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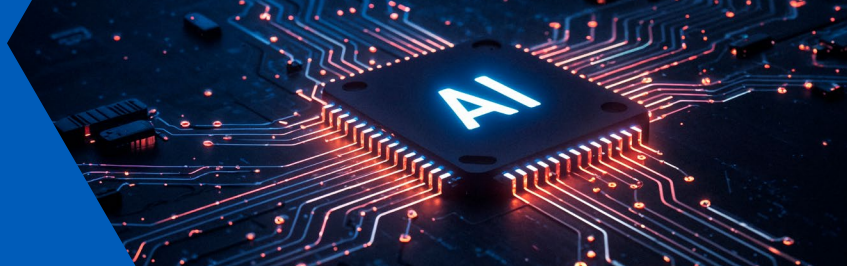

Center for Artificial Intelligence and Autonomy

Decision-Making Support to Government Leaders in Artificial Intelligence

CNA supports government leaders in navigating potential uses of AI and autonomous systems in addressing their toughest national and homeland security challenges. The CNA Center for Artificial Intelligence and Autonomy (CAIA) brings together our most talented analysts, scientists, and engineers to support government decision-makers with data-driven analytics to plan, implement, and evaluate their use of AI.

Our efforts help ensure government AI systems and initiatives are well governed and sufficiently resourced, their outputs are impactful and trustworthy, and their implementation is safe and secure. This ultimately improves productivity, efficiency, and speed of government operations.

Our AI work includes decades of support to the Departments of Defense, Justice, Homeland Security, and Health and Human Services; the Federal Aviation Administration; and state and local agencies.

Our scientists and researchers serve as facilitators to support agency decision-making; as analytic resources in technology assessment; and as conveners, using our strong connections to bring nonprofits, academia, and industry into the conversation. CNA's Center for Artificial Intelligence and Autonomy serves as a focal point for these efforts.

With a focus on technology evaluation, policy and governance, implementation, and analysis, CNA offers objective services and support to government agencies as they navigate the growing array of AI technologies.

CNA is currently supporting government clients in five key areas of AI decision-making:

- **AI and autonomy use cases**
- **Capabilities and solutions**
- **Integration and use**
- **Performance and analysis**
- **Policy, guidance, and risk reduction**

AI and Autonomy Use Cases

CNA's technical expertise allows us to translate strategic vision into technological opportunities and measurable business impacts. By understanding operational constraints, assessing data availability, and mitigating risks in implementation, we bridge the gap between the theoretically possible and the practically successful. By identifying the highest-impact use cases, we ensure that AI adds value—rather than complexity—in meeting our clients' real-world needs.

AI prioritization

Our scientists have supported the US Space Force with an evaluation of how they could develop and apply AI applications across the service, given the current technical and structural limitations of these technologies. We created a "little-picture" framework for prioritization at the mission level and a "big-picture" framework for prioritization at the service level. We also identified how the Space Force might approach a service-level AI strategy and how the components of the AI prioritization frameworks would inform that strategy.

Technology acquisitions

For decades CNA's analysts have provided technical assessment and support to government around small- and large-scale technology acquisitions. At the early stages, we conduct analyses of alternatives to provide decision-makers with a data-driven understanding of capability needs. Then, throughout the acquisition lifecycle, CNA provides analyses of return on investment; impact on manning, training, and education; and continuous test and evaluation to ensure that new technologies are best meeting the needs of the government. For example, we developed an acquisition template that has been used widely by police departments for pilot testing of different body-worn camera technologies. For the Navy, we have conducted analyses of alternatives for platforms and Military Utility Assessments for advanced technology prototypes, helping acquisitions decision-makers understand both functionality and military effectiveness.

Data engineering pipelines

As government leaders look to incorporate AI into future systems, a foundational step is to establish and resource machine learning (ML) algorithm data engineering pipelines. CNA has supported the DOD Chief Digital and Artificial Intelligence Officer, the Joint Artificial Intelligence Center, the US Navy, and other entities in the development of these data pipelines. The use of AI for surveillance and monitoring, for example, requires that data pipelines and structures be in place and fully understood as leaders consider AI solutions in defense and law enforcement.

AI readiness at the agency level

CNA is supporting the Department of Health and Human Services Assistant Secretary for Technology Policy in evaluating and implementing AI capabilities. CNA developed a framework to evaluate AI readiness of operational data and created an inventory of AI tools and platforms. We then developed priority use cases for AI and developed AI models for two of the use cases, including a model to predict contract spending and a model to support the processing of service tickets.

Capabilities and Solutions

CNA builds custom AI models for mission-specific tasks, transforming large quantities of raw information into actionable insights that would otherwise be invisible. Machine learning techniques—from deep learning to image classification and generative AI—allow CNA to discover the hidden patterns embedded in large datasets, increasing efficiency while delivering personalized solutions to complex problems.

AI risk assessment tools

A natural—and useful—application of AI is in risk assessment and management. With funding through the Bureau of Justice Assistance in the Department of Justice, CNA used machine learning techniques to produce a risk assessment model to link incident characteristics with officer safety outcomes. This model is intended to help officers assess risk and practice appropriate safety protocols in real time when responding to incidents. Through this work, CNA also examined the use of predictive analytics in policing, to include goals, feasibility, considerations, bias, privatized software, and limitations.

AI for analysis of large data feeds

CNA has supported DOD with the development of AI algorithms for real-time analysis of video feeds from drones and satellites that can help create models to enhance object detection and tracking capabilities, improving situational awareness for military operations. CNA has also used natural language processing techniques to analyze and interpret large volumes of intelligence data.

AI for retention and infrastructure planning

For the Senior Reserve Officer Training Corps, CNA scientists employed a machine learning and data science model to examine the drivers of officer recruitment and retention. These drivers included scholarships and facility conditions. Using these AI-enabled tools, CNA identified that facility condition is a factor in retention and plays a larger role at minority-serving institutions. The work also identified options for targeted facilities spending and facility planning standards. This method can enhance recruiting and retention throughout the defense, law enforcement, and corrections communities.

AI system engineering proof of concept

In partnership with RIIS, an industry technology developer, our team developed a prototype of the First Responder Awareness Monitoring during Emergencies (FRAME™) tool to transform how first responders can operationally leverage data from smart city sensors. Using AI/ML technology, FRAME takes in large amounts of data, interprets the information, and aggregates that into a common data view to provide increased situational awareness in an emergency.

Agency-wide AI application

CNA is working with the Federal Emergency Management Agency (FEMA) to advance in-house capabilities to meet its mission with the assistance of AI. This work includes building retrieval-augmented generation (RAG)-based large language models, evaluating performance, and developing governance models for responsible AI.

Integration and Use

CNA integrates AI into core government workflows while safeguarding its trustworthiness, transparency, and security. Our focus on interoperability, human-machine teaming, and robust compliance allows CNA to deliver scalable intelligence where it matters most for our government clients. By leveraging both technical expertise and deep experience with public sector needs, CNA supports AI solutions that are fully integrated into government operations, not siloed with limited utility.

Strategic foresight

CNA has engaged practitioners and researchers in evaluating the risks, opportunities, and actions of emerging technologies including AI in corrections and policing. Using a futures analysis framework, we have facilitated strategic working groups focused on examining the world in 2040. Our experts have explored issues such as applications of AI technologies, fairness and bias of AI, social inequalities resulting from advancements in AI, financial implications for already strained government agencies, opportunities for improving the health and safety of incarcerated individuals and staff, and gaps in learning and governance related to AI.

Future of identity management

For the Department of Homeland Security Office of Biometric Identity Management, CNA evaluated the technological developments and societal trends that affect AI-enabled identity management capabilities (e.g., fingerprints, iris scans, DNA, and facial recognition) and non-biometric personally identifiable information increasingly used by the private sector. Our work examines issues hindering public acceptance, such as data bias and demographic differentials, and risk-mitigation approaches, such as human-machine teaming.

Gaming and exercises

CNA has explored AI implementation and futures for the defense and intelligence community in a variety of games and exercises. For example, our gaming team has brought decision-makers together to explore the operational, logistical, and strategic implications of AI for "intelligentized warfare" and for current and future unmanned systems. Our gaming approach for evaluating AI implementation is adaptable and can be used to examine a range of topics from AI integration in public safety to AI use in areas of instability or conflict and adversary adoption of AI.

Awareness and education of AI developments and issues

In 2019, CNA launched a podcast "Artificial Intelligence with Andy Ilachinski," or "AI with AI," which focused on the latest developments in the field of AI and autonomy and their implications and significance for the military community. The episodes covered a mixture of research and relevant news such as announcements from the DOD, and the hosts frequently discussed "notes of caution" about challenges that practitioners face when trying to leverage ML capabilities.

Performance and analysis

CNA evaluates the performance and reliability of AI tools—both internally and externally developed—creating and using rigorous metrics relevant to the client's mission. CNA's technical expertise allows our team to measure and understand how speed, accuracy, clarity, bias, and other factors come together to impact the utility and trustworthiness of an AI solution. Techniques such as scenario testing and red teaming allow us to identify where AI capabilities are working well, where they're falling short, and how they can be improved.

Policy, guidance, and risk reduction

CNA helps clients develop policies that foster innovation while safeguarding public trust and upholding the highest standards of accountability. We empower government agencies to navigate the complexities of AI with tailored policy solutions that ensure ethical, transparent, secure, and effective AI deployment. At CNA, we understand that legal and ethical oversight are an integral part of delivering capabilities that create value for our clients.

Classification structures for approval of AI technology

In collaboration with the FAA and NASA, CNA developed a classification structure to indicate the level of rigor necessary for government approval of various AI technologies for aviation—with application at the state and local level. The structure considers both technical and functional characteristics of AI. This work supported the update of AI technology acceptance and approval processes, as well as current assurance processes, procedures, and techniques for aviation AI use cases.

AI governance plans and frameworks

CNA is supporting FAA's Office of NextGen in developing guidance for the governance of AI technologies. Activities include developing an AI/ML Research Plan to fulfill a congressional mandate, developing an AI/ML assurance framework for products that the FAA regulates or deploys, validating the framework with FAA and NASA NextGen AI prototypes, developing white papers, and engaging with FAA stakeholders across lines of business.

Horizon scanning

CNA supports strategic foresight efforts at the Department of Homeland Security and the National Academy of Sciences by convening expert stakeholders from industry, academia, and government to identify processes and best practices around the emerging trends in AI that impact various infrastructure sectors. This approach provides our clients with informed recommendations for strategic planning and enhances preparedness for emerging AI impacts.

Maturity models for self-assessment of AI capabilities

CNA has developed a maturity model to help government agencies assess their AI capabilities using methodologies that CNA previously used to develop maturity models for several clients. The maturity model fills a gap in the resources currently available for government agencies to understand and improve their use of AI.

Assessment, monitoring, and evaluation of AI applications

CNA designed an assessment, monitoring, and evaluation approach to help DOD understand how they are doing in relation to their stated goals for leveraging AI and identifying areas for continued improvement.

About CNA

CNA is a not-for-profit analytical organization dedicated to the safety and security of the nation. With nearly 700 scientists, analysts, and professional staff across the world, CNA's mission is to provide data-driven, innovative solutions to our nation's toughest problems. It operates the Center for Naval Analyses—the Department of the Navy's federally funded research and development center (FFRDC)—as well as the Institute for Public Research. The Center for Naval Analyses provides objective analytics to inform the decision-making by military leaders and ultimately improve the lethality and effectiveness of the joint force. The Institute for Public Research leverages data analytics and innovative methods to support federal, state, and local government officials as they work to advance national and homeland security.

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