**Planning at the Speed of Relevance: Leveraging Technology to Sustain the 21st Century Warfighter**

Major Matthew J. Schultz and Major Andrew S. Harkins

*As military capabilities continue to advance beyond the industrial age equipment and logistics systems of the Twentieth Century, the Marine Corps must equip its tactical level logisticians with tools that synchronize sustainment at the receiving end of a globally-integrated, all-domain supply chain. The achievement of this end will require a bridging technology delivered on an all-weather platform that generates rapid logistics solutions using real-time data converged from across the Joint Logistics Enterprise (JLENT). In the absence of this capability, the Marine Corps will lack the ability to plan for and execute concepts of support at the speed of relevance in a contested, complex operating environment. This work intends to advance the conversation on logistics modernization. It will use future technologies, as well as a number of existent logistics planning tools, to propose the development of a system capable of extending the operational reach and endurance of the Marine Air Ground Task Force (MAGTF) of the future.*

[[](https://www.dvidshub.net/image/5227981/us-marines-use-polaris-rzr-transport-gear-pacific-blitz-19)](https://www.dvidshub.net/image/5227981/us-marines-use-polaris-rzr-transport-gear-pacific-blitz-19" \t "_blank)

[U.S. Marines with Marine Wing Support Squadron (MWSS) 371 transport supplies with a Polaris RZR to a forward arming and refueling point (FARP) at San Clemente Island, California during exercise Pacific Blitz 19, March 15, 2019. The Marine Corps’ ability to achieve success in the future operating environment will depend on tools that allow tactical level logisticians to plan for sustainment at the velocity of conflict while synchronizing the convergence of support at the customer end of a globally-integrated, all-domain supply chain.](https://www.dvidshub.net/image/5227981/us-marines-use-polaris-rzr-transport-gear-pacific-blitz-19" \t "_blank)

**The Context and Impacts of the Current Operating Environment**

Taken in combination, the *2017 National Security Strategy* (NSS) and its complimentary *2018 National Defense Strategy* (NDS) signal a transition from two decades of counter insurgency operations in mature theatres into an era of great power competition in a multipolar world. By extension, these guiding documents indicate a need to build a lethal force capable of winning in large-scale combat operations (LSCO) while retaining the agility to succeed in small wars against maligned actors on the periphery. They also emphasize the need to compete in scenarios short of armed conflict, necessitating the use of distributed maritime forces capable of responding to threats and opportunities in the contact and blunt layers of the global operating model. As the current world order, established between the end of the Second World War and the fall of the Soviet Union, continues to face challenges to accepted international norms by the revisionist powers of China and Russia, the Marine Corps must posture itself to achieve success in an increasingly entropic operating environment characterized by the presence of dense populations in the urban littorals, contested access to global commons, and democratized technology that enables global communications. While the continued digitalization of our logistics sustainment on the tactical level will be accompanied by many inherent risks, the Corps must weigh this against the other option—fighting tomorrow’s war with yesterday’s logistics systems.

Yet, as artificial intelligence, machine learning, and autonomous systems continue to exert a greater force on the character of war, logisticians will continue to find it increasingly difficult to develop accurate, effective, and timely logistical plans. Paradoxically, this complex environment will place creative thinking and imagination at a premium as a matter of enhancing competitive advantage in conjunction with the perfectly rational solutions produced by algorithms. To meet this need, the Marine Corps must enhance its logisticians’ abilities to rapidly understand the rationality and “science” of war in order to allow them to maximize the use of time, space, and cognitive capacity to focus on the “art” of war.

[[](https://www.dvidshub.net/image/5117886/eye-sky)](https://www.dvidshub.net/image/5117886/eye-sky" \t "_top)

[Tablet-based platforms offer the logistics enterprise similar advantages to those accrued in the realm of the warfighting functions of fires and maneuver.](https://www.dvidshub.net/image/5117886/eye-sky" \t "_top)

As the Nation’s naval expeditionary force-in-readiness, the Marine Corps’ relevancy in the future will rest on the organization’s ability to remain a responsive, credible deterrent that is prepared to win across the spectrum of conflict. As the Corps continues to develop the means required to operationalize the *Marine Operating Concept* (MOC) and its *Expeditionary Advanced Base Operations* (EABO) concept, the logistics enterprise must keep pace on the strategic, operational, and tactical levels alike.  Success in this operational context will rest, in no small measure, on the shoulders of forward-deployed, tactical level logisticians armed with a platform to support their planning and execution of operations at the end of tomorrow’s supply chain built to support the aim of global integration espoused in the *Capstone Concept for Joint Operations* (CCJO). The first part of achieving this solution revolves around the need to field a deployable, all-weather platform from which to plan logistics operations at the tactical level. As stated by General Julian Thompson in his seminal work *The Lifeblood of War*, “only those forces that are demonstrably capable of conducting sustained operations at the end of long lines of communications will be of the smallest use in deterring threats posed by latter-day adventurers on the international scene.”[1]

**A Platform to Support Expeditionary Operations**

[[](https://www.cnet.com/news/the-thinkpad-x1-foldable-prototype-is-a-big-screen-that-bends)](https://www.cnet.com/news/the-thinkpad-x1-foldable-prototype-is-a-big-screen-that-bends" \t "_top)

[The Lenovo Thinkpad X1, unveiled in May 2019, is expected to hit the market in 2020. The flexibility and ergonomics of the tablet demonstrate the advances in technology available to the Marine Corps in arming its tactical logisticians with the tools needed to coordinate and synchronize all-domain sustainment operations in the future environment.](https://www.cnet.com/news/the-thinkpad-x1-foldable-prototype-is-a-big-screen-that-bends" \t "_top)

Despite the great advancements in technology that play an integral role in contemporary military operations, the vast majority of logisticians utilize their enterprise laptops as their primary means of performing their organizational roles. While enterprise laptops are an acceptable means in most garrison settings with access to WiFi or a deployed network, they have significant limitations in expeditionary environments since they are neither all-weather, nor practical in most field situations. Future technology platforms—such as Lenovo’s ThinkPad X1, a revolutionary foldable tablet set for release in 2020—offer an ergonomic solution with a low profile, light weight, and suitable battery life. Such a platform, when combined with access to emerging cloud technology and wireless data streams, has the potential to revolutionize the nature of sustainment planning when linked to the Logistics Automated Information System (LOGAIS) data backbone of the Marine Corps and the Joint Logistics Enterprise (JLENT). Over the past few years, the ground combat element has performed extensive experimentation with its Android-delivered *Killswitch* in a wide variety of scenarios. Although this system highlights the risk of digital compromise to adversaries, as well as the difficulties of conducting operations in connectivity-denied environments, it also demonstrates great potential in terms of empowering consumers at the end of the supply chain. Given the validated utility of this system, the Marine Corps’ logistics enterprise must follow-suit by building a complementary system built from the bottom-up to enable tactical logistics integration with the globally-integrated, all-domain supply chain of the future. Of course, a physical platform is only half the solution. As with any physical information technology platform, the equipment’s operational value also depends upon the systems loaded on it.

**The Wide Array of Analog and Monofunctional Automated Logistics Planning Tools**

The U.S. Army’s Combined Arms Support Command (CASCOM) maintains multiple systems to assist Army logisticians in planning. For example, the Quick Logistics Estimate Tool (QLET) provides estimated unit requirements for each class of supply, whereas the Army’s Platform Calculator provides transportation capacity lift estimates for cargo movement. Similarly, CASCOM’s Food and Water Tool enables the selection of various Class I requirements for separate populations while the Class III(B) Estimation Tool provides fuel assessments. The extensive use of these tools at the Army’s Command and General Staff School demonstrates the utility of the Army’s tools in assisting logisticians to create support packages for large maneuver forces. That said, these systems provide only generic solutions for Marine Corps formations, and they still require planners to reference numerous sources of information to deliver a final product. These two truths reduce the utility of these tools to Marine Corps logistics planners working with Marine-peculiar formations and equipment, such as assault amphibious vehicles (AAV), expeditionary aviation platforms, and light armored vehicles (LAV).

While the Marine Corps’ logistics enterprise possesses many LOGAIS to manage the force’s logistics system, the organization’s tactical logisticians continue to rely on multiple sources of information and unlinked systems to sustain their units. The primary planning tools for tactical logistics planning include MSTP’s Logistics Planning Handbook, unit historic data, Technical Manuals, MCWP 3-40, GCSS-MC, and Total Force Structure Management System (TFSMS), to name a few. Thus, it can take logisticians many man-hours to create detailed quantitative analysis when determining unit logistics requirements during larger exercises or planning for large scale conflict. Further, in the absence of a program of record to unify tactical logistics forecasting, parallel planning at each echelon often yields different logistics estimates based-off of varying perspectives. On the tactical level, some of these variances can be normalized through cross-leveling support; however, these inaccuracies can lead to significant differences at the interface with operational level sustainment providers and the JLENT. It can also lead to inefficiencies within a supply chain that leave units either under-supported or over-burdened.

The ongoing logistics modernization efforts being pursued by Installations and Logistics (I&L), the Marine Corps Warfighting Lab (MCWL), and the Marine Corps Logistics Operations Group (MCLOG) emphasize the urgency of advancing the Corps’ logistics capabilities to meet tomorrow’s needs. Yet, while many of these advancements have focused on material and enterprise-level LOGAIS capabilities, it is vital to provide warfighters with the means to interface and synchronize these advancements to sustain their units. In the information era, tactical level logisticians need the ability to leverage the great wealth of data across the Marine Corps’ LOGAIS enterprise—to include tables of organization and equipment (T/O&E), service-approved planning factors, inventory geolocation data, and transportation network throughput capacity—to put serious power at the fingertips of logisticians in every clime and place. While the Supporting Establishment carries much of the burden of force modernization, the Operating Forces continue to leverage data to solve a wide range of planning problems.

**The *Re-Gonkulator :* A Multifunctional Automated Logistics Planning Tool**

The 3d Marine Division G-4 Plans Section developed the *Re-Gonkulator*in 2017 to manage logistics planning for the Korean Theater of Operations (KTO)—a theater primed for rapid escalation. From its inception, the *Re-Gonkulator* replaced a wide variety of antiquated logistics planning support tools, to include an array of monofunctional excel sheets and planning reference guides, to solve a number of wicked logistics planning problems, ranging from concepts of support for force deployment to the sustainment of mechanized formations engaged in LSCO. While it is far from perfect, the *Re-Gonkulator* demonstrates the ability to integrate numerous functions into a single system to produce rapid logistics solutions with concrete data.



The Re-Gonkulatoruses variable input data associated to tens of thousands of data points and FY-18 TO&E data to build concepts of support that include classes of supply, unit transportation capacity, and base camp masterplan support estimates. A similar program could serve as a modern, tactical logistics bridging capability in a deployed environment with access to the JLENT LOGAIS enterprise. A program of record built to support the Corps’ tactical level logisticians Could revolutionize the global supply chain to support operations across the conflict continuum.

The assessments generated by the *Re-Gonkulator* fed vital planning efforts for the division regarding the OPLAN, the 2017 Installations and Logistics Rehearsal of Concept Drill, and large-scale mission rehearsal exercises such as Key Resolve and Ulchi Freedom Guardian. These assessments also contributed to the identification of the material and service needs to set-the-theater as well as total wartime host nation support (WHNS) requirements.  Additionally, the tool solved a wide array of problems using Marine-centric data to produce a consolidated snapshot of logistics requirements capable of rapid dissemination.  Unlike the other tools available at the time, the successive versions of the *Re-Gonkulator* grew in complexity and pulled from an ever-larger pool of data incorporated into the database to solve emerging operational problems such as the percentage of the division’s transportation capacity lost to support projected humanitarian assistance efforts.

The foundation of the *Re-Gonkulator* database was FY-18 TO&E data extracted from TFSMS. The database, which was limited due to its reliance on authorized rather than on-hand equipment levels, included every TAMCN, as well as the personnel composition, for each type of unit within the division’s wartime structure. Each TAMCN within the base data was associated with data incorporated from a wide variety of sources, ranging from the MAGTF Staff Planner’s Manual to technical manuals and multi-service reference publications.  Further, each type of unit, down to the company level, reflected the personnel structure by rank and military occupational specialty (MOS), as well as ammunition requirements for combat loads and operations at both the sustained and assault rate.  Because of the variable input feature, the *Re-Gonkulator* can add and subtract units or equipment, as needed in order to develop assessments on the impacts of changes in task-organization, support relationships, and unit assignments. In short, the system synchronized tens of thousands of individual data points in the production of standard outputs for use in a range of applications to include update briefs, formal reports, and maintaining tracker boards to enhance situational awareness in the Administration and Logistics Operations Center. Above all, the variable functionality of the *Re-Gonkulator* proved to be the tool’s critical capability since task-organization shifts, particularly in armored or mechanized units, often result in significant emotional trauma and hours lost for logisticians.

Where stand-alone tools focus on things like providing Class I stockage requirements or generating fuel consumption estimates in isolation, the *Re-Gonkulator* operates as a unified system, synchronizing its wide array of activities into a consolidated product. These outputs enable rapid assessments of requirements across each function of tactical logistics under variable conditions and operational parameters.  The *Re-Gonkulator* can perform these actions because each piece of equipment is associated to a large number of data points, enabling assessments at various levels.  For example, the AMK-27 Medium Tactical Vehicle Replacement (MTVR) includes important information within the *Re-Gonkulator* database such as troop capacity (crew and passenger seats), fuel data (capacity and consumption rate, to include idle burn rate), and cargo payload (short tons, warehouse pallets, QUADCONs, ISOCONS).  The MTVR data also includes weight and dimensional information that feeds into the Assault Echelon (AE) and Assault Follow-on Echelon (AFOE) Module to provide rapid assessments of total landing craft utility (LCU) and landing craft air-cushioned (LCAC) sortie requirements to deliver forces from ship-to-shore. This dimensional data also enables the determination of requirements for amphibious embarkation, wartime movement program (WMP) transportation capacity, and Time Phased Force Deployment Data (TPFDD).  Taken together, the *Re-Gonkulator* supports the rapid assessment of units in various scenarios, which proved to be incredibly useful in planning everything from battalion-level air assault operations with pre-staged emergency resupply packages to division-level river crossing operations.

The *Re-Gonkulator* also includes an array of modular off-shoots such as the Base Camp Module that can produce a rapid estimate of the material, services, and space requirements to build a base camp master plan.  This tool proved invaluable in planning for wartime host nation support (WHNS), as well as Base Operations Support Integrator (BOSI) functions, to meet life support needs during force closure and RSO&I. The Base Camp Module relies on user input in terms of unit types, personnel numbers, and climatic variables to provide automatic feedback based off of planning factors found in the MSTP MAGTF Planners Manual, the PACOM Blue Book, and various aviation ground support (AGS) planning publications maintained by Marine Aviation Weapons and Tactics Squadron One (MAWTS-1).  The outputs of the Base Camp Module include total port-a-john and hand-washing station requirements, motor pool space estimates, and cantonment area dimensions that include fire lanes and required spacing between facilities.  The Base Camp Module also provides estimates on total tentage requirements to support billeting, postal, recreation, religious services, and field feeding. It also generates administrative space requirements along with rough estimates on the total number of tables, chairs, and fire extinguisher needs, to name a few.  Finally, the module facilitates the integration of plans and support requirements for Korean Service Corps (KSC) personnel—the critical enablers needed to fill key sustainment roles in order to allow units to focus on preparations for war. As with standard *Re-Gonkulator* outputs, the data generated can be scaled and manipulated to plan for other sustainment needs to provision unit battle positions, tactical assembly areas (TAA), and internally displaced people (IDP) collection points. Above all else, this module provides the key data points that outline the support needed to develop accurate demand signals for WHNS, operational contracting support (OCS), and material needs for service and theater entities to achieve an appropriate posture of supplies and equipment to support contingency operations.

The Wartime Movement Planning Module is another spin-off from the *Re-Gonkulator.*  This module uses the *Re-Gonkulator* database to provide assessments of the lift demand to support force closure.  Not only can it identify unit organic transportation capacity shortfalls, it also has the ability to generate estimates of rail and commercial ground lift capabilities needed to support movement from sea and areal ports of debarkation to equipment reception points and TAAs.  This module, because of the dimensional data associated to each TAMCN, also supports force deployment planning and execution (FDP&E) efforts to shape unit TPFDD in accordance with operational priorities.

The *Re-Gonkulator* database enables other key planning functions, to include division-level serial assignment tables capable of supporting movement control and traffic management during river crossings as well as ship-to-objective movements during amphibious operations. It also has the ability to support equipment redistribution and task organization changes during mission rehearsal exercises.  The *Re-Gonkulator* also supports the management of MPF equipment distribution planning.

In all, the *Re-Gonkulator* concept, although limited in its capacity and heavily reliant on user variable manipulation, demonstrates the great potential of using data to empower logisticians and leaders at all levels on a stand-alone platform, even in the absence of internet connectivity.  The *Re-Gonkulator* was designed to solve specific problems and heighten planning tempo and accuracy in real-world preparations for war. As with most innovations, urgency provided the catalyst to build a system capable of synchronizing and consolidating a multitude of planning functions into a usable product in the absence of a capability that was not readily available. A *Re-Gonkulator* -like system, or series of applications, even if only carried-forward on the theoretical level, can serve as a model to support the development of capabilities to meet the service’s future logistics planning needs. In combination with a suitable delivery platform, a *Re-Gonkulator* -like system can serve as an integral link in the global supply chain that connects enterprise data with forward-deployed warfighters, getting the Corps one-step-closer to an Amazon.com-like logistics system that optimizes the convergence of support to units through numerous distribution channels.

The logic of the aforementioned modules could be extended into a wide-variety of other applications to assist in planning, ranging from ground combat element field training to forward arming and refueling point (FARP) operations in support of Marine Corps and Joint Force aviation.  The key remains the need to provide tactical level logisticians with an easy-to-use interface that combines variable inputs and data from across the Marine Corps and the Department of Defense information enterprise. In order to ensure the data remains accurate, LOGCOM can be the gatekeeper of the base information and merge updates from MSTP, GCSS-MC, and TFSMS, among others, as required. With access to other standard LOGAIS programs of record, logisticians would find themselves empowered by the great potential of the JLENT in the palms of their hands.

If the system were built to support planning and coordination in full, limited, or zero connectivity situations, a limitation that plagues many of our current programs or web-based systems, the possibilities are endless. With the ability to plan and request sustainment based-off of real-time, or close-to-real-time, data, a broad range of tactical level applications—ranging from rapid assessments of a MAGTF’s Class IX requirements or fuel estimates to support air-delivered ground refueling (ADGR) of a light armored reconnaissance (LAR) screening force in a distributed environment—logisticians can keep pace with future operations in a complex environment. To achieve this end, the Corps needs an integrated solution that draws from the ever-growing pool of data in our LOGAIS systems and puts it into the palms of our warfighters so that they can converge the right capabilities at the right time and place to extend the operational reach of our future MAGTFs in distributed, EABO.

**Conclusion**

Ultimately, by enhancing the speed and precision of the “science” of war with a deployable, field-capable system, the Corps can enable our logisticians and leaders to operate ahead of, and exploit, the enemy’s decision-making cycle. A system that leverages enterprise-level big-data to produce rapid logistics solutions will provide Marines with more time, space, and capacity to excel in the “art” of war. The cognitive aspects of conflict will continue to be increasingly important in an era wherein adversaries remain in constant pursuit of our intellectual property and proprietary technologies. Further, the prospects of autonomous weapons, artificial intelligence, and machine learning will continue to reduce the technological advantages that the U.S. has enjoyed in the past. In an era where leaders on the tactical level are more frequently called upon to make decisions with strategic impacts, we can deny our enemies the benefits of technology by fielding a platform that allows the Corps to make even better use of our human capital—the greatest competitive advantage in our inventory.

The Marine Corps must empower its tactical logisticians with the ability to harvest big-data and leverage the JLENT in support of effective tactical level logistics planning at the velocity of future operations. If the Corps does not find the means to achieve this endeavor, then the organization will surrender the traditional competitive advantage of American logistics excellence, one of Colin S. Gray’s espoused characteristics of the American way of war.[2] After all, a logistics network that cannot meet its customers’ needs is bound to fail, regardless of how well it manages inventories, processes, and innovations at the enterprise level.

Logistics is, at its fundamental level, about the management and regulation of flows of ideas, things, people, and services along supply chains to extend the operational reach and endurance of the customer—our tactical warfighting organizations. Ultimately, if the patrol leader on point doesn’t have the ammo to close with and destroy the enemy, or the local distribution point doesn’t have the humanitarian daily ration to put in the hands of the target population that needs it, then the rest of the system becomes irrelevant.

[[](https://www.dvidshub.net/image/3023185/3-5-uses-new-tech-itx)](https://www.dvidshub.net/image/3023185/3-5-uses-new-tech-itx" \t "_top)

[Marines and sailors assigned to Lima Company, 3rd Battalion, 5th Marine Regiment move towards their objective with a Logistics Multipurpose Unmanned Tactical Transport (Log-MUTT) carrying a portion of their gear during their Integrated Training Exercise at the Marine Corps Air-Ground Combat Center, Twentynine Palms, California. This is a training event within their pre-deployment training curriculum. The Marine Corps Warfighting Laboratory provided some different unmanned aircraft systems (UAS) and unmanned ground systems (UGS) for the Marines to employ during their training cycle.](https://www.dvidshub.net/image/3023185/3-5-uses-new-tech-itx" \t "_top)

[1] Julian Thompson, *The Lifeblood of War: Logistics in Armed Conflict*(London: Brassey’s, 1991), 16-27.

[2] Colin S. Gray, “The American way of War: Critique and Implications,” in *Rethinking the American Way of War*, edited by Anthony D, McIvor, 13-40 (Annapolis, MD: Naval Institute Press, 2005), 32.

**Bibliograph**

DVIDS, “3/5 Uses New Tech at ITX, by Matt Lyman,” accessed 15 May 2019,

[https://www.dvidshub.net/image/3023185/3-5-uses-new-tech-itx](https://www.cnet.com/news/the-thinkpad-x1-).

DIVIDS, “Eye in the Sky [Image 14 of 14], by Sgt Katelyn Hunter,” accessed 15 May 2019,

[https://www.dvidshub.net/image/5117886/eye-sky](https://www.cnet.com/news/the-thinkpad-x1-).

DVIDS, “U.S. Marines Use Polaris RZR to Transport Gear at Pacific Blitz 19 by LCpl Tia Carr,”

accessed 15 May 2019, https:// [www.dvidshub.net/image/5227981/us-marines-use-](https://www.cnet.com/news/the-thinkpad-x1-)polaris-rzr-transport-gear-pacific-blitz-19.

Gray, Colin S. “The American Way of War: Critique and Implications.” In *Rethinking the*

*Principles of War*, edited by Anthony D. McIvor, 13-40. Annapolis, MD: Naval Institute

Press, 2005.

Sarah Tew, “Lenovo foldable ThinkPad X1 prototype: A big screen that bends - bigger than

the Samsung Galaxy Fold, this 13-inch tablet folds into a laptop shape for typing and

productivity,” accessed 15 May 2019, <https://www.cnet.com/news/the-thinkpad-x1->

foldable-prototype-is-a-big-screen-that-bends/.

Thompson, Julian.*The Lifeblood of War: Logistics in Armed Conflict*. London: Brassey’s,

1991.

**Author Information**

**Major Matthew J. Schultz** serves as a logistics officer in the Marine Corps. He served as a platoon commander with Combat Logistics Battalion 4 in Iraq, a Staff Platoon Commander at The Basic School, and the Commanding Officer of Motor Transport Company, Marine Wing Support Squadron 172. He also served as the G-4 KTO Plans Officer for the 3d Marine Division. He possesses a bachelor’s degree in Biology from York College of Pennsylvania and a master’s degree in Management, Strategy, and Leadership from Michigan State University. He is an Art of War Scholar at the United States Army Command and General Staff College.

**Major Andrew Harkins** serves as a logistics officer in the Marine Corps.  He served in Iraq under Marine Wing Support Squadron 374, Afghanistan with GLT-1, Australia with V14, and most recently in Kuwait with SPMAGTF-CR-CC 17.2.  He has served as an SPC at The Basic School and is currently attending Army Command and General Staff Course in Fort Leavenworth.  He has a bachelors degree in Supply Chain and Information Systems from Penn State University.