

# Logistics in the Contact Layer

Supporting a “mini-MAGTF”

by Capt Dylan F. Metzler

One piece of advice I learned while attending the Logistics Officer’s Course has stuck with me throughout my career: “When ‘Ops’ starts talking potential plans and courses of action, a good logistician will invite themselves into those meetings, will be intrusive, and will start thinking of ways to support.” While planning for operations that may never occur might appear to be a waste of time, it is imperative if logistics support is to be both timely and effective.

The logistics community as currently structured and resourced simply cannot support the lighter, more agile Marine Corps that has been called for by the leaders of our Nation.<sup>1</sup> In contested combat environments against potential great power competitors, personnel and equipment cannot be transported in large, slow-moving, and vulnerable targets of great value.<sup>2</sup> Nor can equipment and supplies be massed in an “iron mountain” ashore. Our future logistics system must be adaptive, anticipatory, responsive, redundant, simple, and cost effective. In regard to the latter, I propose several means that are more effective and cost efficient than our current model. I will discuss platforms through which small, widely-dispersed forces can be sustained before providing options for reducing the logistics burden by allowing the force to sustain itself to maximum extent. I conclude by incorporating both ideas together as a framework for a viable concept of support.

In keeping with the most recently published *National Defense Strategy* (NDS), LtCol Scott Cuomo, Capt

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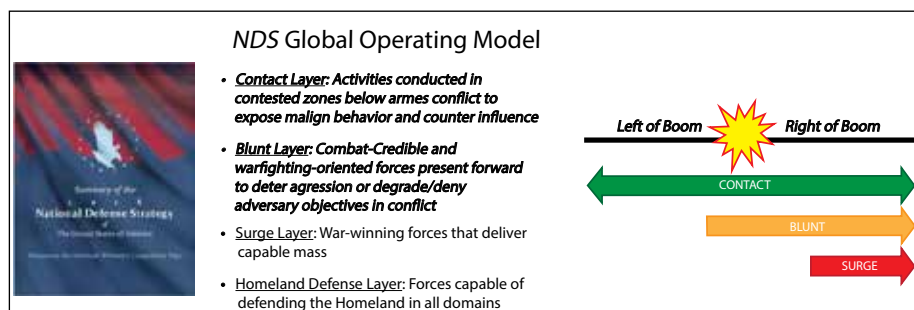


Figure 1. (Figure provided by author.)

Olivia Garard, Maj Jeff Cummings, and LtCol Noah Spataro co-authored an article entitled “Not Yet Openly at War, But Still Mostly at Peace” (MCG, Apr19, web) in which they describe a new structure and role for a Marine Corps which will allow us to remain relevant far into the future. Their proposed “big idea” for the future of the Corps maximizes a “mini-MAGTF” concept in which lighter, faster, more responsive, more distributed and persistently forward-deployed Marine Corps forces operate in the NDS’s “contact layer,” presenting potential adversaries with our own version of anti-access/area denial (A2/AD) while supported by other Marine and joint force elements located in the “blunt layer.”

Essentially, they argue the need for the right forces in the right place at the right time to reassure our partners, deter our adversaries, and secure key maritime terrain for U.S. policymakers.<sup>3</sup> Unfortunately, the current two-MEB joint forcible entry operation (JFEO) concept under which the Marine Corps mans, trains, equips, and deploys does not accomplish these goals and risks casting the Marine Corps into irrelevancy. Further, as our incoming Commandant recently explained to Congress, our current logistics support structure is too expensive, too vulnerable, and too cumbersome to adequately support this force in a semi- or non-permissive littoral environment.<sup>4</sup> I recently had the opportunity to speak with LtCol Cuomo about the co-author team’s vision for the

future of the Corps and to share with him some of my thoughts for logistically supporting their big idea. He explained that while they had considered logistics during their discussions and research, they did not have a resident 04XX to develop a workable theater-level concept of support for the proposed idea. Hence, the purpose of this article is to help develop this concept.

The problem of agile, distributed logistics is not new to Marine Corps leadership. When Gen James Conway released the *Marine Corps Vision & Strategy 2025* in 2008, he called for a “logistics capability that is leaner, lighter, and less energy-intensive than [in] the past.”<sup>5</sup> Eleven years later, our logistics community has failed to accomplish this goal. As a Service, and more specifically as a logistics community, we have once again been given a warning order from the very top of our national defense structure: make the Marine Corps lighter, faster, more responsive, and more resilient. The same applies to our current maritime pre-positioning force ship construct, created during a time when the United States could sail the oceans or pre-stage ships around the world with near-impunity.<sup>6</sup>

Our current methods will not work in the future against a peer adversary. LtGen Michael G. Dana, former Deputy Commandant for Installations and Logistics, made this point clear in his recent *War on the Rocks*’ article entitled, “Future War: Not Back to the Future.”<sup>7</sup> Thus, it is essential that we develop a new concept for sustaining our forward deployed forces, both in the habitual relationship that we form with them and the means with which we deliver sustainment. Logisticians, our operations community is talking. Now it is our responsibility as professional logisticians to invite ourselves into this discussion, be intrusive, and start thinking of ways to support. If we wait, our execution might be many years too late, not only for our Corps but—most importantly—for our country.

### Delivery Platforms and Resupply Methods

*New LCU Squadrons.* The transportation platforms currently utilized

by the Navy-Marine Corps Team are not sufficient to sustain multiple mini-MAGTFs in a semi- or non-permissive A2/AD environment. There are simply not enough platforms to get the job done. The Marine Corps requires a total of 38 amphibious ships to carry out its current two-MEB concept.<sup>8</sup> It was made clear in recent years that there is little appetite in the Navy and Congress for appropriating the funds necessary for this amphibious fleet.<sup>9</sup> Nor should there be. Our current amphibious ships are too large, require far too many Sailors, and are too slow and vulnerable in the littorals to accomplish the mission of inserting a mini-MAGTF, let alone sustaining one. Getting to 38 amphibious ships, even if approved now, is an estimated 14 years away from fruition.<sup>10</sup> There is also a critical vulnerability in our ship-to-shore connectors, as our incoming Commandant just made clear in his recent Congressional testimony.<sup>11</sup> They are currently too slow, too vulnerable, and too small to get the job done from over the horizon. Lastly, the Marine Corps and Navy are not nested in their operating concepts with the Marine Corps needing to get closer to shore and the Navy wanting to stay further away from it. Fortunately, and perhaps surprisingly, this dilemma may have already been resolved by the most unlikely of sources: the U.S. Army. Their

amphibious platforms, or something similar in design and capability, will be much more effective at sustaining a mini-MAGTF.

The Army’s current Landing Craft, Utility (LCU) is a well-designed and capable vessel. It is a versatile, 174-foot roll-on roll-off (RORO) platform with a low draft and a forward ramp capable of carrying up to 500 tons of cargo. To put that into perspective, a single LCU could carry the equivalent of eight C-17 loads, five M1 tanks, or twenty-four 20-foot ISO containers. Just one of these vessels could sustain a combat-credible force dispersed throughout the “contact layer” almost indefinitely. It is capable of being transported on the decks of larger ships for inter-theater transportation, but it is also rated to U.S. Coast Guard standards for full ocean service. The Army LCU requires only a 13-person crew and has a maximum range of over 10,000 miles.<sup>12</sup> Best of all, the Army does not want them! According to the maritime website, Captain.com, “At least 18 of [the Army’s] 35 Landing Craft Utility (LCU) will be sold off or transferred to the Defense Reutilization and Marketing Office (DRMO).”<sup>13</sup> The fact that we could potentially get these LCUs for free from DRMO is all the more reason to try out the concept of Marine mariners. While this concept will take time to be vetted through the



**The LCU Kennesaw Mountain.** (Photo by CPL Jeffrey Daniel, USA.)

doctrine, organization, training, materiel, leadership and education, and personnel and facilities process, the “materiel” is likely to be available soon. The Marine Corps should seize the opportunity to get these vessels now. If the Army can operate ships at sea, why not the Marines?

The Army also operates larger amphibious platforms that are much cheaper than the Navy’s current amphibious fleet. Its Logistics Support Vessel (LSV) is comparable in cargo capacity to some of the Navy’s current amphibious ships while still requiring only a 30-person crew. LSVs can carry 2,000 short tons of cargo, including 15 main battle tanks or up to eighty-two 20-foot ISO containers, directly onto unimproved beaches and into ports using large, retractable bow ramps. Some variants even offer the ability to generate fresh water and incinerate trash.<sup>14</sup> *For the same number of personnel required to operate just one Navy LHD, we could operate 76 Army LCUs or 38 LSVs, greatly increasing the cargo capacity and sustainment capability of the force and putting far fewer Marines and Sailors into harm’s way.* The ability for the Marine Corps to operate an independent fleet of small, tailorable, and capable watercraft that can operate in a hub-and-spoke system from larger ships at sea is in line with the “sea-basing” concept. LCUs can supply mini-MAGTFs and return to a U.S. Navy, MSC, or Merchant Marine ship positioned hundreds or even thousands of miles away, resupply, and set out on another mission to support another mini-MAGTF. As a secondary but nonetheless important benefit, LCUs constantly sailing through key maritime terrain, protected by their mini-MAGTFs, will serve as a sort of persistent freedom of navigation operation. LCUs could eventually be outfitted with retractable overhead platforms to conceal cargo from an adversaries’ overhead imagery assets and provide a landing pad for small unmanned aerial resupply systems such as anyone of the Volans-i systems or the K-MAX helicopter.<sup>15</sup> Over time, LCUs and similar vessels could even be adapted to operate autonomously like the Sea Hunter.<sup>16</sup>



**LCU tied up along-side MSC ship. (Photo by MAJ Gregg Moore, USA.)**

LCUs are also ideal platforms for providing fast and effective support during humanitarian aid or disaster relief (HA/DR) missions, thereby strengthening relationships with partnered nations. These ships could continue to provide support to large-scale maritime prepositioning force offloads as they already do while also enabling small-scale offloads during which they only take the necessary equipment for a particular mission. Reutilized Army LCUs will provide the Marine Corps with a single-infrastructure multiple-application platform that could be reconfigured to meet individual mission requirements.

These ships will be primarily employed as a sustainment platform for forces operating below the level of armed conflict. The LCUs can provide the mini-MAGTF with supplies, life-support systems, vehicles, expeditionary runway materials, and larger, long-range weapons like the HIMARS and MQ-9 “Reaper” unmanned aerial vehicle (UAV). A fleet of these LCUs in support of a larger mission will provide redundancy and limit the effects of enemy firepower by spread-loading critical assets amongst numerous ships. For transportation of the mini-MAGTF personnel, or in the event operations rise above the level of armed conflict, there are high-speed, armed combatant crafts like the Combat Boat-90. Boats like

the Combat Boat-90 could facilitate the faster movement of Marines dispersed between islands, along a coastline, or via inland waterways.

All of these options will allow the ARG/MEU team to focus their efforts on providing reinforcements where they are needed most, similar to what the proposed “big idea” suggests for Marines operating in the “blunt layer,” while protecting the MEU’s larger ships and vital aircraft from enemy defenses. *The current ARG/MEU rotations are trying to be everywhere at once but, in reality, are not in any one place long enough.*<sup>17</sup> Mini-MAGTFs operating in the contact layer, however, could remain as long-term deterrents to aggressive actions while being constantly resupplied by LCUs. These long-term, persistent operations will instill further confidence in our strategic partners that we will be there when needed. They will simultaneously send a clear message to any potential adversary: dare to challenge vital U.S. national security interests and fully expect the wrath of U.S. Marines.

*New logistics UAV squadrons.* It is time to create Logistics Marine Unmanned Aerial Vehicle Squadrons (LVMUs). There are numerous scenarios in which LVMUs will be able to resupply troops cut off from conventional lines of communication. LVMUs could provide low-



**The K-MAX at Miramar.** (Photo by PFC George Melendey.)

risk, high-reward aerial delivery options to mini-MAGTFs, and there is already a Marine Corps veteran aircraft perfect for this role.

The K-MAX is an autonomous, medium-lift helicopter that is capable of carrying up to 6,000 pounds of cargo externally. This platform has already proven its worth in operations in Afghanistan. In 2011, it delivered on a daily basis up to 30,000 pounds of food, water, generators, and other supplies. Because of the simplicity of its design, the K-MAX operated at a readiness rate of over 94 percent while only costing roughly \$1,300 an hour to operate, far more reliable and cost-effective than our current fleet of manned helicopters.<sup>18</sup> The Marine Corps could purchase seventeen K-MAXs for every one CH-53K King Stallion; and while the CH-53K boasts almost five times the carrying capacity of the K-MAX, it also requires much more maintenance per hour of flight. A squadron of 17 K-MAXs could be based and maintained on LCUs and fly unmanned from ship to shore, delivering roughly 100,000 pounds of supplies in a single trip, all without putting a single pilot in harm's way. Losing one or two K-MAXs with their loads would not be catastrophic, but the same cannot be said for losing a single \$130-plus million King Stallion aircraft, along with its crew and cargo.

Recently, the Marine Corps Warfighting Laboratory, in concert with the Defense Advanced Research Projects

Agency (DARPA), has been testing a low-cost plywood and aluminum glider drone. Known currently as the LG-1K, this glider can be dropped from aircraft flying at the edge of anti-air defenses and deliver up to 700 pounds of supplies to a ground force either via remote control or through its own internal GPS navigation system. Its low cost (\$4,500 to \$11,000 each) means it can be procured and employed *en masse*.<sup>19</sup>

Logistics Gliders Inc, the company developing the gliders, "expects it to be compatible with MV-22 and CV-22 Osprey tiltrotor aircraft, KC-130, C-130, and C-17 transports, and

MH-60, UH-60, CH-53, and CH-47 helicopters." The MV-22 Osprey, for example, could carry up to four of the drones, and *Aviation Week & Space Technology* says a C-130 could carry as many as eighteen, potentially resupplying many units with a single overflight.<sup>20</sup> The ability to resupply a mini-MAGTF in a single overflight with up to 12,600 pounds of supplies, or 18 different units with 700 pounds of supplies each, is a perfect mitigation for the loss of traditional lines of communication. In combination with other precise air delivery platforms like the Joint Precision Airdrop System, the LG-1K would keep traditional, expensive, manned aircraft far away from enemy air defenses while still enabling fast and effective support to units in remote areas.

*More economical vehicles.* If mini-MAGTFs are to remain light, agile, and less energy dependent, they need a vehicle that matches that concept. These vehicles should be rugged 4x4s capable of quickly transporting a fully equipped team while remaining light, simple to maintain, inexpensive, and adaptable to different missions.

The recently acquired Joint Light Tactical Vehicle is not the answer to the transportation needs of a mini-MAGTF. The JLTV, costing almost a half million dollars each, is too heavy,



**The ground mobility vehicle.** (Photo by DOD.)

too expensive, too energy intensive, and too unreliable for a lighter, more agile Marine Corps. Additionally, it is already experiencing maintenance issues and requires a significant support infrastructure increase, most notably of refueling assets and maintenance efforts and personnel. These issues have, in part, led Army Undersecretary Ryan McCarthy to remark on Armytimes.com that the program has received an \$800-million cut while the Army re-evaluates its applicability to the NDS.<sup>21</sup> The Army's light tactical vehicle solution, the Ground Mobility Vehicle, comes in at just 4,500 pounds, has virtually the same range as the JLTV, can be configured to carry up to 9 personnel, and is much easier to transport.<sup>22</sup> Its lighter frame means that it can be airdropped, internally or externally transported by multiple air platforms (potentially including the K-MAX), and requires far less fuel than the JLTV. Further, its simple design should keep maintenance requirements low, and it is designed around commercial off-the-shelf parts found in civilian vehicles, keeping maintenance costs low as well. The vehicle is advertised as a "21st century jeep," capable of medium-distance insertion operations and moving troops faster than the enemy can counter them with heavy weapons.<sup>23</sup> Production costs are expected to be about half that of the JLTV. In-keeping with the NDS and as demonstrated by the Army, the Marine Corps should also reconsider the JLTV and look to a smaller, faster, less energy intensive, and more versatile vehicle.

**Self-sustainment**

Whether manned or autonomous, the problem remains that these platforms will be operating in a contested environment and, while cheaper and more numerous, their availability will not be unlimited. It will be better to reduce the logistics requirements of the force on the deck by providing them with the tools they need to sustain themselves. This is not a new idea, as the proliferation of water purification and solar energy generators suggests, but we can do better. Next are some ideas for improving the self-sustainment

capability of new mini-MAGTFs in the contact layer.

LtGen Michael G. Dana mentioned during the 2018 USMC Hybrid Logistics Symposium that, "70 to 80 percent of all military logistics is the transportation of water and fuel." If we are to make our logistics system leaner, lighter, and less energy intensive, we have to decrease our maneuver element's reliance on bulk water and fuel transportation. While the Marine Corps currently employs the Tactical Water Purifica-

tion System (TWPS) and the smaller Lightweight Water Purification System (LWPS), both still require a water source to generate the potable kind. In contrast, systems like the Atmospheric Water Generator, developed by Aqua Sciences for the U.S. Army and Federal Emergency Management Agency, can literally make water out of thin air. Their systems range in size with the largest unit capable of producing up to 30,000 gallons of drinking water per day, more than enough to sustain a combat credible force.<sup>24</sup> Depending on the size of the force and the operating environment, other options include drilling wells or catching rainwater in cisterns or water collecting fog fences. Any of these options (to include the TWPS and LWPS, systems not readily available in the GCE) will significantly reduce the water resupply requirements of the force.

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As for fuel, much of this burden could be reduced by the use of more fuel-efficient vehicles as mentioned above. Another mitigation should be the incorporation of Capt Robert O'Berg's "Fuel Forage Kit + Modular, Range-Extension Bladders" proposal. His submission to the CMC's Q2 Innovation Challenge was selected as the "Runner Up." The idea recognizes that

fuel is not actually consumed until it is within a combustion engine. Prior to that point, all usable quantities can be extracted from the fuel tanks it is contained within—whether that be a disabled vehicle or 'lower priority-of-fuel vehicle'—and reallocated to a higher priority platform.

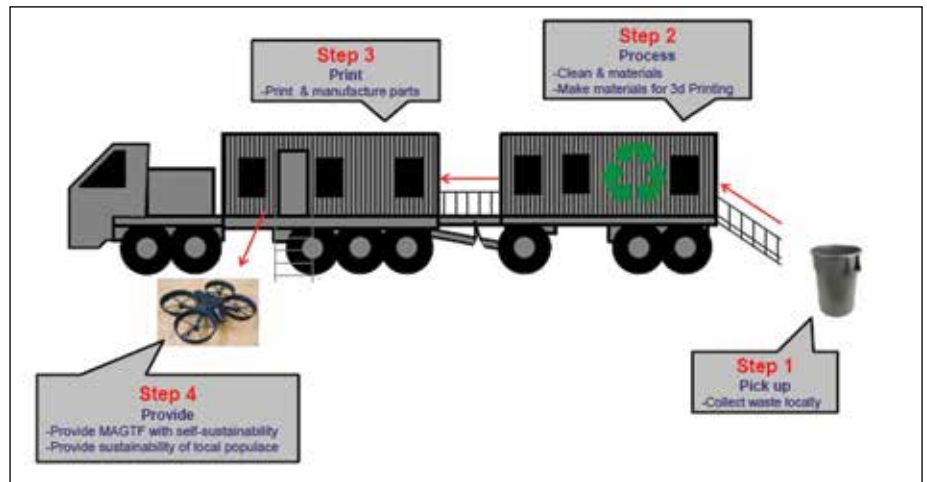
For power to combat operations centers and life support systems, microgrids will serve as a major fuel-reducing option. These systems harness the power of wind, sun, river currents, and

even ocean waves into usable electricity. Along with easing the logistical burden of fuel transportation, these systems will eliminate the need for large, loud, signature producing electrical generators. They will provide the mini-MAGTFs with an almost limitless source of electricity while maintaining a low audible and electronic signature. These technologies exist now and could be utilized to support the robust communications and electronics requirements of the envisioned force.

A mini-MAGTF will need to be able to "live native" if it hopes to operate indefinitely in an austere environment. Trash, discarded packaging, and food byproducts will need to have a second use beyond that of their initial purpose. Instead of creating health risks and a logistical burden in removing trash, it should be viewed as an alternative source of supply. As of March 2018, Dr. Nicole Zander at the U.S. Army Research Laboratory has been working with the Marine Corps to recycle plastic waste into 3D printer filament. I spoke with Capt Anthony Molnar, the Mobile Recycling Facility – Expeditionary (MRF-X) Project Officer with Marine Corps Systems Command in Quantico, and they hope to field a MRF-X to forward-deployed Marines by 2020.<sup>25</sup> This 3D

reclaiming technology could be utilized to turn items like MRE trash and plastic bottles into repair parts right at the point of need. Imagine throwing your MRE spoon into a “reclaimer bin” and a few hours later it is repurposed and printed to replace the broken knob on your next generation handheld radio.<sup>26</sup> As technology in this area continues to advance, it is possible certain metals will be able to utilize this same concept and provide a metal recycling and 3D printing capability in the forward operating environment. The ability to take trash and turn it into repair parts will provide a closed-circuit supply chain, not reliant on lines of communications, and could keep the mini-MAGTFs light and more self-sustaining.

It is important to recognize that mini-MAGTFs will not always be operating alone. It is more likely that they will operate in close proximity to partnered-nation forces, in keeping with the NDS intent to strengthen our Nation’s foremost comparative advantage in the emerging great power competition. As a planning consideration, we should assume that host-nation support would be both available and sufficient for many classes of supply and functions of logistics. Partnered nations will likely want to support the mini-MAGTFs that are helping to protect that nation’s sovereignty, trade routes, and freedom of navigation. Not to mention, these nations will welcome the in-



**3D technology can be used to convert trash into repair parts.** (Image by Capt Anthony G. Molnar.)

cross-servicing agreements with our partner nations and train or enable mini-MAGTFs to conduct their own contracting support in order to meet their logistical needs.

By reducing their consumption, recycling where able, producing their own water, electricity, and repair parts, and procuring from the local economy, the mini-MAGTFs will significantly reduce their logistics dependency on traditional lines of communication. This will increase the time a force could be forward-deployed, reduce its costs, and keep additional Marines and Sailors out of harm’s way. These efforts should be prioritized now to enable the new “big idea,” and meet the NDS intent.

This is also an opportunity for the

utilities systems for the mini-MAGTF ashore before returning to ship. These Marines should operate in a command structure similar to that of the Army’s forward support companies (FSC); the companies are tailored with equipment and MOSs matching the mission of the supported unit and are able to form habitual relationships with those they support.

Riflemen are not off the hook either. Gen Robert B. Neller spoke to this at the 2018 Hybrid Logistics symposium when he stated that simply being an “0311” [infantryman] is not going to be good enough anymore. He mentioned the cross-training of MOSs conducted in the special operations community, and how—like that community—Marines of the future will need to have multiple skillsets. Some of the skillsets he mentioned were utilities support, life support, or contracting. There is simply no room in small units for someone with just one skill.

*Framework for a Concept of Support.* All of these platforms could be employed in concert, depending on the threat environment and the needs of the forward-deployed force. In a permissive or semi-permissive environment, LCUs and LSVs can be used to deliver supplies directly to the beachhead. They can then loiter in the area for on-demand resupply or sail out to permissive international waters to be refueled, resupplied, and possibly re-crewed before returning to the area of operations. In less permissive environments, K-MAXs

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crease of business brought to their local economies through contracted support. Operational contract support and host-nation support are efficient solutions for the sustainment of forward deployed forces and are a win-win solution for both sides economically and diplomatically. We should prioritize efforts to establish long-term acquisition and

Marine Corps to multi-task certain MOSs. Logistics Marines could serve as an LCU crewmember while also being capable of conducting corrective and preventative maintenance on cargo embarked on board. They could serve as landing support specialists, set up initial beach operation groups, and establish various life support and

can be utilized as ship-to-shore aerial delivery platforms, offering a means of sustainment to the force on the ground. In non-permissive, hostile environments, fleets of LG-1Ks can be transported to theatre by high-flying manned aircraft and used as “fire and forget” logistical platforms to deliver bulk supplies to the force. In all of these environments, Marines could be driving the more versatile, lighter, cheaper, and less fuel-consuming vehicles, while employing all possible means of self-sustainment and recycling, thereby placing less stress on the logistics system.

*It is time for logisticians to attack.* Most of the equipment and concepts I proposed to support the new “big idea” are already available. Many are relatively low cost (or free), low tech, and adaptable to a wide range of missions. Whether or not the specific solutions mentioned above are those selected, the fact remains that as a community we cannot logistically support the new mini-MAGTF concept given our current operating concepts and platforms. Innovation is not synonymous with high-tech. Some of the most effective innovations are low-tech process improvements, simpler designs, and updated concepts. While many of the delivery platforms or self-sustainment ideas I presented are not independently new ideas and may not be high-tech, their employment in concert as a viable concept of support is itself the innovation. While there are many inspiring and innovative projects occurring today, they appear to be developing independently. We must further this conversation and join these efforts together to continue developing a concept of support for their employment in line with the guidance provided by the NDS.

An essential element to the success of any business is timing. If we look at the Marine Corps logistics system through this business lens, we must understand that the time is now. If logistics is truly to support maneuver, and the operational concept of the future is similar to that of the mini-MAGTF, then we

must make drastic changes to the way we do business in the logistics community to make this concept a reality. It is past time to consider the concept of support for a lighter, more agile, more lethal Marine Corps, and time now to put this concept into practice.

Notes

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