apply to AI acquisition, although it is possible. Read below about DoD's AI acquisition troubles and the new software acquisition process.

RAND noted the following about the AI acquisition process:

> A recurring concern among these interviewees were DoD's acquisitions processes, which date back to the Cold War and were designed with hardware, not software, in mind.7 One interviewee noted that even rapid acquisition can actually take up to two years, and another estimated that those processes have left the United States some two decades behind other major AI players in securing and incorporating the latest advances. Several interviewees stated that DoD could adopt AI technologies more quickly and enhance its ability to secure industry partners were it to procure those technologies in accordance with existing commercial standards. One interviewee noted that DoD too often ends up creating onerous adoption requirements that, when enacted, already lag their industry counterparts by five years, and another noted that DoD should consider treating AI technologies like perishable goods that might well have wilted by the time they have been acquired.[33]

Defense Acquisition University issued the following press release on October 8, 2020:

> On October 2nd, Ms. Ellen Lord, Under Secretary of Defense for Acquisition and Sustainment, issued DODI 5000.87, the Department of Defense policy for "Operation of the Software Acquisition Pathway". Improved software acquisition is critical for our ability to deliver capabilities to the Warfighter and succeed in an era of Great Power Competition. This new pathway enables the Department of Defense to acquire software with modern software development practices and deliver performance at the speed of relevance in support of the National Defense Strategy. It promotes and streamlines adoption of Agile, Lean, DevSecOps, and human-centered design practices within defense acquisition.[34]

Calculation Method

In order to calculate spending and savings from AI adoption, I first assessed DoD's total back office expenditures. In August 2014, McKinsey & Company estimated that DoD spends $75–$100 billion annually, or 15–20 percent of total annual expenses, on Core Business Operations.[35] In June 2015, Navy Secretary Ray Mabus said that 20 percent of the defense budget went to "pure overhead."[36] Then, in January 2015, the Defense Business Board reported that the DoD spends 22.8 percent of its annual budget on back office operations.[37] I used the 22.8 percent figure in my calculations.

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[33] Tarraf et al., *Posture for Artificial Intelligence*, 102.
[34] Sean Brady, "Faster is possible: DoD Publishes New Software Acquisition Policy," Defense Acquisition University, October 8, 2020, https://www.dau.edu/News/Faster-is-possible--DoD-Publishes-New-Software-Acquisition-Policy.
[35] Whitlock and Woodward, "Pentagon Buries Evidence."
[36] Whitlock and Woodward, "Pentagon Buries Evidence."
[37] Defense Business Board, "Transforming DoD's Core," 6. In FY2016, Core Business Operations were $133.1 billion, and the overall defense budget was $583.5 billion.

Using Defense Business Board figures, I then calculated each Core Business Operation's percent of the total Core Business Operation expenditure.

Core Business Operations	Definition	Spending (FY 2016)	Percentage of Core Business Ops Spending
Supply chain and logistics	supply, transport, logistics, and maintenance	$ 52,100,000,000	39.1%
Acquistiion and Proceurement	contracting and purchasing	$ 37,500,000,000	28.2%
real property management	maintenance of US miltiary bases worldwide	$ 22,600,000,000	17.0%
human-resources management	Military recruiting, civilian hiring, records and benefits administration	$ 11,400,000,000	8.6%
Financial-flow management	Payroll, budgets, accounting, and auditing	$ 5,400,000,000	4.1%
Healthcare management	healthcare policy, oversight and administration	$ 4,100,000,000	3.1%
	Total	$ 133,100,000,000	22.8%
	Total defense budget	$ 583,500,000,000	(Percentage of Total DoD Budget)

In order to forecast spending in FY2021–25, I calculated the total defense budget in each fiscal yeear. Public figures were available for FY2021–22 but not for FY2023–25. For the latter years, I used 2 percent year-over-year budget growth, which General Milley expects. I then calculated the total Core Business Operations spending for each fiscal year by multiplying the 22.8 percent annual overhead by each forecasted total defense budget.

After, I multiplied the forecasted total Core Business Operations by each individual Core Business Operation's percentage from FY2016.

Core Business Operations	Definition	Spending (FY2021)	Percentage of Core Business Ops Spending
Supply chain and logistics	supply, transport, logistics, and maintenance	$ 66,118,337,618	39.1%
Acquisition and procurement	contracting and purchasing	$ 47,589,974,293	28.2%
Real property management	maintenance of US military bases worldwide	$ 28,680,891,174	17.0%
Human-resources management	Military recruiting, civilian hiring, records and benefits administration	$ 14,467,352,185	8.6%
Financial-flow management	Payroll, budgets, accounting, and auditing	$ 6,852,956,298	4.1%
Health-care management	healthcare policy, oversight and administration	$ 5,203,170,523	3.1%
	Total	$ 168,912,682,091	22.8%
	Total defense budget	$ 740,500,000,000	(Percentage of Total DoD Budget)

Core Business Operations	Definition	Spending (FY2022)	Percentage of Core Business Ops Spending
Supply chain and logistics	supply, transport, logistics, and maintenance	$ 64,466,495,287	39.1%
Acquisition and procurement	contracting and purchasing	$ 46,401,028,278	28.2%
Real property management	maintenance of US military bases worldwide	$ 27,964,353,042	17.0%
Human-resources management	Military recruiting, civilian hiring, records and benefits administration	$ 14,105,912,596	8.6%
Financial-flow management	Payroll, budgets, accounting, and auditing	$ 6,681,748,072	4.1%
Health-care management	healthcare policy, oversight and administration	$ 5,073,179,092	3.1%
	Total	$ 164,692,716,367	22.8%
	Total defense budget	$ 722,000,000,000	(Percentage of Total DoD Budget)

Core Business Operations	Definition	Spending (FY2023)	Percentage of Core Business Ops Spending
Supply chain and logistics	supply, transport, logistics, and maintenance	$ 65,755,825,193	39.1%
Acquisition and procurement	contracting and purchasing	$ 47,329,048,843	28.2%
Real property management	maintenance of US military bases worldwide	$ 28,523,640,103	17.0%
Human-resources management	Military recruiting, civilian hiring, records and benefits administration	$ 14,388,030,848	8.6%
Financial-flow management	Payroll, budgets, accounting, and auditing	$ 6,815,383,033	4.1%
Health-care management	healthcare policy, oversight and administration	$ 5,174,642,674	3.1%
	Total	$ 167,986,570,694	22.8%
	Total defense budget	$ 736,440,000,000	(Percentage of Total DoD Budget)

Core Business Operations	Definition	Spending (FY2024)	Percentage of Core Business Ops Spending
Supply chain and logistics	supply, transport, logistics, and maintenance	$ 67,070,941,697	39.1%
Acquisition and procurement	contracting and purchasing	$ 48,275,629,820	28.2%
Real property management	maintenance of US military bases worldwide	$ 29,094,112,905	17.0%
Human-resources management	Military recruiting, civilian hiring, records and benefits administration	$ 14,675,791,465	8.6%
Financial-flow management	Payroll, budgets, accounting, and auditing	$ 6,951,690,694	4.1%
Health-care management	healthcare policy, oversight and administration	$ 5,278,135,527	3.1%
	Total	$ 171,346,302,108	22.8%
	Total defense budget	$ 751,168,800,000	(Percentage of Total DoD Budget)

Core Business Operations	Definition	Spending (FY2025)	Percentage of Core Business Ops Spending
Supply chain and logistics	supply, transport, logistics, and maintenance	$ 68,412,360,531	39.1%
Acquisition and procurement	contracting and purchasing	$ 49,241,142,416	28.2%
Real property management	maintenance of US military bases worldwide	$ 29,675,995,163	17.0%
Human-resources management	Military recruiting, civilian hiring, records and benefits administration	$ 14,969,307,295	8.6%
Financial-flow management	Payroll, budgets, accounting, and auditing	$ 7,090,724,508	4.1%
Health-care management	healthcare policy, oversight and administration	$ 5,383,698,238	3.1%
	Total	$ 174,773,228,150	22.8%
	Total defense budget	$ 766,192,176,000	(Percentage of Total DoD Budget)

Next, I calculated automation savings. I consulted McKinsey & Company's report on AI automation, *A Future That Works: Automation, Employment, and Productivity: Executive Summary*, and applied the report's automation potential percentages to each Core Business Operation.

Core Business Operations	Sector by Activity Type	Automation Potential %
Supply chain and logistics	Professionals	35
Acquisition and procurement	Rrofessionals	35
Real property management	Real estate	40
Human-resources management	Administrative	39
Financial-flow management	Finance and insurance	43
Health-care management	Administrative	39

The automation potential percentage represents full AI maximization when applied to each Core Business Operation by the end of FY2025. For example, if aggressive AI adoption occurs for "Supply chain and logistics," FY2025 savings will be 35 percent less than the status quo "Supply chain and logistics" in FY2025. As immediately adopting full AI maximization is impossible, I used a gradual linear adoption model. For instance, if aggressive AI adoption occurs for "Supply chain and logistics," AI savings will be 7 percent in FY2021, 14 percent in FY2022, 21 percent in FY2023, 28 percent in FY2024, and 35 percent in FY2025. In short, the AI savings percentage corresponds to the automation percentage. Although I use a linear model, AI adoption rates in reality are sporadic, and savings would fluctuate accordingly.

Aggressive (Maximization)			Moderate (67% of Maximization)			Minor (33% of Maximization)		
Automation %	Spending (FY2021)	Savings (FY2021)	Automation %	Spending (FY2021)	Savings (FY2021)	Automation %	Spending (FY2021)	Savings (FY2021)
7.00%	$ 61,490,053,985	$4,628,283,633	4.67%	$ 63,032,815,196	$3,085,522,422	2.33%	$ 64,575,576,407	$1,542,761,211
7.00%	$ 44,258,676,093	$3,331,298,201	4.67%	$ 45,369,108,826	$2,220,865,467	2.33%	$ 46,479,541,560	$1,110,432,734
5.70%	$ 27,046,080,377	$1,634,810,797	5.33%	$ 27,151,243,645	$1,529,647,529	2.67%	$ 27,916,067,409	$764,823,765
7.80%	$ 13,338,898,715	$1,128,453,470	5.20%	$ 13,715,049,871	$752,302,314	2.60%	$ 14,091,201,028	$376,151,157
8.60%	$ 6,263,602,057	$589,354,242	5.73%	$ 6,460,053,470	$392,902,828	2.87%	$ 6,656,504,884	$196,451,414
7.80%	$ 4,797,323,222	$405,847,301	5.20%	$ 4,932,605,656	$270,564,867	2.60%	$ 5,067,888,089	$135,282,434
Total	**$ 157,194,634,447**	**$ 11,718,047,644**	**Total**	**$ 160,660,876,664**	**$ 8,251,805,427**	**Total**	**$ 164,786,779,377**	**$ 4,125,902,714**
Automation %	Spending (FY2021)	Savings (FY2021)	Automation %	Spending (FY2023)	Savings (FY2023)	Automation %	Spending (FY2023)	Savings (FY2023)
14.00%	$ 55,441,185,947	$9,025,309,340	9.33%	$ 58,449,622,394	$6,016,872,893	4.67%	$ 61,458,058,840	$3,008,436,447
14.00%	$ 39,904,884,319	$6,496,143,959	9.33%	$ 42,070,265,638	$4,330,762,639	4.67%	$ 44,235,646,958	$2,165,381,320
11.40%	$ 24,776,416,795	$3,187,936,247	10.67%	$ 24,981,488,718	$2,982,864,324	5.33%	$ 26,472,920,880	$1,491,432,162
15.60%	$ 11,905,390,231	$2,200,522,365	10.40%	$ 12,638,897,686	$1,467,014,910	5.20%	$ 13,372,405,141	$733,507,455
17.20%	$ 5,532,487,404	$1,149,260,668	11.47%	$ 5,915,574,293	$766,173,779	5.73%	$ 6,298,661,183	$383,086,889
15.60%	$ 4,281,763,153	$791,415,938	10.40%	$ 4,545,568,466	$527,610,626	5.20%	$ 4,809,373,779	$263,805,313
Total	**$ 141,842,127,849**	**$ 22,850,588,518**	**Total**	**$ 148,601,417,195**	**$ 16,091,299,172**	**Total**	**$ 156,647,066,781**	**$ 8,045,649,586**
Automation %	Spending (FY2023)	Savings (FY2023)	Automation %	Spending (FY2023)	Savings (FY2023)	Automation %	Spending (FY2023)	Savings (FY2023)
21.00%	$ 51,947,101,902	$13,808,723,290	14.00%	$ 56,550,009,666	$9,205,815,527	7.00%	$ 61,152,917,429	$4,602,907,763
21.00%	$ 37,389,948,586	$9,939,100,257	14.00%	$ 40,702,982,005	$6,626,066,838	7.00%	$ 44,016,015,424	$3,313,033,419
17.10%	$ 23,646,097,645	$4,877,542,458	16.00%	$ 23,959,857,686	$4,563,782,416	8.00%	$ 26,241,748,895	$2,281,891,208
23.40%	$ 11,021,231,630	$3,366,799,219	15.60%	$ 12,143,498,036	$2,244,532,812	7.80%	$ 13,265,764,442	$1,122,266,406
25.80%	$ 5,057,014,211	$1,758,368,823	17.20%	$ 5,643,137,152	$1,172,245,882	8.60%	$ 6,229,260,093	$586,122,941
23.40%	$ 3,963,776,288	$1,210,866,386	15.60%	$ 4,367,398,416	$807,244,257	7.80%	$ 4,771,020,545	$403,622,129
Total	**$ 133,025,170,262**	**$ 34,961,400,432**	**Total**	**$ 143,366,882,961**	**$ 24,619,687,733**	**Total**	**$ 155,676,726,828**	**$ 12,309,843,866**
Automation %	Spending (FY2024)	Savings (FY2024)	Automation %	Spending (FY2024)	Savings (FY2024)	Automation %	Spending (FY2024)	Savings (FY2024)
28.00%	$ 48,291,078,022	$18,779,863,675	18.67%	$ 54,551,032,580	$12,519,909,117	9.33%	$ 60,810,987,138	$6,259,954,558
28.00%	$ 34,758,453,470	$13,517,176,350	18.67%	$ 39,264,178,920	$9,011,450,900	9.33%	$ 43,769,904,370	$4,505,725,450
22.80%	$ 22,460,655,163	$6,633,457,742	21.33%	$ 22,887,368,819	$6,206,744,086	10.67%	$ 25,990,740,862	$3,103,372,043
31.20%	$ 10,096,944,528	$4,578,846,937	20.80%	$ 11,623,226,841	$3,052,564,625	10.40%	$ 13,149,509,153	$1,526,282,312
34.40%	$ 4,560,309,095	$2,391,381,599	22.93%	$ 5,357,436,295	$1,594,254,399	11.47%	$ 6,154,563,494	$797,127,200
31.20%	$ 3,631,357,243	$1,646,778,284	20.80%	$ 4,180,283,337	$1,097,852,190	10.40%	$ 4,729,209,432	$548,926,095
Total	**$ 123,798,797,521**	**$ 47,547,504,587**	**Total**	**$ 137,863,526,792**	**$ 33,482,775,316**	**Total**	**$ 154,604,914,450**	**$ 16,741,387,658**

Automation %	Spending (FY2025)	Savings (FY2025)	Automation %	Spending (FY2025)	Savings (FY2025)	Automation %	Spending (FY2025)	Savings (FY2025)
35.00%	$ 44,468,034,345	$23,944,326,186	23.33%	$ 52,449,476,407	$15,962,884,124	11.67%	$ 60,430,918,469	$7,981,442,062
35.00%	$ 32,006,742,571	$17,234,399,846	23.33%	$ 37,751,542,519	$11,489,599,897	11.67%	$ 43,496,342,468	$5,744,799,949
40.00%	$ 17,805,597,098	$11,870,398,065	26.67%	$ 21,762,396,453	$7,913,598,710	13.33%	$ 25,719,195,808	$3,956,799,355
39.00%	$ 9,131,277,450	$5,838,029,845	26.00%	$ 11,077,287,398	$3,892,019,897	13.00%	$ 13,023,297,346	$1,946,009,948
43.00%	$ 4,041,712,970	$3,049,011,538	28.67%	$ 5,058,050,149	$2,032,674,359	14.33%	$ 6,074,387,328	$1,016,337,179
39.00%	$ 3,284,055,925	$2,099,642,313	26.00%	$ 3,983,936,696	$1,399,761,542	13.00%	$ 4,683,817,467	$699,880,771
Total	**$ 110,737,420,358**	**$ 64,035,807,793**	**Total**	**$ 132,082,689,622**	**$ 42,690,538,528**	**Total**	**$ 153,427,958,886**	**$ 21,345,269,264**
5-year total	**$ 666,598,150,437**	**$ 181,113,348,973**	**5-year total**	**$ 722,575,393,234**	**$ 125,136,106,176**	**5-year total**	**$ 785,143,446,322**	**$ 62,568,053,088**

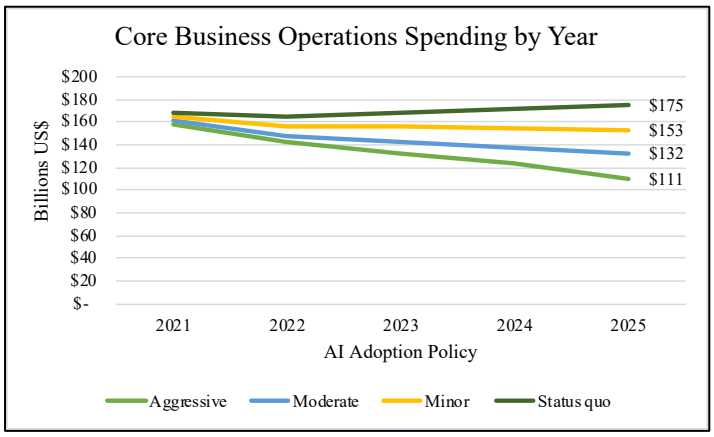
I then used different combinations of the above figures to distill key indicators, which are listed below.

Overall Defense Spending w/ AI Adoption					
Policy Option	2021	2022	2023	2024	2025
Aggressive	$ 728,781,952,356	$ 699,149,411,482	$ 701,478,599,568	$ 703,621,295,413	$ 702,156,368,207
Moderate	$ 732,248,194,573	$ 705,908,700,828	$ 711,820,312,267	$ 717,686,024,684	$ 723,501,637,472
Minor	$ 736,374,097,286	$ 713,954,350,414	$ 724,130,156,134	$ 734,427,412,342	$ 744,846,906,736
Status quo	$ 740,500,000,000	$ 722,000,000,000	$ 736,440,000,000	$ 751,168,800,000	$ 766,192,176,000

Core Business Operations Spending					
Policy Option	2021	2022	2023	2024	2025
Aggressive	$ 157,194,634,447	$ 141,842,127,849	$ 133,025,170,262	$ 123,798,797,521	$ 110,737,420,358
Moderate	$ 160,660,876,664	$ 148,601,417,195	$ 143,366,882,961	$ 137,863,526,792	$ 132,082,689,622
Minor	$ 164,786,779,377	$ 156,647,066,781	$ 155,676,726,828	$ 154,604,914,450	$ 153,427,958,886
Status quo	$ 168,912,682,091	$ 164,692,716,367	$ 167,986,570,694	$ 171,346,302,108	$ 174,773,228,150

Savings					
Policy Option	2021	2022	2023	2024	2025
Aggressive	$ 11,718,047,644	$ 22,850,588,518	$ 34,961,400,432	$ 47,547,504,587	$ 64,035,807,793
Moderate	$ 8,251,805,427	$ 16,091,299,172	$ 24,619,687,733	$ 33,482,775,316	$ 42,690,538,528
Minor	$ 4,125,902,714	$ 8,045,649,586	$ 12,309,843,866	$ 16,741,387,658	$ 21,345,269,264
Status quo	$ -	$ -	$ -	$ -	$ -

AI Adoption Policy (FY2021–25) (billions US$)		
Policy Option	Spending	Savings
Aggressive	$ 666,598,150,437	$ 181,113,348,973
Moderate	$ 722,575,393,234	$ 125,136,106,176
Minor	$ 785,143,446,322	$ 62,568,053,088
Status quo	$ 847,711,499,410	$ -



The above calculations for automation potential and corresponding AI savings for Core Business Operations are reasonable. In April 2017, Deloitte calculated that aggressive AI adoption would generate 27–30 percent in time savings, and corresponding material savings, within 5–7 years.[38] The report adds, "Since IT costs continue to plummet and cognitive technologies are developing rapidly, even the high-end scenario may be within reach."[39] Furthermore, the report analyzed the *entire* federal government, not solely back office operations which have higher automation potential. Consequently, AI savings in Core Business Operations will be higher than 30 percent and closer to McKinsey & Company's automation potential percentages that are used above.

[38] Viechnicki and Eggers, "How Much Time," 3.
[39] Viechnicki and Eggers, "How Much Time," 15.