

United States Government Accountability Office

Testimony Before the Committee on House Administration, House of Representatives

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ARTIFICIAL INTELLIGENCE

GAO's Work to Leverage Technology and Ensure Responsible Use

Statement of Taka Ariga, Chief Data Scientist and Director of Innovation Lab, Science, Technology Assessment, and Analytics

GAO Highlights

Highlights of GAO-24-107237, a testimony before the Committee on House Administration, House of Representatives

Why GAO Did This Study

Al, in general, refers to computer systems that can solve problems and perform tasks that have traditionally required human intelligence. Many federal agencies are using or planning to use Al, through applications such as facial recognition, automated email responses, and enhanced user experience on websites. At the same time, Al capabilities continue to expand in areas such as medical diagnostics, image generation, and emulating human writing styles.

This testimony describes how GAO (1) plans to use AI internally to enhance effectiveness and efficiency across its mission and operations and (2) supports Congress through oversight of federal use of AI and foresight on its wider implementation.

GAO performed the work on which this testimony is based in accordance with all applicable sections of GAO's Quality Assurance Framework.

January 2024

ARTIFICIAL INTELLIGENCE

GAO's Work to Leverage Technology and Ensure Responsible Use

What GAO Found

GAO is exploring internal use of artificial intelligence (AI) to make its work for Congress and taxpayers more efficient, in-depth, and effective. For example, GAO recently began deployment of a large language model to explore generative AI capabilities similar to those found in industry, supplemented with GAO-specific information and security. Among other capabilities, this prototype will also support other use cases to help efficiently synthesize past reports, assist with editorial review, and scan congressional documents for mandated work for GAO. By developing these tools, GAO is also gaining insight into the benefits and risks of AI, which will help GAO evaluate other agencies' use and better provide technical assistance to Congress. See the table for details on eight AI use cases GAO is currently exploring.

List of Artificial Intelligence Use Cases GAO Is Exploring as of January 2024		
Use case	Potential benefits	
Organizes large volumes of text, such as public comments from Regulations.gov	Groups contents by similar themes Prioritizes reviews based on relevant hierarchical topics	
Summarizes draft GAO legislative mandates	Increases efficiency and reduces manual processes	
	Highlights potentially fragmented and duplicative mandates	
Assists with copyediting according to GAO's style guide	Automates select copyediting tasks	
	Enables staff to focus on narrative structure and clarity	
Provides automated responses to chat questions on published GAO work	Summarizes published GAO contents to enhance knowledge management and increase efficiency	
	Enhances specificity and accuracy of results	
Summarizes qualitative	Identifies trends, patterns, and sentiments quickly	
responses from annual GAO Employee Experience Survey	Improves survey interpretation with less manual intervention	
	Assists with root-cause analyses	
Monitors information about congressional committee calendars, press releases, and web contents	Matches congressional interests with relevant GAO work Enhances timeliness of outreach and technical assistance	
Enhances GAO auditing through use of extended reality glasses	Improves data collection and collaboration across locations	
	Reduces costs and risks	
	Enables new data capturing and analysis opportunities	
Triages IT help desk requests and answers internal GAO policy questions	Provides 24/7 self-service assistance to GAO employees	
	Allows support staff to focus on more complex requests	

Source: GAO. | GAO-24-107237

Note: For the full list of use cases, updated periodically, see www.gao.gov/science-technology/artificial-intelligence-use-cases.

View GAO-24-107237. For more information, contact Taka Ariga at (202) 512-6888 or ArigaT@gao.gov.

Al also remains a top priority for many congressional committees and offices. GAO therefore has a robust body of work to meet Congress's need for information on Al's promise and risks. Since 2018, GAO has issued nearly 50 products on Al. It currently has 20 ongoing projects on Al with many more planned, including two technology assessments and one performance audit on generative AI. For example, in a landmark December 2023 report, GAO reviewed the implementation of AI at major federal agencies and made 35 recommendations to 19 agencies to fully implement federal AI requirements. In addition, in 2021, GAO published *Artificial Intelligence: An Accountability Framework for Federal Agencies and Other Entities*, identifying 31 key practices to help ensure accountability and responsible use of AI. GAO's AI use cases are built upon this framework. The following is a selection of GAO AI-related products:

Cybersecurity and Privacy

Facial Recognition Services: Federal Law Enforcement Agencies Should Take Actions to Implement Training, and Policies for Civil Liberties. GAO-23-105607. September 5, 2023.

Facial Recognition: CBP and TSA are Taking Steps to Implement Programs, but CBP Should Address Privacy and System Performance Issues. GAO-20-568. September 2, 2020.

Facial Recognition Technology: Privacy and Accuracy Issues Related to Commercial Uses. GAO-20-522. July 13, 2020.

AI Opportunities and Challenges

Artificial Intelligence in Natural Hazard Modeling: Severe Storms, Hurricanes, Floods, and Wildfires. GAO-24-106213. December 14, 2023.

Generative AI (Science & Tech Spotlight). GAO-23-106782. June 13, 2023.

Digital Twins: Virtual Models of People and Objects. (Science & Tech Spotlight). GAO-23-106453. February 14, 2023.

Federal Research and Management

Artificial Intelligence: Agencies Have Begun Implementation but Need to Complete Key Requirements. GAO-24-105980. December 12, 2023.

Artificial Intelligence: DOD Needs Department-Wide Guidance to Inform Acquisitions. GAO-23-105850. June 29, 2023.

Artificial Intelligence: DOD Should Improve Strategies, Inventory Process, and Collaboration Guidance. GAO-22-105834. March 30, 2022.

Federal Workforce

Artificial Intelligence: Actions Needed to Improve DOD's Workforce Management GAO-24-105645. December 14, 2023.

FAA Workforce: Better Assessing Employees' Skill Gaps Could Help FAA Prepare for Changes in Technology. GAO-21-310. May 13, 2021.

Automated Technologies: DOT Should Take Steps to Ensure Its Workforce Has Skills Needed to Oversee Safety. GAO-21-197. December 18, 2020.

Defense and Law Enforcement

Information Environment: Opportunities and Threats to DOD's National Security Mission. GAO-22-104714. September 21, 2022.

Artificial Intelligence: Status of Developing and Acquiring Capabilities for Weapon Systems. GAO-22-104765. February 17, 2022.

Forensic Technology: Algorithms Strengthen Forensic Analysis, but Several Factors Can Affect Outcomes. GAO-21-435SP. July 06, 2021.

Chairman Steil, Ranking Member Morelle, and Members of the Committee:

Thank you for the opportunity to discuss GAO's work on artificial intelligence (AI). My testimony today summarizes how GAO (1) plans to use AI internally to enhance effectiveness and efficiency across our mission and operations and (2) supports Congress through oversight of federal use of AI and foresight on its wider implementation, while ensuring we have the diversified expertise to support Congress as AI continues to evolve.

Al, in general, refers to computer systems that can solve problems and perform tasks that have traditionally required human intelligence. Machine learning techniques typically underpin AI capabilities and have seen many recent improvements. This type of AI begins by looking for patterns in data—generally large amounts of data—and infers rules or procedures that aim to predict outcomes. Many federal agencies are using or planning to use AI, through applications such as facial recognition, automated email responses, and chatbots. At the same time, AI capabilities continue to expand in areas such as medical diagnostics, image generation, and emulating human writing styles.¹

In recognition of the opportunities and risks of AI, in 2021, GAO published *Artificial Intelligence: An Accountability Framework for Federal Agencies and Other Entities*.² In the framework, we highlighted that, given the rapid pace at which AI is evolving, the federal government cannot afford to be reactive to AI's complexities, risks, and societal consequences. We identified 31 key practices to help ensure accountability and responsible AI use by federal agencies and other entities. These include ensuring systems are documented, designed, and governed appropriately for their intended uses; meeting industry standards; and recruiting and retaining personnel with the necessary multidisciplinary skills and experiences in design, development, deployment, assessment, and monitoring.

¹See for example: GAO, Artificial Intelligence: Agencies Have Begun Implementation but Need to Complete Key Requirements, GAO-24-105980 (Washington, D.C.: Dec. 12, 2023); Artificial Intelligence in Health Care: Benefits and Challenges of Machine Learning Technologies for Medical Diagnostics, GAO-22-104629 (Washington, D.C.: Sept. 29, 2022); Science & Tech Spotlight: Deepfakes, GAO-20-379SP (Washington, D.C.: Feb. 20, 2020); and Science & Tech Spotlight: Generative AI, GAO-23-106782 (Washington, D.C.: June 13, 2023).

²GAO, Artificial Intelligence: An Accountability Framework for Federal Agencies and Other Entities, GAO-21-519SP (Washington, D.C.: June 30, 2021).

	We constantly work to expand our expertise in science and technology generally, and in AI specifically, to ensure we can deliver oversight of and foresight into this rapidly advancing technology to Congress and enhance our internal operations. Given our role, we have begun exploring ways to incorporate AI in a responsible manner into our own operations. Since 2019, we have increased staff resources in our Science, Technology Assessment, and Analytics (STAA) team from 49 to 156 employees, as of September 2023. ³
	We performed the work on which this testimony is based in accordance with all applicable sections of GAO's Quality Assurance Framework.
GAO's Internal Use of AI to Support Congress	We are actively developing internal use of AI to make our work for Congress and taxpayers more productive, in-depth, and effective. Our Innovation Lab is prototyping eight AI projects to enhance our oversight and operations. See Table 1 for our planned AI use cases. Before we start a use case, we evaluate it according to its relevance to our mission, feasibility, and resources, among other criteria. For our use cases, we are also following the principles of GAO's AI Accountability Framework. ⁴ We are establishing coordinating bodies to provide policy guidance and internal training to ensure our implementation of AI is sound. Our implementation will be an iterative, proactive journey, given the evolving nature of AI. We are drawing lessons from this hands-on experience with AI to inform and strengthen the external evaluations and oversight GAO conducts.
	One of our AI tools is a large language model we recently began deploying to explore generative AI capabilities like those found in industry, augmented with GAO-specific information and appropriate security controls. Among other capabilities, we believe this prototype will help us efficiently synthesize our past work to meet congressional and taxpayer needs. This prototype will also support other use cases. Other projects include prototypes of an editorial assistant and a tool to continually scan congressional documents indicating mandated work for GAO. By developing these use cases, we are also gaining insight into the benefits and risks of AI, which will help us evaluate other agencies' use and better provide technical assistance to Congress. While these capabilities will not replace human staff, they hold the promise of improving our productivity.

³GAO, *GAO: Evolving and Innovating to Meet Congressional Needs*, GAO-23-900536 (Washington, D.C.: Sept. 27, 2023).

⁴GAO-21-519SP.

Use case	Potential benefits	Maturity phase	Relevant techniques
Organizes large volumes of text, such as public comments from Regulations.gov	Groups contents by similar themes Prioritizes reviews based on relevant hierarchical topics	Late-stage prototype	Natural language processing Topic modeling
			Sentiment analysis Semantic matching
Summarizes draft GAO legislative mandates	Increases efficiency and reduces manual processes Highlights potentially fragmented and duplicative mandates	Late-stage prototype	Natural language processing Large language model Semantic matching Regular expressions
Assists with copyediting according to GAO's style guide	Automates select copyediting tasks Enables staff to focus on narrative structure and clarity	Late-stage prototype	Natural language processing Neural network modeling Sentiment analysis
Provides automated responses to chat questions on published GAO work	Summarizes published GAO content to enhance knowledge management and increase efficiency Enhances specificity and accuracy of results	Early-stage prototype	Large language model configuration Prompt engineering Retrieval-augmented generation User telemetry measurement
Summarizes qualitative responses from annual GAO Employee Experience Survey	Identifies trends, patterns, and sentiments quickly Improves survey interpretation with less manual intervention Assists with root-cause analyses	Early-stage prototype	Natural language processing Large language model
Monitors information about congressional committee calendars, press releases, and web content	Matches congressional interests with relevant GAO work Enhances timeliness of outreach and technical assistance	Early-stage prototype	Natural language processing Large language model Semantic matching
Enhances GAO auditing through use of extended reality glasses	Improves data collection and collaboration across locations Reduces costs and risks Enables new data capturing and analysis opportunities	Concept exploration	Computer vision and object recognition Real-time image, video, and sensor data processing
Triages IT help desk requests and answers internal GAO policy questions	Provides 24/7 self-service assistance to GAO employees Allows support staff to focus on more complex requests	Concept exploration	Natural language processing Large language model Sentiment analysis Integrated workflow and escalation

Source: GAO. | GAO-24-107237

Note: The list of use cases, updated periodically, is located at www.gao.gov/science-technology/artificial-intelligence-use-cases.

	Foundational to AI accountability is having a critical mass of multidisciplinary digital expertise to help accelerate responsible delivery, adoption of AI capabilities, and robust oversight. In addition to recruitment, we are providing internal learning opportunities and case studies to ensure our staff have the knowledge to assess AI activities across federal agencies, evaluate internal use cases of AI, and offer quick-turnaround technical assistance to Congress. To further build our expertise, we make training available to staff across GAO on data and digital literacy, particularly as they apply to AI. Specifically, we have a GAO-wide data literacy curriculum, guidance on data reliability assessment, and access to sophisticated technical content for our specialists. We also host a speaker series that draws from the larger science and technology community to provide GAO staff with insights and context for their work.
	GAO also has internal mechanisms to ensure coordination, collaboration, and consistent approaches to AI-related work agency-wide. For example, we have established an AI community of practice that also produces a monthly newsletter that highlights AI-related work, recent news, and training opportunities. And it sponsors learning events, including a recent lecture on AI in the federal government by the former founding Director of the National Artificial Intelligence Initiative Office.
GAO Has a Growing Body of Work on Al	We have developed a robust body of work on AI and related topics to meet Congress's need for information on the promise and risk of this rapidly changing technology. For example, we have examined AI's use in facial recognition technology, deepfakes, health care, automated trucking, modeling for natural disasters, and money laundering. ⁵
	Since 2018, we have issued nearly 50 products on AI. We currently have 20 ongoing projects on AI with many more planned, including two technology assessments and one performance audit on generative AI. For example, in a landmark December 2023 report, we reviewed the implementation of AI at major federal agencies and made 35 recommendations to 19 agencies to fully implement federal AI requirements. ⁶ In June 2023, we recommended that the Department of Defense (DOD) develop guidance on acquiring AI capabilities. ⁷ In addition to our audit work, we strive to keep Congress informed on
	⁵ A deepfake is a video, photo, or audio recording that seems real but has been manipulated with AI.
	⁶ GAO-24-105980.
	7000 Artificial Intelligences DOD Neede Department Wide Cuidence to Informe

⁷GAO, *Artificial Intelligence: DOD Needs Department-Wide Guidance to Inform Acquisitions*, GAO-23-105850 (Washington, D.C.: June 29, 2023).

technological advances in AI and their key policy considerations. We have issued several technology assessments and two-page Science & Tech Spotlights on emerging developments, including a Spotlight on generative AI and a technology assessment on the use of AI in modeling for natural disasters.⁸ See appendix I for a list of selected GAO AI work.

GAO also provides technical assistance to Congress on critical science and technology areas, including AI, along with many other related topics, such as cybersecurity, quantum computing, manufacturing and innovation, and the science and technology workforce. In calendar year 2023, we responded to over a dozen technical assistance inquiries from the House and the Senate requesting our support and expertise in connection with AI draft legislation, AI hearings, and AI-related questions. We also hosted visits to our Innovation Lab space and briefed committee staffers on our advanced development work on AI. Furthermore, we worked with the Congressional Staff Academy to offer seminars in 2022 on topics such as AI in the health sector, in government, and in criminal justice.

We continue to engage with experts and stakeholders outside GAO to exchange insights on AI. Our network includes officials and experts from government, nonprofits, industry, academic institutions, and professional and scientific associations. For example, for over a decade, we have maintained a standing contract with the National Academies of Sciences, Engineering, and Medicine. This enables us to engage the Academies when we need outside expertise for our work and, from 2019 to 2022, we issued a series of reports on AI in health care, in conjunction with the National Academy of Medicine.⁹

To meet congressional needs, we have significantly expanded our science, technology, engineering, and cybersecurity expertise. In addition, our Innovation Lab leverages data science and emerging technology capabilities to bolster GAO's work and that of the federal accountability community. We have also hired staff with AI and related

⁸GAO, *Artificial Intelligence in Natural Hazard Modeling: Severe Storms, Hurricanes, Floods, and Wildfires,* GAO-24-106213 (Washington, D.C.: Dec. 14, 2023); and GAO-23-106782.

⁹GAO, Artificial Intelligence in Health Care: Benefits and Challenges of Machine Learning in Drug Development [Reissued with revisions on Jan. 31, 2020.], GAO-20-215SP (Washington, D.C.: Dec. 20, 2019); Artificial Intelligence in Health Care: Benefits and Challenges of Technologies to Augment Patient Care, GAO-21-7SP (Washington, D.C.: Nov. 30, 2020); and Artificial Intelligence in Health Care: Benefits and Challenges of Machine Learning Technologies for Medical Diagnostics, GAO-22-104629 (Washington, D.C.: Sept. 29, 2022).

	competencies, and we plan to seek additional staff as needed to continue producing audit reports, technology assessments, technical assistance, and other congressional support in these areas.
	We work closely with federal Inspectors General and other oversight communities at the federal, state, and local levels to leverage each other's work and share insights. For example, I engaged with the New York State Auditor's office as it implemented GAO's AI Accountability Framework. Our network of auditors also extends globally. Through our leadership and participation in the International Organization of Supreme Audit Institutions (INTOSAI), we work with our counterparts in countries across the globe on emerging issues, including AI. This network is especially important given today's interconnected world. Furthermore, in May and November of 2023, I briefed the Organisation for Economic Co- operation and Development on the accountable use of AI.
	We also network with a number of GAO advisory boards. For example, GAO's Polaris Council brings together exceptional science, technology, and policy leaders and experts to advise GAO's Chief Scientist and other technical staff. We also have our Center for Strategic Foresight, which includes experts in futures thinking from around the world to provide foresight on emerging issues, AI prominent among them. Collectively, these varying perspectives span government, the private sector, non-governmental organizations, academia, and international organizations.
	In summary, GAO will continue to expand our knowledge and to leverage and innovate with this powerful technology to improve our efficiency and effectiveness. We are well positioned to continue meeting the needs of Congress for timely, relevant analysis and for oversight of federal agencies on AI-related topics.
	Chairman Steil, Ranking Member Morelle, and Members of the Committee, this concludes my prepared statement. I would be pleased to answer the committee's questions at the appropriate time.
GAO Contact and Staff Acknowledgements	If you or your staff have any questions about this testimony, please contact Taka Ariga, at (202) 512-6888 or arigat@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement.
-	GAO staff who made key contributions to this testimony are Claire A. McLellan (Analyst-in-Charge), Lisa Gardner, Andrew Kurtzman, and Shenandoah Sowash (Assistant Directors), Ben Shouse, Kevin Walsh, and Jessica Steele.

Appendix I: Selected List of GAO Reports on **Artificial Intelligence**



Federal Workforce

- Artificial Intelligence: Actions Needed to Improve DOD's Workforce Management GAO-24-105645 (2023)
- FAA Workforce: Better Assessing Employees' Skill Gaps Could Help FAA Prepare for Changes in Technology GAO-21-310 (2021)
- Automated Technologies: DOT Should Take Steps to Ensure Its Workforce Has Skills Needed to Oversee Safety GAO-21-197 (2020)
- Federal Workforce: Key Talent Management Strategies for Agencies to Better Meet Their Missions GAO-19-181 (2019)
- Workforce Automation: Better Data Needed to Assess and Plan for Effects of Advanced Technologies on Jobs GAO-19-257 (2019)
- Automated Trucking: Federal Agencies Should Take Additional Steps to Prepare for Potential Workforce Effects GAO-19-161 (2019)

ONGOING

- Digital Surveillance of Workers
- Worker Safety: Technology Tracking the Productivity of Warehouse and Delivery Workers

Defense & Law Enforcement

- Space Operations: National Space Defense Center Faces Enduring Challenges GAO-23-105371C (2023)
- Information Environment: Opportunities and Threats to DOD's National Security Mission GAO-22-104714 (2022)
- Artificial Intelligence: Status of Developing and Acquiring Capabilities for Weapon Systems GAO-22-104765 (2022)
- Forensic Technology: Algorithms Strengthen Forensic Analysis, but Several Factors Can Affect Outcomes GAO-21-435SP (2021)
- Biodefense: DHS Exploring New Methods to Replace BioWatch and Could Benefit from Additional Guidance GAO-21-292 (2021)

ONGOING

- Autonomous and Remote Ship Technologies
- Navy's Uncrewed Maritime Systems
- Technology at U.S. Ports

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- Artificial Intelligence in Health Care: Benefits and Challenges of Machine Learning Technologies for Medical Diagnostics GAO-22-104629 (2022)
- Vaccine Development: Capabilities and Challenges for Addressing Infectious Diseases GAO-22-104371 (2021)
- Artificial Intelligence in Health Care: Benefits and Challenges of Technologies to Augment Patient Care GAO-21-7SP (2020)
- Artificial Intelligence in Health Care: Benefits and Challenges of Machine Learning in Drug Development GAO-20-215SP (2019)

ONGOING

National Institute on Aging Real-World Data Platform

GAO is prepared to help answer your questions about AI and related issues through a variety of services:

 Performance audits, technology assessments, and short-form products;

Testimony and

hearings support;

- On-demand assistance;
- Trainings; and
- Networking and collaboration.

 In 2017, the Comptroller General convened an external Forum on AI. Participants at the forum identified areas where changes in policy and research may be needed.



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Source: GAO (analysis, icons, and graphical elements). | GAO-24-107237

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