FOCUSSED AND DYNAMIC RESPONSE LOGISTICS

J.V. SINGH

The fact that the future is uncertain is no excuse for failing to make adequate preparations. The changing threat requires that logistics be flexible, mobile, integrated, compatible, and precise in targeting support to the point of need.

– USMC Operational Manoeuvre from the Sea
US Marine Corps, Strategic Logistics Plan

Information technology must be leveraged to improve command and control which is key to timely and accurate decisions.

– Global Engagement,
A Vision for the 21st Century Air Force, USAF

Logistics management is the integrated management of the functions required to acquire, store, transport, and maintain the material necessary to support combat forces. The task of the military logistician is to establish the appropriate balance among these functions to achieve the required level of operational support while using the least amount of resources. Future logistics concepts will evolve primarily from recognition of new environments, technologies and processes. The transformation in military logistics and shrinking defence budgets has led to the evolution of what is commonly termed as "focussed logistics". For an operational commander, the basic issue

* Group Captain **J.V. Singh** is a Senior Fellow at the Centre for Air Power Studies, New Delhi.

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is that of responsiveness from his logistics elements. This requirement of responsiveness of a logistics system is intimately related to the study of usage data, planning factors, the "logistics snowball", to flexibility and to "readiness". In a computer-based system, it is possible to integrate all the functions for exercising control at an appropriate level. But, sometimes, individual responsibilities or processes are neither very clear nor well defined. Large and complex organisations such as the armed forces need a rigorous management control system to ensure that each staff element performs its tasks in a manner that provides the troops with all their essential requirements in an economical and more reliable manner.

With the end of the Cold War and the dissolution of the Warsaw Pact and Soviet Union, and, hence, the disappearance of a monolithic threat to Western Europe, there has been an increasing desire to reduce defence spending and divert scarce resources into other public sector services. This increased pressure on the defence budgets has been felt in most countries and more so in democracies such as the US and most of the European countries in the West and closer home in the case of India as well. This has led to a search for ways of making a shrinking budget stretch further. In some ways, the UK Ministry of Defence (MoD) is facing the same challenges as many commercial companies did in the late 1980s and early 1990s with the recession, in their bid to reduce costs in order to maintain profitability. Thus, the Strategic Defence Review (SDR) has generated new initiatives such as "Smart Procurement" and the creation of a Defence Procurement Agency (DPA) and Defence Logistics Organisation (DLO) in order (for some, at the behest of the Treasury) to reduce costs in the procurement and sustainment of the UK's armed forces. This, however, can be seen as important due to the fact that defence inflation has for many years exceeded normal economic inflation, leading to the spiralling cost of new weapon systems. With logistics having become more important as the 20th century has progressed, and particularly since the end of the Cold War, the need for more efficient and effective logistics is becoming paramount,

as it is seen as both a "competitive advantage" and a "force enabler". In our case also, based on the Arun Singh Committee report and the recommendations of the Group of Ministers, the defence procurement organisation consisting of the Defence Acquisition Council (DAC), Defence Procurement Board (DPB), Defence Production Board (DPB), Defence R & D Board and Acquisition Wing has been created.

Logistics operations of the future will operate under an integrated, flexible, and seamless system from the vendor to the battlefield, which will govern logistics decisions and operational strategy.

"Focussed Logistics" is the latest term to enter usage in the US and this paper will examine how different it is from what has gone before, and whether it is applicable to some of the operational challenges that the armed forces might face in the near future. In addition, logistics operations of the future will operate under an integrated, flexible, and seamless system from the vendor to the battlefield, which will govern logistics decisions and operational strategy in a system called Dynamic Response Logistics**.** The model discussed in this paper is primarily derived from the US armed forces vision and experience.[1] However, it is now equally relevant to most of the modern armed forces including India's, as we are evolving to gain a regional role and even beyond that in today's ever shrinking boundaries.

FOCUSSED LOGISTICS

Focussed, joint and combined logistics comprises one of the four pillars of the US Joint Vision 2010, which demands that logistics support and systems "enable joint forces of the future to be more mobile, versatile, and projectable from anywhere in the world." Professor Milan Vego of the Naval War College recently observed, "Logistics is a critical element of combat power that assumes even greater importance at the operational level. It is realised that joint integration of logistics is crucial to unity of effort and the concept of joint logistics cannot be fully realised until accountability and acquisition

1. Department of Defence, US Army Home Page, Army Vision 2010 and related documents.

procedures are completely integrated." An in-depth study of combined operations conducted during the Cold War concluded, "Logistics procedures must be standardised and harmonised to provide flexibility between nations."

Clearly, several factors are fostering the change to current logistics operational doctrine. The large, cumbersome forces of the Cold War are being replaced by smaller, more agile, and more lethal forces that require a modern logistics infrastructure that can provide efficient and effective support. The current and foreseeable resource environment will continue to be constrained, with all of forces being required to do more with less. Technological advances of the information age are providing excellent opportunities for increasing productivity and efficiency. The possibilities for improving operational logistics structure are limited only by the imagination.

If the aforestated recommendations are accepted, then the US will have a real-time, web-based information system providing total asset visibility. It will provide military capability by ensuring delivery of the right equipment, supplies and personnel, in the right quantities, to the right place, at the right time to support operational objectives. The *Focussed Logistics Roadmap* charts the course for gaining full spectrum supportability across the range of possible missions envisioned in the US Joint Vision 2010.[2] It leverages the key enablers of technology innovation and information superiority in linking with the other operational concepts of dominant manoeuvre, precision engagement, and full dimensional protection. Together, these concepts for future joint operations represent an integrated approach to achieving full spectrum dominance in joint war-fighting. The purpose of this roadmap is to outline key joint initiatives that will lead to the desired future logistics capability. It describes *six tenets* of focussed logistics to emphasise a systematic, relational approach in developing full spectrum supportability. These tenets are the framework for designing a logistics template in joint war-fighting, joint theatre logistics, joint deployment/rapid distribution, information fusion, multinational

2. R.A. Kallock, "Glimpse of the Future; Joint Vision 2010", Presented at the RUSI Focussed Logistics Conference, London, January 18-19, 1999.

logistics, joint health services support and agile infrastructure.

Given the scope of this effort, the *Focussed Logistics Roadmap* is being developed in phases. The Phase I roadmap targets initiatives that are rooted in current realities, but directly tied to enhanced future capabilities. The emphasis is on resolving near to long-term deficiencies identified by the Unified Commands and Services. Through Phase I, the US will establish the capabilities required to achieve the 2010 focussed logistics vision and provide the war-fighter both the capability and confidence required to effectively and efficiently succeed on the 2010 battlefield. In Phase II, the US will continue to refine their vision and include updates of the capabilities via electronic access to the *Focussed Logistics Roadmap*. The Phase II roadmap will enhance the direct linkage to the other operational concepts of the Joint Vision 2010 as they evolve. As such, the roadmap will remain a "living document" to serve in guiding efforts for addressing the broad range of logistics challenges in future joint operations.

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In the foreseeable future, the US will continue to be faced with the daunting task of committing forces on short notice to potentially hostile environments of unknown duration. Unlike in Operation Desert Shield/Storm, it will not have the lead-time necessary to develop the "traditional" logistics infrastructure. The political leaders will come under continuing pressure to decrease defence expenditures through downsizing yet maintain high states of readiness. Force structure, particularly logistics force structure, will come under close scrutiny in an attempt to generate cost savings/avoidances. Future military operations are likely to find a great many logistics functions privatised or outsourced. The contribution of the reserve component will be an important part of the national military strategy. Joint Vision 2010 (JV2010) prescribes an operational template for dealing with this dynamic environment. It describes focussed

logistics as the fusion of logistics information and transportation technologies for rapid crisis response deployment and sustainment, the ability to track and shift units, equipment, and supplies even while en route, and delivery of tailored logistics packages and sustainment directly to the war-fighter. The goals of focussed logistics can be achieved by concentrating energies on innovative and efficient processes and products. Focussed logistics will require logisticians to more fully examine the big picture (joint and combined operations) while maintaining functional and/or service stovepipes as the other concepts of JV2010 are developed. JV2010 highlights "six critical considerations" as being essential to the armed forces reaching the next level of jointness namely, doctrine, organisations, training, material, leadership and people. These same considerations need to be taken into account in pursuit of focussed logistics. Failure to simultaneously address each of these key elements is a prescription for failure. Processes such as the Joint Monthly Readiness Review (JMRR)/Joint War-fighting Capability Assessment (JWCA) and contingency lessons learned are be factored into the efforts to achieve the goals. At the intersection of the tenets of focussed logistics and the six critical considerations are the various initiatives needed to achieve the focussed logistics vision. There is a host of possible interpretations of focussed logistics, but each has a common frame of reference, the imperative of technological advantage, the need for faster, more reliable and integrated logistics systems; and instilling "confidence" in the war-fighter that critical supplies will be in the right place, at the right time, and in the right quantity. Logisticians must now demonstrate the capability to tailor forces and resources by both expanding and contracting as the nature of the threats changes from large scale Major Theatre War (MTW) to Smaller Scale Contingencies (SSCs). Effective execution of these missions requires an adaptive, responsive and reliable logistics system to make it happen. Logistics systems envisioned by focussed logistics will include refined techniques for ensuring combat readiness and sustainment. The goal is "full spectrum support" from deployment to redeployment, reconstitution or forward deployment, enhancing both combat effectiveness and the quality of life of US forces. Logistics organisational structures will

be streamlined to right size the logistics footprint and make genuine progress in such vital areas as logistics command and control and theatre distribution. The days of multiple requisitioning of an item in the hopes that at least one will arrive when needed will become a thing of the past. The logistics footprint of the future will be a more precise balance between "just in case" and "just in time" with a goal of "just enough." Developments in Automatic Identification Technology (AIT) integrated into the Automated Information Systems (AIS) and interface with industry will enhance automated tracking of assets throughout the world. A rapid air, sea, and land transportation system will enable reduction in Logistics Response Time (LRT) and lead to a streamlined effective, efficient, and economical logistics system. Goals of this magnitude will require a clear understanding and synchronisation of a high-level strategy process. Information fusion and transportation technology will enable the war-fighter to replace mass with velocity and to have the confidence needed to make it work. The focussed logistics vision calls for improved support to the war-fighter through increased responsiveness, visibility and accessibility of logistics resources. The desired end state is full spectrum supportability to the war-fighter from a source of supply to a point of need, whether that be a foxhole, cockpit, deck plate, or base, while maximising the benefits to be gained from information superiority and technological innovation. To achieve that end, the *Focussed Logistics Roadmap* draws from the Office of the Secretary of Defence (OSD), Services, Unified Commands, and Combat Support Agency (CSA) strategic logistics plans. The *Focussed Logistics Roadmap* is an integral part of high-level strategy. Focussed logistics programmes have become high-profile issues within the Chairman's Programme Recommendations/Chairman's Programme Assessment (CPR/

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CPA). The CPR/CPA feeds the Defence Planning Guidance (DPG), which, in turn, provides the Programme Objective Memorandum (POM) guidelines for the National Military Strategy (NMS).JV2010, and the Quadrennial Defence Review (QDR) served as the overarching structure for developing the *Focussed Logistics Roadmap* while the JWCA, JMRR, Commander-in-Chief (CINC), and Integrated Priority List (IPLs) provide the baseline issues. Understanding the relationships and interactions involved in the development of these products is key to understanding the role of the roadmap in the overall scheme. These processes and programme, along with strategic guidance provided by JV2010, provide a unique opportunity for logisticians to have significant influence on defence issues at the highest levels. As they migrate from strategic concerns to operational ones, attention turns to the enablers of JV2010, namely, information superiority and technology.

What is Focussed Logistics?

As the 21st century dawns, the rate of change in technological progress is, compared to earlier times, astonishing. With this change, mankind is potentially facing a revolution in Information Technology (IT), which will be equal to, if not greater than, the agrarian and industrial revolutions of previous centuries. With this technological change, allied with the end of the Cold War and the seeming necessity to be able to intervene effectively far away from the home base, attitudes to war are changing, along with the approach to business. In many ways, the two are converging, as the military tries to take on board some of the 'best' practices of the business and commercial world, as both are faced with significant alterations in political and economic structures, geo-political balance, technological progress and perceptions of the 'threat'.

The term "Focussed Logistics" originates with the US armed forces and is defined as "the fusion of information, logistics and transportation technologies to provide rapid crisis response, to track and shift assets even while en route, and to deliver tailored logistics packages and sustainment at the strategic, operational and tactical level of operations" (Department of Defence, 1999). The key elements here are the embracing of emerging technologies

(particularly IT), transportation techniques, business methods of asset control and the concept of 'tailoring'.

There are a few authors who suggest that focussed logistics is what in civil parlance is termed as lean and six sigma logistics. To understand the similarity and dissimilarity between the two seemingly synonymous terms, it would be prudent to first look at what lean logistics is as such.

What is Logistics?

There are as many definitions of "logistics" as there are logisticians. This is not a bad thing. Logistics is so far reaching, so integrated into businesses that it is hard for one definition to ever meet the challenge of summing up what we do in a few short sentences. Although logistics does span the entire scope of any business, it is fair to say that any definition of logistics will need to involve the management of inventory. Whether inventory is in the form of hard goods (materials-people) or soft goods (information), logisticians manage it.

What is Lean?

Lean logistics concepts are deeply rooted inside the lean manufacturing of the Toyota Production System. Jim Womack summarises the key principles of the Toyota Production System as Lean Manufacturing in his book *Lean Thinking*. Lean Manufacturing has now been abbreviated to simply being called "Lean". Lean and Six Sigma joined forces in Michael George's book *Lean Six Sigma*.

In its purest form, lean is about the elimination of waste and the increase of speed and flow. Although this may be over-simplification, the ultimate objective of lean is to eliminate waste from all processes. At the top of the list of known wastes, according to the lean theory, is the elimination of inventory. More simply, any inventory should be eliminated that is not required to support operations and the immediate need of the customer.

Lean Logistics Understanding

Supply chain management was designed to take waste out of supply chains – waste as to excess inventory, time and cost. Supply chains are meant to

pull, not push, inventory through the supply chain. This is exactly what lean logistics is also about: removing waste and variation from supply chains; it is what pull is about with lean logistics. Wholesalers, manufacturers, retailers, distributors, suppliers, 3PLs and every party involved in the supply chain feels the pressure to reduce, and balance cost, time and inventory to be lean. This is true with domestic supply chains; but it is especially true with global supply chains.

Articles titled "Japanese Automakers Taking Market Share From Big Three" or similar titles are misleading. The title would lead the average reader to think that the "Japanese" as a culture somehow have a secret that is allowing them to take over the automobile industry. However, many in the automotive industry are aware of two critical points. The first is that it is not the "Japanese" who are building the cars that are winning the car wars, as these cars are being built by North Americans in Canada and the United States. The second key point is that it is not the "Japanese" who are reducing manufacturing costs and increasing quality, but rather it is the "lean manufacturers". With all of this in mind then, the newspaper article should headline "Lean Manufacturers Taking Automobile Market Share Over Mass Producers". This headline would be more appropriate and more accurate.

Lean logistics has many challenges. Global lean logistics especially has the challenge of the additional time required for shipments to move door-to-door over long distances. In addition, there are many parties involved with each shipment. Some reports say that up to seventeen parties can be involved with one shipment: suppliers, truckers, freight forwarders, terminals, customs brokers, railroads, ocean/air carriers and more. Bringing lean across such an extended, multi-transactional supply chain is daunting. Often, the parties are working together and at odds with each purchase order/shipping transaction.

As the competitive environment changes the way companies do business, companies are embracing lean and six sigma initiatives to support cost reductions and quality improvements. Although lean and six sigma

programmes were initially separate initiatives in most organisations, today's firms see that lean and six sigma do not compete with each other, but rather the two complement each other and provide for dovetailing of continuous improvement activities.

But what does this have to do with logistics. The quick answer is "everything." Once we are grounded in lean and six sigma principles, the logistician will realise that logistics, lean and six sigma form a natural union. This union leverages the strengths and weaknesses of each discipline to create a cultural and operational model that will aid the logistician to solve age-old issues, while improving operations at all levels. To truly understand lean and six sigma logistics, the best place to start is to learn about the logistics, lean and six sigma.

Lean and the Logistician

The impact of lean on the logistician is significant, as the goal of lean is to eliminate waste (inventory) which will decrease work in process inventories which, in turn, will decrease process and cycle times and ultimately increase supply chain velocity and flow. Lean also has a vital cultural element to it that is crucial to the logistician. This is the concept of "Total Cost." The lean practitioner does not focus on individual cost factors such as transportation or warehousing, but rather on "total cost of ownership". With inventory carrying costs representing 15-40 per cent of total logistics costs for many industries, making decisions based on total cost has dramatic implications for the logistician. Unfortunately, though, many organisations never fully embrace total cost concepts, as poor decisions are continually made based on traditionally visible cost drivers like transportation, warehousing and ill-fated sourcing practices.

Six Sigma

Six sigma is a management methodology that attempts to understand and eliminate the negative effects of variation in our processes. Based on an infrastructure of trained professionals (Black Belts), six sigma delivers a

problem-solving model armed with the voice of the customer utilities and statistical process control tools. The DMAIC (Define-Measure-Analyse-Improve-Control) process is a map, or step-by-step approach, to understand and improve upon organisational challenges to reduce variation in processes and attempt to achieve "Six Sigma Quality".

At the heart of six sigma is the principle of variation reduction. Essentially, the theory is that if we can understand and reduce variation in our processes, then we can implement improvement initiatives that will centre the process and ensure accuracy and reliability of the process around customer expectations. For example, if the purchase order-delivery cycle required for your supplier in China is 60 days, and you are averaging 60 days, then you may think all is fine. However, your average of 60 days may reflect the fact that some orders arrive in 45 days and others are delivered in 75 days. It is this variation that results in expedited transportation, out of stock and all the evils of non-confidence result, the worst of which is inventory build-up.

Six Sigma and the Logistician

The concept of variation reduction is paramount to the logistician. As stated above, logistics is about managing inventory. And managing inventory is about managing variation, a driver in both the amount of inventory carried and in stock-out potential. Given the basic types of inventory, variation plays a vital role in how inventories are managed at all levels.

For example, safety and buffer stock are inventories needed to hedge against unknowns. These unknowns really represent variation. Safety stocks are maintained because of variation with supplier quality, transportation reliability, internal operations process capability and customer demand patterns. If variation from supplier to customer can be understood and controlled, then firms will be able to dramatically reduce reliance on safety and buffer stocks. Implicit in this is the seeming addiction that business seems to have to inventory.

Lean Six Sigma Logistics

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Now that the three elements of lean six sigma logistics have been presented, they need to be put together to fully appreciate how they dovetail and complement each other. Remember, logistics is about managing inventory, lean is about speed, flow and the elimination of waste inventory, six sigma is about understanding and reducing variation. Therefore, lean six sigma logistics can be defined as: the elimination of unnecessary inventories through disciplined efforts to understand and reduce variation, while increasing speed and flow in the supply chain. Put this into the global supply chain and the impact can be significant to retailers, wholesalers, distributors, manufacturers and suppliers. Logistics service providers need to understand this too and their impact on reducing waste and controlling variance.

Getting Started

Both lean and six sigma bring disciplines and tools to logistics. Using these disciplines and tools will allow an organisation to uncover and deal with waste (inventory) and gross inefficiencies. Although the tools are very powerful from both lean and six sigma, companies should remember that for lean and six sigma to work in logistics, a fundamental mind shift must occur. This mind shift requires that firms begin making decisions based on the concept of "Total Logistics Costs" and, second, they must have the courage to eliminate inventories that are unnecessary. This may sound simple, but reality will prove otherwise. Organisational norms and financial accounting traditions will fight against "Total Cost" and the addiction to inventory will make it difficult to reduce inventory levels.

All in the international supply chain must practice lean logistics in order to obtain dramatic, significant improvements. Waste must be identified and removed. Variation must be identified and removed.

"Focussed logistics" seeks to reduce the logistics footprint, that is, to reduce the amount of equipment and consumables that the MoD needs to store and that commanders need to take on operations.

Focussed Logistics: Evolution or Revolution

Is "focussed logistics" a new concept or an evolution from present ideas? Is it a military version of "Lean Logistics"? Lean logistics has five principles: specify value, identify its stream, make it flow, pull just in time and strive for perfection. [3]Additionally, the objective of integrating information, logistics and distribution systems is also known as "supply chain logistics". This includes "the functions of purchasing, transportation, inventory control, materials handling, manufacturing, distribution and related systems. Its primary focus is the physical flows and storage of materials and the system flows of related information."[4] It seems that "focussed logistics" is similar to "lean logistics" in many ways, but it can be argued that it is not exactly the same. Where they differ is the intention to adopt the principles of "lean logistics" in the military environment. The military have a requirement for their supply chain to be as flexible as possible given the uncertain environment they now face. In essence, they are seeking a leaner supply chain, which can support forces anywhere in the world, at short notice.

However, given that the overriding imperative seems to be that of reducing costs, the need to have a more efficient supply chain must be seen in that light. Ultimately, if revisions in the supply chain are going to be costly, then despite the military benefit, governments are unlikely to give the go-ahead as the objective for them is the reduction of defence spending. Even if the go-ahead is given, is "focussed logistics" achievable? Is it possible to utilise a leaner, more responsive supply chain tailored for the operational environment (whatever that may be)?

3. David Taylor "Supply Chain Improvement: The Lean Approach", Logistics Focus, Corby, January 1999.

4. J.J. Coyle, E.J. Bardy, C.J. Langley, *The Management of Business Logistics* (West Publishing Company, 1992), p. 9.

The Lean Supply Chain

"Focussed logistics" seeks to reduce the logistics footprint, that is, to reduce the amount of equipment and consumables that the MoD needs to store and that commanders need to take on operations. This could be undertaken either by better predicting the rate at which resources are used, which would enable the defence industry to better gear their rate of production within the supply chain to match the usage of the 'customer'. Therefore, the current philosophy of "just in case" (where equipment and supplies are stockpiled to cover as many eventualities as possible) would have to be replaced by a "just in time" one.[5] However, it may be that commercial just in time is too risky in an operational environment, and that the MoD will move towards a compromise position of "just enough", which should reduce inventory and make the supply chain more efficient.

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The second method would be to build a greater level of reliability into systems in order to reduce the maintenance burden. By reducing the amount of maintenance needed, it logically follows that the amount of spare parts that have to be moved through the supply chain can, thus, be reduced. Correspondingly, the number of faulty parts moving back up the chain is reduced as well. As an example, during the Gulf War, the Challenger 1 main battle tank was found initially to have a poor mean time before failure rate, of around 723 km, instead of the planning figure of 1,235 km.[6] Thus, as the Challenger was substantially less reliable than anticipated, far more spares had to be moved down the supply chain, more man hours of work had to be put in to fix the problems, and more faulty parts had to move back up the supply chain.

5. P.G. Kaminski, "The Revolution in Defence Logistics," Prepared Remarks to the 12th National Logistics Symposium and Exhibition, Alexandria, Va, October 1995.

6. David Moore, M. Bradford, Jeffrey P. Antill, D. Peter, *Learning From Past Defence Logistics Experience*: *Is What Is Past Prologue*? Whitehall Paper No .52, Royal United Services Institute , p.57.

By reducing the amount of inventory held in the combat area, reducing the throughput in the supply chain, and having a greater visibility in the supply chain, it would be possible to reduce the logistics infrastructure. Less inventory requires fewer people to maintain it and less space to store it, as well as fewer troops to guard it in the theatre of operations. Fewer consumables will mean fewer personnel and less transport assets will be needed to move these items (which, in turn, will mean fewer consumables will be required to keep those assets running) but it is important that the right material be loaded on the correct transport, at the correct time and place. The concept of tailoring resources is an important one and will be vital if a leaner supply chain is to be set up.

Focussed Logistics: The Advantages

The setting up of a "focussed logistics" system could have several advantages:

- The availability of global real-time logistics information for all those who need it (as in the United States discount chain "Wal-Mart" model). Automatic identification technology (bar codes, optical memory cards, radio frequency tags, etc.) will enhance worldwide asset tracking.
- Electronic commerce systems would allow on-line ordering and payment.
- Logistics will be centred around speed instead of mass, relying on rapid transportation systems on both land and sea, as well as in the air.
- Integrated distribution systems (supply chain integration) should improve response times, accurate delivery scheduling and forward delivery.
- The enhancement of civil-military integration should mean that the military capitalises on best business practices. Commercial lift can be used and brought onto the battlefield as a part of the force, as happened in the Gulf War. The contracting of civilian firms to provide a broad range of logistics services can be viewed as a potential force multiplier, especially in peace-keeping or humanitarian situations in countries that have little infrastructure.

- The accurate identification of future logistics requirements should allow industrial base planning, allow the MoD to target investment in critical material the supply of which in times of war is too uncertain or lead times too great.
- Logistics supply planning tools would allow real-time awareness of unit and weapon system readiness, enabling the logistician to be 'proactive' and using a 'pull' supply chain. The redesign of unit organisation should allow it to have a smaller logistics 'footprint' and act as a broker of information and integrator of supplies and services.
- Personnel should receive additional training in the use of IT and its acquisition.
- It would enhance overall acquisition reform, such as the move to the paperless contracting procedure, electronic commerce, the growth of civil military integration and the use of life-cycle management.

Overall, "focussed logistics" is designed to reduce response times and costs, produce a more agile infrastructure, and improve quality and readiness. This "faster, better and best value" support is arrived at by first identifying and then concentrating on the key elements of the logistics system, and substitutes speed of response for large "just in case" inventories. The real question is whether "focussed logistics" can actually be made to work in an operational environment, or whether it is merely a buzzword for an inappropriate business philosophy shoehorned into a military context. There is a danger of being seduced by the theory of cost saving and efficiency building implementing "focussed logistics" and then cutting overall logistics capability (or in classic British government parlance, "improving the tooth-to-tail ratio"). The Falklands campaign reminded the MoD that the "need to get the logistics right determined the ability of a formation to conduct its operations".[7] The Gulf War could have been a good opportunity to test many of the concepts

7. Maj M.W. Proffley, "The Logistics Lessons from the Falklands Campaign and Their Relevance to Future British Army Operations, Within Defence Role 3", MA (Mil Studies) , Dissertation, September 1994, p. 16.

The immense power of emerging technology (which continues to advance at a rapid rate) has created its own myths, and produced a myopia in which technology and automation is the panacea for all situations.

now grouped under the banner of "focussed logistics" but the Coalition instead chose to build up a logistic "insurance policy". Why was this apparent lack of trust exhibited when the crunch came?

Focussed Logistics: The Disadvantages

The difficulty for the armed forces is knowing what they want and need as well as finding out what is "just enough" in order to accomplish the goals set for them. Allied to this are the possible disadvantages with "focussed logistics":

- A possible over-reliance on technology, where "a soldier who is a true information warrior may be so fascinated by what he is seeing on his laptop, that he fails to notice that his virtual battlespace is about to be violated by a real warrior with a machete who has crept up behind him."[8] The immense power of emerging technology (which continues to advance at a rapid rate) has created its own myths, and produced a myopia in which technology and automation is the panacea for all situations. As the US Deputy Undersecretary of Defence (Logistics) has said, "Information and technological advances will revolutionise warfare."[9] There is very little in the concept of "focussed logistics" that makes imaginary use of such advances.
- While many factors in the post-Cold War world have created a drive for new ideas (low threat perception and financial pressure among them) we should not "make the mistake of equating reception of concept and volume of debating noise with strategic truth." Purely basing a paradigm shift on upcoming technology (and, hence, changing the fundamental structure of our armed forces) without any true regard or appraisal as to

8. Colin S. Gray, "The Revolution in Military Affairs" in *The Nature of Future Conflict: Implications for the Force Development*, SCSI Occasional Paper 36, September 1998.

9. Kallock, n.2.

the nature of future opponents has its own dangers. Even if we make our logistics cleverer, we have not altered the conditions in which they will be tested. Technology has many advantages, but in many areas in the world, "the ultimate determinant in war is the man on the scene with a gun."[10]

- Future warfare is increasingly seen as being dominated by coalition or international cooperation. "We take it as a 'given' that the future battle space will be joint and multinational." [11] True integration between nations will be very difficult given the disparity between the budgets and size of armed forces.
- Not only is there disparity between frontline forces, but also in strategic lift. The UK has just over 60 Hercules transports and a few surface ships. The USA used some 350 transport aircraft in the Gulf War. It is capability differences such as these that raise questions about full integration. Asset tracking depends on an uninterrupted stream and a capability mismatch anywhere along the line, could prove dangerous. [12] Modern deep battle doctrine stresses the need to strike at the enemy's rear areas, where he is vulnerable and his supply system is located. If we are fighting a reasonable competent and technologically sophisticated opponent (given that we are conducting deep battle) then we can assume that he will be looking to do the same to us, that is, dislocate our fighting forces from our supply line. "Focussed logistics" has not addressed the issue of its own vulnerability to enemy action. Even an asymmetric opponent will be out to try and make sure that "just in time" becomes "just too late".
- Transportation is another central tenet of "focussed logistics". Many of the current transport methods use sophisticated technology and are thus open to exploitation. The balance between "just in time" and "just in case" as indicated by Paul Kaminski seems to rely heavily on delivery rather than storage. It requires "the substitution of fast transportation for logistics

10. Rear Admiral J. C. Wylie in Gray, n. 8.

11. Col Dick Applegate, "Towards the Future Army" in *The Nature of Future Conflict: Implications for Force Development*, SCSI Occasional Paper 36, September 1998.

12. John Campbell, I"S/IT and Organisations," Lecture to MDAI3, RMCS, March 22, 1999.

Commercial organisations are unlikely to want, or be able to leave production capacity unutilised whilst awaiting MoD requirements.

infrastructure" (Kaminski), which focusses on actual customer requirements when those requirements arise. Transportation assets are vulnerable, not only to a sophisticated opponent employing deep battle, but also to a well placed insurgent. Ships, planes, trucks and trains however mobile, are soft targets, while supplies carried with the forces are protected inside their own battlespace.

- There are risks in becoming too dependent on corporate outsourcing in that the military may cease to be an 'intelligent customer'.
- Is one of the true drivers behind "focussed logistics" that of cost? While cost and value have a legitimate place in all defence policy calculations, it is dangerous to dress them up as military advantages. "Cost was the ever present limitation. Before Hitler came to power, there seemed very little prospect of the British Army being called upon to fight a (European) land battle. Theorists spoke of the 'expanding torrent' in which armored forces, with close air support, would make deep penetrations through fortified fronts. Such expensive ideas were far too Napoleonic for an army mainly concerned with putting down riots in the colonies."
- If 'tailoring' is a cost cutting exercise, then it should be acknowledged as such and adapted to. Cutting the cloth to produce a more elegant fit is valid, stretching it until the seams go, is not. User confidence in "focussed logistics" will be essential, and cost-cutting is a great disincentive to the acceptance of innovation, particularly if it is dressed up to be something it is not.

The Tailored Supply Chain

Whatever happens in the way of moving the supply chain towards a more "just in time" approach, the MoD must match the logistic capability with its war-fighting capability. This is actually pretty diverse, with high intensity conventional warfare at one extreme and peace-time training at the other, and many other types of conflict in-between. The logistics requirements of these

two scenarios are quite different, and for the UK's armed forces to be an effective tool in foreign and defence policy, it may seem that the best solution would be to have a system that could cope with the worst case scenario – a conventional war. But that may incur additional costs in peace-time, with significant capability going unused.

Financial pressure may mean the increased outsourcing of certain services such as the maintenance of equipment, to a greater extent than happens now.

It would, thus, appear that the concept of "focussed logistics", advocating as it does the tailoring of the supply chain to the operational need, provides the answer. In peace-time, the assets and resources that the military needs will be quite small. But as they begin to move along the spectrum of conflict, more assets and resources could be allocated to meet the increasing requirement. This, however, may not only have implications for the production capacity within the supply chain, but for the relationships between customers and suppliers.

Firstly, there will be implications for the supply of material to formations on the ground that are at the end of the supply chain. Because of the rising costs of running and maintaining equipment, coupled with the high costs of certain consumables (such as ammunition, missiles and torpedoes), there is a move towards a greater reliance on simulation to cover the needs of peace-time training. If this is combined with the concepts of lean supply management, that is, keeping the minimal amount of inventory and producing goods as and when required, it is possible that the production of such goods will be small or even zero in peace-time, with the intention to gear up or even restart production if necessary. The problem, however, is that commercial organisations are unlikely to want, or be able to leave production capacity unutilised whilst awaiting MoD requirements. Chances are they will want to employ these resources, satisfying other customers, and are unlikely to divert these resources back to the MoD if it adversely affects other commercial relationships. In order to guarantee supply, it might have to purchase production capacity that lies dormant, and that could be expensive.

Secondly, financial pressure may mean the increased outsourcing of certain services such as the maintenance of equipment, to a greater extent than happens now. This may also become more commonplace as systems become more complicated and the MoD has to rely on the system's producers to maintain their product in service. While in a peace-time role, this may not present a problem, the MoD has to prepare to engage in, if need be, other operational deployments, up to, and including, high intensity conventional warfare. How the MoD satisfies this need, either by having civilian contractors or sponsored reserves is not the question. What matters is that the operational commander can be guaranteed their participation, particularly where it is a foreign company, whose government does not support the actions of the UK. Of course, the same problems could recur with regard to the tailoring of the transportation needs of the supply chain. Transport assets need to be earmarked and contracts placed, to acquire the necessary resources as the MoD's needs expand and contract according to the situation. This principle isn't new, but the SDR identified a number of flaws in the system, as did the National Audit Office (NAO) report regarding the contractoring of sealift for Operation Granby (NAO, 1993). These flaws would have an impact on one of the central tenets of "focussed logistics" – that of rapid response.

Automatic Identification Technology (AIT)

AIT ensures the capturing of current and accurate source data for existing and future Service, Agency and CINC Automated Information Systems (AIS). AIT devices include bar codes for individual items, optical memory cards for multipacks and containers, radio frequency tags for containers and pallets, and a movement tracking capability using satellite links for convoys, trains, and barges. A joint AIT implementation strategy is being developed, including use of standard data formats/media. This will maximise the efficiency of technology options while ensuring effective support of the CINCs' asset visibility requirements. The next requirement is to see, then use the data. Two key initiatives in this area are Joint Total Asset Visibility (JTAV) and In Transit Visibility (ITV).

Joint Total Asset Visibility (JTAV)

JTAV is the capability to provide users with timely and accurate information on the location, movement, status, and identity of units, personnel, equipment, and supplies. It also includes the capability to act upon that information to improve overall performance of the DoD's logistics practices. JTAV includes in-process, in-storage, and in-transit business processes. In process assets are items that are being either repaired or procured. They include items that are in repair at depot-level repair organisations, both organic and commercial; in repair at intermediate-level repair organisations; or on order from the Department of Defence (DoD) vendors and not yet shipped. These assets are categorised as either "due in from maintenance" or "due in from procurement" in DoD inventory management systems. Visibility of items being repaired begins with the turn-in of an unserviceable asset to supply for repair at either an intermediate or depot-level maintenance facility and it ends when the repaired asset is shipped to a customer or placed in storage. For items being procured, visibility begins when an item manager prepares a request to procure an asset and ends when a DoD component representative inspects and issues a receipt for the ordered asset.

Moving to in-storage, material assets encompass all classes of supply, whether categorised as wholesale or retail. For JTAV purposes, visibility of wholesale assets in storage means information on stock balances by condition code and purpose code, while visibility of material requirements means information on reorder points, requisitioning objectives (ROs), and retention limits. Visibility of retail assets consists of stock balances by condition code and assets on order. JTAV implementation focusses on both a global perspective and a near term in-theatre capability based on an operational prototype deployed in support of the Operation Joint Endeavour (OJE). As JTAV evolves, the objective is to minimise duplication of data while optimising visibility of that data within the GCSS vision by any box, by any user, anywhere in the world. The global perspective includes visibility of the increasing focus on direct vendor delivery operations. The JTAV vision also includes full integration with the Joint Personnel Asset Visibility (JPAV) initiative and

comprehensive medical asset visibility initiatives such as the Theatre Medical Information Programme (TMIP). To address ordnance total asset visibility, the DoD established a Corporate Management Information Strategy to develop a common ammunition automated information system. This system, called the Ammunition Management Standard System (AMSS), will provide the war-fighter peace-time and war-time ammunition support. Full implementation of JTAV is completed as targeted by FY99; however, complete implementation will depend upon the Final Operating Capability (FOC) of the Global Transportation Network (GTN), AIT implementation, and systems selection to track assets in process, in storage, and in theatre. JTAV is the foundation upon which DoD-wide asset visibility and accessibility is based. This requires horizontal integration of the supply and transportation activities and one-time data capture. It also requires using automated information systems all the time, every time. Source data can then be electronically positioned. AIT can be used for nodal update and to provide source data in the event of a communications failure. It can also be used for real-time tracking of units. The end state is a seamless information capability that replaces the traditional division of the logistics pipeline into wholesale, retail, and in theatre.

In-Transit Visibility (ITV)

While JTAV includes in-process, in-storage, and in-transit functions, the functional proponent for in-transit visibility is USTRANSCOM. ITV specifically refers to the ability to track the identity, status, and location of DoD unit and non-unit cargo, passengers, and medical patients from origin to the foxhole, during peace, contingencies, and war. As the single manager for the Defence Transportation System (DTS), USTRANSCOM has developed the GTN as its command and control automated information system. GTN provides the automated tool for command and control and business operations of the DTS. ITV is a by-product of USTRANSCOM's operations, and GTN provides ITV for all DoD customers. GTN gathers data from a number of DoD, Services, agencies, and commercial transportation systems to satisfy USTRANSCOM's command and control needs and DoD's ITV needs. GTN will provide the

visibility to improve both movement efficiencies and command and control of the transportation pipeline. One of the key systems to provide information is under development. Transportation Coordinator's Automated Information Management System II (TC-AIMS II). TC-AIMS II was selected as the joint migration system to integrate disparate Service unique, installation level systems. It will provide actual source data on people, equipment, and sustainment throughout the deployment/ redeployment process as well as the day-to-day movement of people and cargo. GTN achieved Initial Operating Capability in March 1997 and Final Operating Capability in January 1999.

Total Asset Visibility

The theatre logistics structure must include the capability to redirect or cross-level critical items of supply from one organisation to another. For maximum efficiency, the senior operational logistics commander must have total asset visibility and control of all available resources and supplies. The existing and proposed logistics systems do not provide a logistics commander with total asset visibility or with the authority he needs to accomplish this cross-levelling task. For example, during the war with Iraq, over 41,000 containers of supplies were delivered to the theatre of operations, and approximately 28,000 of them had to be opened just to determine what they contained. Additionally, if the marine corps in the theatre were short of Ml tank ammunition, it was the joint theatre logistician who had to try to cross-level supplies from an army organisation if possible.

Flexibility and Responsiveness

In times past, there was an assumption in the MoD that transport assets could be obtained from commercial sources if the need was sufficiently great. In the SDR, the MoD announced its intention to purchase four more roll-on/roll-off ships and four large strategic lift aircraft (C-17 or equivalent) (MoD, 1998) in recognition that while resources such as these may be obtainable, given sufficient lead time, the time-frames that the MoD may sometimes have to deal with makes it unlikely that commercial resources would be available. This is another

Environment, technology and process changes have enabled military and business logisticians to significantly increase support while achieving dramatic reductions in total cost.

possible Achilles heel with "focussed logistics".

Of the few definitions that exist of "focussed logistics" none defines rapid response in terms of time-frame. The British Army holds combat units at varying states of readiness, some as little as 24 hours. As a benchmark, however, it anticipates being able to deploy a fully operational brigade in 30 days. Any logistics support for this formation must, therefore, be able to respond in the same time-scale. It is unlikely then, that in a normal situation, civilian production facilities, support assets and transport assets will be available at such short notice unless they remain uncommitted to other ventures and earmarked solely for MoD use, which in all probability will command a premium price. It may, therefore, be more cost-effective in certain situations to rely on military assets rather than civilian ones. If the operation then becomes a prolonged one, the commercial assets could be used in the longer term, thus, releasing military assets to once again be held for short notice contingencies.

DYNAMIC RESPONSE LOGISTICS

Logistics, combined with strategy and tactics, will continue to shape command planning and decisions into the future. Commanders will continue to have "the responsibility to create, to support, and to employ combat forces." Logistics will play a major role in the command of aerospace forces through "the creation and sustained support of weapons and forces to be tactically employed to attain strategic objectives."

A task at hand is to reduce the logistics 'footprint' and decrease the size of the logistics 'tail'. This statement is easy to articulate but challenging to achieve. The paramount goal for the military logistician in 2025 will be to provide a responsive, agile logistics system to support military operations in an effective and efficient, manner (dynamic response logistics). A critical requirement for any logistics system in 2025 will be that it operate similarly in

both war-time and peace-time environments.

Environment, technology and process changes have enabled military and business logisticians to significantly increase support while achieving dramatic reductions in total cost. For example, deregulation of transportation modes in the 1970s and 1980s allowed organisations to achieve higher levels of customer service through the trade-offs of inventory and safety stocks for faster, less expensive, and more reliable transportation. Changes in technology and information management have resulted in logisticians trading "inventory for information" and using more timely information to anticipate customer requirements. Process changes have also significantly affected logistics support by reducing cycle and repair times, reducing non-value-added interfaces and transactions occurring among logistical functions, and more clearly focussing on those activities that provide the greatest value to the customer.

The environment, technology and process innovation will continue to act as the major agents of change within military logistics. The environment will shape logistics practice through changes in air and space missions, resource availability and business logistics practice. Technological changes and improved information management will allow the logistician to bring state-of-the-art decision-making and hardware to bear on logistical problems. Process changes will streamline the flow of material from source of supply to the ultimate customer. The future logistics structure will be dominated by a "pull" process rather than the predominant "push" process in use today.

Changing Environments

By the mid-1990s, changes in the environment in which military logistics operates were already blooming. By 2025, the fruits of these changes will transform the current logistics system into one barely recognisable as a peculiarly military system.[13] The environment has been especially affected by three significant changes. First, the end of the Cold War has impacted the structure of a military force which had for a generation been prepared

13. D. Craig, M. Brant, Lt Col Karen W. Currie, Ph.D, "Dynamics Response Logistics, Changing Environments, Technologies and Progress," a Research Paper presented to the Air Force 2028, p. 5.

for a global struggle against a powerful adversary, including the possibility of widespread nuclear war. Second, commercial business practices have undergone major modifications as companies have focussed on quality, productivity and international competitiveness. Finally, as a subset of business, logistics processes have benefited from greater attention paid to customer service, leaner organisations and strategic alliances. All three areas will influence military logistics in 2025.

Military Changes

With the disappearance of the Soviet Union as the United States' (US) central adversary, scenarios for future wars will likely focus on ethnically and nationalistically based regional conflicts rather than global conflicts, with the possibility of simultaneous regional conflicts. Thus, the US must plan for quicker, more intense and conceivably more lethal wars. The US may find that higher proportions of logistics needs are related to various humanitarian missions, interspersed with brief but intense sessions of supporting battlefield needs.

The US will develop dynamic response logistic support, capable of both rapidly tailoring support packages to particular circumstances and responding with standardised kits for shorter, higher tempo operations. As recent US military operations have shown, there will be more work with, and support from, allies. However, the US must be prepared to muster a force independent of that provided by allies, either from collateral assistance by way of direct support(troops and material) or through indirect support (basing rights).

The growth of the joint responsibilities for many logistics functions – the roles of the Defence Logistics Agency in supply and distribution, the Defence Contract Administration Service in contract administration, and the Defence Finance and Accounting Service for billings and payments – demonstrates an inexorable trend toward a unified and consolidated military logistics system. Only a systems approach to all military logistics operations will achieve organisational harmony and inter-functional integration to work seamlessly across the DoD.

Because logistics support systems will no longer be Service, or even country specific, all US military systems will be supported by a joint logistics system that will also be designed for compatibility with systems operated by allies. Interoperability and interchangeability will be essential not only for major system components, but also for many of the database and information systems used to manage materials.

Integrating operations across distribution channels requires flexibility to switch rapidly from one mode of transportation to another based on availability of transportation and the need for the assets.

Changing Technologies

Technology advances will drive some of the greatest changes to logistics in the future. Technologies, especially in communication and data transmission will change the face of logistics and make possible new organisational structures. New technologies will include many that are already in use in the civilian sector, such as FedEx's ability to monitor the delivery progress at the item level. The changes in this area will be so great as to result in a qualitative difference in the way logistics is applied.

Integrating operations across distribution channels requires flexibility to switch rapidly from one mode of transportation to another based on availability of transportation and the need for the assets. Inventory will be containerised and kept in motion rather than stored in a fixed warehouse. Battlefield support of the future will depend upon both military and commercial transportation built upon a network of standard shipping containers utilising automatic identification technologies and Radio Frequency Identification Devices (RFID), coordinated through electronic commerce and global communication capability.

A. Brathwaite and M. Christopher discuss the need for global logistics and supply chain management strategies, and summarise the central elements of each.[14] They list several factors as critically important to the development of

14. A. Braithwaite, and M. Christopher, " Managing the Global Pipeline ." *The International Journal of the Logistics Management*, vol.2, no. 2 , 1991.

"The management of global logistics is in reality the management of information flows".

global supply chains, including extended supply lead times and uncertain transit times, multiple freight nodes, and opportunities to ship intermediate components for local assembly. The greatest challenge, in their view, is to determine what information is needed for a global supply chain strategy and to use it effectively for planning. According to them "the management of global logistics is in reality the management of information flows".

CONCLUSION

The United States armed forces see "focussed logistics", once fully implemented, as a seamless system where there is total asset visibility to enable logistics to be based on velocity of distribution rather than stockholding. Rapid force projection will be possible thanks to an adequate but small logistic footprint and an "agile supply chain" (Christopher, 1999). The use of commercial best practices, competitive sourcing and partnering, combined with a decreased in-theatre logistics footprint and infrastructure, reduced inventory and reduced numbers of maintenance personnel are all part of the strategy. It will reduce costs, increase flexibility and provide them with the tailored support to take on an enemy anywhere in the world at short notice. It, thus, seems an answer to budgetary prayers. For those who resent paying for war-fighting assets that remain under-utilised in peace-time, "focussed logistics" advocates lean supply and a flexible supply chain that should enable the 'tailoring' of logistics requirements on a case by case basis. Not only would it remove the financial drain of under-utilised assets, but a properly constructed and tested "focussed" supply chain should ensure that the right war-fighting assets are in the right place, at the right time and in the right amount. The MoD has not stated that they will adopt "focussed logistics" as such, and will have to implement a number of changes before they will have the capability to support such a system. The United States has the advantages of having the required funding, economies of scale and readiness to innovate,

which means that they have every chance of pulling this off.

While some operations (such as in the former Yugoslavia) have shown "focussed logistics" at work, it would be inappropriate to draw the conclusion that it can, therefore, work in all scenarios. In large scale conventional operations, the dependence on technology and logistics based on velocity of distribution, may leave the forces involved vulnerable to whether there are enough transport assets available to accomplish the mission, unanticipated weather, capability mismatches with other allies, maintenance problems, enemy interdiction and the 'fog' or 'friction' of war. 'Tailoring' needs to provide the best, and not just the cheapest, if the troops on the ground are going to have confidence in the system. The final shape of the supply chain, whether it is closer to "just in case" or "just in time," must be constructed and tested under the concept of kaizen or the eternal drive for perfection. The system must be constantly tested under conditions as close as possible to what will be found under operational deployment. As such, logistics planning must take into account the huge variety of scenarios that is possible in the post-Cold War world. In the commercial world, the supply chain that works for cars may not work for computers or fresh food, just as high intensity conventional conflict is far removed from many of the operations other than war that we have seen in the past few years. While the exploitation of technology for military advantage has always been an important part of the race to win wars, it should not be sought in isolation. Just as important is an understanding of its best use, the risks, how it can change or not change the operational environment, and how an enemy might respond to its use.

The material acquisition system will change dramatically to meet the needs in the future years. To the extent possible, material will be procured on demand, with direct delivery to the user by the vendor.

The material acquisition system will change dramatically to meet the needs in the future years. To the extent possible, material will be procured on demand, with direct delivery to the user by the vendor. Outside contractors

will be the integral part of the purchasing system and will have direct access to both consumables and repairable demands information. Visibility into projected requirements provided to vendors through long-term contractual relationships will allow vendors to manufacture and distribute components based on projected requirements, current demand history, and repair capability. Furthermore, commercial carriers will project freight movements based on the manufacturer's projected date and DoD need dates. Coordination will entail improved methods of contracting, especially in the use of systems contracting or blanket-order agreements. The trend will be toward fewer suppliers with longer contract periods rather than contracting on a single-order basis. The contracting function of the future will be expedited, requiring much less daily oversight after the establishment of the initial system between the commercial supplier and the DoD. In connection with the increasing reliance on local purchase, bases will procure with blanket contracts negotiated at a wholesale level, thus, avoiding a contracting burden at the local level.

As regards dynamic response logistics, the dynamic relationship among various logistics elements, namely, order processing, warehousing, inventory levels, organic and commercial transportation, organic and commercial repair information systems and weapon system availability will reshape the future structures of the logistics. These dynamic relationships will be formed through a combination of synergy and balancing activities among logistics elements. Logisticians recognise that numerous trade-offs will occur between logistics processes. Rapid transportation allows for frequent inventory replenishment, thereby lowering inventory levels and reducing the need for fewer and smaller warehouses. Precise delivery of information will reduce the uncertainty associated with the inventory and lead to reduction of the safety stocks. Logistics operations of the future will operate under an integrated logistics system, or "supply chain management" which will govern logistics decisions and operations. Logistics decisions in one area will be made with a recognition of their impact on the other areas as well. Increasingly, an awareness of the cost of the logistics trade-offs will impact logistics decision-making, especially in the notion of trading inventory for information. Information is

cheap, while inventory is expensive. The fusion of the wholesale and retail logistics structures will provide for a streamlined flow of goods and equipment and complete supply chain visibility. Logistics will move from the just-in-case system to dynamic response logistics.

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The Indian armed forces are fully in sync with the contemporary trends in the management of military logistics as obtaining in some of the developed Western countries. Our armed forces also are looking at the futuristic trends in logistics management in Vision 2020 and beyond. Whether it is in the ways and means of acquisition and procurement, including life-cycle management concepts, public-private partnerships and long-term support agreements, development of indigenous capabilities, smarter ways of using information technology for managing the entire gamut of military logistics management, the process of transformation is on and is being continuously calibrated and refined. The fact that our armed forces are going in for force modernisation and acquiring cutting edge technology weapons to meet the futuristic threat scenario for both conventional and other than war kind of quick response contingencies makes it incumbent on the logisticians to look for best logistics practices. The creation of the Headquarters Integrated Defence Staff (HQ IDS) under the Chiefs of Staff Committee (COSC) has been able to give the desired thrust toward a joint and integrated approach for logistics management amongst the three Services to meet these contingencies. However, as of now, only a beginning toward this direction has been made. It would need to be more broad-based and consolidated, leaving single Service preferences aside to make it more meaningful. The present approach is more aligned to a threat-based concept as the requirements of the capabilities are aligned to the nature and type of the threats faced by the country, these mostly being territorial in nature. Each Service tends to enlarge its threat perception for a greater share of the budget pie. In a larger context, the nature of the threats facing the country has enlarged

from the primarily territorial threat to a larger level affecting both internal stability and development. In addition, the internal scenarios in which the armed forces of India may be required to operate in the future are also on the increase. There is, thus, a need to create the requisite capabilities to meet such contingencies, backed up by adequate logistics support to launch and sustain the operations The fact is that the changing international scenario and its growing power in both the economic and military fields will propel India into the international limelight in a very short time span. India would soon be required to participate in fulfilling its commitments in the international field. The growing threats facing India are more than just a territorial problem and, therefore, require a far more integrated approach and a very broad range of capabilities. In the internal construct, there is a requirement to consider synergy not only within the armed forces but also the other security agencies which are operating within the country.