

## Integrating Biometrics, Policy, and Data-Driven Training: Enhancing Military Readiness and Reducing Risk

**LCDR N.J. Armendariz, PhD**

**US Navy School of Aviation  
Pensacola, FL**

**Nicholas.j.armendariz.mil@u  
s.navy.mil**

**J.J. Walcutt, PhD**

**DAF A1D  
Alexandria, VA**

**Jennifer.j.walcutt.civ  
@us.af.mil**

**COL Kris Saling**

**USARC  
Washington, DC**

**Kristin.c.saling.mil@arm  
y.mil**

**LT Jacob Westerberg, PhD**

**NAVINSGEN  
Washington, DC**

**Jacob.r.westerberg.mil@us.  
navy.mil**

### ABSTRACT

Achieving true operational dominance requires a comprehensive, data-driven strategy that integrates diverse sources of information. This paper introduces a unified framework leveraging real-time biometric and neurophysiological data, formal education, and operational analytics to optimize talent identification and management, emphasizing lethality and joint military readiness. Central to this approach is the strategic alignment of training methodologies with government policies, including Department of Defense Directive (DODD) 8521.01, which governs biometric data usage.

By personalizing training interventions through modeling, simulation, and machine learning, the proposed framework accurately forecasts performance outcomes, streamlines talent identification, and dynamically refines curricula. Additionally, our approach explicitly addresses policy alignment, ensuring adherence to ethical standards outlined in directives such as DODD 8521.01. This alignment ensures that biometric and physiological data are handled responsibly and securely, facilitating operational scalability without compromising individual rights or data integrity.

The 2023 Department of Defense Inspector General (DoD IG) report highlighted the critical importance of securing biometric data to protect sensitive information while also emphasizing the necessity of effectively harnessing advancing technologies to support research. Understanding successful case studies that balance strong data governance with appropriate data accessibility can enhance DoD personnel recruitment and development, thereby accelerating improvements in human performance. Ultimately, this integrated strategy demonstrates how aligning scientific discoveries, policy-driven governance, and advanced training methodologies can significantly enhance military readiness and operational effectiveness in complex environments.

This paper aims to highlight the importance of aligning practices in academia and industry with government standards. By examining lessons learned and successes from case studies, we intend to support future research efforts, reduce risk for both researchers and government agencies, and help alleviate concerns within risk-averse environments.

### ABOUT THE AUTHORS

**LCDR N.J. “Terror” Armendariz, PhD** is a Naval Aerospace Experimental Psychologist serving as a Human Factors and Fixed Wing Aerodynamics instructor at the Naval School of Aviation Safety. He previously flew the EA-6B in the USMC and later served as a Training and Education Officer and policy writer for TECOM and while working to support OUSD (P&R).

**Dr. J.J. Walcutt** is a scientist, innovator, and learning engineer that specializes in strategic development and reform across education, military, and government. She is currently serving as a Highly Qualified Expert (HQE) in Human Development for the USAF (HAF/A1D). In this role, she is leading the design of an Air Force Development Strategy and providing advisement across a variety of assessment, strategic, and technology-enabled projects aimed at enhancing human capabilities.

**COL Kris Saling** is a recognized leader in the United States Army people enterprise, who has spent the past eight years investigating new technologies and analytics, pairing them with teams of talented individuals, partnering with academia and industry to deliver best practices, and attacking the Army’s most pressing challenges in people analytics and talent management

**LT Jacob “Quad” Westerberg, PhD** is an organizational psychologist serving as an Assistant Inspector General for Organizational Culture with the Office of the Naval Inspector General.

## **Integrating Biometrics, Policy, and Data-Driven Training: Enhancing Military Readiness and Reducing Risk**

**LCDR N.J. Armendariz, PhD**  
US Navy School of Aviation  
Pensacola, FL  
Nicholas.j.armendariz.mil@u  
s.navy.mil

**J.J. Walcutt, PhD**  
DAF A1D  
Alexandria, VA  
Jennifer.j.walcutt.civ  
@us.af.mil

**COL Kris Saling**  
USARC  
Washington, DC  
Kristin.c.saling.mil@arm  
y.mil

**LT Jacob Westerberg, PhD**  
NAVINGEN  
Washington, DC  
Jacob.r.westerberg.mil@us.  
navy.mil

### **INTRODUCTION: A STRATEGIC IMPERATIVE**

In today’s contested and rapidly evolving operational landscape, achieving dominance is no longer just a matter of superior firepower or cutting-edge platforms. It hinges on the ability to identify, train, and employ human capital with surgical precision. The Department of Defense (DoD) faces a critical inflection point: the policies that govern how we manage data, especially biometric, neurophysiological, and cognitive data—are not keeping pace with the operational and technological potential of those data sources. Without integrated policy guidance, the full power of modern data-driven capabilities cannot be brought to bear in talent management or training design. This paper proposes a unified framework for leveraging those capabilities, arguing that policy alignment is both overdue and essential.

Our approach is grounded in the belief that we can no longer afford to treat training systems, personnel selection, and physiological data collection as separate domains. Instead, these should be fused into a continuous, adaptive feedback loop that serves both readiness and resilience. Through aligned policy, we can empower commanders and trainers to personalize learning pathways, mitigate risk, and achieve operational outcomes with greater speed and precision. With direction from emerging doctrines and supported by insights from thought leaders (Saling, 2021; Walcutt & Schatz, 2019), this paper argues for a synchronized DoD policy shift that embraces comprehensive, ethically sound data integration.

### **THE CASE FOR COMPREHENSIVE PERSONNEL MANAGEMENT**

Aviation professionals understand better than most the value of integrated systems. Mission success often depends not just on a capable airframe or a reliable engine, but on the harmony between avionics, sensors, propulsion, and pilot inputs. Managing personnel should be no different. Saling’s (2021) contributions to data-driven talent management emphasize the need to operationalize data as a strategic asset. Her work shows that by aggregating data from performance metrics, learning histories, psychometrics, and biometric streams, we can identify not just who is succeeding, but why—and then replicate that success across the force.

The military services invest heavily in training, yet we often lack the mechanisms to align training investment with emerging mission requirements or to anticipate when individuals are most ready for advancement or reassignment. A data-centric, policy-enabled pipeline could solve this. Consider the case of precision billet assignment: rather than relying solely on commander judgment or performance appraisals, we can layer objective indicators from neurophysiological load profiles, cognitive adaptability assessments, and M&S-derived performance models to optimize who goes where, and when.

Walcutt and Schatz’s work in *Modernizing Learning* (2019) complements this by emphasizing the shift from legacy training models to adaptive, real-time learning systems. In their vision, learning is a dynamic process—one in which data informs every decision, from curriculum sequencing to retraining thresholds. Applying these principles at scale demands that our policies not only allowx but actively promote, such integrations.

## **THE VISION OF ENHANCED ACCESS TO HUMAN DATA**

The Department of Defense has the capacity to transform into a force in which human capability is managed with the same rigor and precision as advanced weapon systems. Just as pilots rely on integrated avionics to synthesize thousands of data points in flight, future personnel systems will harmonize learning trajectories, cognitive performance, readiness indicators, and operational histories in real time. This isn't just automation—it's insight amplification. Decision-makers at every level, from squadron leaders to joint force commanders, will be equipped with tailored dashboards that reveal not only who is trained, but who is primed—mentally, physically, and contextually—for the task ahead. The result: mission-aligned, adaptive force deployment that maximizes both individual talent and collective lethality.

This vision requires more than technology—it requires human data structures, policy and governance, and a shift in how we define readiness. Integrated human data pipelines must be recognized as core infrastructure, no less essential than fuel lines or satellite links. By embedding learning science, human performance analytics, and operational modeling into the full lifecycle of service—from accession to retirement—we can close the loop between talent investment and mission return. As adversaries embrace speed, complexity, and cognitive warfare, the decisive edge won't be in platforms alone—it will be in people, and our ability to amplify their potential through data-driven precision.

## **CURRENT DOD POLICY ENVIRONMENT AND KEY GAPS**

Despite a growing awareness of data's potential, the DoD's current policy environment remains fractured and underpowered when it comes to supporting the next generation of talent management and learning integration. Directive 8521.01, while commendable in its ethical framing, is insufficiently scoped to enable biometric data usage for continuous learning pipelines or longitudinal human capital forecasting. It treats biometrics as static identification markers rather than as dynamic performance indicators that could inform developmental pathways and learning precision.

Similarly, DoDI 5000.97 speaks to digital engineering but does not create explicit bridges to workforce systems or educational ecosystems that rely on human-machine teaming data. The potential for digital twin models of human performance—used to model, test, and project readiness—remains unaddressed in policy. There is no directive that holistically binds modeling and simulation capabilities to live performance data in a manner that supports real-time curriculum updates or precise talent allocation.

Most glaring is the absence of a consolidated cross-functional policy that links training systems development, talent management, data governance, and acquisition lifecycle. The lack of interoperability across these domains means commanders, educators, and acquisition professionals operate in stovepipes, impeding innovation and reinforcing systemic risk aversion.

The 2022 National Defense Strategy emphasizes people as the “foundation of readiness,” yet fails to prescribe policy mechanisms for enabling continuous, adaptive talent optimization. Instead, we remain bound to static readiness reporting, outdated performance models, and limited integration of cognitive or physiological data. Without dynamic policy support, the full promise of advanced technologies remains out of reach.

Compounding the issue is a lack of ethical scaffolding. The Federal Data Strategy's Data Ethics Framework rightly points out that compliance with current law is not enough—ethical governance demands transparency, accountability, and a commitment to ongoing evaluation of potential harm. Current DoD guidance lacks the ethical architecture to fully support the responsible use of emerging data streams in training and personnel management. This absence not only increases the risk of data misuse but dampens warfighter trust—an essential ingredient in successful implementation.

## **THE INTEGRATED DATA-DRIVEN FRAMEWORK**

What we propose is a policy-enabled framework that consolidates biometric, neurophysiological, and cognitive data inputs into a single, adaptive ecosystem—one capable of informing both training design and personnel placement. In

aviation terms, this is the equivalent of moving from analog steam gauges to a fully integrated glass cockpit. Data isn't just available; it's actionable, secure, and ethically governed.

Such a framework includes:

- Modeling and Simulation platforms that incorporate real-time biosensor input to adjust task difficulty, workload, or simulation fidelity.
- Machine Learning algorithms that identify optimal training intervals, flag performance degradation, and personalize curriculum pacing.
- Neuroadaptive training environments that adjust complexity based on brainwave patterns, eye movement, and stress biomarkers.
- Human digital twins constructed using longitudinal biometric, psychometric, and operational data to simulate and optimize individual career trajectories and team configurations.

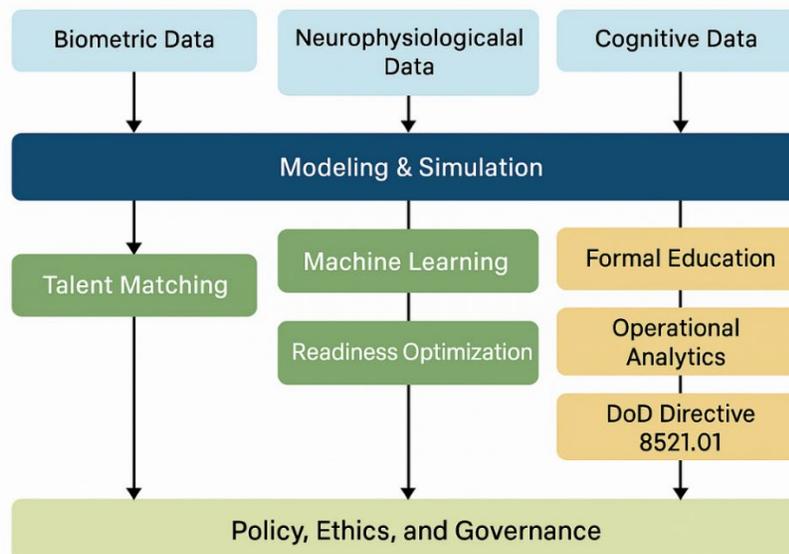
Saling's blueprint is essential here. Her vision integrates force management data with analytic systems that enable real-time billet recommendations, developmental milestone forecasting, and AI-assisted readiness evaluations. Rather than treat personnel data as a reporting function, her approach operationalizes it as a capability. To make this viable at scale, we propose embedding the Federal Data Strategy's ethical tenets into DoD's policy foundation. Principles such as Respect for Individuals, Stakeholder Engagement, Transparency, and Accountability must guide every stage of design, implementation, and evaluation. This ensures data is not only effective but responsibly employed in ways that foster trust and mission alignment.

Operationally, this framework allows for:

- Just-in-time training interventions based on real-time performance degradation alerts.
- Predictive readiness scoring that empowers commanders to act on data instead of lagging indicators.
- Secure cross-platform integration of personnel, medical, training, and mission execution data—governed by role-based access controls and informed consent.

Such a system, supported by coherent, future-focused policy, enables the DoD to fully transition from reactive personnel management to proactive, data-enabled force development. This is not science fiction—it is the next logical evolution in strategic human capital readiness, and the infrastructure already exists. What's missing is the policy to tie it all together. The digital data age of managing talent is about the confluence of smart analytics, big data, AI systems, and automated processes to enable personalized learning paths and optimized management (Gricnik, Zizek, Poljasevic, & Crnjar, 2024).

### Integrating Biometrics, Policy, and Data-Driven Training



**Figure 1. Integrated Framework for Data-Driven Talent Management, Adaptive Training, and Operational Readiness**

## OPERATIONALIZING, DATA, ETHICS, AND COMPLIANCE

Policy alignment is not simply a procedural issue; it's an ethical one. Warfighters must trust that their data will be used to support them, not surveil them. The DoD Data Strategy calls for a culture in which data is managed as a weapon system—with accountability, traceability, and protection (Department of Defense, 2020b). Biometric and cognitive data, especially when collected passively or longitudinally, must be subject to robust access controls, anonymization protocols, and role-based usage restrictions.

This trust is essential to participation. Aviators will not voluntarily wear EEG headbands or biometric flight suits if they believe the data will be misused in evaluations or medical down-channels. Policy must explicitly define boundaries of use, enforce compliance mechanisms, and include stakeholders from both operational and psychological disciplines in governance.

Ethical stewardship of data within the DoD also demands a broader framework that accounts for how emerging technologies intersect with human rights, privacy, and autonomy. Compliance cannot be addressed through a single policy or program office—it requires navigation of a mosaic of oversight structures, including the Defense Privacy, Civil Liberties, and Transparency Division (DPCLD), the DoD CIO, and each Service's legal and human research protections offices. The overlap between medical monitoring, operational assessment, and training data creates new complexity that must be resolved through deliberate coordination.

The ethical risks of misuse—either through misinterpretation, unauthorized access, or secondary use—can undermine unit cohesion and confidence in leadership. Therefore, it is critical to move beyond checkbox compliance and toward value-based governance. This includes establishing explicit ethical review thresholds for all biometric-enabled systems, embedding operational ethics advisors in system development lifecycles, and requiring red-team style testing for privacy vulnerabilities and unintended bias.

Moreover, policies should reflect the dynamic nature of biometric and neurodata. Unlike static demographic information, these datasets evolve with the individual, making questions of consent, data persistence, and repurposing even more critical. Ethical use must not be assumed—it must be continuously reaffirmed. This demands not only robust policy language, but recurring oversight and cross-functional data ethics working groups that evaluate evolving risks in light of new capabilities.

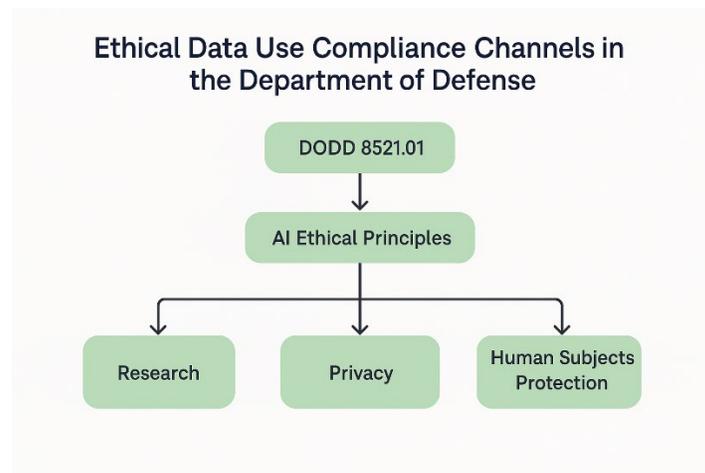


Figure 2. Ethical Compliance Structure

## EMERGING ACQUISITION PATHWAYS: OTA AND IP IMPLICATIONS

The modernization of data-driven training systems is not only a policy issue—it is a question of how flexibly and intelligently we procure capabilities. Current acquisition pathways often struggle to accommodate rapid iteration cycles, experimental systems, or emerging technologies like biometric-enabled simulation and neuroadaptive training environments. This is where mechanisms like Other Transaction Authority (OTA) can play a pivotal role.

OTAs allow the DoD to engage nontraditional vendors and prototyping communities to develop modular, interoperable training systems with integrated data-handling architectures. By bypassing some of the constraints of the Federal Acquisition Regulation (FAR), OTAs enable accelerated deployment of innovation—particularly in AI/ML-driven learning platforms and physiological data ingestion tools. These instruments have already shown value in adaptive training prototypes where biosensor inputs directly inform curriculum pacing and complexity.

However, OTA-driven solutions must not exist in a vacuum. Clear policy alignment is necessary to ensure these acquisitions incorporate proper ethical guardrails, data interoperability standards, and retention of government-purpose data rights. Training systems built using OTA pathways must be required to interface with larger digital engineering efforts (Department of Defense, 2021) and meet compliance thresholds articulated in the DoD Data Strategy (Department of Defense, 2020b). The challenge is not speed for its own sake, but speed with strategic coherence.

The modernization of data-driven training systems is not only a policy issue—it is a question of how flexibly and intelligently we procure capabilities. Current acquisition pathways often struggle to accommodate rapid iteration cycles, experimental systems, or emerging technologies like biometric-enabled simulation and neuroadaptive training environments. This is where mechanisms like Other Transaction Authority (OTA) can play a pivotal role. OTAs allow the DoD to engage nontraditional vendors and prototyping communities to develop modular, interoperable training systems with integrated data-handling architectures. By bypassing some of the constraints of the Federal Acquisition Regulation (FAR), OTAs enable accelerated deployment of innovation—particularly in AI/ML-driven learning platforms and physiological data ingestion tools.

What does success look like? In practice, this means moving from proof-of-concept to operational prototype in months, not years. For example, an OTA-funded effort might yield a simulator upgrade where biosensor inputs (EEG, HRV, eye tracking) are integrated into an adaptive engine that adjusts task pacing in real time. Within 12–18 months, such a prototype could be field-tested with training squadrons, producing both performance data and user feedback for rapid refinement. Success is not defined by full program-of-record fielding at this stage, but by demonstrating measurable training benefit, clear ethical safeguards, and interoperability with existing platforms—while shortening acquisition timelines.

However, OTA-driven solutions must not exist in a vacuum. Clear policy alignment is necessary to ensure these acquisitions incorporate proper ethical guardrails, data interoperability standards, and retention of government-purpose data rights. Training systems built using OTA pathways must be required to interface with larger digital engineering efforts (Department of Defense, 2021) and meet compliance thresholds articulated in the DoD Data Strategy (Department of Defense, 2020b). The challenge is not speed for its own sake, but speed with strategic coherence.

## **VALIDATING THE EFFORTS**

Quantifying the impact of data-integrated training systems is essential to making the case for policy change. Fortunately, a growing body of research supports the claim that biometrically informed and adaptive training models offer measurable gains. Case studies from NATO’s HFM-311 research group highlight improvements in decision-making, cognitive resilience, and task performance when learners engage in environments where physiological and behavioral data are continuously analyzed (Dugan & Baloi, 2022). Validation must move beyond case studies toward a joint effort between DoD, academia, and industry to establish standardized benchmarks for biometric-enabled training.

The ADL Initiative’s pilot efforts in Total Learning Architecture (TLA) demonstrate the feasibility of real-time data capture across learning ecosystems, enabling personalized adjustments and predictive assessment (Advanced Distributed Learning Initiative, 2019). Similarly, Saling’s data-driven talent management models provide a scalable method for workforce analytics, enabling precision in billet assignments and proactive identification of readiness gaps (Saling, 2021).

Walcutt and Schatz (2019) further substantiate the effectiveness of adaptive learning environments by emphasizing how continuous, non-intrusive feedback mechanisms improve learner engagement, reduce attrition, and elevate retention across training cohorts. Importantly, these gains are not anecdotal—they are rooted in multi-source data streams that can be modeled, validated, and scaled.

However, validation efforts must also recognize that transformation is more than technological. The Innovation @ HRC model provides a practical roadmap, emphasizing that successful implementation of human-centered innovation must move through a structured cycle: Ideate → Design → Prototype → Scale → Integrate → Assess. This model aligns precisely with the DoD's challenge of moving from promising research (e.g., ADL pilots) to fully institutionalized policy-backed systems. More critically, the model distinguishes between 10% improvements and 10x transformations, reinforcing that policy and acquisition pathways must enable—not hinder—leaps in readiness capability.

## **DRIVING POLICY CHANGE: RECOMMENDATIONS**

The path forward demands deliberate policy synchronization, not merely isolated reforms. We propose the following:

First, DoDD 8521.01 should be revised to explicitly allow biometric and physiological data to inform adaptive learning environments, performance monitoring, and workforce planning (Department of Defense, 2020a). This update must differentiate between static identification use and dynamic training or developmental use.

Second, DoDI 5000.97 must expand its guidance to explicitly include human-centric modeling and simulation elements—encompassing biometric simulation inputs, digital twin modeling of personnel, and longitudinal performance tracking (Department of Defense, 2021). Third, a new policy mechanism is needed to harmonize language and accountability across DoD components. This mechanism should mandate that any system designed to collect or act on biometric or cognitive data must demonstrate compliance with ethical guidelines derived from the Federal Data Strategy's Data Ethics Framework (Federal Data Strategy, 2020). Oversight should come from a Joint Data Ethics Council comprising operational commanders, legal experts, training architects, and military psychologists. Fourth, acquisition programs should be required to demonstrate that any new data-integrated training solution—whether acquired through traditional FAR contracts or OTA—meets minimum thresholds for data portability, human-centered design, and government-owned analytics. Acquisition is not just a mechanism for fielding tools; it is the front line of how we shape our training doctrine.

This is where the Innovation at Human Resources Command model becomes even more instructive. Without robust integration and assessment mechanisms, even well-intentioned pilot efforts risk becoming “one-offs.” A sustained policy shift must include requirements for enterprise-level adoption roadmaps that account for cultural resistance, readiness metrics, and feedback loops. The Integrate and Assess phases must be codified into DoD doctrine and acquisition oversight if innovation is to scale responsibly.

Yet even these structural efforts require an operational foundation in change management. According to the Guidance for Change Management in the Federal Workforce (OPM, 2017), federal agencies undergoing transformation must pair structural updates with cultural transition strategies. Restructuring efforts—including realigning workforce competencies, integrating biometrics, or automating parts of the learning pipeline—demand tailored human capital strategies and direct engagement with the affected personnel.

In this context, coaching emerges as a critical tool. Coaching equips leaders, training developers, and operational commanders with frameworks for empathy-based communication, managing resistance, and guiding others through uncertainty. It builds a bridge between policy design and daily execution. Structured coaching initiatives can also create feedback loops between implementation and policy evaluation, aligning tightly with the evaluation components of the Human Capital Framework under 5 CFR 250 subpart B.

Federal change management guidance emphasizes the importance of transition teams, strategic communication, stakeholder governance, and performance tracking tied to Human Capital Operating Plans (OPM, 2017). Embedding these principles ensures that biometrics and neurodata aren't just technically deployed but are organizationally

adopted. Without deliberate efforts to align agency culture, performance incentives, and workforce planning to these new data pipelines, the policies will fall short of their transformative potential.

Modernizing policy is not simply about embracing new technologies—it's about ensuring those technologies reflect our values, serve our mission, and scale responsibly. With the right policy scaffolding in place, supported by deliberate change management infrastructure, the DoD can ensure that its workforce is not only ready, but resilient, optimized, and aligned to meet tomorrow's challenges.

## **CHANGE AT THE GRASSROOTS LEVEL**

As the Department of Defense pushes toward integrated, data-driven training ecosystems, it must recognize that enduring transformation hinges not just on systems or policy—but on people. From the perspective of both a psychologist engaged in coaching and a practitioner of aviation safety, it is evident that the most effective way to scale innovation is by empowering service members to act as stewards of change. Research consistently affirms that organizational culture and psychological safety are foundational to innovation readiness (Rashid, Sambasivan, & Rahman, 2003). Without trust, clarity, and ownership, even the most sophisticated technologies fail to gain traction.

Structured coaching programs offer a practical bridge between high-level reform and day-to-day operational reality. Coaching enables individuals—especially mid-level leaders—to develop the emotional agility, systems thinking, and influence skills required to serve as what Dorr (2003) describe as “development agents of change.” These leaders translate strategic vision into actionable steps, anticipate human friction points, and help their peers adapt through empathy and credibility. In aviation, this model is intuitive. Pilots, safety officers, and maintainers routinely navigate complex decision environments with both rigor and adaptability. By extending that mindset to digital integration efforts, aviation personnel become natural translators between data-centric policy and frontline mission requirements.

Pfeffer (2010) reminds us that sustainable organizations invest not only in systems, but in the well-being and engagement of their people. In military terms, this means creating climates where personnel feel both informed and invited to participate in transformation—not merely subjected to it. The framework proposed for organizational change integrated through digital transformation (Guerra & Davnila-DelValle, 2024) is one that reinforces the need for distributed leadership, structured feedback loops, and role clarity during reform efforts. Units can operationalize these insights by embedding trained coaches within reform initiatives, identifying informal influencers, and providing avenues for cross-rank collaboration.

While the term *influencers* strikes a different chord and meaning with regard to social media, it means something different in organizational change, yet has some of the same goals – to drive at change in behavior or adoption to a novel idea. This is no small feat. At the Naval School of Aviation Safety, more than 400 students annually are sent out to the fleet forces as Aviation Safety Officers (ASO). These ASOs are newly minted in the information needed to embed safety lessons into their unit's culture and climate, while integrating a Safety Management Plan. In a discipline which the operational tempo and risk is high, it is important to build a culture and coach others into becoming enablers of this change (Guerra & Danvila-Del Valle, 2024). This change can be impacted by the ASOs at monthly meetings, daily briefs, or in the aircraft itself. Scale this example out to other units and organizations requires a holistic change to how and where data will support decision making and ultimately improve organizations across the military domain.

By aligning change management strategy with human development principles, DoD can ensure its workforce is not simply reacting to change but actively shaping it. This cultural posture is essential to scaling biometric, cognitive, and neurophysiological data solutions ethically and effectively. When personnel are viewed as trusted contributors to innovation—rather than passive recipients—policy becomes practice, and readiness becomes transformation.

## **CONCLUSION**

Military readiness today demands more than just capable equipment and disciplined execution—it requires the ability to adapt our human capital strategy with the same precision and speed as we adapt our technologies. In an era defined by complexity and digital transformation, the decisive edge will come from our ability to integrate biometric,

neurophysiological, and cognitive data into everyday decisions about training, talent management, and mission alignment.

But integration alone is not enough. True transformation requires deliberate, data-driven organizational change—change that engages people as agents of innovation, not subjects of reform. This means embedding human-centered design into every layer of policy, acquisition, and leadership development. It means creating feedback loops between systems and the warfighters they are designed to support. And it means shaping a cultural shift where data is trusted, not feared; used, not stockpiled; and governed, not merely collected.

Aviators cannot fly with outdated flight systems, and likewise, commanders cannot lead with outdated talent systems. When insight is fragmented and policies lag behind practice, risk accumulates silently. To meet emerging operational demands, DoD must align its data infrastructure, ethical governance, and leadership pipelines into a coherent strategy for talent optimization. This is not simply a modernization effort—it is a readiness imperative. The policies we write today will either constrain or catalyze the force of tomorrow. It's time to ensure they do the latter.

## REFERENCES

- Advanced Distributed Learning Initiative. (2019). *Modernizing learning: Building the future learning ecosystem* (Walcutt, J., & Schatz, S., Eds.). Department of Defense.  
<https://www.adlnet.gov/assets/uploads/Modernizing%20Learning.pdf>
- Department of Defense. (2020a). DoD Directive 8521.01E: Department of Defense Biometrics.  
<https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/852101E.pdf>
- Department of Defense. (2020b). DoD Data Strategy. Chief Data Office.  
<https://www.defense.gov/Portals/1/Documents/pubs/DoD-Data-Strategy.pdf>
- Department of Defense. (2021). DoDI 5000.97: Digital Engineering. Office of the Under Secretary of Defense for Acquisition and Sustainment.
- Department of Defense. (2022). 2022 National Defense Strategy of the United States of America.  
<https://www.defense.gov/News/News-Stories/Article/Article/3182180/>
- Department of Defense Inspector General. (2023). Evaluation of the protection of biometric identification data used in overseas contingency operations (DODIG-2024-016).  
<https://media.defense.gov/2023/Nov/30/2003350940/-1/-1/1/DODIG-2024-016.PDF>
- Dorr, K. C. (2003). *Developing Agents of Change*. Research paper, US Army School of Advanced Military Studies.
- Dugan, E., & Baloi, A. (2022). Human Factors and Medicine Panel (HFM-311): NATO Research Task Group final report on human systems integration. NATO Science and Technology Organization.
- Federal Data Strategy. (2020). Data ethics framework. U.S. General Services Administration.  
<https://resources.data.gov/assets/documents/fds-data-ethics-framework.pdf>
- Gričnik, A., Zizek, S., Zolak-Poljasevic, B. & Črnjar, K. (2024). *Talent management in the age of digital transformation and changes in the workforce characteristics*. 159-165. Doi: 10.20867/thi.27.25.
- Guerra, J. M., & Danvila-Del Valle, I. (2024). Exploring organizational change in the age of digital transformation and its impact on talent management: trends and challenges. *Journal of Organizational Change Management*, 37(6), 1273-1294.

- Office of Personnel Management. (2017). Guidance for change management in the federal workforce: Fostering engagement and productivity during times of change. <https://www.opm.gov/policy-data-oversight/human-capital-management/implementation-guidance/guidance-for-change-management-in-the-federal-workforce.pdf>
- Pfeffer, J. (2010). Building sustainable organizations: The human factor. *Academy of management perspectives*, 24(1), 34-45.
- Rashid, Z. A., Sambasivan, M., & Rahman, A. A. (2004). The influence of organizational culture on attitudes toward organizational change. *Leadership & organization development Journal*, 25(2), 161-179.
- Saling, K. (2021). Data-driven talent management: Using analytics to improve workforce alignment. In *Military talent innovation* (pp. 55–70). Government Publishing Office.
- U.S. Army Human Resources Command. (2023). *Innovation @ HRC: Innovation playbook and framework*. <https://www.hrc.army.mil/Assets/Document/1694391325831.pdf>