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
Why GAO Did This Study

AI, 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 AI, through applications such as facial recognition, automated email responses, and enhanced user experience on websites. At the same time, AI 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 andforesight 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.

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.

<table>
<thead>
<tr>
<th>Use case</th>
<th>Potential benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizes large volumes of text, such as public comments from Regulations.gov</td>
<td>Groups contents by similar themes</td>
</tr>
<tr>
<td>Summarizes draft GAO legislative mandates</td>
<td>Increases efficiency and reduces manual processes</td>
</tr>
<tr>
<td>Assists with copyediting according to GAO’s style guide</td>
<td>Automates select copyediting tasks</td>
</tr>
<tr>
<td>Provides automated responses to chat questions on published GAO work</td>
<td>Summarizes published GAO contents to enhance knowledge management and increase efficiency</td>
</tr>
<tr>
<td>Summarizes qualitative responses from annual GAO Employee Experience Survey</td>
<td>Identifies trends, patterns, and sentiments quickly</td>
</tr>
<tr>
<td>Monitors information about congressional committee calendars, press releases, and web contents</td>
<td>Matches congressional interests with relevant GAO work</td>
</tr>
<tr>
<td>Enhances GAO auditing through use of extended reality glasses</td>
<td>Improves data collection and collaboration across locations</td>
</tr>
<tr>
<td>Triages IT help desk requests and answers internal GAO policy questions</td>
<td>Provides 24/7 self-service assistance to GAO employees</td>
</tr>
</tbody>
</table>

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.
AI 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 AI’s promise and risks. Since 2018, GAO has issued nearly 50 products on AI. It currently has 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, 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**


**AI Opportunities and Challenges**


**Federal Research and Management**


**Federal Workforce**


**Defense and Law Enforcement**


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.

AI, 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.


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.

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.


4GAO-21-519SP.
Table 1: GAO Planned Artificial Intelligence Use Cases, as of January 2024

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

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.

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.

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.\textsuperscript{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.\textsuperscript{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


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.

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

GAO provides fact-based, nonpartisan answers to your questions about artificial intelligence. These two pages include a selection of our recently published and ongoing work on AI and related topics.

Federal Research & Management

- Artificial Intelligence: Agencies Have Begun Implementation but Need to Complete Key Requirements
  GAO-24-1095860 (2023)
- Artificial Intelligence: DOD Needs Department-Wide Guidance to Inform Acquisitions
  GAO-23-105850 (2023)
- Artificial Intelligence: Key Practices to Help Ensure Accountability in Federal Use
  GAO-23-106811 (2023)
- Artificial Intelligence: DOD Should Improve Strategies, Inventory Process, and Collaboration Guidance
  GAO-22-106834 (2022)
- Artificial Recognition Technology: Current and Planned Uses by Federal Agencies
  GAO-21-526 (2021)
- Artificial Intelligence: An Accountability Framework for Federal Agencies and Other Entities
  GAO-21-5195SP (2021)
- Artificial Intelligence: Emerging Opportunities, Challenges, and Implications
  GAO-19-1425SP (2018)

Ongoing

- Federal Uses of Immersive Technology
- Regulating Emerging Technologies

AI Opportunities & Challenges

- Artificial Intelligence in Natural Hazard Modeling: Severe Storms, Hurricanes, Floods, and Wildfires
  GAO-24-106213 (2023)
- Generative AI (Science & Tech Spotlight)
  GAO-23-1067682 (2023)
- Digital Twins: Virtual Models of People and Objects (Science & Tech Spotlight)
  GAO-23-106453 (2023)
- Deepfakes (Science & Tech Spotlight)
  GAO-20-3795SP (2020)

Ongoing

- Driver Assistance Technology Consumer Education
- Generative AI Technology Assessment - Commercial Development
- Generative AI Technology Assessment - Human and Environmental Effects
- Smart Cities Technology Assessment

Finance

- Tax Enforcement: IRS Audit Processes Can Be Strengthened to Address a Growing Number of Large, Complex Partnerships
  GAO-23-1060220 (2023)
- Trafficking and Money Laundering: Strategies Used by Criminal Groups and Terrorists and Federal Efforts to Combat Them
  GAO-22-104807 (2021)
- Mortgage Lending: Use of Alternative Data Is Limited but Has Potential Benefits
  GAO-22-104380 (2021)

Ongoing

- AI in Financial Services
- Equity in IRS Audits
- Homeowners Property Technology
- Rental Property Technology
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  
- **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)

**Defence & 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-21-4355P (2021)
- **Biodefense:** DHS Exploring New Methods to Replace BioWatch and Could Benefit from Additional Guidance  
  GAO-21-292 (2021)

**Health Care**
- **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-21-75P (2020)
- **Health Care:** Benefits and Challenges of Machine Learning in Drug Development  
  GAO-20-215SP (2019)

**Ongoing**
- Digital Surveillance of Workers
- Worker Safety: Technology Tracking the Productivity of Warehouse and Delivery Workers
- Autonomous and Remote Ship Technologies
- Navy's Uncrewed Maritime Systems
- Technology at U.S. Ports

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;

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.

GAO is a trusted source for fact-based, nonpartisan information about government agencies and programs. Our experts are well-positioned to help elected officials and their staff prioritize policy matters and develop oversight agendas.

Read how GAO supports Congress  
https://www.gao.gov/for-congress

Have a question for your committee’s Congressional Relations Advisors?  
https://www.gao.gov/for-congress/find-your-advisor
GAO’s Mission

The Government Accountability Office, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO’s commitment to good government is reflected in its core values of accountability, integrity, and reliability.

Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through our website. Each weekday afternoon, GAO posts on its website newly released reports, testimony, and correspondence. You can also subscribe to GAO’s email updates to receive notification of newly posted products.

Order by Phone

The price of each GAO publication reflects GAO’s actual cost of production and distribution and depends on the number of pages in the publication and whether the publication is printed in color or black and white. Pricing and ordering information is posted on GAO’s website, https://www.gao.gov/ordering.htm.

Place orders by calling (202) 512-6000, toll free (866) 801-7077, or TDD (202) 512-2537.

Orders may be paid for using American Express, Discover Card, MasterCard, Visa, check, or money order. Call for additional information.

Connect with GAO

Connect with GAO on Facebook, Flickr, Twitter, and YouTube. Subscribe to our RSS Feeds or Email Updates. Listen to our Podcasts. Visit GAO on the web at https://www.gao.gov.

To Report Fraud, Waste, and Abuse in Federal Programs

Contact FraudNet:
Website: https://www.gao.gov/about/what-gao-does/fraudnet
Automated answering system: (800) 424-5454 or (202) 512-7700

Congressional Relations

A. Nicole Clowers, Managing Director, ClowersA@gao.gov, (202) 512-4400, U.S. Government Accountability Office, 441 G Street NW, Room 7125, Washington, DC 20548

Public Affairs

Chuck Young, Managing Director, youngc1@gao.gov, (202) 512-4800 U.S. Government Accountability Office, 441 G Street NW, Room 7149 Washington, DC 20548

Strategic Planning and External Liaison

Stephen J. Sanford, Managing Director, spel@gao.gov, (202) 512-4707 U.S. Government Accountability Office, 441 G Street NW, Room 7814, Washington, DC 20548

Please Print on Recycled Paper.