

# *Sustaining the Force in the 21<sup>st</sup> Century*

a functional concept for

## Future Installations and Logistics Development



12 May 2019



## FOREWORD

The Marine Corps exists to defeat our Nation's enemies. Even in a world of ever-increasing technology, the Marine Corps must continue to provide combat formations capable of closing with and destroying the enemy. In the future operating environment, logistics will be the pacing function for the Marine Corps. To effectively support and sustain expeditionary forces, the naval logistics enterprise must devise new and innovative methods to stay ahead of adversaries who will continue to adapt and improve in ever more sophisticated ways.

Future challenges will impact how the Marine Corps organizes our installations and logistics which ultimately sustain maneuver forces to fight and win our Nation's battles. *Sustaining the Force in the 21st Century* provides guidance for future Installations and Logistics development. It describes the steps the Marine Corps will take to design, develop, and field a logistics enterprise for the 21st century in support of the future fight as defined in the National Defense Strategy. Force developers and integrators should examine potential solutions to required capabilities using the doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy methodology. Further, while our ability to leverage existing capabilities and new technologies within the Marine Corps is critical, integration with the industrial base, Navy, Joint, and Coalition forces will be of equal importance.

Our logisticians exist to enable and sustain the lethality of the Marine Air-Ground Task Force across all warfighting functions and within all warfare domains. The Marine Corps needs every logistician to develop creative solutions to today's and tomorrow's complex problems. The Marine Corps needs disruptive thinkers who are willing to challenge the status quo and provide professional recommendations that will improve our installations and logistics capabilities in support of the National Defense Strategy, Defense Planning Guidance, and other Navy, Joint, and Department of Defense strategic guidance.

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## 2 Scope

***In a distributed and contested environment, logistics is the pacing function for the Marine Corps. Marine Corps logistics must increase the readiness, agility, and lethality of the MAGTF in order to allow us to fight and win in future engagements.***

*Sustaining the Force in the 21<sup>st</sup> Century* provides an aiming point for logistics development, documents priorities, and provides direction for supported and supporting actions in the future. It is driven by the requirement for logistics to support distributed forces fighting against peer and near-peer adversaries within a dynamic and contested battlespace. This document is independent of any specific mission, theater, or region. Rather, it is intended to outline the enterprise logistics capability requirements, from tactical-level through strategic-level logistics, necessary to execute multiple missions in diverse environments across all warfare domains.

*Sustaining the Force in the 21<sup>st</sup> Century* serves three purposes: 1) to articulate a vision for how logisticians will move and sustain Marine Corps expeditionary forces in the 21<sup>st</sup> century; 2) to guide resource alignment for installations and logistics through informed advocacy; and 3) to assist in capability development across the logistics enterprise. It is meant to support the Deputy Commandant for Combat Development and Integration in concept and capability development by identifying the logistics requirements necessary for the future. It will also support required planning, programming, budgeting, and execution (PPB&E) decisions.

Accordingly, *Sustaining the Force in the 21<sup>st</sup> Century* identifies improvements necessary to enhance the lethality of the MAGTF as well as any joint and coalition forces that Marines will serve and fight beside. It guides our efforts to highlight risks and potential mitigation to enable speed, agility, and flexibility across the logistics enterprise. The success of this endeavor will depend not only upon the integration of new technologies, but also on developing and evaluating solution alternatives across the entire Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy (DOTMLPF-P) spectrum. Furthermore, this guidance seeks these solutions throughout all functions of logistics and in optimizing our installations for sustained operations.

While this document provides some specific direction, it requires continuous review, discussion, and debate on capability development as informed by DoD, Department of the Navy and Service strategies, emerging concepts and revised operations plans (OPLANS). These are challenges that will require action and solutions at all levels -- from new tactics, techniques, and procedures (TTP) for smaller, distributed, and agile units of employment at the tactical level; to enterprise systems re-engineering and business process improvements within the operational and strategic level.

### 3 Problem

***Marine Corps logistics is not postured to sustain the future fight defined by the National Defense Strategy.***

The Marine Corps Logistics Enterprise must continue to evolve in order to support future operational requirements against peer and near-peer adversaries. Fundamentally, this means transitioning from a force optimized for supporting land-based combat operations from fixed positions in a logistically robust theater where naval forces dominated in three domains (land, sea, air) to a maritime force designed to support operations in austere and expeditionary environments which will be contested in multiple domains (land, sea, air, cyberspace, space, and the electromagnetic spectrum).

### 4 Logistics in the Future Operating Environment

The NDS identifies an increasingly complex global security environment, characterized by direct challenges to international order and the re-emergence of long-term strategic competition between nations. The future operating environment will further be characterized by complex terrain, technology proliferation, information warfare, the need to shield and exploit signatures, and increasingly non-permissive or denied environments. Since naval forces can no longer presume sea control or air and land superiority at the onset of a campaign, Marines must take a different approach to logistics integration and expeditionary force sustainment to mitigate risks.

In response to adversaries' formidable and growing anti-access and area denial capabilities and systems, Marine forces can expect to operate in a distributed fashion -- predominantly in the littorals -- as part of a larger naval force working in concert with joint and coalition partners. It may be imprudent to risk operating amphibious ships in close proximity to the coastline, negatively impacting current naval sustainment distribution capabilities and capacity shortfalls. Operating in the littorals will also require Marine Corps logisticians to sustain those forces amongst populations that may enable or impede our operations through technology or other means. Our logistics enterprise must be capable of providing expeditionary support and sustainment from the greater distances imposed by a future threat environment that is broader and deeper than in past conflicts.

The rapid evolution of technology and the growing ease of access to it amongst state and non-state adversaries will present additional risks to logistics operations. These threats will require a proactive cyber defense posture. New technologies include advanced computing, "big data" analytics, artificial intelligence (AI), autonomy, robotics, directed energy, hypersonic weapons, and biotechnology -- the very same technologies required to enable Marine forces to fight and win future battles.

For example, future decision-makers will rely on sensors, data, and networked systems, making them especially vulnerable in the cyberspace domain. Information and cyber warfare will greatly complicate how and when data can be transmitted. Disruptions to our networks will be

commonplace during operations in the contact, blunt, and surge layers. Technology proliferation poses a specific threat to Marine Corps installations. The ability to easily acquire and adapt commercial off-the-shelf technologies (e.g. drones) or interfere with wireless-based environmental and access control systems increase risk across Marine Corps infrastructure.

The NDS suggests that the Marine Corps must have the ability to sustain a force that has to *fight in order to get to the fight*, and not just those forces that are forward deployed or engaged forward. Deploying forces may face kinetic and non-kinetic threats whether at logistics depots, installations and stations, aboard ships at sea, or at forward bases and stations in all phases of a campaign. Marine forces may be contested from the outside, with cyber-attacks, or actual disruptions and attacks to physical infrastructure and security. Starting at the industrial base, the entire supply chain and distribution network, from “warehouse to warfighter” will be under the same threats.

## 5 Central Idea

In the future operating environment, logistics will be the pacing function for the Marine Corps. Marine Corps logistics must **sustain combat power in contested environments** -- thereby enabling the lethality of Marine Corps operating forces. Enabling lethality in the future fight as defined in the NDS demands that the Marine Corps Logistics Enterprise be capable of supporting all of the other warfighting functions with increased speed, agility, and survivability. The overall approach to achieving this will be to focus the development of new capabilities in parallel with efforts to sustain and off-ramp/divest legacy capabilities within four lines of effort (LOE):

- **Enable Global Logistics Awareness**
- **Diversify Distribution**
- **Improve Sustainment**
- **Optimize Installations to Support Sustained Operations**

These LOEs have implications for solution alternatives at every level of logistics, as well as at logistics depots and installations, across the entirety of DOTMLPF-P spectrum. As the Marine Corps proceeds towards realization of the desired end state, it must do so along these LOEs within a framework that aligns with Service guidance, and informs logistics force management, force development, and force design, as illustrated in figure 2 below.

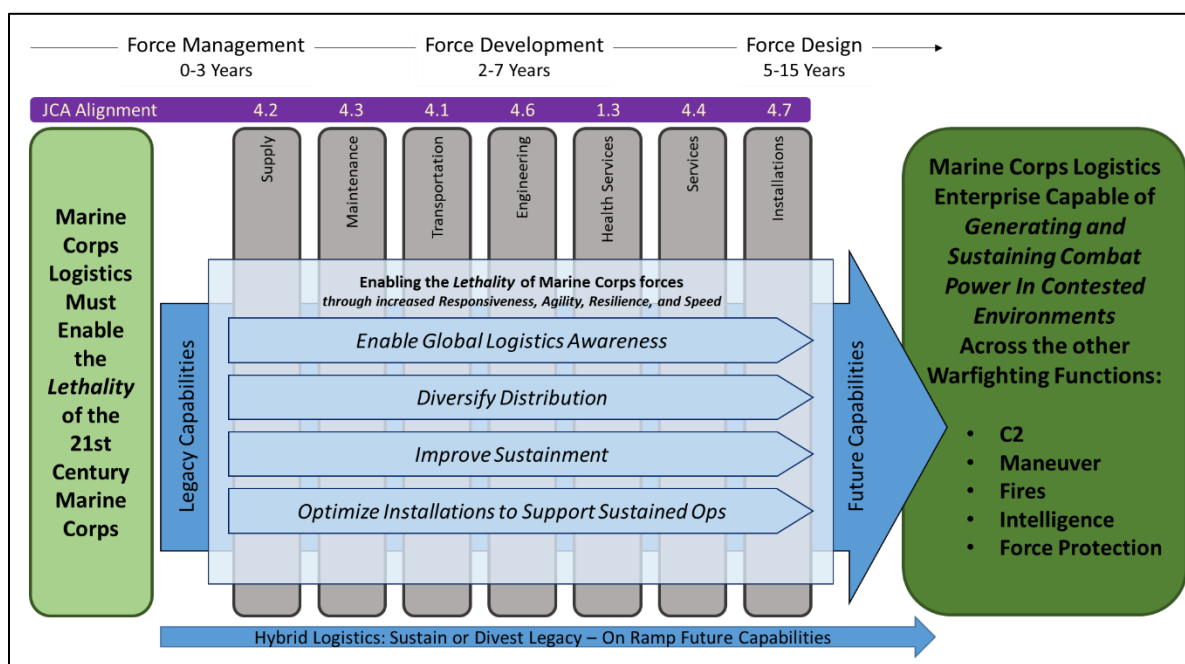


FIGURE 2: CONFIGURING THE MARINE CORPS LOGISTICS ENTERPRISE



## 5.1 Line of Effort No. 1: Enable Global Logistics Awareness

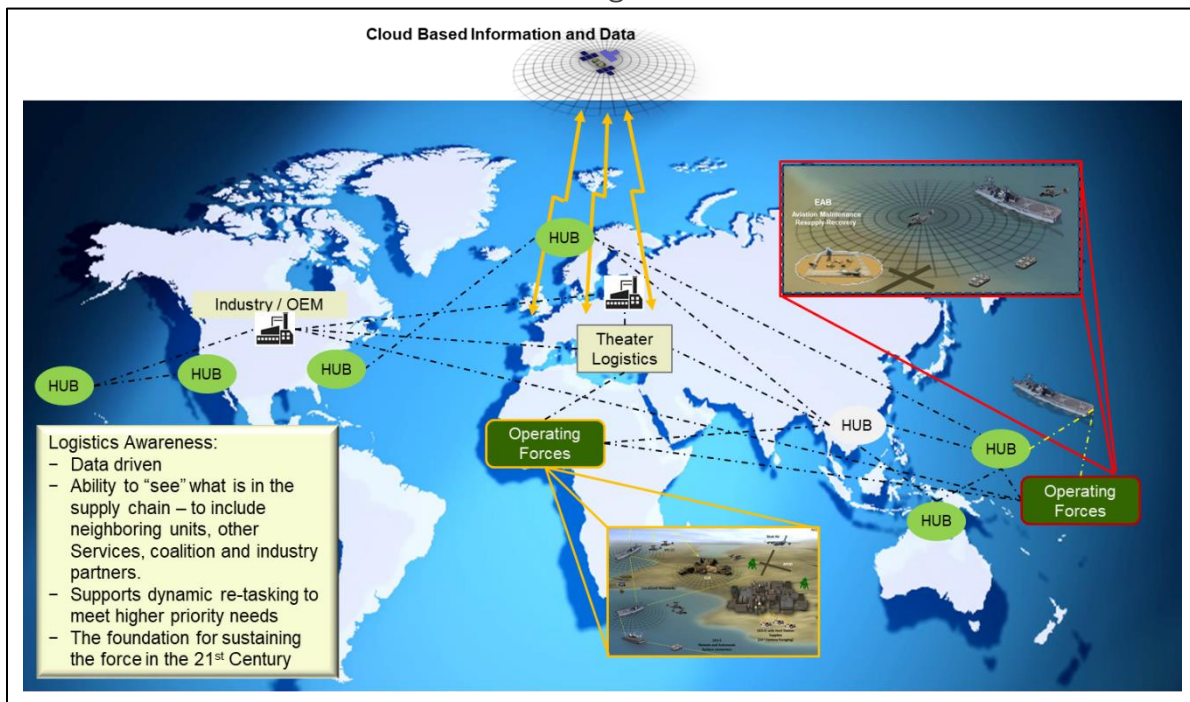


FIGURE 3: GLOBAL LOGISTIC AWARENESS OVERVIEW

### 5.1.1 Description

Global Logistics Awareness is the ability to rapidly and accurately:

- Identify warfighter requirements (i.e. "What is needed?")
- Assess friendly force posture (i.e. "Where and when is it needed?")
- Determine available resources (i.e. "Who has it" and/or "Can I get it?")
- Allow for dynamic and adaptive fulfillment planning (i.e. "What happens if the answer to any of these questions changes?")

### 5.1.2 Key Characteristics

Logistics awareness must be global in nature to allow the logistics enterprise to fully leverage strategic and operational level logistics capabilities. In order to support widely distributed forces at the tactical level, Marines must have improved visibility in order to leverage Marine Corps, Navy, other Service and partner capabilities. Global logistics awareness will be sensor-based, data-driven, and networked. Simultaneously, it must consider signals management and operations in a denied or degraded network environment.

- Sensor-Based: The Marine Corps will integrate sensors to provide accurate enterprise-wide visibility and accountability to create rapid and effective transition of combat ready war reserves and other materiel to, from, and between units and the supporting establishment.

- Data-Driven: The Marine Corps will seek to refine the planning factors we use and ensure that they are based on actual information related to the situation (e.g., facts about a unit, piece of equipment, or the operating environment). This will require integration of quantifiable and measurable data from authoritative sources, to support rapid and flexible decision-making.
- Networked: The Marine Corps will ensure that future programs and initiatives provide the ability to sense, transmit, and access data from locations that are physically separated from the source, integrating with Naval Operational Architecture, maximizing data availability to the warfighter and denying access to adversaries.

#### 5.1.3 End State

Global Logistics Awareness will support the lethality of Marine Corps forces by enabling decision and execution superiority, allowing commanders to outpace the enemies' decision cycle. It will do so by allowing the logistics enterprise to deliver the *right* resources, to the *right* place, at the *right* time, for the *right* reasons. Enabling Global Logistics Awareness is therefore the foundation of *Sustaining the Force in the 21<sup>st</sup> Century* and will set the conditions for success within the other three lines of effort. While the Marine Corps continues to invest in improved global logistics awareness, it must not become so dependent on increased communications demand that logistics fails during high intensity operations with peer and near-peer competitors in congested and contested information environments.

## 5.2 Line of Effort No. 2: Diversify Distribution

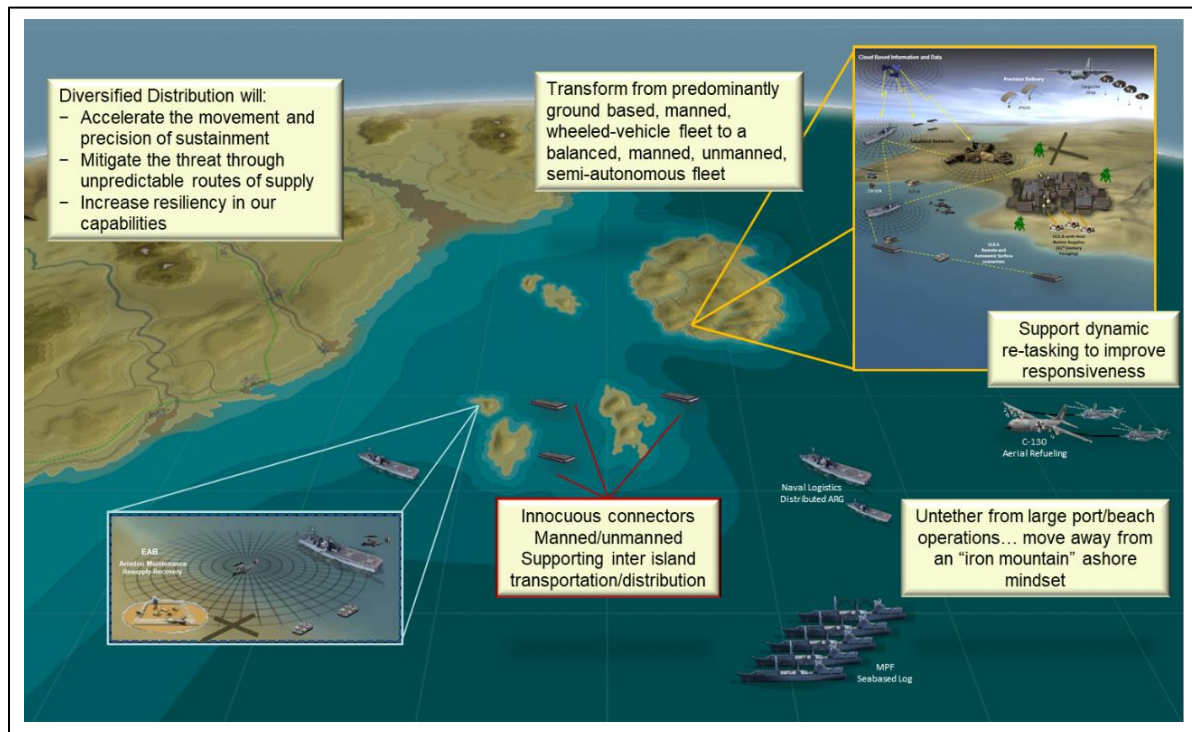


FIGURE 4: DIVERSIFY DISTRIBUTION OVERVIEW

### 5.2.1 Description

Diversifying Distribution refers to the methods, nodes, and modes available to the Marine Corps Logistics Enterprise in the staging, delivery, retrograde, and recovery of mission critical assets and logistics services to deployed forces. This line of effort addresses the need to capitalize on both legacy and emerging distribution capabilities in order to support geographically dispersed forces throughout an operating environment that is more highly contested than in past conflicts.

### 5.2.2 Key Characteristics

Diversifying Distribution at the operational level inherently involves integration with Joint, coalition, and host nation capabilities, particularly those belonging to the Navy. At the tactical level, forces will need to capitalize on both legacy and emerging capabilities that enable resilient, scalable, and unpredictable distribution.

- **Resilient:** The specific employment and composition of Marine Corps distribution networks will be influenced by threat level and the impact of platform or payload loss. The Marine Corps must enable mission accomplishment while minimizing the loss of life and property in the delivery of supplies and equipment.
- **Scalable:** The Marine Corps must achieve a level of precision that enables direct delivery of support to large numbers of smaller and disaggregated units. This will require real-time

in-transit visibility to provide situational awareness of distribution operations in order to allow logisticians to shift deliveries on-the-fly and meet evolving mission requirements.

- Unpredictable: A diverse set of distribution platforms will give us access to previously unused lines of communication (LOC), staging nodes, and alternative modes of transport. The availability of multiple LOCs will allow logistics planners to avoid routines that might be exploited by adversaries.

### 5.2.3 End State

Diversifying Distribution will support the lethality of Marine Corps forces by maximizing the ability of commanders to employ tactical units across the depth and breadth of a non-linear battlespace. Expansion of the Marine Corps distribution portfolio will allow logisticians to provide logistics support to a large number of geographically dispersed forces (e.g. a Marine Wing Support Squadron supporting a forward arming and refueling point, or reconnaissance unit) operating ashore in support of a deployed Marine Expeditionary Unit) while maintaining the ability to mass a Marine Logistics Group in support of larger, more traditional Marine Expeditionary Force or joint operations.

### 5.3 Line of Effort No. 3: Improve Sustainment

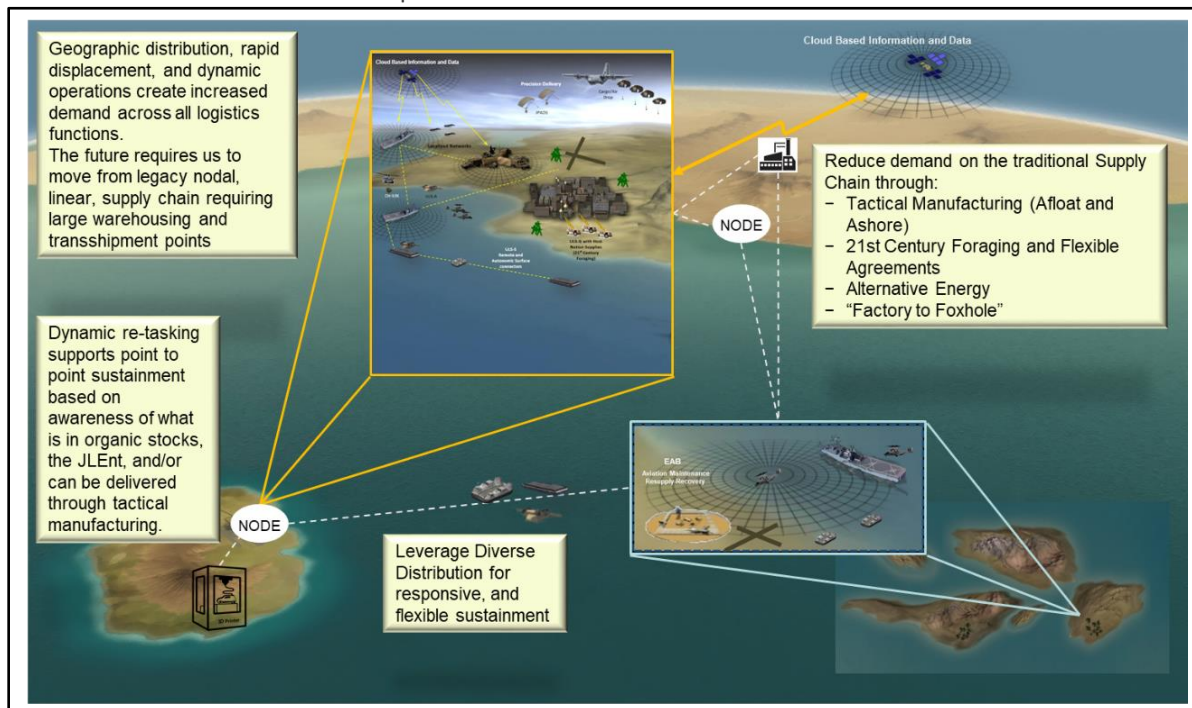


FIGURE 5: IMPROVE SUSTAINMENT OPERATIONAL VIEW

#### 5.3.1 Description

The current sustainment construct relies on deliberate, multi-modal movement of equipment and supplies across a linear logistics and supply chain requiring large warehousing and transshipment nodes to break down, consolidate, and repackage shipments for delivery to the end user. Sustainment often occurs without the full awareness of existing capabilities and their availability, sometimes within an adjoining unit or force. Improving Sustainment will make the global logistics and supply chain shorter, flatter, and non-linear, reducing overall inventory quantities within the entire sustainment chain. The Marine Corps must optimize packaging to reduce the size of loads from the initial shipment point to the end user to reduce shipping, and storage requirements. The Marine Corps must integrate existing sources of logistics support into a broader framework that includes new and non-traditional sources including host nation support, tactical manufacturing & supplying forward, and energy efficiency (fuel and batteries).

#### 5.3.2 Key Characteristics

The Improve Sustainment LOE is the most interdependent LOE, in that it is more completely realized as actions within the previous two LOEs are achieved. Success in Enabling Global Logistics Awareness and Diversifying Distribution will naturally improve sustainment. Other efforts within this LOE will principally involve:

- Operational-Level Logistics Integration: In a distributed, contested environment, logistics flows rapidly from strategic to operational, to tactical and back in a fluid continuum, particularly in the realm of supply chain management. The Marine Corps will enhance the

organic capabilities to command and control this logistics flow, while fully leveraging the integration of joint, interagency, and coalition support capabilities. The Marine Corps, Navy, other Services, DoD, and the defense industrial base will support strategic-level capabilities, improving sustainment support to widely distributed forces at the tactical-level.

- Inventory Control: Service-level enterprise inventory control and coordinated management of war reserve equipment, materiel, and supplies will position inventory to provide responsive sustainment support and improve materiel readiness.
- Alternative Sources of Supply: The Marine Corps will plan, develop, and integrate non-traditional sources of supply to include: host nation support, 21st century foraging, tactical manufacturing and supplying forward. Marine forces will embrace the concept of austerity and improve expeditionary energy efficiency (fuels and batteries), and plan for forward field/depot maintenance at appropriate tactical-level locations.

#### 5.3.3 End State

Improving Sustainment will support the lethality of Marine Corps forces by increasing the ability of forward logistics and maneuver elements to sustain themselves over longer periods of time despite longer LOCs. It will enable the logistics enterprise to meet the demands of distributed operations and rapid displacement.



## 5.4 Line of Effort No. 4: Optimize Installations to Support Sustained Operations

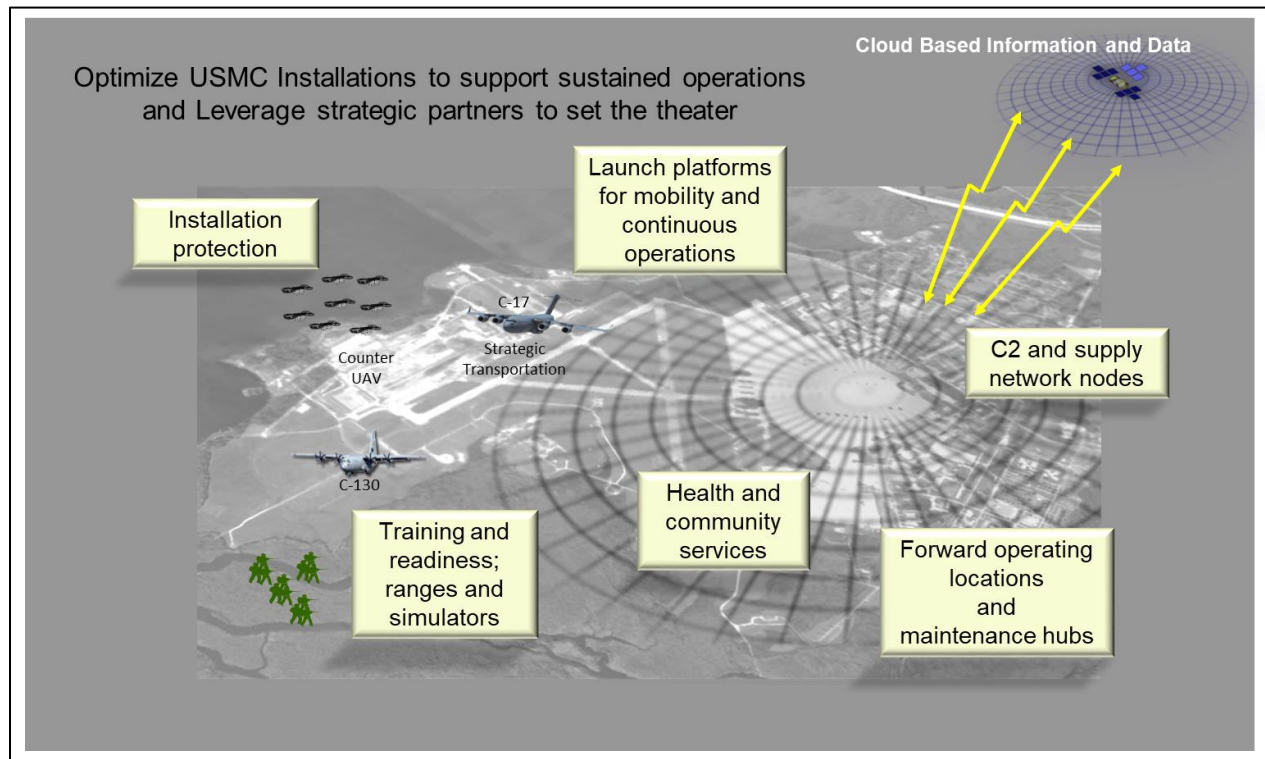


FIGURE 6: OPTIMIZE INSTALLATIONS OPERATIONAL VIEW

### 5.4.1 Description

Optimizing Installations to Support Sustained Operations requires installations to transform and meet future protection, training, and support requirements across the ROMO while supporting the operating forces and all tenant organizations. The NDS, Marine Corps capstone concept, and Infrastructure Reset Strategy provide strategic planning context and direction for such a transformation. Today's bases and stations operate in a very complex environment including: supporting operations across the contact, blunt, and surge layers of the Global Operating Model, mitigating capability impacts during contingency plan implementation, implementing strategies to "right size" each installation, fostering relationships with the civilian population, and improving the quality of life for Marines, Sailors, and their families. This LOE is focused on the warfighting aspects of optimizing base and station capabilities as information network nodes, as elements of the supply chain, and as operating locations from which to fight.

### 5.4.2 Key Characteristics

Optimizing Installations will be accomplished by establishing priorities focusing on critical support functions provided to readiness, training, deployment, employment, force protection, and sustainment. Actions along this LOE will support installation modernization while strengthening the interdependencies between the supporting establishment and the operating forces. There must therefore be an immediate emphasis on resiliency of force protection;

airfield operations; range support; and command, control, and communications ensuring the operating forces can deploy and/or fight from any installation as required.

- Support to Readiness: Ensuring the operating forces has access and the capability for storage and maintenance of critical principal end items
- Support to Training: Providing modern and relevant ranges and training areas for exercises in preparation for deployment
- Support to Mobilization: Focusing on reducing the impacts of mobilization across all bases and stations; their ability to effectively support deployment force reset, reconstitution, and preparation for redeployment; and providing reserve/Individual Ready Reserve the means to mobilize and train
- Support to Employment: Supporting continuous employment of forces throughout operations
- Support to Force Protection: Providing the means to protect against or mitigate threats and/or hostile actions against personnel (to include family members), resources, facilities, and critical information
- Support to Sustainment: Ensuring installation capabilities are enduring throughout a long-term engagement and providing an effective deployment platform for all forces

#### 5.4.3 End State

Optimizing installations will support the lethality of Marine Corps forces by providing the means to ensure critical capabilities are maintained and provided in all environments. Resiliency efforts ensure the capacity to maintain support to the force before, during, and after deployment. Accordingly, our bases and stations must become better prepared and able to withstand kinetic and non-kinetic attacks at home and abroad while maintaining an operational capability.



## 6 Way Ahead

### 6.1 Service Strategy Alignment

Precise guidance for the application of *Sustaining the Force in the 21<sup>st</sup> Century* will be published in a forthcoming implementation plan. This plan will promote unity of effort across the logistics enterprise and ensure that current operations, capabilities development, and resource alignment are in line with joint and Service priorities. This effort includes appropriate coordination with the Navy for adequate “Blue in Support of Green” funding and appropriation.

### 6.2 Future Framework

The future framework for executing this guidance will occur within the three strategic horizons defined below:

- Force Management (0-3 years) is the process the Marine Corps and the broader joint force employs to plan force employment and meet day-to-day requirements while maintaining readiness and flexibility to respond to the unexpected.
- Force Development (2-7 years) starts with assessments of capability gaps in the years of execution. Beyond the near-term, force development relies on the identification of requirements in strategy, concepts, and their assessments that normally fall in the Future Years Defense Program. In many cases, Force Development leverages education to institutionalize changes into the Marine Corps against identified trends.
- Force Design (5-15 years) enables the Marine Corps to adapt to future challenges through experimentation, leap-ahead approaches, and advances in technologies and materiel. The Marine Corps innovates to develop the strength, agility, endurance, resilience, flexibility, and awareness necessary to retain competitive advantage against any adversary. In this horizon the Marine Corps must plan for improvement and integration of technologies and practices from across industry, partners, and the Joint community.

Force Design and Force Development are not completely divergent from one another. While Force Development seeks to capitalize on innovations in Force Design, Force Design actively identifies opportunities to incorporate spiral innovations to accelerate adaptation and modernization of the current force.

Within these strategic horizons, logisticians will focus on development considerations within each relevant timeframe. All logisticians need to understand that the timeframes associated with each of these strategic horizons do not describe a sequence of work (the way that a plan of action and milestones might). These horizons better serve to inform division of labor. Force Management, Development, and Design actions take place continuously and concurrently to affect outcomes in the timeframes presented above. Finally, the objectives are intended to be descriptive (vice prescriptive) to encourage the broadest consideration in capability development within the four lines of effort presented in this document.

### 6.3 Force Management

Logistics Force Management is dependent on a global logistics/supply chain and distribution network formed by a combination of logistics force elements, properly-positioned materiel, and agreements with host nation, coalition, and joint partners and commercial industry. This synergy sustains naval expeditionary forces during day-to-day activities across the globe and provides the flexibility and scalability to support operations in the contact, blunt, and surge layers. Additionally, this global logistics/supply chain network maintains resilient and agile bases, air stations, and logistics depots connected by a theater and global distribution network, serving more as force deployment platforms than “garrison” facilities.

#### 6.3.1 Enable Global Logistics Awareness

The Marine Corps must have trustworthy data. Global logistics awareness will be built on a foundation of accurate, relevant, and comprehensive data that is sensor-based and integrated with authoritative sources. The Marine Corps logistics enterprise already owns, or has access to, an immense amount of data that will need to be collected and either organized, corrected, or disposed of (archived) in order to maximize its utility. The use of trust metrics (quantifiable assessments based on the information’s age and means of collection, for example) will allow logisticians to exercise existing data while gradually building this foundation. The Marine Corps will integrate all existing and developing logistics command and control capabilities with naval, joint, and coalition networks. In supporting the warfighter, logisticians must reduce and tailor bandwidth, latency, and general data communications requirements to support deployed operations, develop proficiency in a data denied environment, navigate absent global positioning system, and exercise emissions controls. The Marine Corps must also identify an appropriate capability for Service-level enterprise inventory control.

#### 6.3.2 Diversifying Distribution

The Marine Corps must integrate legacy systems with newly fielded programs (e.g. joint light tactical vehicle and CH-53K). At the tactical level, methods of distribution must shift drastically from those used during recent operations, finding ways to get off the road and away from large convoys and stockpiled supplies. Hybrid logistics will be an ongoing theme in the Force Management timeframe as the Marine Corps remains prepared to “fight tonight” with whatever the on-hand capabilities may be. Marines will always need to plan for a mix of the old with the new. Staging ground equipment within the Marine force’s area of responsibility will improve responsiveness to distributed forces. Prepositioned stocks (afloat and ashore) must be managed and stored in such a manner to support current theater plans and future activities. The Marine Corps must assess its current prepositioning structure and capabilities to ensure adequate capability and capacity for future operations and innovative use of legacy platforms as afloat forward staging or EABO support platforms (e.g., aviation logistics support ships (T-AVB) as a means for logistic planners to integrate supply nodes, command and control, and forward maintenance capabilities during distributed operations.) The Marine Corps must improve real-time in-transit awareness to shift distribution and delivery options on-the-fly.

### 6.3.3 Improve Sustainment

Efforts to set the theater to Improve Sustainment begin with leveraging joint maritime efforts such as Naval Logistics Integration, Seabased Logistics, and Distributed Agile Logistics.

Furthermore, the Marine Corps must update doctrine and more fully integrate sustainment planning with the use of forward Defense Logistics Agency support to deployed forces and proactively engage with U.S. Navy and U.S. Army theater logistics planners. War reserve materiel readiness must be improved. To improve sustainment, the Marine Corps must increase access to, and use of, flexible agreements (i.e. Inter-service Support Agreements, Acquisition Cross-Servicing Agreements, etc.). Sustainment packaging must be reduced to minimize loads and to support delivery via smaller platforms. The Marine Corps must optimize Service-level inventory control and coordinated management of equipment, materials, and supplies; account for and posture inventory holdings across the enterprise to sustain operations through mission accomplishment.

### 6.3.4 Optimize Installations

Installation Force Management is focused on each installation's ability to integrate supporting functions and capabilities into operational planning for major combat operations. Bases and stations are the Marine Corps deployment platforms providing a range of services and capabilities ensuring operating forces readiness, training, mobilization, and deployment meet combatant commander requirements. Installations rely on the operating forces to provide and augment many services during normal garrison operations. Installations must plan to mitigate any and all impacts caused to the current operating environment and OPLAN execution. MCICOM focuses its efforts across key OPLANS while ensuring the tactical, operational, and strategic threshold of services are maintained in any environment. The Marine Corps must insert technologies to enhance depot maintenance capabilities and optimize storage and preservation solutions to improve readiness and accountability of war reserve equipment, materials, and supplies.

## 6.4 Force Development

Logistics Force Development enables our logisticians to do what they do better. The Marine Corps logistics community, working in close partnership with the Navy, must continue to adapt functions, capabilities, and concepts to improve the strength, agility, endurance, resilience, flexibility, and awareness of the current force. Logistics transformation objectives in this horizon will be a blend of proven and developing logistics approaches, bridging legacy and future capabilities. This blending will produce a mix of mature legacy capabilities sustained within logistics Force Management and new capabilities that are emerging within the operating forces.

### 6.4.1 Enable Global Logistics Awareness

Marine Corps efforts to maintain and manage trustworthy data will continue building on the need for new capabilities to generate or collect appropriate data. Automated Identification Technology that improves visibility and accountability across the battlefield for all assets

(personnel, equipment, and supplies) must be integrated into the common operating picture to ensure logistics concerns are part of overall operational considerations. Capabilities development must include sensors, data, and network capabilities. Logistics information technology systems must be developed/modified to leverage accumulated “big data” to assist initiatives like Conditions Based Maintenance-Plus and improved accurate readiness reporting. The Marine Corps must develop and incorporate AI heuristics, and ensure that all future systems are designed with interoperability as a core capability. This includes integration with other networks or initiatives (e.g., the MAGTF Agile Network Gateway Link) to assist in bridging the gaps between disparate networks. These advanced systems must be incorporated into the overall USMC AI, Cloud, and Big Data solutions in order to allow for simultaneous, seamless access to the information by all Marines from all locations.

#### 6.4.2 Diversifying Distribution

Diversified distribution networks with predictive and optimized processes will increase logistics agility and responsiveness. Autonomous/highly automated and/or sensed platforms, capable of semi-independent operations in highly contested and degraded environments will be required. Organizationally, the Marine Corps must account for and integrate a mix of manned, unmanned, and autonomic air and ground capabilities – and plan for impacts to existing or future military occupational specialties and training. The future naval distribution portfolio will integrate traditional, legacy, surface combatant craft (i.e. connectors like landing craft utility or landing craft air-cushion, or larger vessels like the legacy T-AVB) with new and innovative systems (i.e. offshore supply vessels, common hull auxiliary multi mission platforms, or unmanned sub-surface systems) to connect the afloat distribution network to operations ashore. Improvements to precision delivery of tailored sustainment packages (i.e. unmanned logistics systems, aerial delivery, etc.) will be necessary to support distributed forces in future operations. These improvements are applicable to all levels of war; where sustainment can be provided through precision delivery directly from strategic and long-range organic airlift launching from our installations, surface or sub-surface capabilities operating from a sea base, or delivered using unmanned air, ground, surface, or sub-surface logistics systems from forward distribution nodes.

#### 6.4.3 Improve Sustainment

The Marine Corps must modernize legacy supply and maintenance systems and integrate autonomic logistics capabilities providing diagnostic input and decision support capabilities to our planners. The Marine Corps will establish the required policies to support the increased use of localized and tactical manufacturing (e.g. additive manufacturing and 3D printing) and limited acquisition via 21st Century foraging (the coordinated and integrated supply action using organic operational contracting support, Navy husbanding agents, and regional, joint, and/or Department of State capabilities). Behaviorally, the Marine Corps will institute processes to reduce overall demand through more precise requirements determination,

advanced analytics and supply chain management, conservation of resources, improved maintenance practices, and increased energy efficiency.

#### 6.4.4 Optimize Installations

Key to integrating installations into Force Development is the planning, programming, budgeting, and execution process. Installations must be provided the ability to tie installation capabilities into future wargames and exercises to ensure planners, across the MCICOM HQ and regions, are coordinating actions from garrison operations to initial deployment through sustainment of the force. This initial step will support further validation of capabilities and define critical gaps across the capacity to train, mobilize, and deploy the operating forces. Regions, installations, and program managers across MCICOM must integrate into Force Development to ensure success and provide expertise in identifying alternatives and innovative solutions for transforming for future needs and requirements.

### 6.5 Force Design

Efforts within this horizon are not intended to direct specific solutions or continue efforts started in force management and force development. Logisticians should instead assess future requirements in terms a threat-focused framework. We will pay attention to continuing the evolution and/or divestiture of legacy capabilities, integrating emerging/developing concepts and technologies, and/or enhancing efforts to bridge between the two. This may include new equipment and systems but will notably require adjustment to logistics education, TTPs, and modification to existing doctrine. As an example, Force Design logistics will look to integrate, or replace, human operators with autonomic or robotic systems.

#### 6.5.1 Enable Global Logistics Awareness

Progress towards a distributed network built on a robust communications backbone will allow the Marine Corps to focus on the specific ways that we employ logistics data through advanced computing. Advanced computing will allow Marines to accurately and rapidly interpret data in a way that simplifies and expedites decision-making. A mature data architecture and data management infrastructure will feed predictive analytics, enabled through emerging (and rapidly developing) technologies like AI and machine learning. This will allow logisticians to continuously mine for relevant data and identify patterns and anomalies that serve as indications of impending requirements. AI and machine learning may also employ digital modeling of physical systems to support planning and predict equipment failures and other sustainment needs.

#### 6.5.2 Diversifying Distribution

Emerging capabilities will allow the Marine Corps to transform and diversify its distribution platforms from a predominately ground-based, manned, wheeled-vehicle fleet to a mix of manned and unmanned air, surface, subsurface and ground capabilities with variable payloads and ranges the Marine Corps may either own or contract. Lightweight fully autonomous platforms must be designed to integrate with these networks and must enable sustainment

actions at a price where the loss of an autonomous platform is acceptable if the mission dictates.

#### 6.5.3 Improve Sustainment

Marine Corps supply and maintenance systems, through the use of autonomic logistics capabilities, will provide diagnostic input and decision support capabilities to logistics planners. Developing capabilities will incorporate reduced energy requirements (e.g. improved fuel efficiency, smart power distribution, and renewable power) from the requirements identification through capability fielding. The supply system will use more point-to-need vice point-to-point delivery and the Marine Corps will leverage all available providers, choosing speed of delivery over source of supply. Tactical manufacturing will become a source of supply and will be leveraged at the appropriate node.

#### 6.5.4 Optimize Installations

Today's environment is rapidly evolving, and the Marine Corps can no longer consider the homeland a sanctuary. Bases and stations must evolve into warfighting power projection platforms – installations as weapons systems. Evolving and expanding challenges across all five domains (air, land, sea, space, and cyber) require next generation installations to support Marine forces in complex operating environments. Smart, networked installations will provide the operating forces with enhanced capabilities and resources to fight with more speed and lethality. The concepts and ideas are further defined, constructed, and integrated in the Installation next Operating Concept.

Marine Corps Installations exist to generate and sustain Marine Corps combat power. Through the application of new and emerging technologies, organizational adaptations, and process improvement, Marine Corps installations will advance along eight, interdependent lines of operation:

- Protection: Security must be a forethought. Eschew physical limitations of traditional perimeter security measures to create a “digital fortress” as a means to achieve full situational awareness in order to reduce uncertainty as well as bolster protection and response.
- Resilience: A smart, connected installation – one hardened against cyber-attacks, natural disasters, and asymmetric attacks – is the only acceptable solution, and must be able to independently provide water and energy for at least 14 days to support, or conduct, military operations.
- Operational Reach: A fully connected and hardened installation grid will provide full-spectrum support to deploying and forward deployed operational capabilities.
- Command and Control: Data-informed and cloud-hosted virtual commands will be capable of near-real-time coordination, interoperability, and information integration.

- Mobility: Push information to the tactical edge, to empower individual action that leverages an environment of multi-modal needs-based transit, with lower costs and environmental impacts.
- Training and Range Support: Ranges and training areas will be state-of-the-art, full-spectrum venues to enhance operational readiness.
- Maintenance: Integrated “smart” monitoring and control systems will condition opportune predictive maintenance and enable timely corrective repairs, i.e. – completed within five business days or less.
- Community: Full integration with surrounding communities will strengthen Marine Corps communities.

## 6.6 Future Logistics Force Implications

An uncertain future, the threat of peer and near-peer competitors, and, challenges across all five warfare domains creates wide-ranging implications to sustaining the future force. The Marine Corps must improve the way it educates, trains, assigns, and employs our personnel and organizations. This improvement starts with behavioral changes. The lessons learned from the past two decades of near unchallenged dominance in conflict has led to habits that increase risk to Marine forces in future conflicts. The Commandant directs Marines to embrace the concept of austerity. The impact to the future logistics force is that it must be better at delivering the right sustainment at the right time to reduce the burden on the warfighter while simultaneously reducing the overall footprint and demand on the Marine Corps, the Navy, and the joint logistics enterprise logistics chain.

Doctrine must continually be reviewed and updated to ensure supportability for all types of operations. Interim policy must be developed and published to support operating force requirements, and then integrated into doctrine during the current review process. At the same time the current doctrine review process is too cumbersome and does not support the speed of change that will be required in the future to influence training and education.

There are approximately 45,000 uniformed Marine logisticians throughout the Marine Corps, with roughly 39 percent in the logistics combat element, leaving the majority of uniformed logisticians assigned to the other elements of the MAGTF and the supporting establishment. As we adopt and implement new functional concepts and capabilities across the LOEs, the Marine Corps must continually evolve its logistics force structure, and when appropriate ask if the roughly 14% in the aviation combat element and the 24% in the ground combat element is adequate to reflect the future reality.

Similarly, the Marine Corps must integrate the work of its military, civilian, and contractor logisticians during operations, particularly in day-to-day operations from its installations and logistics depots, or when forward deployed and widely distributed. Training and course

curriculum for military and civilian logisticians must be prioritized, resourced, and adapted to support new TTPs. Uniform military occupational specialties (MOS), and civilian job series must be reviewed and adjusted to ensure integration and implementation of new processes and technology.

Materiel development will not be the default for future improvements. The first focus must be behavioral change within the logistics community, and then across the operating forces, to embrace the change necessary to execute future missions.

Marine Corps leadership and education must be improved and developed to ensure that logisticians and commanders become comfortable identifying and managing the increased information from multiple sources regardless of the environment and domain. Professional military education must be expanded to ensure that logisticians and commanders become comfortable modifying support plans based on standard, non-standard, and alternative sources of supply.

Logistics personnel must be prepared to adjust to changes in MOS demands as new technology is delivered. For example, today's vehicle operator may need to expand from a behind-the-wheel driver to an unmanned convoy operator or drone pilot.

Facilities and critical infrastructure must be modernized, improved, or developed to meet current and future threats with the ability to rapidly respond to base recovery after attack.



## 7 Conclusion

The Marine Corps logistics enterprise must improve the lethality of the operating forces by extending operational reach and improving response time while remaining integrated with the naval and joint force. Success in the future fight depends heavily on the success achieved in implementing the *Sustaining the Force in the 21<sup>st</sup> Century* concept. The Marine Corps will remain capable of accomplishing any mission anywhere and anytime; but future requirements must be framed in the context of posturing Marine Corps logistics to support future service and departmental guidance. The Marine Corps must continue to transform its installations as articulated in the Commandant's Infrastructure Reset Strategy, integrating Installation-neXt initiatives.

The future operating environment requires collaboration with joint and naval partners at all levels of logistics, integrating and synchronizing resources across the strategic, operational, and tactical levels of war. The end state is a Marine Corps installation and logistics enterprise capable of generating, employing, and sustaining combat power across all domains, in contested environments, across the warfighting functions, and throughout the entire ROMO.

## Glossary

AI	Artificial Intelligence
DLA	Defense Logistics Agency
DOTMLPF-P	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy
DPG	Defense Planning Guidance
LOC	Lines of Communication
LOE	Lines of Effort
MAGTF	Marine Air-Ground Task Force
MOS	Military Occupational Specialties
NDS	National Defense Strategy
NMS	National Military Strategy
NSS	National Security Strategy
OPLAN	Operations Plan
POM	Program Objective Memorandum
PPB&E	Planning, Programming, Budgeting, and Execution
ROMO	Range of Military Operations
T-AVB	Aviation Logistics Support Ships
TTP	Tactics, Techniques, and Procedures
USMC	United States Marine Corps