

CHIEF DIGITAL AND ARTIFICIAL INTELLIGENCE OFFICER
Dr. Craig Martell
Statement for the Record
House Armed Services Committee
Subcommittee on Cyber, Information Technology, and Innovation
March 22, 2024

Chairman Gallagher, Ranking Member Khanna, and distinguished Members of the Subcommittee, thank you for the opportunity to testify before you today. This is my second appearance before the Cyber, Information Technology, and Innovation subcommittee, and I look forward to sharing the ongoing efforts of the Chief Digital and Artificial Intelligence Office (CDAO) and the broader collaborative teaming within the Department of Defense (DoD).

The Deputy Secretary of Defense (DSD) established the CDAO in February 2022, bringing together the authorities and resources of previously separate organizations, including the DoD Chief Data Officer (CDO), Joint Artificial Intelligence Center (JAIC), Defense Digital Service (DDS), and Advancing Analytics (ADVANA) Office.

The DSD charged the CDAO with the mission of accelerating DoD adoption of data, analytics, and AI from the boardroom to the battlefield. This includes the following as outlined in the *DoD Data, Analytics and Artificial Intelligence Adoption Strategy*:

- Lead and oversee DoD's strategy development and policy formulation for data, analytics, and AI.
- Work to break down barriers to data and AI adoption within appropriate DoD institutional processes.
- Create digital infrastructure and services that support and enable Components to develop and deploy digitally enabled data, analytics, and AI solutions.
- Selectively scale proven digital and AI-enabled solutions for enterprise and Joint use cases.
- Surge digital services for rapid response to crises and emergent challenges.

I am proud of the solutions CDAO continues to build for DoD in support of this mission, and the impact the team has made since we last testified before this subcommittee. While CDAO is a Principal Staff Assistant (PSA) to the Secretary of Defense (SD), our organization, authorities, functions, and tools are unique. Unlike a more traditional PSA focused almost exclusively on policy and governance, the CDAO has been asked not only to lead and oversee, but to do and deliver. Getting data- and AI-driven solutions into the hands of warfighters and making sure there is the correct policy in place to do so has never been more essential than it is now. I am excited about the progress we have made on policy, governance, as well as the solutions we have already delivered.

Uniquely, as a PSA driving the delivery of capability to the warfighter, CDAO balances investments to deliver at speed and scale. We deliver solutions for decision-makers and mission users at *speed*, demonstrating the value of data-enabled capabilities, and ‘fielding to learn’ so that we can promulgate best practices. We also support DoD developers and program offices to *scale* the adoption of data, analytics, and AI, enabling Components to build sustainable capability in a responsible manner. Our delivery of solutions for these two customer segments balances the inherent tension between the concurrent priorities of preparing to ‘fight tonight’ and ‘get it done right.’ It is imperative that our national security posture require that we deliver tailored solutions to pressing challenges quickly, while establishing enterprise capability to improve interoperability and efficiency. Importantly, these capabilities, delivered at speed and scale, include not only data, analytics, and AI, but also the key enablers of acquisition, talent management, and experimentation and prototyping.

CHANGES

Over the past year, CDAO has worked to become increasingly agile to deliver value to DoD. We have applied lessons learned during our first year of operation to improve our organization for our customers, the warfighter. Things move fast in the world of data and emerging technology, and it is essential that we are positioned to move faster. The creation of a team focused on Combined Joint All Domain Command and Control (CJADC2) is a prime example of this rapid adaptation. CDAO’s CJADC2 team works across the Office of the Secretary of Defense, the Joint Staff, Combatant Commands (CCMDs), and the Services to improve data accessibility, data interoperability, and decision support tools for Commanders and decision makers. The team is leading delivery of solutions for global integration to include development of the joint Data Integration Layer (DIL), and decision support applications for key customers. We have also entered the second year of running technical experimentation, such as the Global Information Dominance Experiment (GIDE) series, to evolve concepts and technology together in an iterative, metrics-based environment.

Now, the solutions and platforms we deliver are only as good as they are secure. Our newly created Cyber Assurance Office (CAO) is geared towards creating “decision advantage with agile, operationally oriented cyber risk management”. Established to address foundational scaffolding that supports our strategic initiatives, the CAO has provided eleven Authorizations to Operate (ATO) for CDAO capabilities over a 4-month period (increasing cyber security posture of CDAO and reducing execution costs). These ATOs are in support of CJADC2/GIDE, ADVANA, DIL, and SUNet, all key programs CDAO is delivering to DoD and done so with the necessary protections thanks to the efforts of this new office.

CULTURE

CDAO continues to deliver on our promise to deliberately develop a workplace culture that both supports the people of CDAO and delivers strongly against our mission. We have implemented cultural leadership coaching sessions to expose our senior leaders to various methodologies, leadership strategies, models, tools, and tactics for improving culture. Our

quarterly in-person town halls are half-day events where all military and civilian CDAO staff come together and focus exclusively on collaborative team building, shaping CDAO culture, and delivering an experience that strengthens the sense of belonging our people have to one another and to the mission. We continue to expand communications between senior leaders and the CDAO workforce through dedicated time for listening sessions which serve as a forum for staff to directly share candid and honest feedback, concerns, and needs with executive leadership. Our monthly virtual all hands calls were crafted so the entire community has a frequent cadence for alignment, information sharing, clarity around roles and responsibilities of the CDAO subcomponents, socialization of our organizational structure, and informal interactions between employees and leadership. Our popular lunch and learn series feature different programs each week which allow staff to learn about other subcomponents of CDAO. We are also creating opportunities for professional and personal development, training, and growth for employees at all levels to increase their effectiveness and impact on DoD and beyond.

SUCCESSSES AND ACCOMPLISHMENTS

Delivering to the Warfighter

As a part of our “do and deliver” obligation to DoD, we have been delivering solutions that use quality data to advance decision-making. We have made great progress since our organization was stood up in 2022 to get data-enabled solutions into the hands of warfighters. These activities take a wide range of forms, from joint experiments to interactive dashboards, CDAO is working to fill every niche we can. The GIDE events and the progress those have enabled on CJADC2 are two of the most exciting initiatives we have advanced this year.

In 2023, the CDAO hosted four GIDE events focused on defining and delivering a joint DIL that will enable INDOPACOM, CENTCOM, NORTHCOM, their components as well as international partners, to access, share, and integrate data to address key operational problems in the Joint Warfighting Concept. CDAO successfully executed these events with key global partners, focusing on global integration and joint maritime kill chains. This series of experimentation is designed to stress-test current systems and processes, introduce new technologies and approaches, and learn in an experimentation environment that replicates real-world operations and exposes areas which require improvement.

In an historic achievement, during GIDE 8 – the last iteration of 2023 – DoD declared the achievement of a Minimum Viable Capability (MVC) for Joint Staff and CCMDs to perform global integration in a CJADC2 context. This allows warfighters across the globe to provide increased decision advantage for DoD. Throughout the 2023 GIDE series, CDAO led mission partners in using live data and operational networks to iteratively experiment with prototype and commercial software applications, data integrations, and new operational concepts. This capability is available to the warfighter today. Looking ahead, using the GIDE 2024 series as a venue, CDAO will continue to work with a rapidly expanding industrial base to diversify the portfolio of solutions available to the Joint Staff and CCMDs for global integration.

Another successfully tested solution for the Warfighter is the Smart Sensor, which matures AI-enabled software onboard an autonomous MQ-9 Reaper to detect objects in the battlespace. Using AI-based technologies reduces required bandwidth necessary for passing full-motion video by identifying objects of interest and pushing that information into the sensor platform. It allows operators to maintain target awareness even in a degraded communications environment.

In FY23, the Smart Sensor team conducted research and development work, including development flight tests and a limited operational assessment, during an INDOPACOM deployment. The objectives of the deployment were to operate an AI and autonomy software package in an operational environment, rapidly retrain the Smart Sensor system from land-based mission orientation to deploy in a maritime environment, collect sensor data, and improve the ability to disseminate data from the airborne drone. While there are objectives which need to be further addressed, it proved to be an extremely useful deployment providing the project with many lessons learned as well as demonstrating the capability is on track for US Marine Corps Initial Operating Capability (IOC) requirements. Development efforts continue in FY24 in order to meet the US Marine Corps' planned IOC timeline of 1QFY26.

Delivering Infrastructure

AI/Autonomy Scaffolding

The Smart Sensor program highlighted above is an example of the scalability of the tools CDAO builds. We cannot scale our impact without enabling others to also scale their use of data, and deliver solutions themselves. We have established scaffolding that enables self-service and analytics, accelerating change at scale. Our approach to this enormous task covers everything from our investments in scaffolding to ensuring Large Language Models (LLMs) are used responsibly.

ALPHA-I is a portfolio of investments in tools, processes, and infrastructure that enable the holistic development of machine learning, AI, and autonomy, in DoD. CDAO is managing the procurement and availability of these investments in this portfolio across DoD. This set of investments is useful across CDAO activities, specifically for the Replicator Initiative announced by DSD at the end of last year. CDAO was directed to establish a data and AI Hub in support of the Replicator Initiative, and ALPHA-I is prepared to set-up the scaffolding and infrastructure of components of this AI Hub. Indeed, CDAO is partnering directly with the Defense Innovation Unit (DIU) to leverage commercial AI scaffolding tools, and has entered a Memorandum of Agreement in January 2024 with the express purpose of expanding this collaboration to make this infrastructure available to users across the Department.

ALPHA-I in support of DoD Autonomy programs enables AI/autonomy performers to iterate on their software in protected development and test environments, with government-owned datasets and classified design reference missions, over the course of potentially years of sustainment. The end state is mission-performant, multi-domain enterprise autonomy testing

and development that is only possible with shared tools, acquisition vehicles, datasets, and a culture of sharing lessons learned.

Delivering Business Wins

The use of capability enabled by quality data metrics extends past the battlefield into the fiscal and operational domain of DoD. CDAO is not only delivering solutions to aid business functions of DoD, but also providing a strategy and framework for DoD-wide use. Our approach to the “boardroom” side of data, analytics, and AI needs is holistic, and creates both solutions and guidance for accelerating adoption.

The CDAO developed and released the Responsible Artificial Intelligence (RAI) Toolkit, a resource that provides a voluntary process to identify, track, and improve alignment of AI projects to RAI best practices and DoD AI Ethical Principles, while capitalizing on opportunities for innovation. CDAO collaborated with DIU and, in particular, built on DIU’s 2021 Responsible AI Guidelines to develop the Toolkit. RAI work at DoD maintains the ultimate goal of end-user trust in AI technology, called justified confidence, due to measurable and explainable criteria showing that a model works within the parameters necessary to assist the user in accomplishing the mission. Use of the Toolkit will help assure end-users that AI capabilities work in alignment with DoD’s ethical obligations and that issues have been identified and addressed. By furthering warfighter trust in AI capabilities, the Toolkit helps unlock more capability for the warfighter and brings more support for commander intent to the battlefield.

Another big win for the CDAO and DoD this year was the development and deployment of Pulse. CDAO’s Pulse centralized data model and business analytic tools leverage technology on ADVANA to monitor and track performance metrics. The Pulse Analytics Dashboards refer to the application suite for reporting on performance management across DoD and integrating data across the National Defense Strategy Implementation (NDS-I), DoD Strategic Priority Metrics (SPM), Business Health (BHM), and any additional applications aligned to communicating progress towards executing Secretary of Defense priority areas. The Pulse suite of applications is DoD’s enduring initiative to institutionalize a culture of data-centric thinking, relying on data to drive improved performance and global competitive advantage. In 2023, Pulse provided decision advantage via an integrated executive dashboard for the SD and DSD to track progress on DoD priority areas using a centralized database of key metrics to enable data-driven performance management.

Underpinning multiple efforts to better integrate AI and innovative technologies to DoD is our ability to work with industry and other DoD innovation organizations. Beyond traditional cost-type development contracts, the CDAO Acquisition Ecosystem allows for multiple ways to buy products and services such as commercial solutions openings, other transaction agreements, basic ordering agreements, and blanket purchase agreements. In addition, we also offer expedited contracting processes; and AI driven tools to streamline federal procurements. These contracting pathways can also provide a flexible acquisitions onramp for technologies prototyped and validated within other DoD organizations that lack long-term scaling abilities.

For example, in 2023 we debuted our Tradewinds Solutions Marketplace, a new business model that expedites market research and competition through matchmaking non-traditional defense contractors and government buyers based on plain language requirements and videos documenting potential solutions. The Marketplace allowed for 13 awards based on 119 “awardable” solutions from 419 submissions.

Delivering Data for Strategic Priority Metrics

In July 2023, DSD directed the offices of primary responsibility (OPRs) to update the current value and targets of all Strategic Priority Metrics (SPMs) before the end of the fiscal year and ensure there was a plan to connect all current and future performance metrics to authoritative data sources. CDAO PSA analytic product teams targeted data engineering and analytics support to OPRs where needed. By end of September, 105 of 119 FY23 metrics used data to calculate a current value in the SPM Dashboard. An example of this transition is the integration of data logic for Washington Headquarters Service’s (WHS) outcome-based PSA metrics into the Pulse framework. CDAO worked directly with each WHS directorate to successfully identify data sources, confirm business logic, and build a dashboard prototype for 30 of 34 metrics, equating more than 300 unique current value calculations at the PSA-level.

Additionally, CDAO aims to enable users with self-service options for input and connection to its databases. As a testament to the self-service-driven model underlying Pulse applications, the Air Force recently integrated their set of 60 SPMs into the Pulse common data model for the first time, with minimal CDAO guidance or support.

TASK FORCE LIMA

The evolution of AI and emerging technologies remains highly dynamic with major advancements happening overnight. The mainstream explosion of LLMs is an example which required a good deal of agility from the CDAO. The DSD established Task Force Lima to harness the opportunities and mitigate the risks associated with applying generative AI to DoD mission sets. Since its establishment, Task Force Lima has engaged DoD components from across the Services, Combatant Commands, defense agencies, and field activities, as well as the Intelligence Community. Underpinning this effort is work CDAO is leading the development of a LLM maturity model that helps DoD ensure responsible application of LLMs considering specific use cases. During a LLM workshop at the CDAO’s Advantage DoD 2024 Data and AI Symposium last month, CDAO requested input from industry with a focus on reviewing maturity models.

DIGITAL TALENT

A necessary part of creating a lasting infrastructure for adopting AI across DoD, are the people that are going to build and maintain this technology. A memo for the record was delivered to Office of the Under Secretary for Personnel and Readiness to establish CDAO as the Digital Workforce Functional Community Manager. We are partnered with the Office of the Under Secretary for Research & Engineering, the functional community manager for software work roles, to build the Defense Digital Workforce. We have begun by coding existing DoD

talent and positions that execute roles in data, analytics, AI, and software. We are also investing in capabilities that will allow the digital workforce to be globally identifiable, accessible, and available for DoD use. CDAO has built a robust team to systematically analyze DoD's digital workforce and promote education and management as a unified cohort. In an additional effort to train and educate our own people, we are offering training to senior leaders across DoD through the Naval Postgraduate School, MIT, and online portals to improve understanding of data, analytics, and AI among current DoD personnel to facilitate and accelerate adoption.

Outside of DoD, CDAO is identifying and curating prospective digital talent and stimulating interest in working for DoD. CDAO has led direct engagement with 15,000+ students across all 50 states through DoD's Civilian Talent Pipeline Programs.

GOALS

The *2023 DoD Data, Analytics, and AI Adoption Strategy* differs from the first two data and AI strategies because it focuses on **how** DoD will accelerate adoption of data, analytics and AI in a manner that fits with all DoD Components. It unifies previous DoD-level strategic guidance, with more of a focus on alignment and synchronization to scale capabilities across the department. When effectively implemented, this strategy will allow leaders and warfighters to make rapid, well-informed decisions by leveraging high-quality data, advanced analytics, and AI. Built into this new strategy are a set of goals and guidelines that CDAO is helping the department action and work toward:

- **Driving a culture of experimentation and campaigns of learning:** Through our leadership on initiatives like the GIDE, the CDAO is rapidly integrating capabilities in support of CJADC2 and testing systems using cross-domain, operational data.
- **Integrating data, analytics, and AI leadership and investment:** Analytics and AI are applications of data. Through efforts such as the AI and Data Accelerator (ADA) initiative, the CDAO unifies the Department's approach to these technologies rather than treating them separately.
- **Breaking down barriers to systemic reform:** The CDAO understands that unlocking the full value of data, analytics, and AI is not just a technology-development problem. CDAO's work on building the Department's digital talent, for example, focuses just as much on shifting culture, process, and human behavior.
- **Developing enabling digital infrastructure:** CDAO's impact cannot scale without enabling others to do & deliver for themselves. With resources like the Joint AI Test Infrastructure Capability (JATIC) and platforms like Alpha-I, the CDAO is fielding infrastructure and structural scaffolding that enables self-service analytics and AI, accelerating change at scale.

This strategy provides DoD with guidance to adapt to new technologies as they come along, and proactively positions the adoption of whatever new data- and AI-enabled technology has disrupted the industry. The CDAO's integrated, agile approach to enabling self-service will

better allow us to leverage the strengths that are the sources of our advantage: our diverse society, our culture of ingenuity, our innovation base, and our network of Allies and partners.

INVESTMENTS

Going into FY25 and beyond, CDAO continues to make a great deal of investments in scaffolding, technologies, platforms, and people that are essential to our mission. During our first 25 months of operation, we have built multiple applications on Advana and identified ways to scale data and AI development that are essential tools for DoD. CDAO also continues to devote resources to efforts like CJADC2 and the Non-Geo INT projects from Project Maven as they grow in maturity and importance.

The Advana platform is the single enterprise authoritative data management and analytics platform that serves over 100,000 users across DoD. They are a key CDAO investment and expected to reach 150,000+ users in FY24. The platform is a foundational enterprise data management, data integration, analytics, and AI capability specifically designed to support large-scale, data driven decision making processes within DoD. Advana supports several CDAO efforts, such as CJADC2, GIDE, Pulse, and Alpha-I.

Alpha-I is CDAO's portion of investments in tools and platforms that enable the holistic development and scaffolding of AI and related technologies. One of the missions of CDAO is to appropriately scale the use of AI across DoD, which will require technologies to scaffold and help scale. These investments include:

- **Enterprise Data Labeling Service:** Piloting a common data labeling contract and tool deployment on multiple networks to support the data annotation needs of multiple AI projects initially focused on computer vision.
- **AI-Data Platform (AI-DP):** A demonstration of multiple (5) leading industry AI project development, orchestration, and data management capabilities on SUNet and SIPR to facilitate and coordinate development, management, collaboration, and sharing between multiple DoD AI stakeholders.
- **Enterprise Physics-based Platform Autonomy Simulation Tools (Sensor-level):** This is a commercial software platform that enables platform-level autonomous system development and test.
- **Enterprise Physics-based Mission Autonomy Simulation Tools:** This is a commercial software platform that enables "fleet level" autonomous mission behavior development and test.
- **Enterprise perception AI and autonomous system T&E Tools:** This is a set of select commercial and government-owned T&E tools for the test of both perception AI as well as the test of full autonomous systems performance, both a single vehicle and in collaborative missions.

CDAO's major efforts delivered to the warfighter are underpinned by campaigns of experimentation and learning. Our CJADC2 team is leading several key initiatives including:

- **Data Integration Layer:** Integration of data sources across DoD and intelligence community and prototype data mesh services that will inform additional requirements for enterprise capability to be developed starting in FY25.
- **GIDE:** Ongoing execution of quarterly experimentation events with the Joint Staff, Combatant Commands and FVEY partners.
- **Mission Command Applications:** Enterprise decision support tools initially for INDOPACOM, EUCOM, NORAD/NORTHCOM, CENTCOM and TRANSCOM, including but not limited to commercial licenses for Maven Smart System (MSS)
- **Joint Operating System (JOS):** A prototype commercial capability to validate enable low-latency data integrations for use cases like time-sensitive targeting.

CONCLUSION

The CDAO continues to drive massive value and an integrated approach to scaling data, analytics, and AI for the entire DoD. We are providing the necessary guidance to implement a holistic, agile AI strategy, as well as delivering platforms and solutions in the hands of warfighters. I look forward to working closely with the Subcommittee on these issues and others, as we push the boundaries of technology within DoD and enact long-lasting changes that keep us ahead of our adversaries.