Logistics Operations in a DDIL Environment

Sustainment when C4 is denied, degraded, intermittent, and low-bandwidth (DDIL)

by Mr. Brent Lancaster, Mr. Patrick Gallaher,
Capt Mathew Williams & Mr. Greg Kellenberger

>Mr. Lancaster is the Team Lead for Advanced Technology for the Logistics Integrated Information Systems-Marine Corps (LI2S-MC) Program Office, an acquisition element of the Marine Corps Systems Command and Program Executive Office for Manpower, Logistics and Business Solution (PEO MLB) with Deputy Commandant (DC) Installations and Logistics (I&L) advocacy.

>>Mr. Gallaher is the Project Officer for Advanced Technology for LI2S-MC Program Office, an acquisition element of the Marine Corps Systems Command and PEO MLB with DC I&L advocacy.

>>>Capt Williams is the Product Owner for DDIL MC Log for LI2S-MC Program Office, an acquisition element of the Marine Corps Systems Command and PEO MLB with DC I&L advocacy.

>>>>Mr. Kellenberger is the Logistics Lead for Advanced Technology for LI2S-MC Program Office, an acquisition element of the Marine Corps Systems Command and PEO MLB with DC I&L advocacy.

To maintain information superiority, Logistics Information Technology (LOG IT) must be adaptable to meet evolving business operation needs of the MAGTF. The Marine Corps currently faces logistics communication challenges in non-permissive environments and requires innovative approaches to improve data accessibility and accuracy. To sustain the force in the 21st century and fulfill the *38th Commandant's Planning Guidance,* the Marine Corps is committed to achieving solutions that maintain continuity and integrity from garrison to the tactical edge to ensure that warfighters make more informed decisions and can execute service, supply, and maintenance requirements effectively.

The Marine Corps must develop next-generation technical architecture to seamlessly support LOG IT business process resiliency to achieve a tactical advantage over adversaries. Program Manager, Logistics Integrated Information Solutions, an Acquisition Program Office in Marine Corps Systems Command and PEO MLB, is enabling this expansion and demonstrating valuation of data and informed decisions by increasing access to information, accuracy, and timeliness through DDIL MC Log.

Background

The Global Combat Support System–Marine Corps/Logistics Chain Management (GCSS-MC/LCM) is the technology centerpiece for logistics business operations in the Marine Corps. It provides accurate, near-real-time, integrated logistics information and enterprise-wide visibility of logistics data, enabling Marines to make informed logistical decisions at the speed of relevance. Currently, GCSS-MC requires a sustained internet connection and has limited accessibility and use under disconnected or disadvantaged network conditions. Host networks are used to connect GCSS-MC users with the system to provide web connectivity to the garrison, shipboard, and expeditionary operational environments. When reliable web connectivity cannot be achieved, Marines must document actions manually and enter them into GCSS-MC later once internet connectivity is obtained.

DDIL MC Log Vision to Pilot

To meet the Marine Corps' need to innovate, adapt, and succeed in a rapidly changing operating environment, LI2S-MC conducted a one-year prototype development effort with subsequent pilot demonstrations that would identify the availability of technical solutions that could resolve the warfighter's experience in a challenging environment. The pilot was supported by user representatives and sought to prove the ability to perform GCSS-MC functions in like environments (garrison, MAGTF-afloat, and ashore) under DDIL conditions.

The successful pilot proved GCSS-MC functionality in the Marine Corps Tactical System Support Activity Cyber and Network Engineering Lab testing environments by simulating logistics business operations in DDIL environments (Figure 1). The team verified that service, supply, and maintenance requests transactions within GCSS-MC successfully synchronized in disconnected and disadvantaged scenarios while assuring effective cybersecurity. The demonstration resulted in zero functional errors on more than 2,500 transaction scenarios. The pilot proved that greater sync capability, effective data exchange, and ease of use would considerably improve logistics communication in an austere tactical environment.

After the successful pilot, the LI2S-MC team aggressively awarded a critical capability production contract. This solution was named DDIL MC Log, and it will provide an extension of GCSS-MC capabilities to all operational environments and will allow GCSS-MC users' continuity of operations for logistics business processes under degraded or absent network conditions.

DDIL MC Log Development Process

DDIL MC Log employs an Agile "whole team" approach to deliver a complete end-to-end structure for iterative system development and testing. The integrated Agile team is comprised of the Product Owner, Program Management Team, GCSS-MC subject-matter experts (SME), developers, and users from both the Acquisition Community and the functional, user community. This cross-organizational team composition ensures a customer-centric, collaborative, and adaptive environment to foster meaningful customer-focused results.

DDIL MC Log will be hosted on the secure and accredited Marine Corps Business Operations Support System service provider Amazon Web Services GovCloud hosting environment. DDIL MC Log makes full use of cloud benefits through this hosting environment, such as availability, reliability, and other vital non-functional requirements that support user mission and the Security Control Inheritance Model and Marine Corps Business Operations Support System Secure Cloud Computing Architecture components.

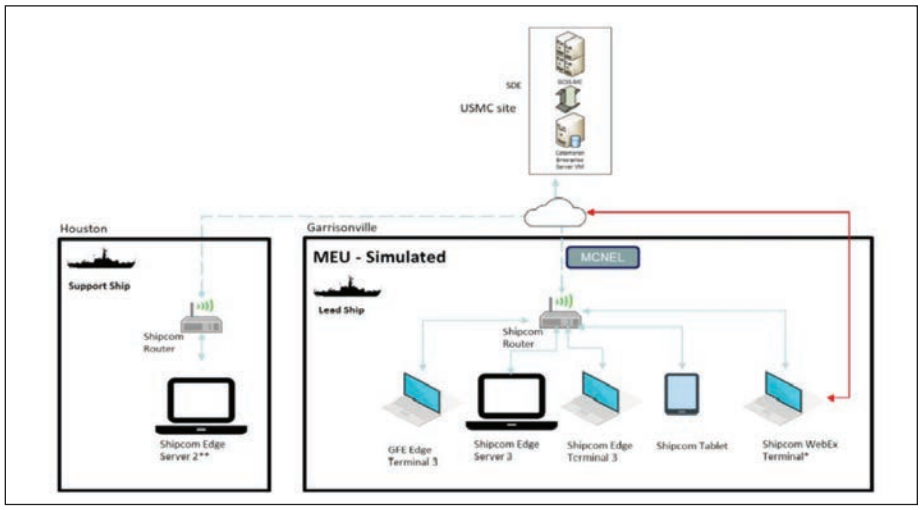

Figure 1. DDIL MC Log–Operational View 1 (Simulated). *(Figure provided by author.)*

DDIL MC Log Capabilities

Currently, Marines in a non-permissive environment must record information through various manual means for follow-on digital entry into GCSS-MC. Unreliable or overburdened connections disrupt the normal work process as GCSS-MC requires a consistent connection to complete updates. The FMF currently has no reliable digital tool supporting mobile technology, resulting in services, supply, and maintenance requests captured with pen and paper until connections with GCSS-MC are reestablished.

Envision a Marine performing a limited technical inspection in the well deck of an amphibious ship or at a forward operating base, capable of capturing data or taking notes electronically that can then be directly used to support logistics processes. DDIL MC Log allows Marines to enter and store data when web connections are poor or unavailable and synchronize the stored

GCSS-MC Core Functions Provided in DDIL MC Log
Login/Logout
Create or Update Field Service Request
Request for Supply and Associated Task(s)
Request for Service and Associated Task(s)
Request for Maintenance and Associated Task(s)
Flag Operational Status
Order Part
Approve Requests
Assign Requests to Specified Organizations
Receive Requests from Other Organizations
Display/Manage Request
Attach Funding Appropriations Data to Part Requests
Provide Feedback Response on Actions Taken

Table 1. GCSS-MC Functions in DDIL MC Log.

data once a reliable connection has been established through an intuitive graphic interface.

The functionality delivered during the first year of the DDIL MC Log has been developed around a subset of thirteen core functions from GCSS-MC (Table 1) identified by the GCSS-MC functional subject-matter expert team. Using a commercial off-the-shelf application loaded on forward deployed computer systems, DDIL MC Log allows tactical users to select the time and place of their choosing to smart-sync the geographically distributed device with the enterprise service. The enterprise service then delivers the necessary information to GCSS-MC, receives appropriate updates, and provides the updates to the local computer. The operator can perform its core functions regardless of an active link to GCSS-MC.

The current effort will provide a highly scalable solution of critical functionality to extend field service supply chain management maintenance processes in disconnected and disadvantaged environments. The solution is built with functional experts working shoulder-to-shoulder with developers giving realtime feedback as the product advances. Through user-based tactical interfaces and advanced reporting dashboards, the solution will provide Marines with enhanced alert and notification functions, search and audit features, advanced key performance indicators, and management capabilities for GCSS-MC reporting as the Accountable Property System of Record. Extending access to GCSS-MC capabilities to all operational environments, specifically to DDIL environments, would better support garrison, shipboard, and expeditionary functional requirements and processes for GCSS-MC users.

The DDIL MC Log application will enable the full exploitation of *sense and respond* logistics, giving end-users the ability to track shipments, effectively manage inventories, and monitor equipment status while enabling predictive—vice reactive—logistics without any noticeable interruptions to users or ongoing transactions. This technology will provide Marines the ability to offset

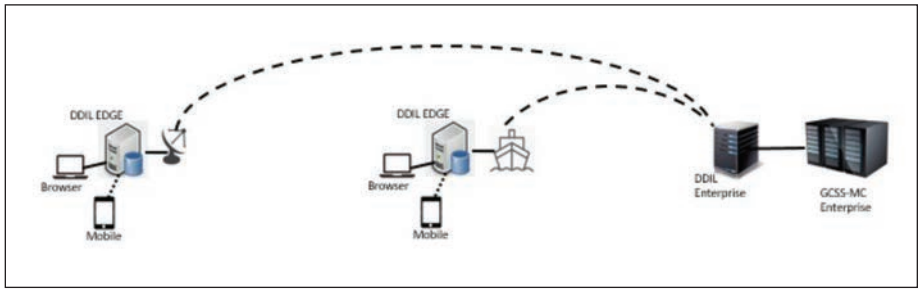

Figure 2. DDIL MC Log–Operational View-1 (Production). *(Figure provided by author.)*

enemy capabilities by resupplying faster, reducing repair cycle times, and provisioning on-demand parts. Additionally, LOG IT business processes will be more secure and will realize significant improvements to property accountability, traceability, and data integrity by allowing disconnected users to continue on-site activities, capturing up-to-date data, and synching the information to the enterprise when practicable.

The first year of effort for DDIL MC Log is focused on producing a minimum viable product for a selected MEU. LI2S-MC is currently executing a Critical Data Analysis which is developing a model integrated with the Deputy Commandant Combat Development and Integration led and Deputy Commandant Installation and Logistics advocacy supported capability base assessment, which will identify gaps in LOG IT. This output will be used to inform the next capability expansions of DDIL MC Log and legacy system replacements. The DDIL MC Log application is scalable by design and can support a broad range of additional logistics services, enhancing the Marines Corps' capacity to operate effectively in a non-permissive operational environment.

Conclusion

The FMF is focused on preparing for a near-peer opponent and structuring itself to operate in a non-permissive environment. The DDIL MC Log concept of employment supports the core functionality of logistic supply and maintenance support for the disconnected user. The application fulfills the needs of critical weapon systems maintainers and supporting equipment. These maintainers and supply Marines need to conduct day-to-day logistics transactions and status reconciliations while not relying on a constant reach back to GCSS-MC through the web. Removing the dependency on a continuous internet connection and providing a solution to conduct operations in challenging environments allows the fleet Marine to perform tasks without interruptions from LOG IT business systems operational requirements.

The DDIL MC Log application, as part of the portfolio of actions under development in the LI2S-MC modernization space, contributes to the critical capabilities necessary to support the Marine Corps in future conflicts. DDIL MC Log allows forward-deployed operators in the non-permissive environment to execute their mission while disconnected, building on the local information and enriching the data and information provided to the commander when connectivity is established. LI2S-MC is working toward placing DDIL MC Log functionality into the hands of the Marines by the conclusion of the current year. Subsequent active engagement with the fleet user will establish an immediate feedback loop that will be integrated with CDA/CBA outputs to identify areas for future enhancement, expansion, and legacy system replacement.