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**COMMAND AND CONTROL OF THE CANADIAN FORCES SUPPLY CHAIN**

By /par  
LCol Neville Russell

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## **ABSTRACT**

This paper looks at the issues surrounding command and control of the CF Supply Chain. First it argues that at the operational level of conflict, the supply chain plays a key role in providing materiel to the war fighter and logistical situational awareness to the Commander. It then discusses the problems and inefficiencies caused by the poor command and control structure currently in place and in particular the problems caused by managing the supply chain in segments instead of by an integrated supply chain management strategy. Finally, it looks at current CF initiatives relating to the CF Supply Chain and proposes a number of steps to improving command and control of the supply chain.

# COMMAND AND CONTROL OF THE CANADIAN FORCES SUPPLY CHAIN

By Lieutenant-Colonel N.E. Russell

## INTRODUCTION

Alexander, Frederick the Great, the Duke of Wellington, and Field Marshal Viscount Slim, are a few of a small but esteemed group of individuals who through their deeds in preparing, orchestrating and leading armies in conflict have earned the reputation as great commanders. A common thread associated with the success of all their campaigns was their mastery of logistics concepts, and in particular the role of the supply chain. This is due in large part because what is possible operationally depends on what the supply chain is capable of supporting.

The Duke of Wellington understood this perfectly. During his peninsula campaign of 1812 he stressed the importance of "... following the history of a biscuit from its leaving Lisbon until it reaches a soldier's mouth on the frontier."<sup>1</sup> His supply chain had three distinct components: the rear line of barge traffic linking Lisbon to intermediate depots, the ox-wagon convoys to forward supply depots, and lastly the divisional and regimental mule-trains supplying the individual units at the front. Because Wellington placed great importance on logistic details such as the combat load a soldier could be realistically expected to carry, the loading of mules, the daily distance an ox cart could be realistically expected to cover, and the positioning of supply depots he was able to maximize the daily distance his army could travel and the physical condition in which his soldiers arrived in at their destination.

By synchronizing logistics with combat operations, Wellington was able to forestall culmination in his Peninsula Campaign. Further, Wellington was able to keep his forces

continually concentrated and employed decisively, while the much larger French forces were forced to constantly break down into widely dispersed units, in order to forage for food. This gave him a significant advantage in operational reach, and an ability to operate at a higher tempo of warfare than that of his French counterparts.

For commanders at the operational level of war, the supply chain is as important today to as it was in Wellington's era. Logistics is a function of command. The supply chain is the artery on which sustainment, or as Julian Thompson calls the "lifeblood of war"<sup>2</sup> flows. To exercise control at the strategic, operational, and tactical levels of war, commanders must also exercise control over the supply chain.<sup>3</sup> As Field Marshal Wavell noted in 1946:

It takes little skill or imagination to see where you would like your army to be and *when*; it takes much knowledge and hard work to know where you can place your forces and whether you can maintain them there. A real knowledge of supply and movement factors must be the basis of every leader's plan; only then can he know how and when to take risks with those factors and battles are won only by taking risks.<sup>4</sup>

Controlling the supply chain and gaining knowledge of supply and movement factors requires effective command and control (C2) both to coordinate the provision of timely material and services to the combatants and to provide logistical situational awareness to the commanders. However, the Canadian Forces (CF) Supply Chain is a huge, complex and expensive network of processes, information technology and organizations. Further, it faces two significant challenges. First, it needs to address deficiencies outlined in after action reports and CRS and AOG audits so it can improve its performance in supporting the increasing operational tempo of the CF.<sup>5</sup> Secondly, when the decision was made in November 2002 not to proceed with Phase II of the Supply Chain Project (SCP)<sup>6</sup>, it was done in the expectation that similar savings to those expected from the SCP, approximately \$46 million, could be achieved in house.<sup>7</sup>

To meet these challenges the supply chain will need to become fully integrated, but to do so will require reengineering. However, as the US Government Accounting Office has noted, supply chain reengineering is more successful when various supply chain activities are viewed as a series of interconnected processes rather than isolated functions since “Changes in one element of the supply chain are likely to affect the cost and/or performance of other processes.”<sup>8</sup> A proven business strategy that addresses this problem is Integrated Supply Chain Management. When applied in the private sector, effective management of the supply chain has not only improved the flow of materiel’s from the supplier to the customer, thereby increasing customer satisfaction rates, but at about half the cost.<sup>9</sup>

The biggest obstacle to the CF in gaining the benefits of an integrated supply chain management approach is C2. The supply chain is not commanded by one individual, but rather guided by staff in the J4 Mat/DG Log Division. Decisions are made by consensus with the various Environmental Chief of Staffs (ECS), Equipment Program Managers (EPM) and other stakeholders. Since the optimum output of the entire supply chain often requires some organizations within the supply chain, which often have competing objectives, to operate sub-optimally, decision-making is an extremely long, arduous and often unsuccessful process.

This paper will demonstrate that the supply chain, being an essential part of the operational level of conflict, requires a single authority for effective C2 with the resources, responsibility and authority to manage it as an integrated supply chain.

## **LOGISTICS, SUPPLY CHAIN AND C2 DEFINED**

I don’t know what the hell this ‘logistics’ is that Marshall is always talking about, but I want some of it.

Admiral Ernrt King, USN  
To a staff officer, 1942

Logistics has existed since the formation of the first armies, but as a branch of the military arts it is by far the least studied. Logistics just does not have the military sex-appeal of strategy, or tactics and General Nathaniel Green was probably right when he said “Whoever heard of a Quartermaster in history as such”<sup>10</sup>, but nevertheless logistics has and likely always will play a central part in the strategic, operational and tactical levels of war.

Martin van Creveld in *Supplying War; Logistics from Wallenstein to Patton* defined logistics “... as the practical art of moving armies and keeping them supplied.”<sup>11</sup> RAdm Eccles defined it as, “... the creation and sustained support of combat forces and weapons.”<sup>12</sup> Today Canada uses the NATO definition of logistics:

... the planning and carrying out the movement and maintenance of forces. It includes those aspects of military operations that deal with: a) design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposition of materiel; b) transport of personnel; c) acquisition or construction, maintenance, operation and disposition of facilities; d) acquisition or furnishing of services; and e) medical and health service support.<sup>13</sup>

The supply chain is a major component of military logistics and in many respects it is the heart of logistics. Although it has existed as a function of logistics since the formation of large armies, the term supply chain is of recent vintage, originating in the business world in the late 1980s.<sup>14</sup> A supply chain is the integration of all the processes needed to efficiently deliver products to the end user.<sup>15</sup> The DOD military dictionary defines supply chain as “The linked activities associated with providing materiel from a raw materiel stage to an end user as a finished product.”<sup>16</sup> With respect to the above logistics definition the supply chain consists of all links involved directly, or indirectly, in fulfilling a customer demand including all aspects of “design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposition of materiel.”

The purpose of the supply chain is to serve its customers. Consider an aircraft technician servicing a CF188 while on a deployment at Forward Operating Location Inuvik. The supply chain begins with the customer, in this case an aircraft technician and his need for a spare part. The next link is the squadron supply section, which stocks its deployable spares account using inventory supplied from the Wing Supply Squadron at 4 Wing, which in turn is supplied from one of the Canadian Forces Supply Depots (CFSD). The depots in turn are stocked from suppliers. Supporting elements include policy, procurement, and materiel and distribution management personnel. The CF Supply Chain is dynamic and involves the constant flow of goods, materials and information between each link from the original supplier to the customer and, when not consumed, back for storage, or repair.

Supply chain management (SCM) is the strategy of managing these logistics functions at each link from the commercial supplier to the war fighter. “The broad goal of supply chain management is to effect a seamless flow of products from cradle to grave with the fewest resources and the highest customer service possible.”<sup>17</sup> Information is what links, or integrates a supply chain together. Operational efficiency is the result of effective SCM.

Command and control is:

... the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities and procedures employed by a commander in planning, directing and coordinating and controlling forces and operations in the accomplishment of the mission. Also called C2.<sup>18</sup>

The ability of Commanders to focus those resources at their disposal on a single objective relies in large part on the effectiveness of C2. It has three principal components: structure, procedures and communications.



However, recently Dr. Ross Pigeau and Carol McCann, of DRDC, Toronto, have proposed a new scientific model of the concept of C2. They have taken a humanist approach to the function of command and define it, "... as the creative expression of human will necessary to accomplish the mission."<sup>19</sup> In their model they make the important distinction that command is not limited to commanders and allows for even individuals to command. They define control as "... those structures and processes devised by command to enable and manage risk."<sup>20</sup> Their Competencies, Authority and Responsibility (CAR) model is composed of three dimensions: competencies - physical, intellectual, emotional, and interpersonal; authority - legal and personal; and responsibility - extrinsic and intrinsic. They assert that effective command rests on an optimal balance between these elements. In other words to be effective a commander must have the necessary competencies, authorities and level of responsibility appropriate for his position. According to Pigeau and McCann "...it is the region that best protects militaries from dangerous or ineffectual command, and it is the region where motivation and initiative are maximized while the likelihood of poor performance and fear of failure are minimized."<sup>21</sup>

## **IMPACT OF LOGISTICS ON THE OPERATIONAL LEVEL OF CONFLICT**

A campaign plan that cannot be logistically supported is not a plan at all, but simply an expression of fanciful wishes.

John Meehan <sup>22</sup>

In studying World War I and their own civil war Russian military theorists realized that logistics and movement (through railroads and road nets) played a vital role in determining the scale, scope and depth of military operations. As a result in the mid-1920s, Soviet Army Staff Chief Mikhail N. Tukhachevsky ordered the staff academy to incorporate logistics into their operational level exercises. Bruce Menning states that

some Russian commentators later asserted that consideration of support in tandem with operations actually gave birth to the concept of Soviet operational art.<sup>23</sup> Captain (N) Hughes in his article *Naval Maneuver Warfare* states that maritime operational art is almost synonymous with operational logistics, referring it to one of the three prongs of the naval trident strategy, logistics and tactics. He further argues that it is the “logistical question, which is the solid, computable core of operational art that needs to be answered if tactical force requirements can be brought to bear quickly and surely in order to fulfill the strategist’s goal.”<sup>24</sup>

When the logistics support is not available at the place where it is needed, campaigns, or strategic opportunities can be lost. In early September 1944 after exploiting the tactical victories of the Falaise Pocket from August 20<sup>th</sup> to 22<sup>nd</sup> the forces of General Eisenhower, Supreme Commander Allied Expeditionary Forces, seemed on the verge of driving through to victory in Germany. However, by the end of September this offensive, which if successful might have changed the whole post-war political situation in Europe, was halted due to the lack of gasoline and ammunition. The allies could not ship enough ammunition and fuel fast enough through the supply chain from North America to the ports in France and onward to the Allied frontlines. “For the next two months supply limitations were to dominate the real meaning of the tyranny of logistics.”<sup>25</sup> This truism is still valid in modern day conflicts. In the Gulf War, Dick Cheney, Secretary of Defense, when briefed on logistical problems by General Schwarzkopf, acknowledged that the timing of the ground attack was subject to logistical constraints, stating “... we can’t try to force it too early”<sup>26</sup>

At the strategic level, economic capabilities limit the combat forces, which can be created. At the same time, at the operational and tactical levels, logistic capabilities limit the forces, which can be employed in combat operations.<sup>27</sup> Further, the supply chain is not only required for every operation at each point along the spectrum of conflict and at all levels, but it flows from the strategic level, the Canadian economy to military depots, down through the operational level (National Support Element and in the future the Joint Support group (JSG)) to the tactical level (the unit supply section) in one continuous supply chain.

Logistics is a function of command because it governs the tempo and power of operations. The supply chain provides the food, clothing, fuel, munitions and spare parts to make weapons systems ready. Furthermore, the supply chain gives commanders information. For instance, it allows commanders to determine whether their forces have the necessary sustainability for upcoming operations.<sup>28</sup> To develop an effective campaign plan, commanders and their staff need to have a good indication on how the supply chain is going to perform - what it can provide and when it can provide it. Likewise, without timely and accurate feedback on actual and potential usage from operators, in terms of consumption, unserviceable repairables and pre-positioning requirements, the supply chain cannot respond and adapt and logistics performance will suffer. Information needs to be fed from the operational staff and end users, back into the supply chain, from the unit supply section back through the operational and then to the strategic level where new purchases can be made and contracts let. As we move to a distribution-based replenishment system, just in time; not just in case will be the rule so quick passage of information will become even more vital to compensate for lower inventories.

## **THE CANADIAN FORCES SUPPLY CHAIN**

The CF Supply Chain has an inventory of 1.2 million NATO Stock numbers worth \$10 billion. Approximately, \$1.2 billion in annual national procurement flows through the supply chain. It is composed of a host of customers, suppliers, contractors and CF logistics sections, units and directorates. Theoretically, it operates on the basis of centralized control from NDHQ and decentralized delivery by the ECSs. In 2001, the estimated annual cost of the supply chain was \$366 million.<sup>29</sup>

ADM Mat has the overall responsibility for policy for all aspects of materiel support, from acquisition, to in-service support and disposal. J4 Mat/DG Log (BGen) is the senior advisor for supply chain operations and the J4 Mat/DG Log division is the focal point for supply chain activities. The Directorate of Materiel and Distribution develops and implements supply policies and manages the Canadian Forces Supply System Upgrade. The Directorate of Logistics Business Management develops and implements transportation policies and manages the National Materiel Distribution System (NMDS). J4 Logistics operates the National Defence Logistics Co-ordination Center and the co-located National Defence Movement Control Centre coordinating supply chain support to domestic and international operations. J4 Mat/DGLog has a number of field units that also support the supply chain. For deployed operations 3 Canadian Support Group provides materiel management/processing and distribution support and 4 Canadian Forces Movement Control Unit provides strategic and operational movement services. Finally, 7 and 25 CFSD provide fourth line supply and materiel/distribution services to CF bases/wings and units.

Although, the J4 Mat/DG Log division is the principal focal point, other ADM Mat divisions also conduct supply chain activities: ammunition management through DGEPS, and

weapon system spares parts procurement through DGAEPM, DGGLEPM and DGMEPM. The ECSs also own part of the supply chain through unit supply sections, close and general support units, Wing/Base supply and traffic sections, and Air Movement Squadrons and are responsible for delivery to the customers. In the near future the DCDS will also impact on the supply chain, not only as a customer, but also through the JSG, which will act as the overseas link between Canada and overseas unit supply sections.

## **SUPPLY CHAIN C2 ISSUES**

The instruments of battle are valuable only if one knows how to use them  
Charles Ardant du Picq  
Battle Studies 1870

In the 1990s, the CF Supply Chain underwent a significant transformation. Two CFSDs were closed and the two remaining CFSDs were modernized. The workforce was substantially reduced and inventory was rationalized, including devolution of responsibility for supply of non-centrally managed items. Technology was improved, albeit slowly. Initiatives to improve the performance of the supply chain had been identified and people were capable and motivated to implement them; however, the unrelenting resource reductions of the nineties made it difficult for the military to keep pace with the private sector. Further, from January 1998 until November 2002 many improvement initiatives were cancelled, or indefinitely postponed to avoid possible conflict with the SCP.<sup>30</sup> The net effect of the resource cuts combined with the devolution and decentralization policies of this period was a fragmentation of the CF Supply Chain. This fragmentation led to gaps in process ownership, accountability and oversight. No single individual had the authority, responsibility and the resources to make end-to-end process

changes. As per figure 1 below, C2 is carried out in a combination of organizational and/or functional stovepipes instead of by process across the entire supply chain.

Suppliers	Procurement	Material Control	R & O	Warehousing	Distribution	Customers (Requirements)
	PWGSC DGAEPM DGLEPM DGMEPM DGEPS	DMMD	DMMD DGAEPM DGLEPM DGMEPM Contractors	DMMD CAS CLS CMS	DLBM CAS CLS CMS	DCDS CAS CLS CMS

Figure 1: Fragmentation

Consequently, no proper framework for performance management was developed, policies became guidelines and single common standards disappeared. With the chain broken and segmented amongst many owners, each with its own goals, policies and interests, the chain became more difficult to coordinate. The result was a wide variability in the management and delivery of supply chain activities at the Wing/Base level and for deployed operations.<sup>31</sup>

In September 2002 a cross functional/environment working-group concluded that because of the fragmented accountability structure and the lack of an overall control or management system a number of undesired consequences occurred. These consequences were: “Wastage, carelessness, loss; confusion of aim, loyalty (functional vs. operational); savings in A drove costs in B; no incentive to conform to policy, command, etc; and Priorities and SHC could be manipulated to advantage.”<sup>32</sup>

It was not that the problems were unexpected, they had been repeatedly been identified in DMMD studies, or CRS reviews, but there were insufficient resources available to deal with them all. Further, new ideas that would improve the performance of the entire supply chain, but

at the expense of some its segments, would go nowhere because the lack of authoritative power meant universal acceptance had to be achieved. The single-tier warehousing concept put forward by the Inventory Management Control Team, as part of the MCCRT reengineering efforts, met this fate.<sup>33</sup>

Because the supply chain has become fragmented, a number of serious inefficiencies have developed including; poor synchronization, gaps in responsibilities and process overlaps.

Synchronization: An effective supply chain needs to be synchronized. It requires each link to take into account the impact its actions have on the complete chain and this can only be done through effective C2 over all links in the entire supply chain. This is because it is the synchronization of activities among the members of the supply chain that counts.

Synchronization requires purposeful design and engineering of supply chain networks.<sup>34</sup>

“synchronization includes matching the goals of the interdependent parts and linking their priorities with other parts of the organization. When conditions change, synchronization realigns the multiple priorities and reallocates resources.”<sup>35</sup>

Poor synchronization is due to lack of coordination. The lack of coordination leads to a degradation in customer service and an increase in cost within the supply chain. A lack of coordination occurs when different links have different objectives that conflict.<sup>36</sup> As a result, each link tries to optimize its own local objectives, resulting in actions that often diminish the performance of the entire supply chain. The following three examples illustrate this point.

First, supply managers do not work for the J4Mat/Log Division and although their procurement decisions have a significant impact on warehousing and distribution costs, they are not held accountable for them. This lack of accountability and poor coordination has led to the accumulation of dormant stocks, problems with the stockpiling of repairable reserves, sub-

optimal positioning of stocks and unacceptable stock out rates.<sup>37</sup> Although a bulk buy may seem sound financially on its own merits unless all the costs including inventory, order processing and distribution costs are factored in, the true cost of procurement cannot be determined. In addition, by splitting the process of satisfying a customer requirement into two organizational stovepipes, procurement in the EPMs (the supply side) and materiel management and distribution in J4 Mat/DG Log (the demand side) the link between supply and demand is broken. This inhibits communications and customer responsiveness.

Second, Project Management Offices in capital projects rarely consult with supply chain stakeholders, but their decisions have the same impact on the supply chain, as do the supply managers. Without obtaining warehousing, order processing and distribution costs, decisions to use, or not to use the supply chain are not based on total cost and therefore can end up being sub-optimal to the CF.

Third, in June 2003, in order to reduce the cost of supporting the CF188 fleet DGAEPM staff developed a draft CF188 Concept for Operational Weapons System Management (OWSM).<sup>38</sup> The concept includes the contracting out of a large range of spare part line items for C188 spares to Boeing Ltd. If implemented this would become the third grouping of spares for the CF188 weapons system to be contracted out, CATEF and BLISS being the others. Since the CFSS also still provides support, squadron supply sections would have to deal with a fragmented supply chain consisting of four stovepipes each with their own information technology system, rules, procedures, and customer service contacts. When deployed overseas the challenges of coordinating four pipelines for one weapon system into a theatre of conflict would become even more difficult. Although it would have a direct impact on the efficiency of the CF Supply Chain, the OWSM concept had been developed in isolation without consulting supply chain



stakeholders. Since there is no single organization controlling and coordinating changes to the supply chain no one is in a position to determine the trade-offs between the benefits to DGAEPM of implementing their concept compared to the inefficiencies created in other links of the CF supply chain - in this case increased workload for the squadron supply sections and an underutilized CF warehousing and distribution system.

Gaps in Responsibility: Fragmentation also causes inefficiencies to develop in between the areas of responsibility of different elements within the supply chain. For instance, the Minister of National Defence's Advisory Committee on Administrative Efficiency noted that reducing contractor held spare parts could save \$10 million annually. This inefficiency developed in the gap in responsibility between EPMs and DMMD. In addition the committee identified that there was no visibility of the costs associated with maintaining surplus equipment in a useable state while it is being marketed for sale. In this case the responsibility gap is between ECSs and ADM Mat.<sup>39</sup>

Process Overlaps: The same committee also identified an overlap in the procurement process between DND and PWGSC. Further, it stated the procurement and leasing of information technology and software was often obtained at a higher than necessary cost because of the dilution of spending power due to the overlaps and redundancies among all Level One managers within DND.<sup>40</sup>

As demonstrated, fragmentation makes it difficult to develop and sustain a system wide view of the entire supply chain.<sup>41</sup> Although individuals understand and operate their segment of the supply chain quite well, no one in the CF has a clear understanding of how all the segments fit together or how to optimize the entire supply chain. Further, and very similar to problems

experienced by the USAF, no one has the effective authority to optimize it and no one is held accountable to optimize it.<sup>42</sup> As a result, inefficiencies develop, but no action is taken.

Currently, ADM Mat has delegated the responsibility for coordination of the supply chain to the J4 Mat/Log Division. Although the division may have the responsibility, it is not structured nor does it have sufficient resources, or the authoritative clout to control the inputs into the chain from the other ADM Mat divisions and therefore cannot adequately influence the outputs to the customers. Likewise, it cannot control the performance of ECS units that carry out the movement of assets and information through their respective links in the pipeline. Further, even within the division it has missed an opportunity to increase supply chain integration by segregating materiel management and transportation management into separate directorates, DMMD and DLBM respectively.

When evaluated against the Pigeau/McCann CAR model the problem becomes clearer. J4 Mat/DG Log would be expected to have the competencies and the level of responsibility commensurate with his position as the senior advisor for the supply chain; however, he does not have sufficient authority to influence decisions affecting the supply chain that originate outside his division. Authority in terms of both a clear mandate and performance goals and the power over sufficient resources have not been assigned. According to the CAR model this type of situation could lead to ineffectual command. “Without sufficient authority, a commander is compromised in his position,”<sup>43</sup> or in this case unable to exert effective C2 over the supply chain.

Much of this problem can be attributed to the manner in which NDHQ is structured. Although NDHQ has centralized authority it leaves accountability relatively decentralized. “This

imbalance between authority and accountability appears to be at the heart of the lack of trust in senior leaders and higher headquarters today.”<sup>44</sup>

Further, the matrix style organizational structure at NDHQ has led to decision-making by committee where each stakeholder has the power to delay or veto initiatives that may impact on their area of responsibility. Further, in a matrix organization, which emphasizes the horizontal flow of authority,<sup>45</sup> the lines of authority and responsibility become blurred making it difficult sometimes to resolve conflicts.<sup>46</sup> As observed upon by the Advisory Committee on Administrative Efficiency “accountabilities [including responsibilities and authorities] are too diffuse – with insufficient attention paid to the identification assignment and enforcement of senior management accountabilities and, consequently, defence relies extensively on consensus as a decision making philosophy.”<sup>47</sup> Since the supply chain consists of numerous organizational elements, with differing objectives, it becomes very difficult in a matrix style organization to optimize the whole when it means some of its parts may be sub-optimized. Instead small compromises that accomplish little are agreed to instead of decisions supporting decisive action.

## **SUPPLY CHAIN INITIATIVES**

With the decision in Nov 2002 to not proceed with Phase 2 of the SCP, ADM Mat decided to achieve similar savings from an in house solution called the Materiel Acquisition & Support Optimization Project (MASOP). The aim of MASOP is “... to achieve an integrated cost effective and efficient MA&S process, which supports force generation and sustainment, while focusing on the areas of warehousing, distribution, POL, clothing, ammunition, calibration and quality assurance.”<sup>48</sup>

MASOP has already underway a number of major initiatives. Warehousing and Distribution Optimization proposes to establish a Hub and Spoke distribution system based on materiel flowing through the major depots in Montreal and Edmonton and two smaller depots in Halifax and Esquimault. These sites will act as “Hubs” and all other sites will act as “Spokes”. A two-tier inventory model will be used; wholesale (2<sup>nd</sup> and 3<sup>rd</sup> line) and retail (1<sup>st</sup> line). Trading knowledge and mass for speed, inventory will be consolidated as much as possible in the hubs and then distributed quickly to the spokes. Optimization will be achieved by determining the best trade-off between inventory holding and transportation costs as components of the overall supply chain costs.

In-Bound Transportation Optimization will arrange the transportation for delivery of goods rather than allowing the related shipping costs to be determined by the vendor, who has little incentive to keep them low, and simply included in the cost of procurement. Ammunition optimization will look at repositioning of inventory, reducing handling and distribution by implementing direct delivery from supplier, rationalize maintenance of ammunition and eliminate obsolete stock.<sup>49</sup> Other initiatives for clothing, POL and quality assurance are also underway, however, to date there are no initiatives to address supply chain C2.

MASOP was set up as a separate project partly because DMMD had already identified a plethora of major improvement projects, but lacked the personnel resources to action them fully.<sup>50</sup> MASOP has a large mandate. Not only does it have to fund internally improvements to the supply chain it also needs to achieve approximately \$46 million in savings. Decisions will have to be made to improve the performance of the entire supply chain that may be detrimental to the objectives of individual links within the supply chain. It will entail an unprecedented level of coordination amongst all organizations and a leadership that has the

resources and authority to effect changes. Although resourced adequately with keen and knowledgeable logisticians, MASOP does not have the authority to implement changes without obtaining the permission of all stakeholders. Since personnel cuts and organizational changes will be required from most of the stakeholders, the lack of authoritative power will likely be the biggest challenge for the project to overcome.

Defence Total Asset Visibility (DTAV) is a separate initiative, which will play a key role in improving Log C2. At end state, this capability will provide users with timely and accurate information on the location, movement, status and identity of personnel, equipment and supplies. DTAV is not a COTS product but an environment. The presentation interface that the user sees is supported by five layers; decision support applications, middleware, database administration, data migration, and operational data. Currently, DTAV allows visibility into five subject areas; supply, in-transit, personnel, operations, and vehicles. Development of a sixth area - Performance Measurements - has already begun for AVPOL and Health Services. The system is expanding rapidly in size. It currently has 1600 users and processes over 18000 queries a week. Quality is also improving as DTAV highlights quality control issues for data being fed to DTAV from source systems, i.e. People Soft, CFSSU, FMS, SAP, LOOMIS, NMDS, etc. <sup>51</sup>

## **BENEFITS TO IMPROVING SUPPLY CHAIN C2**

Successful supply chains are based on three objectives: recognizing the war fighters' service level requirements, determining the ideal quantity and optimal location for placing inventories along the supply chain, and developing appropriate policies and procedures for managing the supply chain as a single entity. <sup>52</sup> By improving supply chain C2 an integrated supply chain can be achieved and a number of significant benefits realized.

By reducing cycle time (the total time to complete a process) goods can flow faster along the supply chain reducing the quantities of goods required in warehouses thereby bringing down inventory holding costs (i.e. Dell manufactures more than 50,000 computers a day but carries less than four days inventory),<sup>53</sup> quicker customer response and fulfillment rates are achieved, greater productivity at lower costs, shortened repair times and equipment readiness, and improved flexibility for operational commanders.<sup>54</sup>

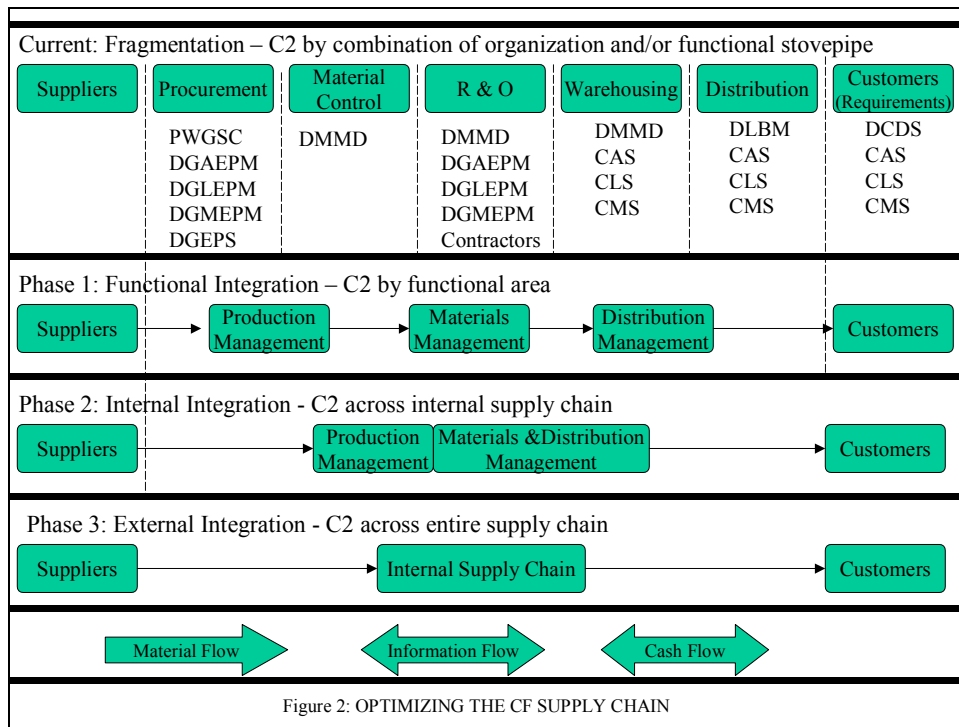
With the implementation of total asset visibility, the timeliness and accuracy of information flow is improved, lowering costs, improving customer service and the quality of the information required for logistical situational awareness. Without this information comm

significant reductions in procurement and operating costs. AMR's supply management strategy allowed it to reduce its supplier base by 59% in 3 years resulting in more than \$250M in savings. Harley Davidson cut its supplier base from 4,000 to 800 and saved \$40M in materials costs.<sup>60</sup>

## **THE WAY AHEAD**                      aaain min m

A good organizational Structure does not by itself produce good performance – just as a good constitution does not guarantee great presidents, or good laws, or a moral society. But a poor organization structure makes good performance impossible12 283.9801 557.16016 TtTn2 08769236023 Tm(a)Tj12 0 0 12 151.92997 4286

strategy would be fundamental to success. Integration could be achieved in three phases as shown in figure 2 below.



The first phase would involve reducing fragmentation by integrating in functional areas, the second phase would be integration across the internal (CF) supply chain and the third phase would be integration across the entire supply chain (to include suppliers). Critical to achieving integrated supply chain management would be the establishment of an organization that has clear lines of authority and responsibility to implement the strategic direction. This would normally involve placing a manager in a superior position relative to supply chain activities and placing the manager's authority on a level in the organization's structure that allows compromise with the other major functional areas of the CF, i.e. DGAEPM, DGMEPM, DGLEPM, DGEPS and ECS equivalents. One alternative would be to amalgamate all non ECS supply chain organizations under a newly appointed DG Supply Chain with the rank of BGen. He would be responsible for developing CF Supply Chain strategy and act as champion of integrated supply chain activities.



This would elevate and structure supply chain management in a manner that promotes activity coordination and provides an equal voice in resolving resource conflicts thereby creating a balance of power. This balance of power would ensure that the performance of the entire supply chain is not sub-optimized to the benefit of a single organization with its own differing objectives. The DG Supply Chain would remain in the J4 Mat/Log Division to ensure active coordination with J4 Log and the support it provides to deployed operations.

The next layer of the organization should be decided on “a balance between minimizing the number of activity groups to encourage coordination while separating them to gain effectiveness in the management of their technical aspects.”<sup>64</sup> A Distribution Network Manager (network design, warehousing, etc.), Inventory Manager (order fulfillment, demand fulfillment, manage inventory), Transportation Manager (administer national contracts and safety program), Supply Chain Policy, Performance Measurements and Audits Manager and an Information Technology Manager would fit this criteria. Further, a Procurement and Acquisition Manager would need to be appointed to coordinate capital project impacts on the supply chain and to control if not actually command supply managers that are located throughout the NICP.

Additional resources beyond those existing in the J4 Mat/Log division would have to be allocated and appropriate authority would have to be given to the DG Supply Chain to carry out his responsibilities particularly in regard to setting performance standards for the CF and enforcing their compliance. This would ensure that the various organizations within the supply chain network are held accountable for their performance and continually work towards optimizing the entire supply chain.

## CONCLUSION

History has shown that commanders who succeeded in war did so because they understood that logistics governs the tempo and power of operations. They knew that to exercise control at the strategic, operational, and tactical levels of war, they must also exercise control over the supply chain. The supply chain provides the food, fuel, munitions and spare parts to the war fighter. Another critical output of the supply chain is logistical situation awareness. To develop a campaign plan Commanders and their staff need to have a good indication on how the supply chain is going to perform - what it can provide and when it can provide it.

The CF Supply Chain is comprised of many segments including the customer, supply sections, depots, procurement directorates, suppliers, to name a few. Severe resource cuts combined with the devolution and decentralization policies of the 1990s have resulted in a fragmented supply chain. C2 of the supply chain is divided amongst many organizations often within the same functional area. These organizations often have competing objectives. Further, many organizations have tried to optimize their performance in isolation and unknowingly at the expense of another link in the supply chain. Poor synchronization, gaps in responsibility and process overlaps have developed.

To overcome the inefficiencies of fragmentation and optimize the performance of the entire supply chain it needs to be managed and controlled in a coherent manner with one strategy under one individual. This does not mean that each link that plays a part in the supply chain needs to be under command, but they do have to be held accountable for working within the framework of policies, controls and goals set up by the champion. A champion is essential - one who can articulate the need for change, develop a plan of action, and defend and secure the additional funding that will be required and then have the authority to implement those changes.

Significant benefits have been obtained in the private sector by integrating the supply chain. The USAF expects similar benefits to accrue from its efforts to integrate its supply chain, including reduced operating and purchasing costs, increased customer satisfaction rates and improved logistical situational awareness for commanders. One model for achieving this is the formation of a DG Supply Chain along with a mandate and clear strategic direction from ECSs, DCDS and ADM Mat. Although other models are certainly viable, the most important step is to vest command and control of the supply chain in a single individual with the resources, responsibility and authority to manage it as an integrated supply chain.

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