Research Essay

The Key to Logistics Interoperability

In a US-Led Coalition

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INTRODUCTION

Military doctrine is undergoing a revolution today as it incorporates the vast technologies being developed in the Information Age. As recent crises have demonstrated, a nation will seldom employ military forces unilaterally. Military forces will be employed as an alliance or as a coalition to garner international political support for the force employment cause. Recent NATO or coalition force employments have been "ad hoc" at best. The immense differences in the technological capabilities of the various deploying forces from weapons systems to communications to computers have made command, control, and sustainment a planner's nightmare. With the differences in technology becoming even greater as the US implements Joint Vision 2010 (JV 2010), ways must be developed to achieve as much interoperability as possible between potential allied/coalition forces. This will ensure allied/coalition partners are prepared to operate effectively together in peace operations or wartime missions.

PURPOSE AND METHOD

The purpose of this investigation is to ascertain the key issue with respect to achieving logistics interoperability for participating nations in a US-led coalition using JV 2010 technologies. The principal conclusion is that information systems interoperability is the key issue for participating nations to achieve logistics interoperability in a US-led coalition. To demonstrate this Joint Vision 2010,

with particular emphasis on its focused logistics component, will be defined as it has been articulated by the US Joint Chiefs of Staff. Then an examination will occur of how the current Director of Logistics, J4 of the Joint Staff, LTG John M. McDuffie implemented US-led coalition logistics at the operational level for Operation Uphold Democracy in Haiti. Next the JV 2010 changes occurring for land forces at the tactical level will be explored. These changes were shaped by the recent Army Warfighting Experiment (AWE) conducted at the National Training Center (NTC). Land forces are examined in particular because historically, as demonstrated in the Gulf War, the preponderance of forces provided to US-led coalitions have been land forces.[1] The investigation then projects how the JV 2010 changes will affect allied/coalition logistics.

SCOPE AND REFERENCES

The scope of this paper does not include defending the focused logistics concept or addressing the additional risks that may accompany it. The U.S. military has determined that focused logistics will be the logistics operational concept under JV 2010.[2] The scope of this paper is to assist in answering the following question. Given that focused logistics will be a reality for a US-led coalition under JV 2010, what should participating nations direct their resources toward first, in order to be interoperable with the focused logistics concept? This paper argues that participating nations should direct their resources first towards

achieving information systems interoperability with US logistics systems. This will enable logisticians at strategic, operational, and tactical levels in a US-led coalition to know precise logistics statuses of units of participating nations. Logisticians can then anticipate the logistics requirements the unit will need for upcoming missions and 'push' the logistics to the coalition unit directly from the appropriate sources of supply. These sources of supply may be at the strategic, operational, or tactical levels. To illustrate this requires examining the emerging trends and lessons of focused logistics as it has been tested and is being developed. Since JV 2010 and its operational concepts are new and futuristic in nature, limited traditional academic references exist which refer to these new concepts. Therefore, recent periodical literature, including military newspaper accounts of the recent AWE, are referenced to illustrate these emerging trends and lessons. We begin by defining JV 2010 and its four operational concepts.

JOINT VISION 2010 - INFORMATION AND FULL SPECTRUM DOMINANCE

Joint Vision 2010 is the template for how the United States Armed Forces will leverage technological opportunities to create greater effectiveness in Joint Warfighting. In fact, it has been referred to as a revolution in military affairs. Alvin and Heidi Toffler describe what, in their view, is a revolution.

> A true revolution goes beyond that to change the game itself, including its rules, its equipment, the size and organization of the teams, their training doctrine, tactics, and just about everything else.[3]

Additionally, based on recent weapons developments, including weapons used in the Gulf War, the Tofflers go on to state:

> In short, three distinct lines of military development have converged explosively in our time. Range, speed, lethality all reach their outer limits at about the same moment of history – the present half century. If nothing else this fact alone would justify the term "revolution in warfare."[4]

In the document Joint Vision 2010, America's Military Preparing for Tomorrow, the U.S. Joint Chiefs of Staff state the vision is based on four operational concepts: dominant maneuver, precision engagement, full-dimensional protection, and focused logistics. The document further states:

> Each of the operational concepts incorporates America's core strengths of high quality people and information-age technological advances, builds on proven competencies, and focuses the development of future joint capabilities. Together, the application of these four concepts by robust quality forces will provide America with the capability to dominate an opponent across the range of military operations. This **Full Spectrum Dominance will be the key characteristic we seek for our Armed Forces in the 21st Century.**[5]

It is no coincidence that Toffler terms such as "information-age technological advances" are included in this statement and throughout the Joint Vision document. The Tofflers use the US-led Gulf War Coalition as their model for both a second wave industrial-based military force and a third wave information-

based force in their book War and Anti-War.[6] Also included in the JV 2010 document is the Tofflers' concept of a "revolution in warfare." These include range (long-range technologically advanced weapons), speed (higher tempo of operations), and lethality (precision strike capability) to achieve Full Spectrum Dominance. The U.S. military has embraced the Toffler framework for information-age warfare in its Joint Vision, just as the Toffler book used the US-led Gulf War Coalition as its model for third wave warfare.

At the heart of accomplishing Full Spectrum Dominance is achieving information superiority. Joint Vision 2010 states:

> Throughout history, gathering, exploiting, and protecting information have been critical in command, control, and intelligence. . . . We must have information superiority: the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same.[7]

Achieving information superiority in each of the four operational concepts is central to achieving Full Spectrum Dominance.

JOINT VISION 2010 – FOCUSED LOGISTICS

With regard to logistics, General Dennis Reimer, the U.S. Army Chief of staff said it best:

> ". . . there can be no revolution in military affairs unless there is a revolution in logistics." [8]

The logistics operational concept, focused logistics, is defined to be:

> . . . the fusion of information, logistics, and transportation to provide rapid crisis response, to track and shift assets even while enroute, and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical levels of operation.[9]

Hence focused logistics will deliver tailored logistics packages, what is needed for the mission, directly to the point of need. That point could be at the strategic, operational, or tactical levels. Since focused logistics is the support concept for JV 2010, it must support the other JV 2010 operational concepts. Therefore, the other operational concepts must be defined and an explanation given on how they will receive focused logistics support.

> **Dominant maneuver** will be the multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, land, sea, and space forces to accomplish assigned operational tasks. Dominant maneuver will require forces that are adept at conducting sustained and synchronized operations from dispersed locations. [10]

Under JV 2010, a significant change from how we have done business in the past occurs under dominant maneuver. That is, forces will be adept at conducting operations from dispersed locations. These dispersed locations could be at the strategic, operational, or tactical levels. If forces are operating from dispersed locations, they are not massed in theater like they have been in the past. Dominant maneuver will be able to accomplish the effects of massing forces from strategic, operational, or tactical locations at the right place and right time to accomplish the

mission. Focused logistics will provide support to dominant maneuver at these dispersed locations.

> **Precision engagement** will consist of systems that enable forces to locate the objective or target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to reengage with precision if required. [11]

Similarly, the forces that execute precision engagement will have weaponry that can engage from the strategic, operational, or tactical locations. Focused logistics will provide support to precision engagement at these dispersed locations.

> The primary requisite for **full-dimensional protection** will be control of the battlespace to ensure our forces can maintain freedom of action during deployment, maneuver and engagement, while providing multi-layered defenses for our forces at all levels.[12]

Hence the battlespace at the strategic, operational, and tactical levels must be protected to include the lines of communications that links those levels. Focused logistics will provide support to the forces that provide this full-dimensional protection throughout the strategic, operational, and tactical battlespaces to ensure forces can maintain freedom of action.

In the past where forces were physically massed in the operational area, materiel (ammunition, fuel, and subsistence) could be stockpiled in the theater of operations to handle just about any contingency. This was done because redundancy in materiel reduces the risk of casualties. Lieutenant General (LTG)

Gus Pagonis, the senior U.S logistical commander during the Gulf War, when reflecting on his Gulf experience echoes this when he states:

> But *real* life and *real* death tend to change all the calculations. We in the military must sacrifice some level of efficiency to maintain a higher level of safety. We stockpile a little (or a lot) extra, just in case. We build a redundant system . . . just in case. [13]

Under JV 2010, focused logistics will improve efficiency while reducing redundancy. That is what technological advances do in the business world. That is what they will do for logistics under JV 2010. Brigadier General (BG) Don Morelli, head of U.S. Army doctrine development in the early 1980s, predicted this de-massification in the military to the Tofflers, just as they had predicted the de-massification of the economy and society.

> When we first met Don Morelli in 1982, he noted that our book the Third Wave had introduced the concept of "de-massification." . . . "But," he told us, "there's one thing you missed." All this de-massification in the economy and society was going to take place in the military, too. "We are moving," Morelli said, in a memorable phrase, "toward the de-massification of DE-struction in parallel with the de-massification of PRO-duction." [14]

In a recent interview, General William Hartzog, the Commanding General of the U.S. Army Training and Doctrine Command (TRADOC), and the officer responsible for developing U.S. Army doctrine and systems for implementing Joint Vision 2010 applied this de-massification phenomenon in the military to logistics.

> . . . a culture shift was required to make the new process work . Historically, the Army has believed in building "iron mountains," said Hartzog, referring to supply dumps of materiel and provisions in the rear of the battlefield. The Army can no longer afford "iron mountains," he said. It has spent the last several years using industry warehousing and tracking techniques to reduce the size and need for those mountains.[15]

Hence it's clear that the logistics challenge under Joint Vision 2010 is to provide support to dispersed locations from different locations around the world, without relying on huge stockpiles of materiel in the rear of the theater of operations. Focused logistics must provide materiel at the right place and right time at the strategic, operational, and tactical levels to support dominant maneuver, precision engagement, and full-dimensional protection. With less opportunities to physically mass forces and build up large quantities of supplies in rear areas, a reliance on civilian business practices such as inventory control, requisition demand and tracking techniques to achieve just-in-time delivery of materiel will be the norm to conduct operations. Demands to satisfy logisticanog2Tm(h)Tj Tm(y)Tj12 0 0 13.9503.97931 343.55969(

supplies will be time-critical and rely on the precise accuracy of information to meet logistical requirements.

The implications of focused logistics for participating nations in a US-led coalition are very significant. Since the US logistical footprint will be greatly reduced under focused logistics, participating nations in a US-led coalition cannot count on robust logistical support from the US in-theater. Since the US will be shipping materiel from outside the theater with just-in-time delivery, it will be incumbent on participating nations, relying on US support, to be integrated in logistics information systems that drive the delivery systems. In this way, the identification of logistics requirements and delivery to coalition forces at the right time and place can be achieved alongside fulfilling US logistics requirements. Another option for participating nations is, of course, just to provide their own logistical support as they have done in the past. However, the national logistics concept will be seen as inefficient, contradicting the efficiencies trying to be achieved under focused logistics. Even then, for deployments to immature theaters, the robust infrastructure in terms of ports and airfields, provided in the past by the US, may not be in place because of the reduced US footprint.

In June 1998, LTG John M. McDuffie became Director of Logistics, J4 of the Joint Staff. As the chief logistician on the Joint Staff, LTG McDuffie will have great influence on how focused logistics is shaped and implemented over the next

few years. It is valuable then, to examine how, then BG McDuffie, handled the logistics challenges for Operation Uphold Democracy in Haiti as the Commander of the Joint Logistics Support Command (JLSC) for the Joint Task Force (JTF). Many of the logistics concepts from that operation illustrate important concepts for JV 2010 focused logistics.

OPERATIONAL LEVEL HISTORICAL EXAMPLE - HAITI

Operation Uphold Democracy in Haiti is a prime example in supporting logistics challenges in an immature theater. With a population of over 5 million people, Haiti is the least developed country in the Western Hemisphere. It is mountainous and the countryside has been deforested by the population. The nation's infrastructure is minimal, and what infrastructure does exist is in a poor state of maintenance and repair.[16]

In July 1994, the United Nations (UN) authorized the use of all means necessary to restore President Aristide to power. President Aristide had been deposed by Haiti's elite and military in a 1991 coup because they felt they were experiencing a loss of power and prestige under policies instituted to improve the average Haitian's standard of living. UN involvement would return Haiti to Aristide leadership.[17]

In July 1994, then Brigadier General McDuffie served as the Commander, 1st Corps Support Command (COSCOM), XVIII Airborne Corps, Fort Bragg, North Carolina. When XVIII Airborne Corps was named the JTF headquarters for Operation Uphold Democracy, 1st COSCOM was designated the Joint Logistics Support Command (JLSC) to provide support to U.S. forces, combined forces, non-governmental organizations, and private organizations in the joint operations area (JOA).[18]

Its mission was:

> When directed, 1st COSCOM provides combat service support to forces assigned, attached, or OPCON [operational control] to the Joint Task Force 180 (-), JTF 190, and the UN mission in Haiti (UNMIH). On order, supports noncombatant evacuation and humanitarian assistance operations. Prepares to transition all logistics operations to LOGCAP [logistics civil augmentation program] (Brown and Root) during Phase IV of the operation, and to assist non-Governmental organizations (NGO's) as required. On order, redeploys.[19]

BG McDuffie established his essential tasks to ensure mission success as: establish intermediate staging bases (ISB's) at Homestead Air Force Base (AFB), Florida, and on the island of Great Inagua in the Bahamas; open the port; establish key logistics nodes (bases); sustain the force; expand the logistics template; improve the force's quality of life; support humanitarian assistance operations; and return all soldiers home safely.[20]

BG McDuffie's concept of support for the operation centered on deploying a robust logistics task force which would be sustained by continental United States (CONUS)-based operations at a sanctuary located at Fort Bragg. Sanctuary coordinated the requisition, procurement, and delivery of supplies from the national inventory control point (NCIP) into the JOA. The COSCOM coordinated receipt and issue of sustainment support throughout the JOA. Stocks were replenished by air from Pope AFB, North Carolina, and Charleston AFB, South Carolina, and by ship from the ports of Wilmington, North Carolina, and Jacksonville, Florida, into the Port-au-Prince International Airport and the port of Port-au-Prince, respectively.[21]

Of particular significance in the concept of support for the logistics operation was the split-based nature of the operation. The logistics task force in the JOA worked requirements and then tasked the CONUS-based sanctuary at Fort Bragg to fulfill the requirements. Brigadier General McDuffie describes this when he states:

> *Split operations (sanctuary).* Sanctuary is the term used to describe the split operations support base located at Fort Bragg. While the ISB's were being established, sanctuary operations were well underway. Commanded by my deputy commander for operations (DCO), sanctuary consisted of an operations center, a material management center, a movement control center, and liaison officers from 1st COSCOM units. Sanctuary anticipated requirements and ensured that supplies needed in the JOA were ordered and shipped in accordance with the set priorities in the JOA.[22]

The information-age connectivity between the forward direct support units (DSU's) at the tactical level and the sanctuary made a split operations requisition flow possible that achieved new efficiencies over previous operations. A 'pull' supply system was established from the NICP's at the strategic level coordinated through sanctuary. Forward DSU's in theater sent requisitions via the automated standard Army retail supply system to the 2d Support Center at Sanctuary Bragg. The corps theater automated data processing support center computer-searched the corps' rear DSU's stocks for the required items. When an item was located, it was released and shipped to the consolidated receiving and shipping point at Fort Bragg and then into the theater. If the requested item was not in-stock at Sanctuary Bragg, the request was automatically passed to the NICP, where it was released to the container consolidation point at the Defense Depot, Susquehanna, Pennsylvania and shipped directly to the tactical units in Haiti.[23]

In order to track shipments from CONUS coordinated by the sanctuary, information-age systems, specifically intransit visibility (ITV) and total asset visibility (TAV), were used to know where the shipments were at any given time and what was in the shipments. The automated manifest system (AMS) consisted of a laser card, which detailed the shipment contents. The radio frequency (RF) tagging technique tracked the location of the shipment. These systems provided intransit "in-the-box" asset visibility from the point of origin to delivery in the

theater. This enabled the user to go to a single activity to obtain the location and line-item-level content of every shipment processed through the AMS and tagged with an RF tag.[24]

This historical example illustrates how the three components of BG McDuffie's concept of logistics support linked the tactical, operational, and strategic levels logistically using logistics information systems. These systems moved supplies from strategic level defense depots and bases in CONUS to the tactical units in theater. BG McDuffie's three components, working in concert, enabled the focused logistics concept to support the JV 2010 requirement to supply the preponderance of materiel from outside the JOA. Split-based sanctuary operations, split operations requisition flow, and total asset visibility using automated manifest systems and radio frequency tagging techniques eliminated the need for "iron mountains" of materiel in Haiti. The "iron mountains" stayed in the US at the bases and depots designed to accommodate them. Supplies arrived in the JOA "just-in-time" through a 'pull' supply system. Information-age technology enabled this 'pull' system to work in providing materiel more efficiently and with less redundancy.

This logistics support concept was designed to work in both peace operations and war. Operation Uphold Democracy ended up being an Operation Other Than War (OOTW) mission. When XVIIIth Airborne Corps received the JTF mission,

however, it was a forced entry, peacemaking mission. Only after the eleventh hour Carter-Nunn-Powell agreement resolved the crisis, allowing permissive entry of forces, did this become a peacekeeping mission. Hence, BG McDuffie's split-based logistics support was planned to work for both spectrums of conflict. BG McDuffie states:

> On D-1, we established the command and control platform on the lead LSV, from which I could communicate with all elements of the task force, higher headquarters. . . . With the D-day support package waiting offshore and all logistics support in place on Great Inagua, the 1st COSCOM was prepared to support the forced-entry plan. . . The logistics support package that had been prepared was robust enough to support either plan, so the transition to permissive entry was smooth.[25]

An additional benefit also emerged in BG McDuffie's eyes. He observed that the split operations sanctuary concept

> . . . allows the maneuver commander to focus on the fight while his chief logistician controls the logistics flow into theater.[26]

In summary, what we learn from the Operation Uphold Democracy example is that BG McDuffie's Joint Logistics Support Command was able to provide a full range of logistics support to U.S. forces and combined forces, private organizations, and non-governmental organizations in the JOA. The JLSC accomplished this through split-based sanctuary operations, split operations requisition flow, and total asset visibility. These components form the model for how the strategic, operational, and tactical levels are linked through information systems to almost instantaneously communicate the requisition to the source,

wherever it is, and get it shipped to the user. This makes it possible to meet the JV 2010 requirement to supply the preponderance of materiel from outside the JOA. In addition, this model was designed to work in both peace and war. It freed the JTF commander to focus on the fight while his logistician controlled logistics flow into theater.

However, the focused logistics concept is not complete in the Haiti example. For Haiti still had a 'pull' system of supply. The focused logistics concept will be based on a 'push' supply system. To see how focused logistics will go from a 'pull' to a 'push' system, attention will now shift to how focused logistics is being implemented by the US Army at the tactical level under JV 2010.

TACTICAL EXAMPLE – ARMY WARFIGHTING EXPERIMENT

In order to gain a better understanding of where JV 2010 is heading at the tactical level requires examination of the only Army field experiment of JV 2010. This was termed the Army Warfighting Experiment (AWE). It was conducted at the National Training Center (NTC), Fort Irwin, California in March 1997. It is necessary to study this because logistics support provided to participating nations in a US-led coalition will normally be provided at the tactical level.

For AWE the Experimental Force (EXFOR) was outfitted with the most modern equipment prototypes available from defense contractors in an attempt to test the

warfare potential of a force equipped with the latest technologies. The hypothesis for the experiment was,

> . . . a redesigned force equipped with new digital technologies will operate at a faster tempo and be more lethal and survivable than a force from today's Army.[27]

The EXFOR was allowed to train with the equipment for a limited time prior to engaging in a maneuver training rotation against the World Class Opposing Force (OPFOR) at the NTC. The OPFOR is arguably the best trained fighting force in the world, especially at the NTC, its home turf. The most significant equipment addition to the EXFOR's arsenal was an applique computer (name given to the test computer) mounted inside each EXFOR combat vehicle. The computer provided a common information picture concerning enemy and friendly forces to every combat vehicle in EXFOR throughout every level of command. US Army Chief of Staff, Dennis Reimer expressed what the Army hoped this would provide.

> The Army calls this "situational awareness." Reimer said it is at the heart of issues being examined in the experiment. "We started out here with the premise that if we could answer three questions out there on the desert floor - where am I? where are my buddies? and where is the enemy? – then we could change the way we do business. [28]

By the end of AWE the Army Chief of Staff felt the experiment had been a success because the answers to those questions had been achieved, creating better overall situational awareness of enemy and friendly force dispositions on the battlefield.

> . . . I think I've seen enough to convince myself that we have answered those questions and we can make a difference in the way we do business, and I think that's probably the major lesson learned for me." [29]

After the experiment concluded, EXFOR leaders felt the greatest improvement this increased situational awareness provided was in the ability of the EXFOR to operate at a higher tempo of operations.

> . . Of the three criteria listed in the hypothesis – tempo, lethality, and survivability, the most clear-cut improvements were in tempo, the pace at which a unit plans and conducts operations. . . "The planning process has just become a whole lot more efficient," said Lieutenant Colonel Phil North, commander of the 1st Battalion, 22d Infantry Regiment, the EXFOR Brigade's mechanized infantry component. "It's not as laborious as it used to be. . . I can make decisions quicker, and I can get forces to a decisive point at the right time." [30]

This perception was also shared at the platoon and section levels.

> According to a Staff Sergeant James Bartlett, a Bradley infantry vehicle commander and section leader, "Our biggest difference is to adapt to new situations quicker and do a change of mission." Bartlett's platoon leader, 1st Lieutenant Andre Tucker, said the applique laptop computer inserted into each Bradley in his platoon for the experiment had more than cut in half the time needed to send his platoon a sector sketch - a diagram of the coverage of fires for each element of the platoon – from 1 ½ to 2 hours to 45 minutes.[31]

This improvement in EXFOR tempo of operations also did not go unnoticed by the OPFOR. In a news interview, Colonel Guy Swan, the OPFOR commander, stated:

> The OPFOR mode of operation against any opponent out here is to hold the final decision on a course of action as long as possible, to try to get inside the opponents decision cycle, so he can no longer

> react to your final decision. . .Over the last 13 days that decision point has been pushed farther and farther because the EXFOR brigade has been able to react just a little bit more quickly with some of the tools as they become more proficient with them. . .We are still able to hold the last card, but not for much longer. Pretty soon we will be at the mercy of the guy with the quicker decision cycle, so that has been a significant change over the course of the rotation.[32]

The improvement in situational awareness that this provides with respect to friendly and enemy forces demonstrates the power of information-age technology from the tactical viewpoint. For example, when a Bradley fighting vehicle records the sighting of an enemy tank at a certain grid coordinate on its applique computer, everyone in the brigade combat team knows it at the same time. Everyone within range of the enemy tank's firing system can take evasive action from being engaged by the tank. Commanders decide, then direct, which weapons platforms can most effectively engage the enemy tank. Simultaneously, commanders with their intelligence staffs at all levels, use the information about the enemy tank as a piece to the puzzle to assess what the enemy formations are doing. Distribution of information is instantaneous. This is much more efficient than old spot reports made over isolated company/troop FM nets. In the past it took enormous time, labor, and effort to collect and distribute the information to the different levels of command.

The improvement in situational awareness provided by technology enabled the EXFOR to not only perform missions at a higher tempo, but also perform missions over a greater tactical area.

> To test the concepts . . . the Army expanded the size of the maneuver "box" at the NTC for the latter half of the experiment by almost 50 percent over the area most brigades train in here. The EXFOR brigade took the additional space in stride, which has to count as good news for the Army.[33]

The EXFOR's improvement was particularly evident in defend missions. Toward the end of the experiment, the EXFOR displayed substantial improvement in gaining the situational awareness advantage the new equipment offered when the brigade won two defensive battles against the OPFOR.[34] Hence, with respect to tactics alone, the EXFOR saw efficiency gains in higher tempo of operations and in defensive mission productivity gains. In the latter, the EXFOR was able to successfully defend a 50% wider defensive front than a brigade without the advanced equipment.

Improved situational awareness on the battlefield works for logistics, just as it does tactics. The applique computers create improved situational awareness about unit logistics statuses to logisticians. Logistics and equipment statuses can be communicated instantaneously to all command and control nodes just like enemy tank locations can. The hypothesis of the JV 2010 focused logistics redesign is that instant digital communications will allow logisticians in the rear to track a combat unit's logistics needs very closely. The logisticians then push supplies forward to the unit, as it needs them, instead of having the unit drag food, fuel, and ammunition around the battlefield. This is referred to as "just-in-time logistics," as opposed to the old "just-in-case" system. This tactical level redesign concentrates

logistics assets, including mechanics, in the parent maneuver brigade's Forward Support Battalion, drastically reducing the number of logistics soldiers and vehicles in the brigade. The Forward Support Battalion pushes supplies forward to the maneuver battalions via forward support companies, under the command of the Forward Support Battalion commander.[35]

After the EXFOR rotation at NTC, numerous officers were queried on how well they thought the redesign of logistics forces went. The verdict was unlike the unanimity we heard about improved situational awareness on the battlefield. The lower in rank one was, the less the individual favored the logistics redesign.

> Maj. Gen. Paul Kern, commander of the 4th Infantry Division (Mechanized), parent unit for the EXFOR brigade task force, told Army Chief of Staff Gen. Dennis Reimer at a March 28 briefing that the redesigned logistics organization was doing so well the Army should consider expanding it. . . "CSS redesign is working. The operational ready rate for the 1st Brigade Combat Team is pretty high. Have we gone far enough?" he said, noting that the Army had yet to look at whether the divisional support command should be redesigned. [36]

More junior officers had an opposite view about the logistics redesign.

> "CSS redesign is a failure," said Capt. Michael Bottiglieri, commander of EXFOR's D Company, 1st Battalion, 22d Infantry Regiment. "It makes it harder for us to get what we need." . . . Bottiglieri also argued the loss of so many logistics assets meant his battalion had to go without vital supplies that would have been guaranteed under the old system. . . Bottiglieri scoffed at claims made by some higher ranking officers that no EXFOR unit had run out of food, fuel, or ammunition because of the CSS redesign. He cited the example of an EXFOR armor company that ran out of fuel

> during battle. . . . I don't think just-in-time support has worked the way it is supposed to.[37]

The battalion commander, however, had a different view of the event cited by the company commander.

> Lt. Col. North, Bottiglieri's battalion commander, said a tank company attached to 1st Battalion did run out of fuel but blamed it on "a breakdown within the company" rather than a logistics system flaw.[38]

Lieutenant Colonel North, took a more centrist approach to the logistics redesign when he stated:

> "I don't think the redesign is a failure, but I think it has a long way to go as far as making sure the lash up between the supporting unit and supported unit is more intact.. I no longer own any organic (logistics assets), and that's frustrating."[39]

These contrasting views about how focused logistics worked during AWE, are presented to cite concerns expressed about focused logistics. As can be seen in the case of the company commander's view and the battalion commander's subsequent rebuttal, the new logistics systems may be blamed for any logistics failures on the battlefield, whether warranted or not. Despite these contrasting perceptions though, the Army remains committed to making focused logistics work.

The division tested the logistics redesign during a command post exercise approximately six months later in the fall of 1997. The exercise showed the logisticians were able to get supplies to the troops on time. However, questions

were raised about the full-dimensional protection required to protect the supply lines that lengthened because of expanded battlespace.[40]

This raises the issue of full-dimensional protection, an operational concept of JV 2010. Focused logistics relies on full-dimensional protection to control the battlespace in which to move supplies. This can be a major concern of commanders at either the operational or tactical levels depending on the threat the enemy presents. Brigadier General Thomas Metz, the Director of the EXFOR's coordination cell alluded to this in an interview.

> . . . Metz said the changes to a culture where a maneuver commander can see his supplies to one where he must rely on someone in the rear to get them to him will take time, perhaps years. "As a maneuver commander, I could look over my shoulder, and see parts, fuel, logistics, and felt comfortable. That was my culture. . . Future commanders will not be able to look over their shoulders and see all that fuel and ammo. They will have to have faith in the system that when they need it they will have it."[41]

While it is outside the scope of this paper to assess the additional risks of focused logistics, including those associated with ensuring full-dimensional protection, this is a concern worthy of study in another paper.

Colonel Tim Muchmore, an Army staff officer cites an additional advantage of the logistics redesign at the tactical level. He touts the flexibility for the division commander to task organize his combat units more freely. The division

commander can leave the logistical details of how to support the 'ad hoc' task organizations to the logisticians.

> It's the flexibility that the new structure offers a division commander that is innovative, which is difficult for the casual observer to understand. . . . A commander will now have the ability to mix and match his assets, said Muchmore. He attributes the new flexibility to changes in combat support, and combat service support functions, allowing commanders of maneuver units to concentrate on fighting the enemy rather than worrying about how to feed his troops or find spare parts for his vehicles. [42]

In summary, the Army Warfighting Experiment at the tactical level reinforces the JV 2010 focused logistics requirement to supply the preponderance of materiel for tactical units from outside their areas of operations. Information systems will generate requirements and supplies will be pushed down to tactical units. In theory, commanders will be less involved with logistics and will be able to concentrate on the fight with the enemy. Logistics will rely on information systems. If the information and logistical systems work then supplies will come automatically.

THE LOGISTICS PIPELINE AND THE NEW CUSTOMER

But wait, the Haiti experience demonstrated a 'pull' system and the AWE showed a 'push' system. What's the difference and which type of system will focused logistics end up with? The answer is that, if the systems work correctly, focused logistics will end up being a 'push' system. The difference is that the combat vehicles in Haiti had not yet been equipped with a computer on every

vehicle. That's the key to enabling the 'push' system to work. With a computer on every vehicle, every logistics node from the tactical to the strategic level can anticipate the logistics requirements for that vehicle. The customer for logistics support changes.

> . . . the definition of customer has been narrowed. . . . the customer was the next lowest level of command that had ordered supplies, and so on until you reached the lowest level. Now, from the factory to the front, the customer is the combatant who needs that piece of equipment.[43]

Hence the 'focused' part of focused logistics is to get the support to the point that the support is required, to the customer, wherever that customer is, no matter which nation or service.

> The desired end state is full spectrum supportability – supporting the warfighter from a source of supply to a point of need whether that be a foxhole, cockpit, deck plate, or base while maximizing the benefits to be gained from information superiority or technological innovation.[44]

The logistics flow to this new customer can be envisioned as a pipeline from the highest level to the lowest level. The pipeline provides combat service support seamlessly from the strategic level, through the operational and tactical levels, all the way down to a broken infantry-fighting vehicle in a defensive fighting position. A senior command logistician at the strategic level (the national provider) - will be responsible for the pipeline. A major subordinate command of the national provider located forward in the theater of operations will

provide in-country coordination and logistics command and control. A battlespace command logistician will be fully responsible to the supported commander-in-chief (CINC) or his joint task force (JTF) commander. This in-theater element will be a jointly staffed organization, possibly a coalition, fulfilling the operational level of logistics role.[45]

This logistics pipeline will consist of a logistics information conduit that will provide the same level of increased situational awareness we saw at the tactical level in AWE, extended to the operational level through to the strategic. The pipeline will be owned, controlled, and resourced by the national provider, who pushes sustainment forward. The battle command logistician's battlespace will reach from the CINC's peacetime area of operation all the way forward to the tactical customer of combat service support. All logisticians - strategic, operational, and tactical - will be technologically integrated throughout the supported CINC's battlespace. They will know everything that is going on, from the factory to the foxhole. Digitization will provide each logistics echelon with situational awareness of the maneuver commander's units location and logistics requirements. The logisticians will be able to forecast wher

elements. The pipeline will continuously flow logistics and sustainment stocks from CONUS to the front line soldier, sailor, airmen, or marine.[46]

THE ROAD TO 'FOCUSED LOGISTICS' IN A US-LED COALITION

The essence of focused logistics under JV 2010 is to provide support from outside the coalition's operational area, from depots/bases in CONUS, seamlessly from the strategic, through the operational and tactical, to the point where it is needed. Operation Uphold Democracy provided an example of how a joint and combined logistics support command will support joint and combined forces, private organizations, and non-governmental organizations in a JOA through split-based sanctuary operations, split operations requisition flow, and total asset visibility. These three components rely on accurate information from the JOA to provide the logistics flow from bases/depots in CONUS to the JOA. This tracks with the JV 2010 requirement for focused logistics to support dominant maneuver and the other operational concepts from outside the JOA. The Army Warfighting Experiment at the tactical level demonstrates how computers on all combat vehicles will enable logisticians to know unit statuses and unit missions. The logisticians will then be able to anticipate unit logistics requirements. This will allow 'push' supply systems to get materiel to units and points of need just-in-time. At both the operational and tactical levels, the implementation of these information-based 'push' supply systems are expected to free commanders from

worries about logistics. This will allow them to concentrate on the fight. If the information and logistical systems work properly, supplies will come automatically.

Based on this, the implications for participating nations in a US-led coalition are significant indeed. If the units of allied/coalition nations are going to receive supplies in such a 'push' manner as was demonstrated by AWE, the units will have to have inter-connectivity and compatibility with US logistical information systems to communicate the unit equipment and mission statuses to logistics nodes. Logisticians will then be able to anticipate logistics needs of participating nations and 'push' the supplies to points where they are needed. Hence, for participating nations in a US-led coalition, information interoperability is the key issue to logistics interoperability. Potential participating nations in a US-led coalition would be wise then to direct their resources first towards achieving information systems interoperability with US logistics systems. In this way their forces will be able to receive focused logistics support in a US-led coalition.

Fifteen years after BG Morelli spoke to the Tofflers, the person that holds BG Morelli's former position today, as the head of U.S. Army doctrine, was asked whether the technological advances in JV 2010 will leave parts of the force, allies, and coalition partners far behind on future battlefields. MG Robert H. Scales, Jr., deputy chief of staff for doctrine at TRADOC and author of Certain Victory: The US Army in the Gulf War responded:

> We've never had a homogeneous Army. The secret is to tailor the Army so every division has a role to play in every conflict. . . What needs to be done is to use the information and telecommunications revolution to literally tie all those together. Interoperability really means to apply in concert. You're using the telecommunications to fold itself over all the forces on your side. When you're on the battlefield, you're laying a blanket of precision fires and then a blanket of dominant maneuver.[47]

Hence information systems interoperability will not only be the key issue to achieve logistics interoperability under focused logistics, it will be the key issue for interoperability for precision fires and dominant maneuver as well. The addition of the applique computer on US tactical vehicles has created a tactical internet, which will tie together precision fires, dominant maneuver, full-dimensional protection, and focused logistics. While this paper has argued the focused logistics interoperability aspect, it is clear that information systems will tie together the other operational concepts as well. Participating nations in a US-led coalition will have to be tied into this tactical internet to be a relevant player on JV 2010 battlefields.

In War and Anti-War the Tofflers' thesis states, ". . . the way we make war reflects the way we make wealth – and the way we make anti-war must reflect the way we make war."[48] As the international business community transitions to making wealth on the commercial internet, western military forces will transition to making war on the tactical internet. Military forces around the world will have to make this transition or risk becoming obsolete on the modern battlefield.

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