

The Modern Iron Mountain

Integrate the bold and new with the tried and true

by Capt R. Campbell German

The Marine Corps is focusing more on sustainment as *Force Design* continues progressing with logisticians proposing adopting commercial practices and new technology for better support in contested environments. Storing large equipment near units in iron mountains has been deemed impractical for fast-paced 21st-century warfare due to size and vulnerability. Instead, it is proposed that units will be entirely self-reliant, and the Service will leverage artificial intelligence and machine learning (AI/ML) for forecasting and supply chain development to meet the needs of the force. While these are admirable and thought-provoking ventures, AI/ML advancements will not replace the need for assured sustainment sources, and units will always require external assistance to help them succeed. The Marine Corps needs a logistics approach harmoniously integrating these advanced technological solutions with tried-and-true supply chain practices. To achieve an agile, modern mountain, the Service needs to harness data to provide meaningful recommendations on maintenance and repair parts, enable units at the tactical level to access the Joint logistics enterprise (JLEnt) for urgent requests, and further develop the inventory of pre-staged equipment and supplies, in the form of the Global Positioning Network (GPN).

The Marine Corps is collecting more data to feed AI/ML models in the hopes of providing helpful estimates, but this pursuit is not providing relevant results because there is an overlooked caveat: the quantity of data does not necessarily translate into meaningful output. Cur-

>Capt German is a Ground Supply Officer currently with the 22d MEU Command Element. Previously, he was the Supply Officer for 3d Littoral Logistics Battalion, 3d Marine Littoral Regiment.

rently, supply and maintenance systems are based on data from home stations in a permissive environment, not in the austere conditions of deployments during constant operations. The Navy is attempting to address this by capturing data from deployed ships to determine priorities for overhaul and maintenance in port.¹ The Marine Corps began to do the same with the Condition Based Maintenance Plus (CBM+) program which pulls data directly from sensors installed on equipment employed during exercises.² These sensors display fault codes that need to be analyzed to provide a usable output. Although more sensors are being installed on equipment, claims from Marine Corps Systems Command that these are directly driving operational improvement are inaccurate given the absence of a system to analyze the data.³ Rather, what is being produced is just a lot more data unhelpfully displayed in the form of lengthy lists of codes that a maintainer must sift through without guidance related to relevancy or priority.

One way the Marine Corps should utilize data is for recommendations on critical repair parts that units bring on deployment, also known as IX blocks. The Marine Corps last updated the order discussing guidelines for IX blocks in 2012, and it desperately needs a re-

fresh. For example, a deploying MEU will receive recommendations for their IX block from their local supply management unit (SMU), Marine Corps Logistics Command (LOGCOM), and the Defense Logistics Agency (DLA), each basing their recommendations on different methodologies and experience-driven opinions. Currently, the SMUs do not have standardized software for providing IX block recommendations, and methodologies differ between MEFs. While the experts at the SMUs are making the best recommendations they can with the organic resources at their disposal, these units have limited trained professionals to utilize the overwhelming amount of data available to them.

The easiest and most economical solution for the Marine Corps to address both the art and science of logistics optimization is to utilize the same company to perform the analysis for the CBM+ program in the first place. Uptake Technologies completed the prototype for the CBM+ solution with the sponsorship of the Defense Innovation Unit and was endorsed to continue development with the Marine Corps, signed by both the Defense Innovation Unit and Marine Corps subject-matter experts.⁴ This made sense given Uptake's development of programs to intake the massive amount of data from the Global Combat Service System–Marine Corps (GCSS-MC) along with the thousands of fault codes and sensor readings to provide near realtime recommendations.

Along with their field-tested CBM+ platform, Uptake has also developed a predictive Block Builder concept that

would use the historical maintenance data in GCSS to make data-based IX block recommendations, providing the Marine Corps with the science component. This application would consider the health of each National Stock Number in identified equipment for IX block development. Then considering commander's guidance with SMU expertise, a unit could perform the art of customizing the IX block for their specific deployment. Equipment lists often change at the last minute before embarkation and logisticians must recreate their forecasts painstakingly through Excel workbooks and numerous GCSS-MC reports. This is time-consuming and inefficient; a Block Builder program would remove the guesswork and shorten the time to make sound recommendations. Based on sensor data from each serial number and historical data regarding failure on components without sensors, the program would predict components and subsystems that may be at risk of failure during a specific time frame, indicating a need to stock those critical items. This would provide commanders with a decision point to embark equipment as-is, repair prior to, or simply buy the repair part in anticipation of failure. If a MEU or Marine littoral regiment is deployed and needs to conduct an offload within 72 hours, the equipment list could easily be plugged into the program to create a new IX block recommendation. This will be the answer for expeditionary advanced base operations as small units of employment will rapidly need recommendations for Class IX parts that fit their requirements, and this program could provide customized recommendations based on the life history of the equipment a unit employs.

While deployed in future conflict units need to have the means to action requirements from the JLEnt and cannot assume business practices like Just-in-Time-Logistics will provide timely support. Just-in-Time-Logistics is based on the premise that the required number of parts for an end item arrive precisely when needed, optimizing efficiency and cost savings, and has been proposed as a solution for Marine Corps logistics to reduce reliance on standard



Figure 1. Users would begin a new block build by selecting the appropriate mission environment and operating parameters such as space, duration, and budget. (Figure provided by Uptake Technologies.)

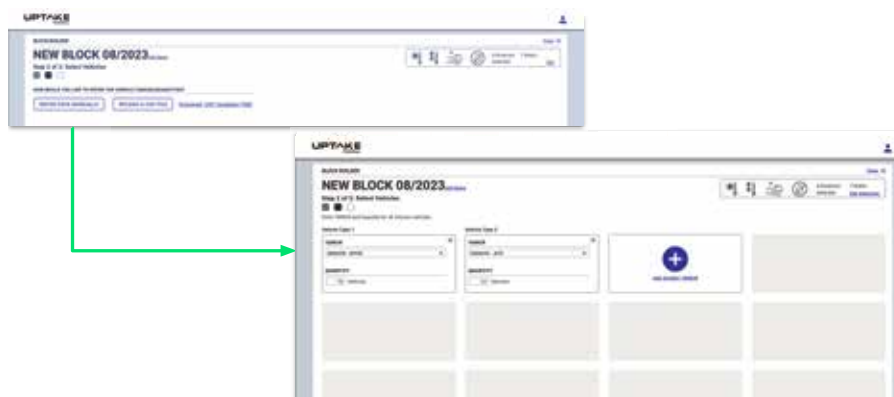


Figure 2. Then asset type and quantity will be selected along with an editable parts list produced via GCSS data analysis and user input. (Figure provided by Uptake Technologies.)

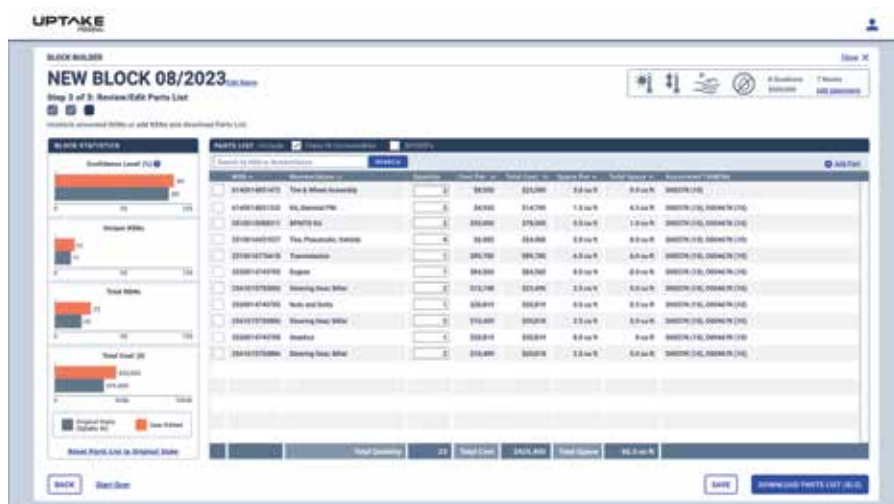


Figure 3. The program would output the new block composition improving logisticians' accuracy and efficiency. (Figure provided by Uptake Technologies.)

inventories.⁵ While effective with careful demand and production forecasting, as seen with companies like Apple and Ford, Just-in-Time-Logistics lacks flexibility, increasing risk when forecasts are inaccurate or unexpected events occur. The recent situation in the Red Sea illustrates this perfectly, as Houthi rebel attacks prompted shipping companies to choose longer transit routes, raising freight costs and causing retailers to fear stock shortages.⁶ Factory closures due to parts shortages further compound the problem, potentially leading to lost sales for a company.⁷ However, for the Marine Corps, it could mean a unit preparing for (or engaged in) combat operations becomes non-mission capable.

Instead of depending on the enterprise to ensure parts arrive at just the right time, units need to train and utilize their staff to source solutions at the point of need and from joint resources. For example, basic intermediate supply actions should be 1000-level training and readiness events so that those Marines understand external sources of supply and how to employ them. Also, utilizing subject-matter experts for each class of supply will be paramount and has already shown its practicability in formations like the Marine littoral regiment's material sustainment integration cell (MSIC). The MSIC is empowered to "rapidly respond to emergent requirements for class of supply, critical item maintenance, or contracting; effectively tying the requirement sourcing solutions to the inter and intra-theater movement, tactical distribution, and maintenance actions together into one process narrative."⁸ The MSIC consolidates expertise and uses it to leverage capabilities up to the JLEnt to meet operational requirements where normal business practices would fail or be greatly delayed. The Marine Corps must place more emphasis on these types of formations and avoid isolating logistics professionals from each other. Semblance of the MSIC can be replicated at every echelon to simplify and standardize resource allocation or requirement fulfillment. These developments are practical ways supply and logistic sections can provide rapid results.

A counterargument against pre-staging equipment asserts that it is unnecessary because current models show that moving items within an operational area is often more challenging than between theaters. But this does not negate the need for nearby resources because these models are misleading given they are based only on past observations, not potential future events. For example, in the aftermath of the massive market drop in 2007 that led to the housing crash, some experts in the quantitative finance industry said that based on their models "the meltdown

and is not clearly understood by lower echelons. Within the first island chain, there are efforts to establish the GPN by Marine Corps Forces Pacific and LOGCOM—on top of the existing network of DLA, Navy, and Army logistics hubs. Requesting support through these organizations is not clear or responsive and some require that the request go through multiple general officer staffs for approval.

Outside of requesting lateral support from a different geographically located inventory control point in the form of a Marine Corps SMU, there is no prac-

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of August 2007 was so unlikely that it could never have happened in the history of the human race."⁹ These events are often referred to as black swans or occurrences that seem unfathomable because they have never been seen before. The military equivalent of a black swan might be an invasion of Taiwan or perhaps the more recent example of a massive Russian offensive into Ukraine. The American military, and specifically the Marine Corps, should be prepared for these black swans and can only do so by methodical preparation. This does not imply that the Marine Corps should not use data or AI/ML to make predictions; rather, it implies that we must be aware of the limitations of these models and consider how to best augment their gaps.

Preparing for these black swan events requires an efficient GPN that stages equipment and supplies in the first island chain in preparation for a near-peer conflict. Installation and Logistics 2030 mentions that "we will also reinvigorate our ability to operate with and sustain from naval shipping while developing a modernized supply and globally positioning network that supports crisis response and operations across the competition continuum."¹⁰ However, the reality is that GPN is underdeveloped

tical way for a unit to access alternate sources of supply, even though DLA already exists across the globe for this very purpose. The Marine Corps underutilizes economical solutions like DLA hubs that are already staffed and tasked to provide support to the Services. For example, DLA San Joaquin is located on the U.S. West Coast and supports all units in the Indo-Pacific, yet in 2021, they held less than 10 Marine Corps-specific National Stock Number items compared to the Navy, which stocked over 50,000.¹¹ Renting space from DLA would be a cheap and easy answer for the Marine Corps, but previous attempts to utilize this program (such as with the remote storage activity program through LOGCOM) have faltered after their initial experimentation phase. Specifically, the remote storage activity concept worked at accomplishing this by stocking critical components at distribution centers around the globe, but it was never backed with appropriate funding or directives to fully succeed. The staging of equipment with DLA, Navy fleet logistics centers (FLCs), and other hubs offers a more economical and streamlined solution. The DLA ships thousands of parts every day, and their warehouse practices are superior to those of the Marine Corps, with

industry contacts and salaried, experienced workers to aid them in these activities and decisions. Renting space from DLA warehouses or FLCs would provide units with meaningful alternate sources of supply that are in the theater. Items stocked there could include large and heavy items that are difficult to move intra-theater or low-density, high-demand items that have long lead times. These stocks would provide insurance to the maneuver elements when intra-theater lift and commercial shipping are degraded or unavailable—both of which are prudent assumptions for a conflict against a peer threat.

To best solve the intricacies of inter-theater support and further advance the GPN, the Service should also be investing in representatives at these key locations. Logistics Command currently does this at crucial throughput nodes such as Tracy Air Force Base, Yokosuka FLC, and other sites through their Distribution Management Support Service program. This program could be even more advantageous by integrating uniformed members with personnel at these locations. Within the MSIC concept, the liaison cell is depicted as a connection to external support elements via liaison officers (LNOs) who support the operation. There were attempts to do this at the FLCs, and, at one time, the Marine Corps planned to have a Marine LNO at each FLC aligned with the fleets. However, because of limited manning, it is unclear whether these positions will be filled. Whether the Marine Corps ends up establishing contracts, renting space, or stocking items at these locations, the LNOs would still serve an important purpose by providing meaningful relationships between services and yet another resource for units and organizations such as the MSIC to leverage in support of operational requirements. Utilizing the Marine Corps GPN and leveraging the JLEnt will not be cheap, but the Marine Corps (or DOD) will pay for it one way or another in the next conflict when urgent requirements arise.

Through these strategies, the Marine Corps can establish a modern, agile iron mountain capable of providing reliable sustainment to units under

any circumstances. The Marine Corps' involvement in the CBM+ program showcases the concrete advantages of using data-driven tools to anticipate and address logistical needs, including the creation of comprehensive IX blocks. Furthermore, the success of the MSIC illustrates how the JLEnt GPN can be leveraged to construct a resilient logistic framework. These advancements are crucial in preparing for unforeseen black swan events, how the Marine Corps demonstrates its vital role to the American public, and how it has in the past. When war on the Korean peninsula erupted in 1950, it was the Marine Corps that was ready at a moment's notice, not only because they were properly trained but also because they kept their equipment after World War II when other Services had sold theirs for scrap.¹² Implementing these recommendations will ensure the Marine Corps remains equipped not only to handle peacetime logistics but also to triumph in the intricate logistics challenges of future competition. There is no blaming supply chain issues or imprecise models in a future conflict. There is just victory or failure and it is up to us to shape the outcome.

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Notes

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