

The Directorate of Analytics & Performance Optimization

Leveraging data as a strategic asset

by Staff, Marine Corps Directorate of Analytics & Performance Optimization

“We will make strategic investments in data science, machine learning, and artificial intelligence. Initial investments will be focused on challenges we are confronting in talent management, predictive maintenance, logistics, intelligence, and training. In each of those areas, we have significant data ripe for the application of these tool sets. It is not acceptable to waste resources because we lack the investments in infrastructure, processes, and personnel.”¹

—Commandant’s Planning Guidance

Marine Administrative Note 481/19 announced the name and mission change for the Headquarters Marine Corps Force Preservation Directorate (G-10). The new name is Marine Corps Directorate of Analytics & Performance Optimization (MCDAPO), and the new mission reads,

To arm senior leaders and strategic partners with insights derived from integrated analytics and cross functional research in order to optimize warfighter and organizational performance.

MARADMIN 481/19 notes that these changes

reflect the expanded focus of MCDAPO’s analytic projects and its enhanced capacity to employ cross-functional teams that support senior leaders on a range of different topics inclusive of, but extending beyond, force preservation.

In this article, we briefly describe the history of MCDAPO, how it aligns with larger trends within the DOD, MCDAPO’s data analytics environment, and how MCDAPO leverages data as a strategic asset to inform senior leader decision making on an expand-

ing scope of problem sets. In doing so, MCDAPO directly supports the data science, machine learning, artificial intelligence, and data architecture and governance lines of effort laid out in the *Commandant’s Planning Guidance* (CPG).

Background

In July 2016, the Assistant Commandant of the Marine Corps commissioned the 90-day Suicide Analysis Project (SAP) to further the study of an increase in the number of Marines dying by suicide.³ The SAP delivered its findings to senior leaders at Headquarters Marine Corps (HQMC) in October 2016. The Commandant then directed the establishment of a HQMC Force Preservation Directorate to build upon the knowledge and experience gained while completing the SAP and to leverage this unique capability across a wider portfolio of force preservation issues. Over time, MCDAPO has produced major analytic projects covering topics such as recruiting, potential cost reductions related to non-end of active service attrition, the effects of blast overpressure on the health of Marines in the artillery and combat arms communities, the utilization of tuition assistance and its utility as a retention mechanism, and adverse health outcomes related to the special duty assignment population. (See

“And for everyone’s benefit—those outside the department, those inside the department; whether you’re already serving or might serve—we’re also going to use 21st century data and technology approaches to improve and modernize how we manage our talent.”²
—Former Secretary of Defense Ash Carter

Figure 1.) Since these projects began to reach beyond the scope of force preservation, MCDAPO was renamed and re-missioned to better align itself with supporting senior leaders and strategic partners throughout the Marine Corps, Department of the Navy (DON), and DOD.

These changes reflect broader trends within the DOD and its gradual em-

brace of big data and analytics. For example, in 2016, the DOD established the Office of People Analytics to “utilize big-data analytics to better understand key components of service members’ career paths, and how policy and environmental changes affect the performance and composition of the DOD workforce.”⁴ The Navy established 21st Century Sailor (N17)

in 2013 to leverage data to enhance readiness, resiliency, safety, and total force fitness.⁵ The Army established the Army Analytics Group to implement and maintain the Person-event Data Environment, an enterprise platform for integrating data across the human capital enterprise to facilitate descriptive analysis, policy evaluation, and research including predictive modeling. The Army Analytics Group offers subject matter expertise in the areas of research science, data consultation, and data analysis.⁶ The Air Force created the Directorate of Studies, Analyses, and Assessments, which applies scientific and mathematical methods to support planning, resourcing, and operational decisions.⁷ MCDAPO has built a secure data analytics environment containing enterprise-wide data in order to similarly leverage data to inform decision making.

Analytics Data Environment

MCDAPO has built a data analytics environment of enterprise-level information that cuts across systems, programs, processes, and applications that otherwise generate “siloes” data. The data environment is a closed, air-gapped secure network in a separately secured room inside a secured office space. The data environment contains data from, among others, the Defense Suicide Prevention Office, Defense Health Agency, the Defense Equal Opportunity Management Institute, Naval Criminal Investigative Service, Manpower & Reserve Affairs, Marine Corps Recruiting Command, Criminal Investigative Division, Casualty Branch, Lejeune Leadership Institute, and the Marine Corps Safety Center. MCDAPO data scientists leverage cutting-edge analytic software to conduct predictive modeling, neural network mapping, and automated machine learning to facilitate the understanding of wicked problems at the enterprise-level.

All data consumed into the air-gapped system is de-identified to protect the anonymity of each Marine. Data is initially retrieved from the Data Manager and loaded onto encrypted hard drives. That data is then transferred to the air-gapped system, and all PII data

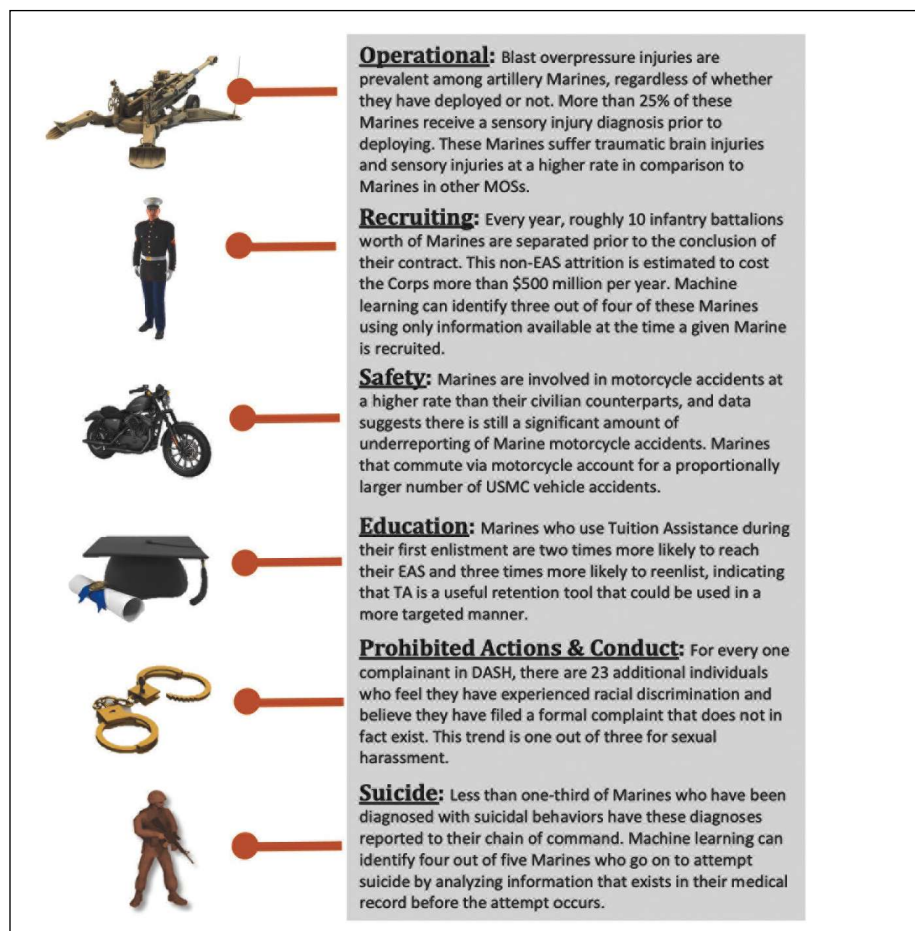


Figure 1. Previous MCDAPO projects span across the enterprise. (Figure provided by author.)

“We will leverage the authorities and guidance in the DON business operations plan to accelerate our transformation from disconnected legacy systems to an integrated data architecture that treats data as it should be—a critical resource.”⁸

—CPG

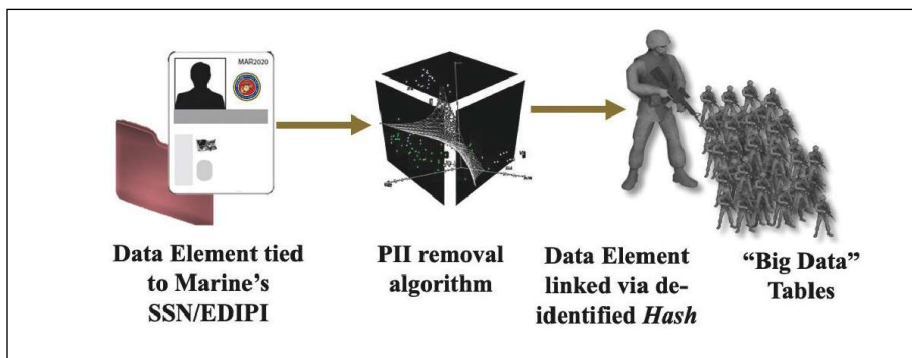


Figure 2. De-identification process. (Figure provided by author.)

fields (e.g., names) are removed from the data. The de-identified data is then loaded into an Analytic Data Schema and only then is it available for analysis. (See Figure 2.) The conversion process utilizes a robust *hashing* algorithm and an alphanumeric *salt*, which provides additional defense against reversing the algorithm and makes it possible to link records from multiple databases while protecting individual Marines.⁹

MCDAPO's response time to requests for studies is driven by access to data. If the necessary data already exists in the data analytic environment, then the response time is quicker than if MCDAPO must request, retrieve, explore, and clean the data first. Additionally, the focus of MCDAPO's analytic efforts are limited to the scope of its existing Institutional Review Board protocols. If one does not exist, this extends the response timeline. MCDAPO can neither share raw data nor access to its data environment. However, despite these limitations, the robustness of its data environment enables MCDAPO to move beyond mere analysis and providing descriptive or summary statistics and conduct advanced data analytics to help

better understand the dynamics driving trends and previously unidentified relationships.

Leveraging Data as a Strategic Asset
MCDAPO is organized into two

staffed branches (Data Analytics, Research Integration) that perform complementary roles in pursuit of its mission. (See Figure 3.) The Research Integration Branch is immersed in research literature relevant to areas of interest or concern for the Marine Corps. This knowledge base informs the scoping, framing, and management of the studies MCDAPO conducts, and results from MCDAPO's studies can be used to confirm, inform, or counter existing research. The Data Analytics Branch leverages advanced operations research techniques, programming languages such as R and Python, and software such as Jupyter Notebook and DataRobot to derive meaningful insights from, and identify hidden relationships in, data.

MCDAPO maintains strategic, collaborative partnerships with offices and commands throughout not only the Marine Corps, but also the DON and larger DOD that have equities in the programs and policies related to MCDAPO's studies. MCDAPO does not own or manage any programs or policies and instead tries to use its data-driven insights to serve as cultural brokers that break down organizational silos at the interfaces between offices and organizations, facilitating horizon-

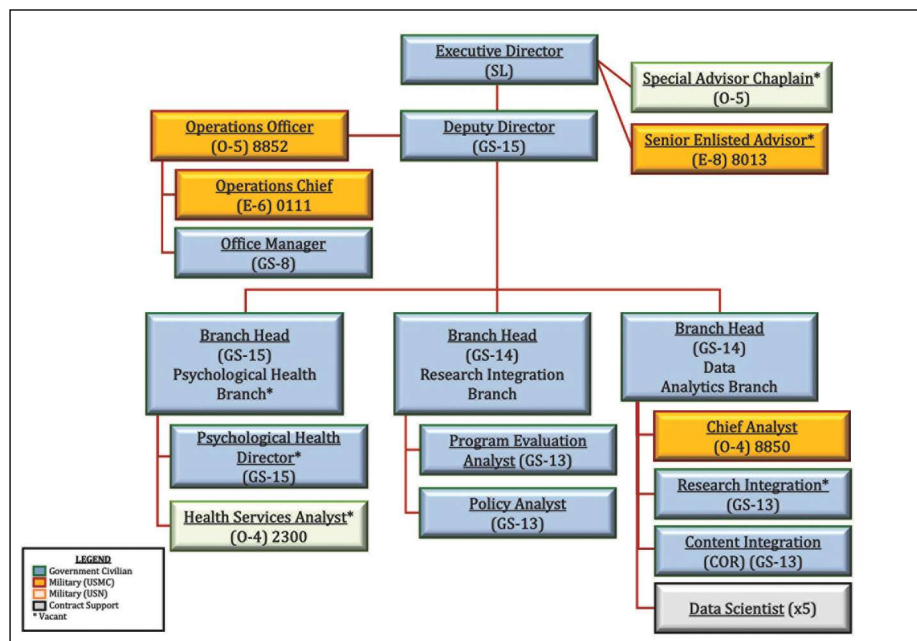


Figure 3. Marine Corps directorate of analytics and performance optimization. (Figure provided by author.)

“Plans or programs developed in support of this planning guidance that require additional resources must include an accompanying resource offset verified by a recognized analytic body (PA&E, OAD, etc.) to be considered for implementation.”¹⁰

—CPG

tal collaboration.¹¹ Additionally, given this freedom from programs and policies, and by leveraging data from across the enterprise, MCDAPO can take a more holistic approach to evaluating them and develop measures of performance and measures of effectiveness that move beyond simple use criteria and focus on specific outcomes such as retention, legal problems, mental health and addictions, and suicide. In doing so, MCDAPO provides the analytic rigor and quantifiable basis for leaders and organizations to implement change.

We invite you to engage us and collaborate with us as we seek to leverage quantitative data to inform decisions that previously only relied on anecdotal evidence and intuition.

Notes

1. Gen David H. Berger, *38th Commandant's Planning Guidance*, (Washington, DC: 2019).
2. Secretary of Defense Ash Carter, “Building the First Link to the Force of the Future” Remarks by Secretary of Defense Ash Carter at the George Washington University Elliot School of International Affairs, Washington, DC,” (speech, Washington, DC, November 2015).
3. Assistant Commandant of the Marine Corps G.M. Walters to Deputy Commandants and Special Staff Directors, “Suicide in the Marine Corps,” Memorandum dated 12 August 2016.
4. Staff, “Welcome to the Office of People Analytics (OPA),” Office of People Analytics, available at <https://opa.defense.gov>.
5. For more information, see Navy Personnel Command, “21st Century Sailor,” available at <https://www.public.navy.mil>. For background information, see Secretary of the Navy Public

Affairs, “Secretary of the Navy Announces 21st Century Sailor and Marine Initiative,” *Navy News Service*, (March 2012), available at <https://www.navy.mil>; and NAVADMIN 153/13.

6. Secretary of the Army, “Army Directive 2017-04 (Implementation of the Army Human Capital Big Data Strategy),” (Washington, DC: January 2017).

7. Secretary of the Air Force, “Air Force Policy Directive 90-16, 2, Special Management: Studies, Analyses and Assessments,” (Washington, DC: July 2018).

8. *38th Commandant's Planning Guidance*.

9. Encrypted means that the data could be recovered through a decryption process. Hashing is designed to be one-way. You turn a password into its hash, but you cannot turn a hash back into a password.

10. *38th Commandant's Planning Guidance*.

11. See Tiziana Casciaro, Amy C. Edmondson, and Sujin Jang, “Cross-Silo Leadership: How to Create More Value by Connecting Experts From Inside and Outside the Organization,” *Harvard Business Review*, (Brighton, MA: Joshua Macht, May–June 2019).



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