The Defense Science Board
1998 Summer Study Task Force

on

DOD LOGISTICS TRANSFORMATION

Volume II
Panel Reports

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FORWARD

This report summarizes the work of the Defense Science Board Summer Study Task Force on DOD Logistics Transformation. The study is comprised of two volumes.

Volume 1 contains a brief Executive Summary, the Task Force briefing charts with facing page text, followed by several appendices. Appendix A contains the Summer Study Terms of Reference. Appendix B lists the members and government advisors to the study. Appendix C is a Glossary of acronyms. Appendix D is a list of the briefings presented to the Task Force and the sub-panels. Volume 1 is the summary of the findings and recommendations of the task Force.

Volume 2 contains the sub-panel's reports of the Task Force. The Task Force examined four major areas in preparation of the final report: Requirements; Deployment; Sustainment; and Technology. Each of these reports summarizes the work of that panel. Panel findings and recommendation in these reports, are those of the panel, and may or may not be incorporated into the final report in Volume 1.

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EXECUTIVE SUMMARY

(Following is the Executive Summary form the Logistics Transformation Summer Study – Volume I)

The 1998 Defense Science Board Logistics Transformation Summer Study was tasked to recommend actions to be taken that achieve "a true transformation – not marginal improvements" to the U.S. military logistics system. The DSB defines a "transformation in military logistics" as "a marked change in the nature and form of the structure and processes that equip, deploy and sustain military operations."

The DOD Logistics Transformation Task Force worked in concert with the DSB's second 1998 summer study, Joint Operations Superiority in the 21st Century, (co-chaired by General Larry Welch, USAF-Ret and Mr. Donald Latham).

The DSB Summer Study on DOD Logistics Transformation emphasizes seven points:

- As concluded in the Joint Operations superiority Summer Study, the principal operational challenge facing the U.S. military in the 21st Century is strengthening and preserving its capability for early, then continuous, application of dominant control effects across the full spectrum of conflict.
- The military logistics system is a critical enabler of deployment, then sustainment, of dominant full spectrum engagement effects.
- Today's U.S. military suffers from a separation of logistics from operations, an organizational principle of long standing, and a reliance on mass, rather than efficiency and certainty, to be effective. As now configured, the logistics system frequently constrains operations and drains scarce resources needed for force modernization.
- Failure to seamlessly blend military logistics with operations will be a showstopper for DOD's planned "Revolution in Military Affairs (RMA)" – a motivation that demands immediate action.
- DOD must recognize that logistics transformation is a "BIG DEAL . . . a VERY BIG DEAL." Continuing to regard logistics as the secondary "tail" to warfighter doctrine, training and armament will have unacceptable consequences in the 21st century battlespace resulting in decreased ability to achieve national security objectives and cost.
- The military logistics system can be reformed. A "Transformed Logistics System" can be responsive to CINC (Joint Task Force Commander) needs, support rapid closure of combat power, permit a smaller footprint – both people and equipment, be more agile, responsive and survivable than today's system, fully integrate business

processes and information systems, be well integrated with industry, and be significantly less expensive.

Transformation of the military logistics system is not held up by knowledge of what to do, not primarily a structural issue, nor is it limited by lack of people, technology or resources. Instead, the most significant barrier to logistics change to meet 21st century needs is the lack of an overall business and information systems architecture focal point – a "champion" (in the Arthurian sense).

The study's findings and recommendations are spelled out in five areas:

- Unified and specified CINCs are unable to perform their Title 10 responsibilities to plan and manage theater logistics. CINCs must be able to "pull" required support from the logistics system.
- DOD's logistics system is fragmented with no end-to-end control, integration, performance measures and accountability. Transformation of logistics business and information systems must be led by a Logistics Systems Architect with power to define and enforce an integrated system.
- Deployment and sustainment methods and equipment must change. Ability to deploy in undeveloped areas and under unfavorable conditions must improve; better use of commercial capability is needed.
- Decreasing logistics demand is a major element of cutting cost and improving flexibility. Force structure and weapons systems and equipment must be upgraded to reduce consumption.
- Logistics vulnerabilities need more attention. Exercises and plans must anticipate and deal with physical and information attacks on the logistics system.

Unified or Specified CINCs are unable to perform their Title 10 responsibilities to plan and mange theater logistics. CINC needs must drive the logistics process. He should have an in-theater logistics component commander to manage all common support / services in theater (peacetime training and war). The logistics component commander must report directly to the theater CINC. DOD should experiment with the JFACC model (task a service component commander).

Today, Services push initial deployment supplies to a theater with little CINC / theater planning and control. Unnecessary materiel clogs the lift and supply pipeline. This, in turn, creates an unnecessary sustainment burden. Combat forces lack confidence in the logistics system to supply their needs and insist on creating vast stockpiles of materiel before commencing operations.

DOD must improve the theater CINC's logistics information tools. These tools must provide dynamic planning / simulation capability, ability to specify

deployment / sustainment packages, do consequence analysis, and be able to change "on-the-fly."

DOD's logistics System is fragmented; it has no end-to-end control, integrated performance and accountability. DOD lacks an overall vision of how to convert its logistics system to the needs of JV2010. A master functional overhaul of today's system is prerequisite to achieving "focused logistics and beyond."

Major corporations (including Caterpillar, Procter and Gamble, DuPont, Cisco, Wal-Mart, FedEx and Boeing) have been able to gain competitive leadership through world class logistics systems. They have re-engineered their business and information systems to support business goals. Commercial experience shows that tools and practices must be developed together.

The SECDEF should designate the DUSD(L) as the DOD Logistics System Architect to define system-wide functional performance and cost goals, lead in integrating logistics practices / supply chain management, develop a functional and technical architecture and execution roadmap, ensure that logistics fully integrates with operations, develop / manage the central implementation / transformation plan through decentralized implementation, and, finally, control funding, establish and monitor performance to the plan for Logistics System Transformation.

The USD(L), working as the Architect, and reporting directly to USD(A&T), would work closely with Service / Agency / CINC logistics leadership and industry logistics management leaders. The Architect should be affirmed by the Chairman, JCS.

The USD(L), as architect, must design a system for logistics based on best commercial practice and military needs using functional specifications, metrics, and warfighter requirements (outcomes). The architecture is envisioned as evolutionary model – one that adapts to operations concepts and requirements. A supporting information tool concept and configuration model, with supporting technical interface standards and domain-peculiar requirements, should be directly tied to the architecture. The system should run in Common Operating Environment (COE) and employ principles of Open Systems for information acquisition and sharing.

Changing how we deploy and sustain is necessary. Only very light forces are deployable in days. Significant land-based combat power depends on PREP0 or ocean shipping (weeks to close). Limited capability of over-the-shore and primitive port techniques and equipment are a major limitation and risk. Deployment planning systems are inflexible and slow; data are often inaccurate and out-of-date. Responsibility for the process is fragmented, with many seams.

This study recommends that DOD:

- Tailor forces to probable lift capabilities; execute Defense Reform Initiative Decisions (DRIDs) to create unified movement system with authority to influence transportation systems acquisition.
- Exploit commercial lift to meet future requirements by using the growth in the civil airlift fleet to support strategic deployment. DOD should enhance CRAF to meet military requirements (such as door width and height, deck height and floor strength), and make CRAF use a key design criterion for land forces equipment.
- Support alternatives to delivery through fixed ports to facilitate operations in undeveloped areas. Support should be given to the Joint Logistics Over the Shore (JLOTS) initiative to create a Sea State 3+ capability. This would yield a 20 percent to 180 percent operating time improvement.

Decreasing logistics demand is key to cutting costs and improving effectiveness. There is a big payoff both in combat response and lower cost for early entry and continuous combat through faster combat forces deployment, smaller footprint in theater and more agile forces. Logistics demand reductions will also reduce the sustainment burden, further compounding demand reduction.

Demand reduction recommendations focus on lighter force structure, low consumption platforms development and other demand reduction techniques:

Force size and weight must reduced (along the lines of the Army After Next (AAN), Smart Ship, and the Air Force Expedition Forces) despite cultural barriers (against unmanned platforms, missiles versus artillery, and traditional crew size, for instance).

Research and development should be directed at "agile force" platforms that require less field support.

- DOD should hold program mangers responsible for Total Owners Cost of both new and legacy platforms.
- Demand reduction should be a significant objective of the JROC / PPBS. DOD should invest to reduce life-cycle costs, improve reliability, maintainability, lower fuel / ammo / power consumption and decrease weight and crew size.
- DOD should competitively source weapons systems and equipment support above the unit level.

Logistics vulnerabilities need more attention. Logistics systems and nodes are particularly inviting targets to adversaries, and ranks with urban environments as a place for exploitation with minimum effort. The spectrum of logistics node threats is very broad and includes both adversary actions and the environment. Adversary actions of concern include IW / EW against logistics communications and data, chem / bio attack on logistics nodes, opposed delivery

(mines, subs) disruption of ports and airfields (both in theater and CONUS). Environment threats include high seas and winds, undeveloped ports and airfields, civil disruption (e.g., refugees), natural disasters, and inadequate civil response (i.e., other agencies).

Considerable attention has been paid to logistics vulnerability since 1990, but much remains to be done. Planning limits the impact of anticipated conventional attacks. The most vulnerable points are airlift takeoff and landing areas, PREPO sites, and civilian infrastructure. Serious vulnerabilities remain for concerted Special Operations Force (SOF) - like attack (on PREPO afloat, DLA Centers, supporting infrastructure and infrastructure). Sophisticated IW / CBW attacks could be devastating to logistics.

To address these concerns, the CJCS should: direct J4 to comprehensively review logistics / PREP0 vulnerability and report results to SECDEF within 9 months; include Red Team assaults against logistics in wargames and simulations for both joint and service exercises; apply the same IW standards to logistics as are in use for other C3I systems; and direct J4 action to assure the logistics-unique aspects of CBW are accounted for in planning.

COST Implication: The cost implications of these recommendations are about a $1 billion to the DOD budget, before logistics savings are counted. Logistics saving implications are approximately $10 Billion.

Issue *Addressed 1996 SS	End-State Cost Savings	Investment	Impact
*1. Strengthen CINC Pull**	**Significant inventory reduction $1-2B**	**Planning tools, Prognostics, etc $150M per year**	**Greatly enhanced theater log support, and responsiveness; reduced footprint**
2. Designate USD(L) as the Logistics Architect *Develop an integrated process and system**	**Potential for: 10-15% direct labor; 15-30% indirect ($3-$6B); 5-15% non-labor ($1-3B)**	**Studies, focused systems, tools, etc- $140 M; Execute systems modem ization within current systems $1.8 B budget**	**Ability to achieve "focused logistics"; true JTF supportability; Platform for continuous modernization; "Truly a national aqset"**
3. Commercial Lift Capabilities	**Avoid future military lift investment**	**$100 M/year**	**Greatly increased lift and reduced need for military lift assets**
*4. Demand Reduction **	**$1-2B /Year**	**R&D, reliability enhancements $500 M / year**	**Faster deployment of combat capability, smaller footprint, more flexibility, less maintenance; reduced lift burden, and military lift investment**

5. Vulnerability	**Opportunity Cost**	**$100 M / year**	**Avoid casualties and loss of assets: reduced risk to military support**

The savings can be achieved and a Transformed Logistics System can be implemented. The SECDEF should consider making Logistics Transformation a Defense Reform Initiative

REQUIREMENTS PANEL REPORT

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I. INTRODUCTION

The DSB Summer Study Panel on "Logistics Transformation" was divided into four sub-panels. Panel 1 was responsible for much the up-front work to lay the environmental foundation for, and stimulate discussion among and between, the other panels. The initial tasks of Panel 1 was to determine what constitutes a "true transformation," set the study's parameters, and look at the future environment. The later tasks of Panel 1 were to address implementation issues and metrics.

After a review of the Terms of Reference (TOR), it was concluded that the following was the appropriate **Definition of a True Transformation:** *Transformation in military logistics is a marked change in the nature and form of the structure and processes that equip, deploy and sustain military operations.* This definition reflects recognition that logistics transformation cannot occur without underlying changes in the way we equip, deploy and sustain the force.

Next step was to establish the Study's parameters and objective. The study objective was set as follows:

> **The 1998 DSB Summer Study on Logistics Transformation will identify and prioritize changes in today's core logistics activities essential to evolving a baseline, no later than 2010, which will support a true *transformation* in military logistics projected to 2025. Guided by the objectives of "faster, better, cheaper", the ultimate test of study recommendations will be effectiveness on the battlefield.**

The Panel also assessed future military, political, cultural, economic, and technological trends, as well **as** the resulting logistics implications.

Panel 1 concluded that there was much that had been identified in past DSB, DOD and Service reports which will help lead to a logistics transformation; likewise, there was also much already being done, though most of it stovepiped within the Services or functionally fragmented. Examples include the Army's Revolution in Military Logistics; the USAF's Lean Logistics, USN's Expeditionary Logistics, the USMC's Precision Logistics and the Focused Logistics initiatives of JV2010. Many significant improvements are being made and, in and of themselves, will have major impacts. But, transformation of military logistics will only occur through a coordinated and integrated Department effort.

Panel 1 believes that the Department needs to focus on logistics reform, approve a systemic approach, give it priority commitment, and then make it happen. We also believe that visibility over "Total Ownership or Life Cycle Costs", as well as the integration of acquisition and operations with logistics, are essential elements of a true transformation in military logistics.

The need for logistics reform becomes more visible when warfare increases in sophistication, speed, and complexity. Changing how we fight causes changes in how we support. The future of DOD logistics is tied to a fundamental tenet — it must remain responsive to the warfighter and to changing military strategies. To meet this challenge — and to enable the mobility, deployability, and sustainability capabilities essential to DOD now, in the future, and to the DOD After Next — the Department must achieve a transformation in military logistics. This transformation must move the DOD logistics system from a supply-based, just in case system to one based on velocity and inventory in motion — a global, distribution-based system that takes maximum advantage of technological breakthroughs, organizational redesign, information technologies, and communications. Technology application and acquisition reform are critical to logistics transformation. For example, increased reliance on industry to complement the DOD's emerging capabilities will require industry to be totally integrated into logistics planning and execution. The high cost and lengthy procurement cycle for many military items emphasize the necessity for more streamlined acquisition processes and partnerships with industry. Innovative application of technology, and ensuring a CINC (customer) pull vs. service push system will be key enablers, leading to a reduction in logistics demand. These issues and others are covered in the DSB study recommendations. Overarching all recommendations, however, is the need for a Logistics System Architect to make "true transformation" happen.

II. TERMS OF REFERENCE

1998 DSB Logistics Transformation Summer Study

Goal (TOR): ". . .(A) true transformation -- not marginal improvements

Study Objective: To identify and prioritize changes in today's core logistics activities essential to evolving a baseline, no later than 2010, which will support a true transformation in military logistics projected out to 2025.

Overall Test of Success: Guided by the objectives of "faster, better, cheaper', the ultimate test of study recommendations will be effectiveness on the battlespace.

Definition: ***Transformation in military logistics is a marked change in the nature and form of the structure and processes that equip, deploy and sustain military operations***

The Terms of Reference established for the study emphasized that a "true transformation" — not marginal improvements — in the military logistics system needed to be the focus. Panel 1 defined this "true transformation" as follows: *"Transformation in military logistics is a marked change in the nature and form of the structure and processes that equip, deploy and sustain military operations. "*

As a test of success of study recommendations, Panel 1 concluded that while recommendations must be guided by more capability for lower cost (i.e., "faster, better, cheaper"), the ultimate test must be effectiveness on the battlespace.

III. PROBLEM STATEMENT

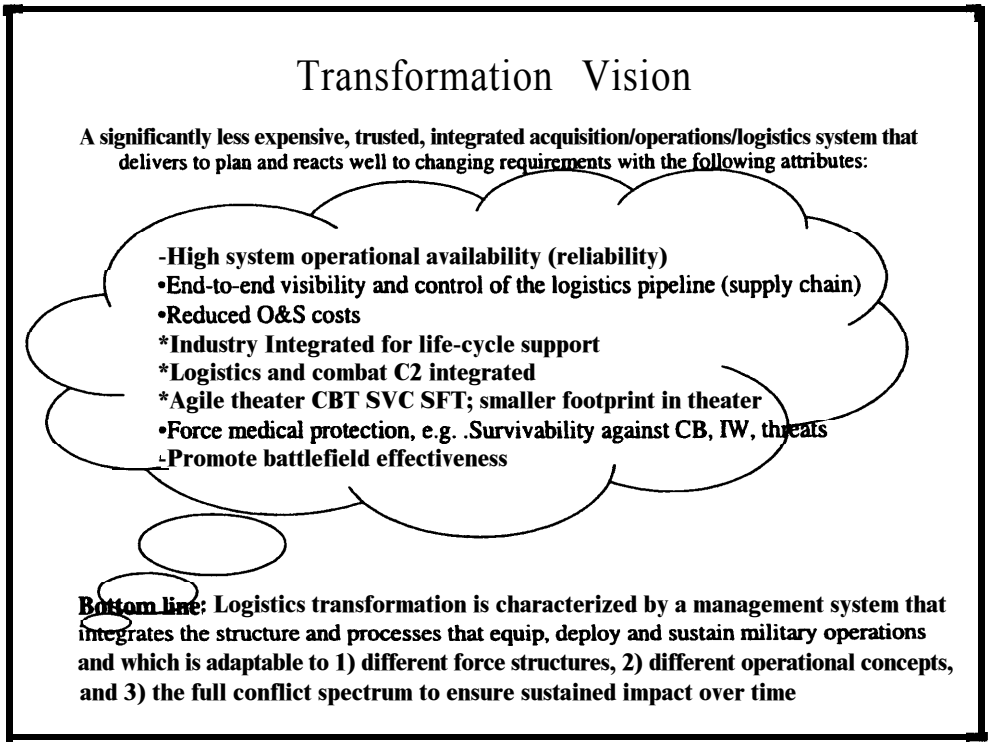
Problem Statement

- Today's logistics system, though ultimately effective on the battlefield, is
  - untrustworthy (right things, right place, right time)
  - too difficult to manage (stovepiped, fragmented)
  - unresponsive to the rate of change (cannot dynamically replan)
  - becoming so expensive that it precludes needed modernization ($80B+ per year)
- Bottom Lines: Today's logistics system, it not changed,
  - will not keep pace with operations
  - will continue to rely on mass for effectiveness

In its deliberations, Panel 1 drafted a preliminary problem statement to underscore the need for logistics transformation. This Panel 1 "problem statement" reflects "macro" characteristics of today's logistics system, but certainly is not characteristic of all sub-elements of that system.

Nonetheless, the bottom lines remain.

IV. TRANSFORMATION VISION



Based on its definition of "true transformation" in military logistics and the Problem Statement, Panel 1 defined a "vision" for the Transformed Logistics System. This "vision" was ultimately refined during the work in Irvine, California, but its elements remained constant.

As envisioned early in Panel l's deliberations, logistics transformation is characterized by a management system that integrates the structure and processes that equip, deploy and sustain military operations and which is adaptable to 1) different force structures, 2) different operational concepts, and 3) the full conflict spectrum to ensure sustained impact over time.

V. DSB STUDY PARAMETERS

DSB Study Parameters

- Proposed DSB Study Statement of Objective:

"The 1998 DSB Summer Study on Logistics Transformation will identify and prioritize changes in today's core logistics activities essential to evolving a baseline, no later than 2010, which will support a *true transformation* in military logistics projected to 2025. Guided by the objectives of "faster, better, cheaper", the ultimate test of study recommendations will be enhanced effectiveness on the battlefield. *Transformation* in military logistics results from a marked change in the nature and form of the structure and processes that equip, deploy, and sustain military operations.

Recommendations resulting from this DSB study should focus on 'capability based logistics' (scalable, tailorable, modular, mobile and flexible) which are adaptable to different force structures, different operational concepts and the full conflict spectrum to ensure sustained impact over time."

"The last step of logistics transformation recommended by the DSB is only the first step of the next generation. "

Based on the foregoing, Panel 1 developed these study parameters to guide the Task Force in its work, focus and recommendations.

VI. STUDY ASSUMPTIONS

Logistics Transformation Assumptions

"'Truth in lending - One changes and all do"

1 US will remain fully engaged in world affairs between today and 2025.

2 US national security objectives will remain the same using cooperative agreements if possible, and unilaterally if not, to ensure national security, protect and defend lives and property, protect our "national interests" (what are the latter in 2025?).

3 That the spectrum of conflict will remain essentially the same until at least 2025 (NDP report, 12/1/97 projected this to 2020). (NOTE:since the current conflict spectrum encompasses A-Z. we assume that the' full spectrum range of conflict continues well into 21st cmtuty; however. the likelihood of specific threats occurring will consistently fluctuate.)

4 Although change in the use and composition of the forces will continue, because of long lead times, the types of weapons platforms will remain the same between today and 2010.

5 That not later than 2025. some significant, breakthrough changes in the types of weapon system platforms are likely supported by technology and acquisition reform.

6 That the Services will continue to exist in 2025, but with progressively attained "jointness," enhanced capabilities, and potentially dramatic change in warfighting operations.

7 That modernization resources can and will be targeted at tech leaps which reduce the logistics demand and footprint and total ownership cost .

8 That DOD will be under continued financial constraints but DOD leadership will develop increased flexibility and systems to allocate resources responsive to dynamic changes in national security and defense requirements. (NOTE. assumes Congress has given DOD required budget and aquisrtion flexibility and that DOD "Culture" can effectively use It.)

As with all projections of the future, Panel 1 determined that certain assumptions were necessary to enable the study to move forward. The 8 assumption above were provided to "set the stage". Change in any one of these assumptions can and will affect study recommendation.

While all of these assumptions have a political content, assumptions #7 and #8 require the direct support of Congress.

VII. FUTURE MILITARY ENVIRONMENTS/TRENDS

After establishing definition and parameters for this DSB study, Panel 1 assessed current DOD and CINC strategic plans, Service specific strategic plans, the work of the QDR and NDP, and "future thinking" from private sector associations and academia.

The purpose of this assessment was to provide the logistics implications of an emerging vision of the not-later-than (NLT) 2025 national security environment to ensure that the study's recommendations for "logistics transformation" were consistent with a longer term vision of where logistics needs to be in the 21st century.

Panel 1 summarized its assessment of the future into 9 major trends depicted above.

Panel 1's overall "future assessment" was too lengthy to include in this study. However, a rough, partial summary follows.

VIII. MAJOR LOGISTICS IMPLICATIONS

Major Logistics Implications

- Logistics becomes joint and "strategic".
- Rely on technology and global digital communications to enable an integrated logistics system architecture.
- Avoid information warfare becoming a "Maginot Line"; will have increased vulnerability to disruption due to feilures or hostik actions.
- Seamless voice and electronic access for commanders and staff to all logistics data from tactical through strategic levels.
- Need for a capability-, distribution-based logistics system responsive across entire spectrum "from factory to foxhole".
- Direct delivery of logistics to point of need.
- U.S. forces likely to be a mix of high-low faces - key is to design integrated system that supports mixture of kgacy forces from today and 2025 forces. Logistics must be agile.
- Smaller, joint, more mobile task forces with enhanced sustainment capability - reduces footprint, reduces "tail".
- Joint C2, logistics organizations. ops-log integration.
- Will require comprehensive reform of financial management systems and practices to successfully complete the "Revolution in Business Affairs" transformation. Commercial industrial base must be integrated with and highly responsive to demands of the defense logistics systems.
- Exploit industry's depth and flexibility.
- Battkfield logistics reduced - leaner, more effective or, for some systems, eliminated (e.g. ultra-reliability, self-healing, etc.).
- Need investments in improve-d reliability of equipment and weapons systems to reduce the requirement for sustainment.
- Decision support tools will enhance logistics planning execution, visualization.
- Increased use of diagnostics and prognostics - enhances the ability to provide anticipatory logistics.
- Need for real-time, precision logistics applications and processing.

From these nine major national security trends, Panel 1 further assessed the implications of these trends for the military logistics system.

Sixteen major areas of implication were identified. These "implications" are stated in rough form but provide a summary of the more lengthy version of Panel 1's assessment.

IX. LOGISTICS IMPLICATIONS LOOKING BACK FROM THE PROJECTED NLT 2025 ENVIRONMENT

2025 Military Environment

- **Based on the trends projected for the NLT 2025 military environment and the major implications for logistics, Panel 1 made a more detailed listing of future logistics implications.**

- **The pages which follow summarize the major national security 'TRENDS" and the Panel's rough assessment of the "LOGISTICS IMPLICATIONS" which emanate from them.**

Military/Threat

Trend A — US position as preeminent economic and military power will be challenged or even eroded

Trend B — Beyond emergence of potential major or peer competitors, ability to counter and defeat asymmetric and asynchronous threats from both economic and military services will be a major challenge

Logistics Implications: All will be characterized by Commonality, Redundancy/Flexibility, Deployability, Mobility/Agility, Responsiveness, and Interconnectivity.

1. Battlefield logistics reduced — leaner, more effective or, for some systems, eliminated (e.g. ultra-reliability, self-healing, etc.).
2. High system availability (lowest possible O&S costs); emphasis on survivability (equipment, protective gear, etc.).
3. Better protected or self-protected — armored logistics?
4. Global strategic management of limited, valuable, highly specialized stocks/components — may imply non-traditional sources of logistics support. Vendor base will be global/multi-national.

5. TAV covers in-storage, in-process, in-transit, and in theater — it must have redundant paths — logistics information must be a combat multiplier. Need for multinational TAV.
6. Extensive GEO-prepositioning may not be politically or economically feasible. Prepo requires rethinking.
7. War reserve system must be highly flexible; surge must be funded/available.
8. Joint C4, logistics organizations, ops-log integration.
9. MOOTW capability likely to increase as percentile of budget -28 deployments in the last 8 years.
10. U.S. forces likely to be a mix of high-low forces — key is to design integrated system that supports mixture of legacy forces from today and 2025 forces.
11. Direct delivery of logistics to point of need.
12. Logistics system must be self-correcting (predictive in nature). Must have dynamic replanning.
13. Must have capability to support operations from strategic distances
14. Logistics inter-connectivity to planning and coordination of strike operations essential.
15. Logistics will require tactical and operational mobility to exploit effects of large-scale precision "ambushes" of NLT **2025** time-frame.
16. Must have ability to adjust logistics structures and procedures to meet NLT 2025 requirements before, during, and following combat operations.
17. Capability to maintain logistics support to all users throughout the theater for the duration of the operation.
18. Comprehensive reform of financial management systems and practices will be required to successfully complete the "Revolution in Business Affairs" transformation.
19. Need to define, develop "Homeland Defense" logistics capability.
20. Logistics must be predictive and responsive; less reliance on "mass" principles and "just in case".
21. Seamless inventory – internodal movement.
22. Joint acquisition of multi-service systems. (Most/all systems should be interoperable?)
23. Theater combat service support – agile and flexible.
24. Reduced logistics footprint - without sacrificing capability.
25. CONUS infrastructure needs to be combined and reduced.
26. Commercial industrial base must be integrated with and highly responsive to demands of the logistics system - industry and the military must have a shared view of the pipeline from factory to user.
27. Survivability against WMD (including **NBC)** and information warfare (including EW) attacks.
28. New medical capabilities and doctrine. Higher health tolerance required.
29. Redefine troop-to-leader ratios.

30. Reduced acquisition cycle time.
31. Combined logistics doctrine and execution.
32. Logistics becomes joint and "strategic".
33. Redefine training of logisticians.

POLITICAL/CULTURAL

Trend A — Domestic political support and understanding (national consensus) of national security needs will be even more challenged due to generational and demographic changes and competing budget resource demands.

Logistics Implications:

1. Budget competition increases pressure on DOD size and cost; placing more pressure on "transforming" the "tail".
2. Impetus for swing toward competitive sourcing and privatization — vendor base will be global and multi-national.
3. Greater use of FMS/HNS to stretch resources and interoperability. Need contingency for backup if US acts unilaterally.
4. Smaller, joint, more mobile task forces with enhanced sustainment capability – reduces footprint, reduces "tail".
5. AC/RC more multi-tasked; multi-compo units.
6. Reduced levels of maintenance and support; dramatically enhanced reliability and maintainability.
7. Scaleable, tailorable, modular, mobile, logistics forces.
8. Partnerships with industry for depth and flexibility — need to strengthen command and control to allow partnerships to work effectively. Redefine DOD relationship with industry.
9. Need for a common logistics lexicon and language; as well as common logistics principles for ease of use/avoidance.

ECONOMIC

Trend A — Regionalization and globalization of national, corporate and financial economies will provide both national security strengths and potential weaknesses/threats

Trend B — Resource shortages and the potential for major environmental disasters (manmade and natural) will increase regional instability and potential for conflict

Trend C — Outsourcing and privatization of military support functions will have redefined the federal sector's relationship with the commercial sector (domestically and perhaps globally) and vice versa

Logistics Implications:

1. Logistics continues as critical bridge connecting the U.S. economy to its warfighting forces. Fully integrated contractor support.
2. Relationship of NLT 2025 global economic infrastructure to military operations undetermined.
3. Reliance on technology and global digital communications that enable an integrated logistics system architecture increase vulnerability to disruption due to failures or hostile actions.
4. Structure of NLT 2025 global transportation and industrial infrastructure will impact conduct of military operations.
5. Rapid, direct power projection directly from CONUS to theater - battlespace begins at the deployment installation in an asymmetric warfare environment.
6. Worldwide asset availability/core competence and capability needed.
7. CRAF, RRF repositioning for globalization of commercial air and sea lift industries; conditional coalition CRAF agreements.
8. Force protection, globally and tactically, is a big issue.
9. Tailorable logistics packages deployable rapidly worldwide.
10. Increased deployments for humanitarian missions requiring logistics support.
11. Logistics regarded as strategic asset . . . like it is in industry.
12. Strategic partnering will be the norm.
13. More leasing rather than buying.
14. Complete financial systems interface – joint and industry.
15. Global connectivity and global support teams.
16. Surge and warm industrial bases concepts need definition.
17. Rise of global partnerships — players include: commercial, academia, international, civilian agencies, military core.
18. Peacetime military health care mirrors civilian.

TECHNOLOGY

Trend A — US information technologies and infrastructure dependence will have created major vulnerabilities with its strengths

Trend B — Open market technologies will constantly level the playing field

Trend C — US intelligence capability will require radical redefinition and reconfiguration.

Logistics Implications:

1. Investments in improved reliability of equipment and weapons systems reduces the requirement for sustainment.
2. Capability-based logistics responsive across entire spectrum.
3. Force lightened through miniaturization and technology.
4. Agility, flexibility, modular, tailorable — to any scenario.
5. Ensure business operational flexibility - not held hostage to technology.
6. Space-based resupply.

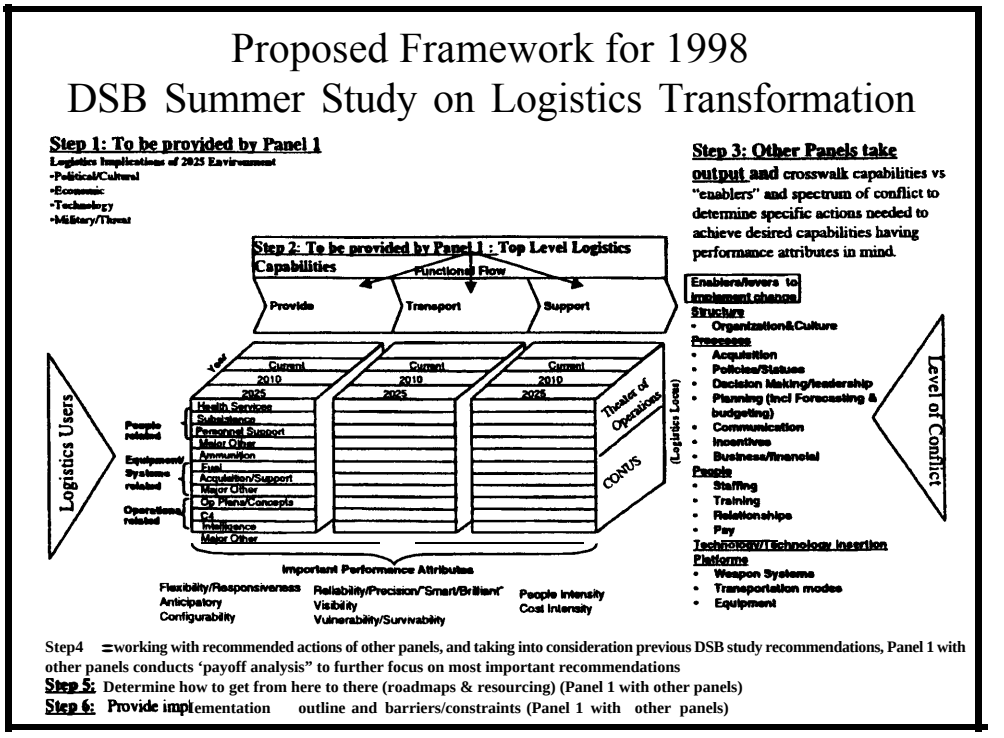
7. TAV and ITV must include 3rd party visibility.
8. Inter-operable AIT — quick fix for rapidly-developed coalitions.
9. Improved strength to weight benefits due to lightweight materials and composites.
10. Fire and forget – use of alternative munitions.
11. Enhanced anti-fratricide capabilities to match technological advancements.
12. Reduction in fuel and batteries through new power generation and fuel sources.
13. Smaller, lighter engines producing greater output to weight.
14. Military forces maintain physical readiness without reliance on traditional foods because of condensed rations.
15. Advanced packaging techniques make shipping cases serve more than one purpose.
16. Advanced munitions generate reduced munitions infrastructure.
17. Increased use of diagnostics and prognostics — enhances the ability to provide anticipatory logistics.
18. Streamlined acquisition – faster fielding.
19. In and of itself, smaller is not necessarily better — better is better.
20. Industrial mobilization programs geared to short technological lifecycles by 2025.
21. Need for integrated, correlated Ops, Intel, Combat Support information.
22. Seamless voice and electronic access for commanders and staff to all logistics data from tactical through strategic levels.
23. Major advances in decision support tools enhancing logistics planning, execution, visualization.
24. Need for real-time, precision logistics applications, processing, and execution.
25. Logistics will require speed, agility, enhanced security operations, and even greater dispersion.
26. In-transit visibility of friendly forces and supplies essential.
27. Fully integrated national defense logistics information network will enhance support across joint and commercial boundaries — also, plug in capability by coalition forces possible.
28. New predictive/performance models needed due to technology application on the battlefield.
29. Avoid information warfare becoming a "Maginot Line."
30. Identify technological breakthroughs which could become surprise "Pearl Harbors".

X. CRITICAL LOGISTIC CAPABILITIES REQUIRED FOR THE FUTURE

Based on its assessment of future (NLT 2025) military trends and the implications for the logistics system, Panel 1 then assessed the logistics capabilities required to support the future.

To make this assessment, Panel 1 developed a "taxonomy" or framework to guide the study effort.

Panel 1 Recommended Framework for Summer Study



The above framework represents the overall approach proposed by Panel 1 to approach logistics transformation. The purpose of this framework was to provide a disciplined and consistent approach across the panels. The specific terminology is intended to avoid the pitfall of addressing logistics transformation through the potential narrowing prism of today's classifications and to focus the study on areas which may produce the "biggest bang for the buck".

First, we discussed and finalized a list of CORE LOGISTICS ACTIVITIES:

- PROVIDE (includes requirements definition and acquisition)
- TRANSPORT
- SUPPORT (included sustainment, reconstitute, dispose and return).

The intent is to provide a simple logistics functional flow to guide our thinking as we look across the needs of the 3 logistics users.

Second, we developed a list of Logistics Users which generate requirements (People, Equipment & Systems, Operations. Then, we further narrowed focus to three selected "high payback" subcomponent. Each Logistics User" was assigned a Panel 1 lead to develop critical logistics capabilities using the overall taxonomy and to refine the proposed subcomponents:

- People (subcomponents: Health Services, Subsistence, Personnel Support, Major Other)
- Equipment/Weapon Systems (Subcomponents: Ammo, Fuel, Maintenance, Major Other)
- Operational Structure and Support primarily from perspective of combat commander (subcomponents: C4, I, Ops planning/new Warfighter concepts, Major Other)

From the Logistics user perspective, we further projected critical logistics capabilities from: Theater of Operation and CONUS/Wholesale level (as applicable).

Third, we developed a "buzzword" listing of Performance Attributes to guide Panel 1 development of the "top level" logistics characteristics:

- Flexibility / responsiveness (ability to change quickly)
- Anticipatory (more capacity to anticipate and predict)
- Configurability (agile, tailorable, scalable, adaptive)
- Reliability / precision / "smart"
- Visibility
- Vulnerability / survivability
- Less people intensive (people intensity)
- Less total ownership cost . More cost effective (cost intensity)

Fourth, we set timeframes from which to look at capabilities as: Today (starting point). . . Baseline (NLT 2010). . .Transformation (NLT 2025).

Finally, we developed a set of five basic levers or enablers which will affect and effect the transition to the baseline and to transformation. These "enablers" were intended to assist other panels as they transform the top level logistics characteristics provided by Panel1 into specific recommended actions. For instance, if a top level, baseline (NLT 2010) logistics characteristic needed is

"simple, flexible AIT for quickly formed coalitions", what levers (or enablers) need to be effected to attain that?

- Structure (organization and culture)
- Processes - could have numerous but we recommend to focus on:
  - Statutes / Policies
  - PPBS (forecasting, planning, budgeting, "color of money")
  - Incentives
  - Platforms (weapon systems, transportation modes, equipment)
- Acquisition
- Decision making / Leadership
- Communication
- Technology / technology insertion
- People (staffing, training, relationships)

Panel l's work on developing top level Logistics capabilities needed in the future resulted in the following rough work product.

The percentages and/or metrics in the following tables were derived from expert judgement, not quantitative analysis.

Logistics Capabilities: Equipment/Systems

Sub component	NLT 2010	NLT 2025
Ammunition	• Obsolete munitions gone • Improved Service methodologies foster major shift from LOE to target-oriented 'smart" weapons. • Full visibility by JTF • Load-out ports upgraded • Shift to more expensive and fragile "smart" weapons severely complicates pre-positioning substantial stocks • Excess government ammo production and storage capacity eliminated. • Legacy missiles costly to support in theater. Long turn-around times	• Fully unified planning for theater-level conflict reduces duplication of target allocations and resulting excess inventories • Wooden round" practices for new smart weapons widespread • Commonality among Services for ammo needs (e.g., common a/c cannon) • True joint planning supported by rapidly adaptive tools and TAV permit substantial reductions in "risk" inventory. • Rationalizing theater target sets on a cost/ benefit basis reduces weapons needs • Increased reliability of smart weapons facilitates pre-positioning • Reduced tonnage requirements ease port loading • Full JTF authority over in-theater stocks, plus adaptive planning/allocation tools, reduce misallocation and permit improved flexibility in combat planning. • Funding of surge capacity limited to those situations where such action is the least costly way to meet the SECDEF planning guidance. (No more warm cannon ball lines!) • No munitions maintenance needed in theater. Support costs limited to storage and distribution facilities.
Fuel	• JTF full visibility • Increased design attention to fuel commonality • Improved LOTS • Preplanned spill teams • Assured access to commercial transport	• JTF full authority • Alternative Fuel/power source • More fuel efficient engines • Light weight/composite systems to reduce fuel demands • HNS agreements in place • Systems fielded for • Common, commercial fuel • Robust LOTS for austere • Areas • Minimal spills • Real time replanning • Advanced pipelines

Logistics Capabilities: Equipment/Systems

Subcomponent	NLT 2010	NLT 2025
Acquisition/ Support	• Improved "joint" requirements for major systems • Increased funding for limiting growth in operating costs of fielded systems • Newest systems designed for 2-level maint,; CLS in CONUS • New equipment segments increasingly sourced globally • JTAV reduces excess orders • Improved access to CRAF, RRF, railcars • JTF uses JTAV to actively track equipment and spares in theater • Government depots "right-sized" to perform "core"/mandated work in support of legacy systems • New IT permits more distance learning/"reach back" for expertise • Distance learning/IETMs reduce TDY costs	• Unified/joint planning governs weapon system "requirements" • Most uses 2 level maintenance • "Defense" unique industrial base limited to combat system final assembly/integration only • Broad access to "cutting edge" commercial R4 due to AR • All new equipment embeds OJT and maintenance aids • Marked increase in directed energy weapons • Shift from buy to lease for semi-commercial equipment (pwrXhr) • Small floats and better PREPO plans cut inventory requirements • PMs have LC management authority • More use of support warranties • Widescale fielding of remote sensors and stand off weapons • Adaptive management tools optimize distribution; reduce "risk" inventories • JTAV precludes duplicative shipments • Almost all new equipment fits in commercial intermodal containers • DOD has full an prompt access to all commercial lift assets to meet surge needs • Increased reliability and better batteries enhance value of PREPO equipment • Management procedures established to handle the shipment of life cycle support material not being generated by myriad weapon system program off ices • Advanced technology permits resupply from CONUS directly to combat units • JTF has full authority to pre-plan and manage in-theater transport of stocks • Sophisticated usage monitoring and modeling permits rapid predictive reallocations • Log info system hardened • Supply system transformed into oversight of support contractors • All depot-level maintenance supplied commercially • Most maintenance schools closed • Most fielded equipment uses commercial fu • "Self healing" features minimize O-level maintenance skill needs • High reliability equipment and 2 level maintenance minimizes in-theater heavy re • If some above-unit maintenance needed, it be provided by contractors and Reservists can be mobilized in place by cog CINC.

Logistics Capabilities: People

Sub component	NLT 2010	NLT 2025
In-Theater Construction	• Maximum modular/prefab • Reduce density and skill of operations skill mix • Full integration of contractors in planning and execution • STOL aircraft greater part of tactical family • Reduced aviation support structure • Hospital ships/strategic lift vs extensive theater hospitals • Environmentally conscious designs reduced environmental impact • Reduced skill training required Structure realignment combat forces	• JAST STOL greatly reduces in-theater AVN. support • Modular facilities light weight and highly transportable • OMFTS and sea-based logistics for Marines • Contractor mobilization fill most requirements for heavy construction • Significant Strategic. lift freed for reallocation • Significant Strategic. lift for PTRP reduction • Contractor logistics support • Significant reduction in construction structure and skills • Civil contingency contracting • Engineering schools structure and training resources reallocated to combat training.
Health Services	• Enhanced soldier immune system for broader protection against infection • Expanded range of vaccines and means of enhancing immuno-competence • Recombinant DNA technology to isolate disease organisms and produce vaccines in days • Dramatic improvements in trauma treatment to reduce mortality and morbidity • Improved prosthetics, replacement tissues such as skin and artificial blood • Expert systems for medical diagnosis-contained in hand-held computers • Non-medical personnel make medical diagnosis-through use of remote medicine • Advanced video imaging and virtual systems make battlefield surgery easier at remote sites	• Speed statistics by unit • Accidents to zero (??) • Individual monitoring/automatic telemetry daily or weekly • Remote MD on demand; telemedicine for non-MDs • Mini-formulary = 5 lbs available to each squad • Clear-head pain killer for short term relief • Single soldier (UAV?) unique delivery of medical supplies • Auto locator (Secure) of wounded personnel • Helicopter evacuation very quickly (similar to now) • Reduce need for medical treatment • Screen out illness: all personnel 60 days free of illness in theater • Habits training established in CONUS • Med history on IT; weekly update; readily available • Services medical facilities specialize on war related medicine • Use high-volume civilian facilities for non-war medicine • Medic train all personnel theater- bound in tele-medicine • Friendly fire/ID zero defects training • Airborne operating rooms/ICU for emergencies • Fast theater to CONUS transport (as now)

Logistics Capabilities: People

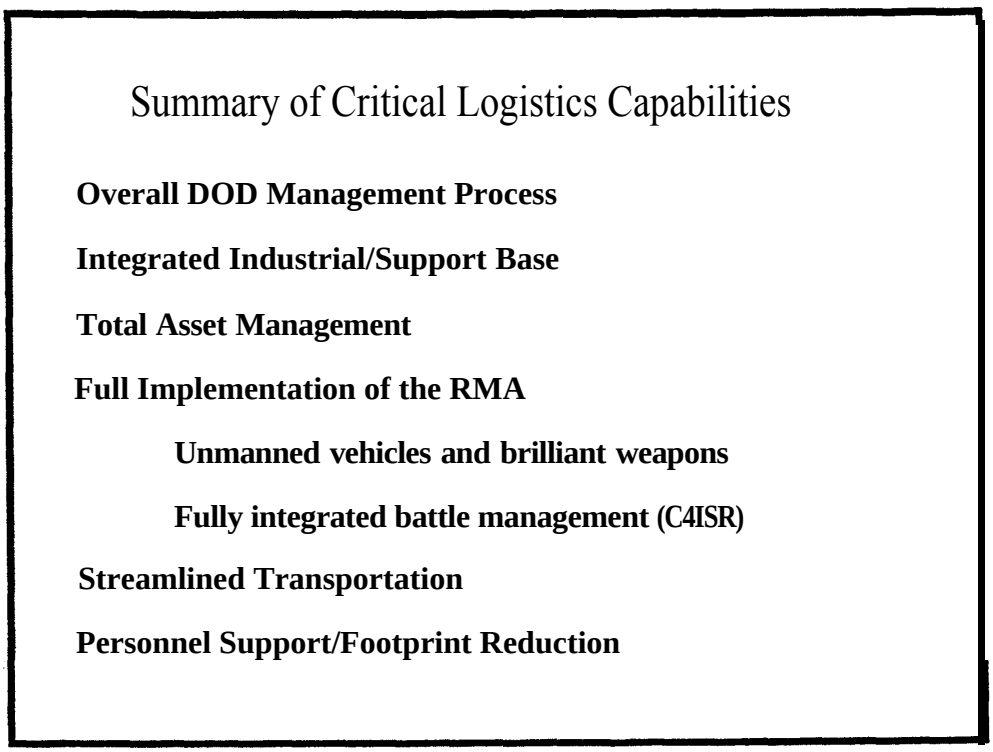
Sub component	NLT 2010	NLT 2025
Subsistence/ Water	• Reduced burden water places on logistics system • Technologies will reduce water requirements by field systems • Water recycling • Potential for eliminating altogether water in laundry, bath, decontamination ops • Miniaturized devices that draw water from moisture content in air • Improvements in desalination, decontamination, and purification	• Individual purification 50% of needs • 90% of land area, all sea, source for purificati • All food processes 50% less consumption • CB protection in clothing 50% vs water • High rate sea water to potable 1 Ox today's rate • Test 60 seconds to test purity • Purify10 gallons to potable 5 minutes by each soldier • Train people to 50% lower consumption per day • Air vs water cooled vehicles 50% of fleet • World-wide water mapping Geo sat of potent purification sources • Purification 1 quart 100,000 gallons capability light weight modules
Personnel support! Clothes	• Lighter, more functional, more capable clothing • Fabrics and components that reduce weight of combat load by 50% • Adaptive camouflage cloth ans fabrics that change color/texture to match environment • Self-heating and self-cooling fabrics using encapsulation technologies • Single uniform that serves multiple climatic environments	• Built-in CB protection • Multi-temp, multi layer modular concepts • Throw-away/or/hyper cleaning capability • Individual replenishment via IT demand • Weight reduced by 75% for theater • Bulk reduced by 80% for theater • Quick make capability (Benetton) increased • Tailored-pack by unit for individuals • Segment needs by squad individual

Logistics Capabilities: Operations/New Concepts/Combat Commander

Sub Component	NLT 2010	NLT 2025
Intelligence	UAVs generally available to tactical commanders National level feeds are effective to at least Divisional level Logistics intelligence data bases are complete and widely accessible Non-traditional threats are collected upon and data is readily available to multiple users	Artificial intelligence analysis capability All source fusion of intelligence from the integrated National community Non-traditional intelligence is readily available Networked national capability No windows/gaps in coverage HUMINT is collectible with same intensity and speed as other sources
C4	• Enhanced staff expertise through reach-back • TAV/Logistics anchor desk • Joint theater logistics a reality • New battle staff organizational concepts • C4 up front partnerships for shared commercial Defense capabilities • Simple , flexible AIT for quickly formed coalitions. • All defense items migrated to appropriate single manager	• Small core staffs deployed with virtual and reach-back capabilities • Staffs can operate widely dispersed and from any location with logistics total knowledge • Shipper to foxhole distribution system • Predictive" push" logistics • Strategic lift requirements greatly reduced • National base of expertise immediately available through reach-back • Commercial/DOD C4 R&D for deployed capability partnerships. • Reliability/survivability improvements lesson need for redundant systems and war reserve stocks. • No "information black holes" ; no denied areas of the world. • Single source to shipper realized • Predictive "push" logistic and force packaging • Total integration into global communications grid
Operations/ Planning/ Concepts	• Reach-back for subject matter experts • Increased quality and quantity of smart weapons • M&S is basis for planning • Reach-back to access industry, agencies , academia is feasible and supportable. • Smart vs dumb weapon inventories are skewed toward smart through risk acceptance and procurement priorities • Satellites and surrogates provide adequate communications	• Mass by combat effects • Planning with virtual staff and M&S • Force widely dispersed • Small staffs and tested courses of action • Worldwide connectivity • Planning/ops done in distributed manner from any location • Plans are fully simulated and confirmed. • Comprehensive combat effects con be massed against rapidly identified and analyzed targets of operational significance

Logistics Capabilities: Operations/New Concepts/Combat Commander		
Sub component	**NLT 2010**	**NLT 2025**
In-Theater Construction	• Maximum modular/prefab • Reduce density and skill of operations skill mix • Full integration of contractors in planning and execution • STOL aircraft greater part of tactical family • Reduced aviation support structure • Hospital ships/strategic lift vs extensive theater hospitals • Environmentally conscious designs reduced environmental impact • Reduced skill training required • Structure realignment combat forces	• JAST STOL greatly reduces in-theater AVN. support • Modular facilities light weight and highly transportable • OMFTS and sea-based logistics for Marines • Contractor mobilization fill most requirement: for heavy construction • Significant Strategic. lift freed for reallocation • Significant Strategic. lift for PTRP reduction • Contractor logistics support • Significant reduction in construction structure and skills • Civil contingency contracting • Engineering schools structure and training resources reallocated to combat training.

Summary of Critical Logistics Capabilities



1. **Overall DOD Management Process.** DOD PPBS and Acquisition System procedures will have been changed such that there is a truly "joint" process for managing the acquisition of military equipment, munitions, and associated support. This will include provision for ongoing trade-offs between desirable performance characteristics and total ownership costs, as well as sufficient reliability to minimize the need for in-theater maintenance by other than the normal operators. Any in-theater heavy maintenance and construction will be planned for contract. The resulting process will implement a fully unified vision of the military posture that is best for the nation, in consideration of the funding likely to be available. It will have taken on the attributes of "continuous improvement" that characterize "world class" organizations.

   Issues: To what extent would planning, programming and budgeting authority need to be shifted from the Services to a strengthened joint vision entity?

   Would there need to be a single acquisition system with a single DOD Acquisition Corps?

2. **Integrated Industrial/Support Base.** The currently sharp distinction between the business practices of industrial segments that work primarily for DOD and those that don't will have been replaced. By 2025 DOD will employ normal commercial business practices when

acquiring equipment, supplies, facilities and services, and will thereby have ready access to the full range of free world industrial capability, along with the cost and innovation benefits that accrue from sustained healthy competition. The result will be military equipment and facilities with a much higher "commercial" content than is currently the case; built to use the commercial support structure, including fuel, parts, (warranty) service, and transportation. (There may be a few specialized companies that act on DOD's behalf, and under DOD direction, to design, assemble and support those specialized items of military equipment that are outside the general abilities of the integrated commercial sector.)

Issues: To what extent should "Buy American" concepts persist vis-a-vis international/global teaming? Given full CLS for fielded weapons outside the immediate battle area, what does this imply for naval ships? How should the transportation of CLS destined for provision in rear-areas overseas be managed? [A TRANSCOM-like CONUS based entity, or a theater based CINC logistics command?]

3. **Total Asset Management.** The theater CINC will be responsible for the cost-effective employment of US military forces, including the full integration of operations and logistics planning To this end he/she will routinely employ a modern accounting system that provides both full visibility into the total cost of ongoing operations and timely estimates of the likely costs of operations being contemplated for the future. This management responsibility will be supported by a highly accessible data base of information on all assets - in theater and enroute - as well as support tools that assist in near-real time decisions that help minimize mal-distribution and reduce overall inventory requirements.

Issues. What should be the relationship between the CINC's operational authority over the introduction and movement of equipment and other assets within his/her theater and the budgeting for such assets and pre-deployment decisions on its location? [E.g. How much prepo, and where?]

4. Full Implementation of the RMA.

a. **Unmanned vehicles and brilliant weapons.** By 2025 about 50 percent of the intelligence, surveillance, and reconnaissance now provided by manned aircraft, ships, and vehicles will be provided by unmanned systems, with an attendant reduction in manpower, fuel, and parts and other support "footprint". Similarly, about 50 percent of the targets now served by unguided weapons will be served by a much smaller number and tonnage of "brilliant" weapons.

Issue: What mechanism should be established to ensure that funding for operational stocks of fuel, munitions and other supplies is adjusted to account for the decreased demand that will result from this aspect of the RMA?

b. Fully integrated battle management (C4ISR).

ISR. By 2025 all-source intelligence fusion will be in place and supplemented by automated tools that assist commanders in exploiting the information content. A process will be in place that permits commanders to not only "reach back" for available information without the necessity of a large in-theater PEDs footprint, but to also retarget collection assets as needed to support the operational situation.

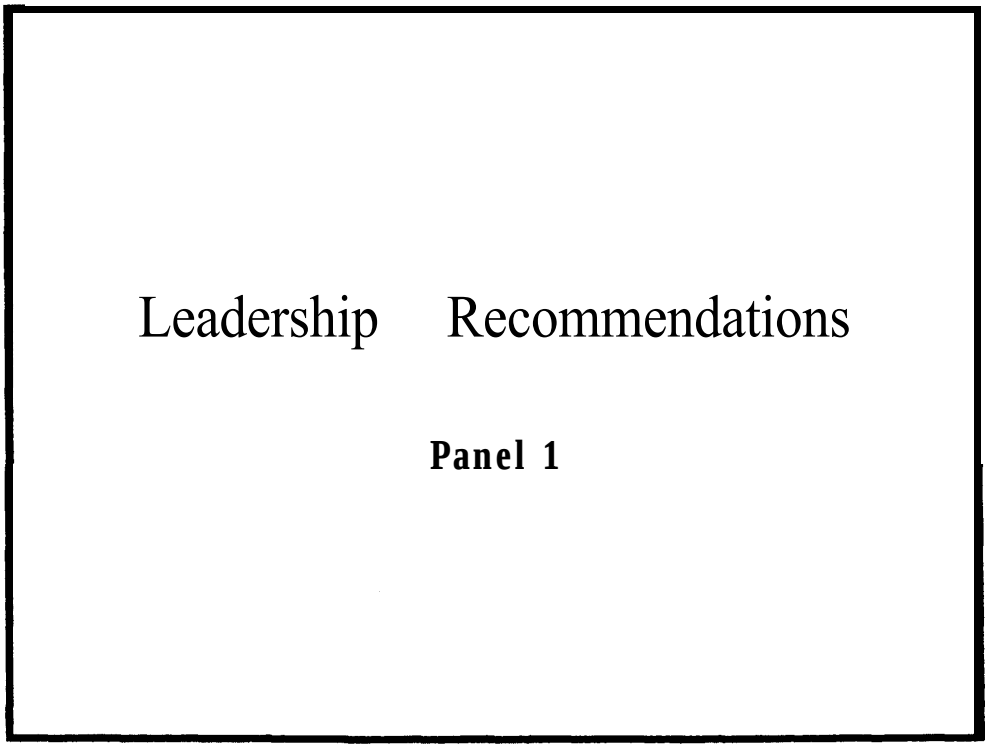
C4/Advanced Combat Management. By 2025 sufficient connectivity and navigational systems will be in place to permit continuous real-time knowledge of all unit locations, engagement status, and logistics posture. Additionally, commanders will have available a broad range of modeling and simulation decision support tools that can utilize available threat and friendly unit information to rapidly plan, re-plan, and rehearse optimum courses of action to accomplish the objective with a smaller force than would otherwise be needed.

5. Streamlined Transportation. Logistics transportation in 2025 will take full advantage of available commercial transportation capacity, building on the highly successful CRAF concept. Essentially all equipment and supplies will be designed for transport in commercial intermodal containers using commercial MHE. Pre-negotiated HNS/prepo plus the increased ability to use commercial fuels will have sharply reduced the need to transport fuel early. Improved lift efficiency, coupled with the reduced weight of required supplies, permits the delivery direct to combat units of roughly1/2 of the resupply that originates in CONUS. Asset visibility is such that the JTF commander is able to rapidly redirect the incoming flow of supplies to the optimum location. In- , theater distribution/redistribution will be facilitated by the availability of both accurate information and new modes of transport, including manned and unmanned VTOL aircraft (including airships) and ground vehicles. Interface between the CONUS transportation management entity and the JTF logistics commander.

6. Personnel Support/Footprint reduction. By 2025 advanced clothing materials will significantly reduce the need for auxiliary CB and ballistic protection, cleaning, and replacement. The bulk and weight of combat rations will have been reduced by about 50 percent and rations will tailored to the needs of each individual. Water requirements will be largely met by advanced local purification techniques, and demand will be reduced through improved food preparation and general cleaning techniques. The health Services footprint will be reduced through extensive telemetry of all individuals; auto-location of injured, tele-medical diagnosis and treatment orders; advanced medicines, and

quick evacuations to CONUS public and private sector facilities for all needed serious treatment.

XI. LEADERSHIP RECOMMENDATIONS



As the DSB study got underway, Panel 1 was asked to explore Leadership recommendations. It was decided to look at leadership from three levels: the National, the Strategic-Operational, and the Theater.

As seen below, Panel 1 initially conducted a quick assessment of leadership issues at the 3 levels.

Leadership Issues

Enabler

1 OVERALL (Executive Level)

- What's Wrong
  - Not providing tradeoffs
  - Not providing top level stability
  - Not resolving conflicts
  - Not closely monitoring, rewarding, or punishing
- Who can Address (<50) - Power to make common vision and resource priorities

OSD	Services	Others as needed
DEPSECDEF	Under Secs	DLA
Comptroller	Vice Chiefs	TRANSCOM
Acq.	Log/Ops	
VCJCS	PA&E	
	Acq.	

- Trade offs
  - Relative priority of log transformation vs other important priorities (resources)
  - What investment now in the long lead stuff (e.g. IT, platforms) vs what to do early and what to do later
  - Greater integration of log into ops
  - Build trust/belief they mean it
  - Integrate new appointees
- Implementation
  - Schedule of major issues to decide

2 Strategic to operational interface

- What's wrong (problems recognized/solutions being discussed)
  - Multiple process owners
  - Redundant
  - Inadequate
- Who can address
  - Same as overall plus unified command decision structure
- Things to do
  - Focus and accelerate dialogue
  - Put a time line on it
- Implementation

3 Theater

- What's wrong
  - No central focus or control
- Who can fix
  - CINC
- How
  - Use of existing functional componency e doctrine (e.g. JFACC model)

Panel 1 Transformation Recommendations Leadership

Providing for Warriors
DoD Departmental Leadership

Moving to War
The Strategic to Operational Challenge

Enabling the Warfighter
Theater Logistics

The next step in Panel I's deliberation was to focus on "major fixes" in each of the 3 areas.

The charts which follow cover Panel l's work in each of the three "leadership" areas. (Also see the "implementation" section of Panel 1's report for more on departmental level actions.)

Providing for Warriors: DOD Departmental Leadership

- **Finding**
  - Executive leadership is slow to decide trade-offs and give direction to organizations, resources, people, & technology.
  - Significant opportunity to save money missed until services trust financial decision-making
  - Information for managing logistics well is not available
  - Fragmented, individual projects (some impressive), would have much greater impact if coordinated
- **Discussion**
  - Compelling need for change is at highest leadership level
  - There is no multi-year plan with reasonable stability and follow-up
  - There is inadequate follow-up on overall focused logistics initiatives
  - Executives need much clearer understanding of why things are/are not being done

Providing for Warriors: DOD Departmental Leadership

- **Recommendation**
  - Agreement among top executives on scope, priority, urgency, objectives of logistics transformation
  - Prepare a single plan with trade-offs among resources, organization, time, including metrics
  - Clarify accountability for plan element achievements
  - Modify existing financial and planning systems to provide data and analysis for managing logistics
- **Implementation**
  - USD and VJCS agree Executive leadership change is necessary
  - Select minimum group, ground rules, define purpose and payoff
  - Clarify priority of logistics transformation vs other priorities
  - Set objectives for stability of schedule, funding, and cost reduction
  - Agree on information required for managing logistics

Moving to War
The Strategic to Operational Link

- Findings
  - Multiple process owners
  - Redundancies and conflicts
  - Inadequate total system performance
  - Particular confusion at the strategic-operational scam
- Discussion
  - No single organization currently has responsibility and authority over the total supporting processes
    - Elements of process not clearly defined
    - Responsibility and authority not clearly linked
  - Multiple process ownership has high potential for conflict and negative impact at theater access facilities (APO/POD/LOTS)
  - Command and control failures are exacerbated by the critical logistics resources involved

Moving to War
The Strategic to Operational Link

- Recommendation
  - Designate a single existing organization (e.g., ACOM, TRANSCOM, DLA) as process owner for all elements of the process
    - Defense transportation - air, land, sea
    - Contracting for support
    - Movement rules and procedures
  - Give the process owner the responsibility and authority to
    - Prescribe process architecture
    - Direct and enforce process compliance
  - Provide for process owner inputs to infrastructure recapitalization planning and funding forum
- Implementation
  - OSD policy directions

Enabling the Warfighter
Theater Level Logistics

- Finding
  - Multiple, redundant and costly competing organizations and requirements for sustainment
  - Effective command and control cannot be accomplished under current organizational concepts
  - Logistics and operations not adequately integrated
- Discussion
  - CINC J-4
    - Cannot direct logistic information operations among the service components/coalition forces
    - Cannot effectively integrate activities of theater service components, contractor logistics support, host nation support NGOs.
  - It's too late to start when we go to war
    - Relationships, policies, procedures, systems
    - Logistics may in fact be the key to success e.g. OOTW

Enabling the Warfighter
Theater Level Logistics

- Recommendation
  - Establish a logistics functional component commander
    - Utilize Joint Forces Air Component Commander (JFACC) model
    - Single point of responsibility for theater level logistics
    - Reports to CINC co-equal to other functional commanders (JFACC, LCC, MCC)
    - Specific responsibilities, authorities and forces designated by CINC
- Implementation
  - Develop supporting doctrine, policies, procedures and tools to enable execution
  - Reinforce in deliberate planning and appropriate CINC/joint exercises

Panel 1: Acquisition

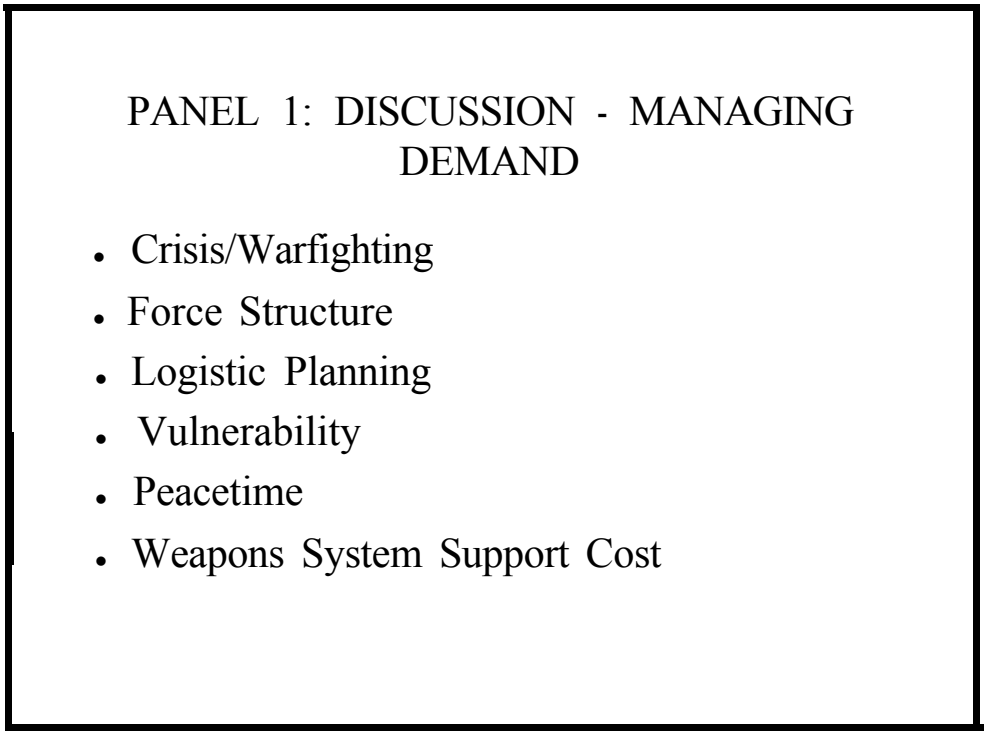
- Complete the Acquisition Reforms
  - **Adopt commercial buying practices**
    - *Planning stability*
    - *Price-Based instead of Cost Based*
    - *Minimize transaction costs*
    - *Gain broad access to commercial R&D*
  - **Shift responsibility for major repairs and upgrades to the private sector**

PANEL 1: FINDINGSS - MANAGING REDUCTION

- Combat/Crisis Development
- Peacetime Readiness

Demand reduction is required in two scenarios. The first scenario is during combat and crisis deployment. It was determined that demand is driven primarily by the Service at the wholesale level, implementing a "push" supply system. This system often creates bottlenecks within the theater supply pipeline and undermines the attempt at a "pull" system initiated by the customer — the CINC. The prime example of a push system that created "iron mountains" is the initial buildup during Desert Shield/Desert Storm.

The second scenario is during peacetime. Current spending on logistics is too high, exceeds acquisition, and continues to grow. Part of the problem is the fact that the DOD management system does not have visibility of the total ownership cost of new weapon platforms (long term support requirements). Secondly, a need exists to reduce the operating cost of legacy systems.



Crisis/Warfighting: The current "push" process clogs any reasonable estimate of available lift with material not essential to the CINC's needs. Without unrealistic levels of prepositioning, the timelines for crisis response expected to be mandated by 21 st Century contingencies can be met only with major redesign of the nation's force/equipment structure and major changes to logistics planning processes.

Force Structure: Currently planned land forces/equipment structure is very "heavy", redundant, poorly fused across Service lines, and does not take adequate advantage of the potential "RMA" reductions in demand for lift and resupply. Large reductions in both total support costs and deployment footprint

can be achieved by taking advantage of improved accuracy, lethality and targeting; unmanned systems, and improved fuel efficiency.

Logistics Planning: Traditional "just in case" push procedures are excessively costly and seriously delay achieving needed levels of combat capability. CINC's do not have the capability to dynamically plan and tailor the composition and timing of either initial force units or sustainment material.

Vulnerability: Large distribution centers with large amounts of material and single transportation nodes are highly vulnerable to WMD.

Peacetime: Peacetime logistics system costs are high and growing while military equipment will age excessively unless modernization rates are increased.

Weapons System Support Costs: The necessary weapons system logistic support requirements are largely determined during early design and development, but development PMs do not often have stated requirements for specific ownership costs and are equipped with few management tools. Life cycle support costs are not visible, and management responsibility is split between acquisition and logistics stovepipes. The result is a weapons systems inventory with excessive operating and support costs. Due to long remaining lives, legacy weapons operating costs must be included in computing the support cost of systems.

PANEL 1: RECOMMENDATIONS - MANAGING DEMAND

- **Crisis/Warfighting**
- **Force Structure**
- **Peacetime**
- **Weapons Systems Support Cost**

The above slide identifies Panel 1 recommendations in the following areas.

Crisis/Warfighting: Enable CINCs to rapidly plan and re-plan lift-constrained force and sustainment packages that are tailored to their specific needs.

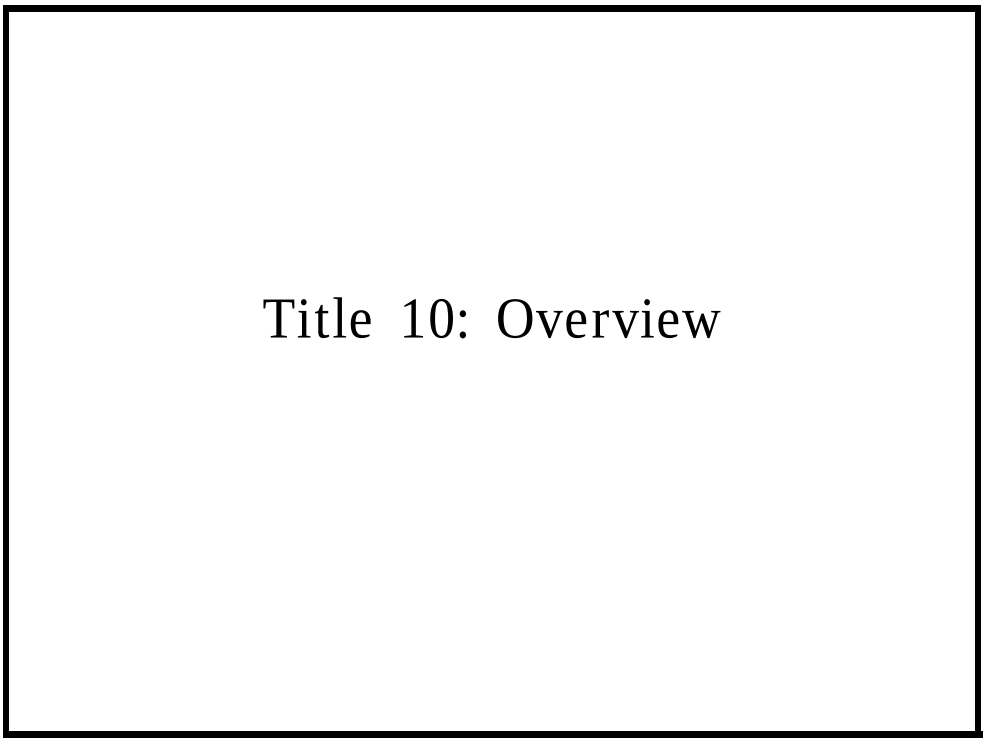
Force Structure: We need to establish a truly joint process for deciding on future weapons systems characteristics and quantities. Secondly, while CtNCs do establish theater munitions controlled supply rate (CSR) and required supply rates (RSR), these requirements do not necessarily meet the needs of the CINCs.

Peacetime : Shift responsibility and authority for contingency planning for both force packaging and logistics support from the Services to the theater CINCs. Shift funding for all in-theater exercises, including logistics exercises to the CINCs. Significantly improve the DOD PPBS process for deciding on future weapons systems characteristics and quantities in response to a more unified vision of how the nation wishes to fight its future wars.

Weapons Systems Support Cost: A need exists to improve the "Cradle to Grave" management of weapons system support costs. The following offers several ideas for how this may be accomplish:

- Assign both acquisition and support responsibility and budgeting authority to weapons system Program Offices.
- Establish a standardized system for estimating the likely future total ownership costs of weapons systems.
- Establish target total ownership costs as "requirements" for each new weapon system and then use such targets as primary management tools.
- Competitively source all above-O-level weapons system maintenance support.
- Invest in O&S cost reduction of legacy systems based on realistic ROI and life-expectancy estimates.

XII. TITLE 10 OVERVIEW



A number of recommendations surfaced that would change the role of many of the organizations that currently exist. Many of those organizations' roles are based on law. If a recommendation changes the role of an organization such that it requires changes in legislation, then the Department's implementation approach must detail required legislative changes.

This slide summarizes the Title 10 responsibilities of the Secretary of Defense

The Secretary of Defense

- **Secretary of Defense...is the head of the Department of Defense.**
  - **Appointed from civilian life by the President, by and with the advice and consent of the Senate.**
- **Subject to the direction of the President, U.S. Code, Title 10 and the National Security Act of 1947 (50 U.S.C. 401), The Secretary is the principal assistant to the President in all matters relating to the Department of Defense.**
- **He has authority, direction, and control over the Department of Defense.**

The next two slides summarize the Title 10 responsibilities of the Chairman of the Joint Chiefs of Staff. These responsibilities are post Goldwater-Nichols.

USC Title 10

Chairman, Joint Chiefs of Staff

- **Planning; Advice;** Policy Formulation - subject to the authority, direction and control of the President and the Secretary of Defense, the Chairman of the Joint Chiefs of Staff shall be responsible for the following:
- **Strategic Direction** - Assist the NCA to provide Strategic Direction of the Armed Forces
- **Strategic Planning**
  - Preparing Strategic Plans
  - Preparing Joint **Logistics and Mobility Plans**
  - Performing Net Assessments of the capabilities of the U.S. Armed forces, and **its** Allies as compared to potential allies
- **Contingency Planning**
  - Preparing and reviewing Contingency Plans
  - Preparing Joint **Logistics and Mobility** Contingency Plans
  - Advising on critical deficiencies and strengths in force Capabilities (including manpower, **logistics, and mobility support)**

USC Title 10

Chairman, Joint Chiefs of Staff (Con't)

- **Requirements, Programs, and Budget**
  - Advising on the priorities of requirements
  - advising on program recommendations and budget proposals
  - assessing military requirements for defense acquisition program
- **Doctrine, Training and Education**
  - Develop Doctrine for Joint Employment
  - Formulate Policies for Joint training
  - Formulate policies for coordinating Military Education and Training
- **Other Matters**
  - Exercise Direction of the Joint Staff
  - As directed by the President, attend and participate in meetings of the NSC
  - Advise and assist the NCA on establishing combatant command
  - Transmit Communications between the NCA and Combatant Commands
  - Review plans and programs to determine adequacy and feasibility
  - Consult with and seek the advice of the Joint chiefs of Staff and Combatant Commanders
  - Provide U.S. representation on the Military Staff Committee of the United Nations.

This slide summarizes the Title 10 responsibilities for Combatant Commanders.

USC Title 10

• Combatant Commands

Unless otherwise directed by the President or the Secretary of Defense, **the authority, direction, and control** of the commander of a combatant command with respect **to the commands and forces assigned** to that command include the command functions of:

- Give **Authoritative** direction to subordinate commands and forces over all aspects of **Military** operations, joint training and Logistics
- Prescribe the **chain of command**
- **Organize commands** and forces necessary to carry out assigned missions
- **Employ forces** as considered necessary to carry out assigned missions
- **Coordinate and approve aspects of administration and support** (including control of resources and equipment)
- exercise the authority with respect to selecting subordinate commanders, selecting combatant command staff...etc...

This slide summarizes the Title 10 responsibilities of each Service component.

USC Title 10

- **Services**

Subject to the authority, direction , and control of the Secretary of Defense...the Service Secretary is responsible for, and has the authority necessary to conduct, all affairs of the Service Department, including the following functions:

- **Recruiting** - **Organizing** - **Supplying**
- **equipping** - **Training** - **Servicing**
- **Mobilizing** - **Demobilizing** - **Administering**
- **Maintaining**
- **The construction, Outfitting, and repair of Military equipment**
- **The construction, maintenance, and repair of buildings, structures, and utilities and the acquisition of real property and interests in real property necessary to carry out the**

This slide summarizes the major issues/changes to Title 10 associated with the Goldwater-Nichols legislation of 1986.

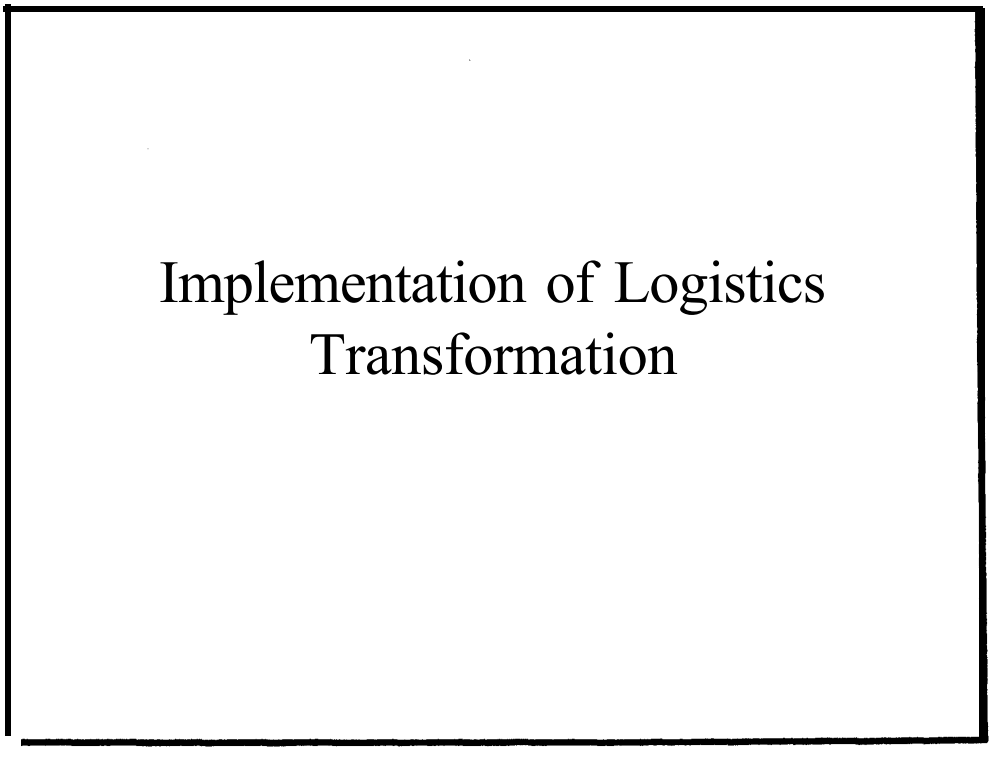
Goldwater-Nichols DOD Reoganization Act of 1986

. A Bill to amend title 10, United States Code, to strenghten the position of Chairman of the Joint Chiefs of Staff, to provide for more efficient and effective operation of the Armed Forces.

- Identified the Chairman of the Joint Chiefs of Staff as the head of the Joint Chiefs of Staff and the senior ranking member of the Armed Forces.
- By law, CJCS is principal military adviser to the President.
  - As he considers appropriate, he may seek the advice of and consult with the other JCS members and combatant commanders. When he presents his advice, he shall present the advice or opinions of other JCS members and, as he considers appropriate, the range of military advice and opinions he has received.

. Transferred to CJCS the functions and responsibilities previously assigned to the corporate body of the JCS

XIII. IMPLEMENTATION OF LOGISTICS TRANSFORMATION



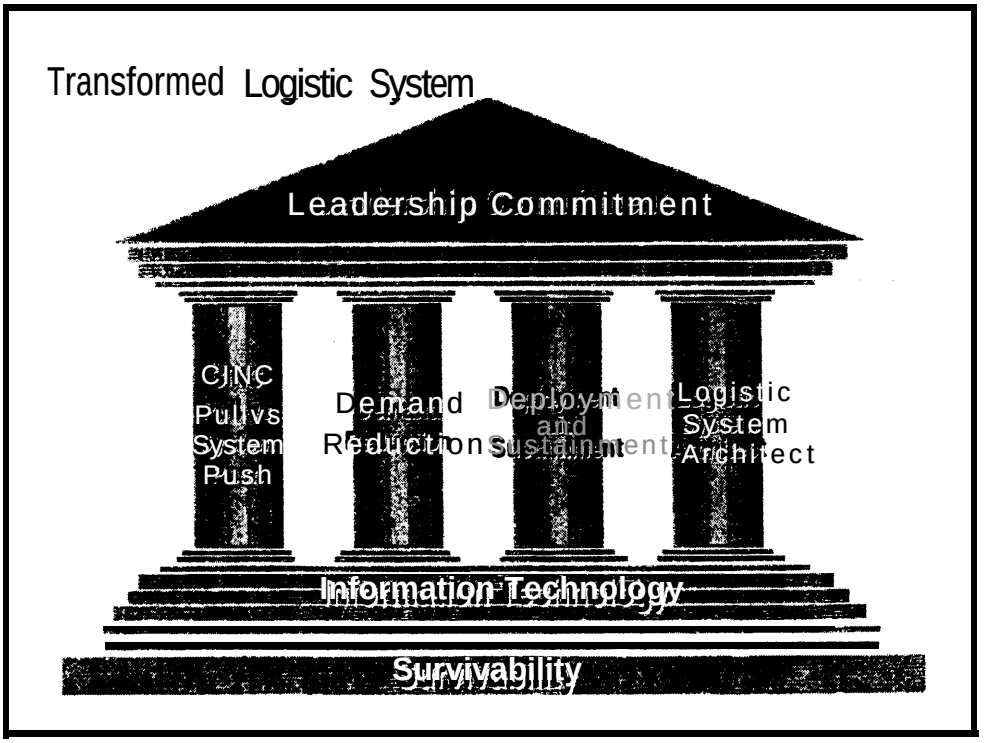
Panel 1 initiated work on a logistics transformation implementation approach.

Logistics Transformation: Key to Full Spectrum Engagement

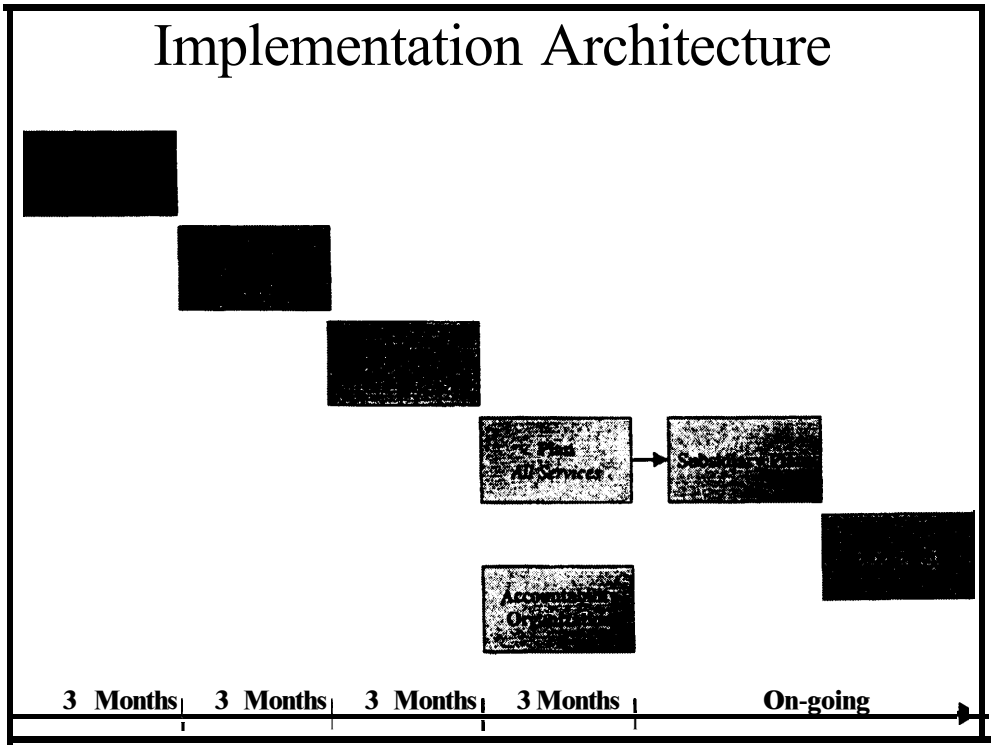
- Cannot have revolution in military affairs without transformation in logistics affairs
  - Tail mass is "impacting" the tooth (constrains tactics)
  - Tail cost is hollowing the tooth (constrains modernization)
- Leadership challenge an order of magnitude more complex than a major weapon system
  - $800B business over 10 years
- Information systems and survivability are critical enablers for transformation
- Failure to transform logistics is showstopper for 21st Century wax-fighter vision

Need a homerun or don't even step up to the plate

The rationale for logistics transformation is compelling.



The envisioned endstate of a transformed logistics system is depicted above. The logistics system architect is perhaps better depicted as part of "leadership commitment", rather than as a separate pillar.



To achieve logistics transformation, two ingredients are key: leadership commitment and an implementation architecture. (This is illustrated in the previous slide). The assumption, of course, is that logistics transformation implementation is grounded in an investment strategy, strongly supported and guided by senior leadership to execution through the PPBS process.

National Logistics System Metrics

Precursor Metrics	**Mission Planning Measures**	**Mission Execution Measures**
- RMA Done/RMA Planned	- Planning accuracy	- Delivery Reliability
- Financial System:	(% Forecast/ % Sent)	(% =/-1 Day) (% =/- 3 Days)
(Change done/Change planned)	- Cost/Ton delivered	- Cost / Ton Delivered
	(5 year change)	- Cost/Hour operation
	- Reliability MTBF of systems	- Quality
	(Change: 5 years)	(% Damaged/Wrong stuff)
	(Hardware /Software)	- Hardware/Software up time
	- Tonnage per unit	(Information system)
	(Change = 5 years)	(Weapons systems)
	- Cost/Military person	- Re-plan cycle time (Echelon?)

Focused Logistics
- Joint Deployment & Rapid Distribution
- Information Fusion
- Joint Theater Logistics Command & Control
- Multinational Logistics
- Force Medical Protection
- Agile infrastructure

Note: How metrics are used to manage/make decisions is more important than &sign of "perfect metric"

N.B.
Mix variance
-By command
- By Function

N.B.
Mission variance
Mix

Metrics by which to measure implementation success must also be developed to monitor plan execution.

Panel 1 was not able to develop specific metrics given time constraints but the above slide and the next two suggest some approaches, the second of which suggests developing an overall measurement called “Precursor Metrics” with two lower level measurements. This example suggests capitalizing on the measures already being used for Focused Logistics as described in Joint Vision 2010, then suggests development of other metrics to measure performance/progress toward attainment of more specific goals.

Calibrating a Transformation
(Economic Level Screening)

Objective: Provide a means to compare dissimilar recommendations, particularly the resources required, the effect on Time, Cost, Quality, and Technical Performance.

Degree of Change

Degree	Cost	Time	Quality	Tech Performance	Degree of Difficulty
Minor	**<15%**	**<15%**	Probably better	Somewhat better Existing parameters	Hard
Medium/Mod	15 - 40%	15 - 40%	Demonstrably better	Noticeably better	Moderate
Major/ Substantial	**> 40%**	**> 40%**	**Impressively better**	**New capability that changes system**	**Easy**

Cost: The one-time cost to implement an idea, and separately the on-going cost saving, or increase
Time: The calendar lapsed time to execute a series of activities, or the clock time to execute one activity
Quality: The reliability and consistency with which the same activity is performed many times
Technical Performance: The operating characteristics, particularly the change from generation to generation, or before/after an idea has been implemented. This is sometimes combined with Quality.

METRICS and MEASURMENTS

Precursor Metrics

% RMA Done 2010

in

% RMA Planned 2010

Focused Logistics

Challenges	Measures	Metric
- Information Fusion		Time to RE-TPFYD { Army 100hrs Div 10 hrs
-Force Medical Protection		_%Healthy and available
- Joint Deployment Rapid distribution		_% Doctrine done _% Assets in place
- Joint Theater Logistics Management		_% Doctrine done available _% Time-in-transit
- Multinatioual Logistics		_% Coalition doctrine done _% Functional commonality
- Agile Infrastructure		- Inventory in-hits - Equipment up-time - Response time & cost/function

Guiding Logistics Transformation: Senior Process Ownership

- **Finding**
  - **Those leaders with power to decide and direct resources need to be more visibly in agreement on:**
    - **Objectives for changing logistics**
    - **Organization for pursuing change**
    - **Plan and resources to be followed**
    - **Cost reduction approach**
  - **Because they are not, many trade-off opportunities will be missed, and the overall "project to improve logistics" will move slowly**
  - **. . . and the management of information needed to manage logistics will be years in coming.**
  - **In sum, more cohesive leadership is needed, even though many individuals are doing what they can do, well**
- **Discussion**
  - **Transforming logistics is a project that has the same needs as a weapons systm project:**
    - [illegible]
    - **Plan from now to completion**
    - **Tradeoff of resources, time, and quality early**
    - **Clear assignments, organizationally**
    - **Stability over several years**
    - **Tight coordination between related activities**
    - **Constant follow-up**
    - **Positive and negative incentives**
  - **Only the most senior leaders in DOD, acting jointly can provide these needs**
  - **So far, they have not**

Implementation also requires a clear statement of investment costs & projected ROI.

Implementation Overview

Executive Level

- A multi-year complex business project, Logistics Transformation, requires proportionate management attention, planning and control
- Logistics Transformation involves changing practices in 4 Services, 9 CINCs, 20t logistics commands, DISA, DITSA, DCMC, DLA and finance while spending $800 B and conducting upwards of 100 logistics missions over the next 10 years
- Leadership is essential
- "Leading" requires strong agreement among senior executives concerning objectives, resources, accountability, priority and incentives.
- Planning requires a view of all individual efforts, trade-offs among resources,timing, and technical objectives
- Control requires quarterly review of progress in considerable detail, insistence on schedule performance, and correction of resistant units.
- DOD knows how to do this in operations and weapons system acquisition.

Implementing Logistics Transformation

Implementing Logistics Transformation

DOD Departmental Leadership

- **Findings**
  - ***Top 50 (or less) Military and Civilian leaders need to be more visibly in agreement**
  - ***Executive Leadership is slow to decide trade-offs and give direction to organizations, resources, people, & technology.**
- **Recommendation**
  - **Agreement among top executives on scope, priority, urgency, objectives of Logistics transformation**
- **Implementation**
  - **USD and VJCS agree Executive leadership change is necessary**
  - **Select minimum group, ground rules, define purpose and payoff**

- The majority of senior military and civilian leaders need to be more visibly in agreement on the following areas:

  1) Objectives for changing logistics;

  2) Organization for pursuing change;

  3) Plan and resources to be followed;

  4) Cost reduction approach to save $15B.

  Also, because they are not in agreement, many trade-off opportunities will be missed, and the overall "project to improve logistics" will move slowly and the management of information needed to manage logistics will be years in coming. In sum, more cohesive leadership is needed, even though many individuals are doing what they can do, well.

- Transforming logistics is a project that has the same needs as a weapons system project: Clear goals, Plan from now to completion; tradeoff of resources, time, and quality early; Clear assignments, organizationally Stability over several years Tight coordination between related activities Constant follow-up Positive and negative incentives Only the most senior leaders in DOD, acting jointly can provide these needs. So far, they have not.

- **Executive leadership is slow to decide trade-offs and give direction to organizations, resources, people, & technology. This slow decision making process leads to: (1) significant opportunity to save money missed until services trust financial decision-making (2) information for managing logistics well is not available; (3) Fragmented, individual projects (some impressive), would have much greater impact if coordinated. Change is required at highest leadership level along with a multi-year plan with reasonable stability and follow-up. This follow-up needs an overall view on all focused logistics initiatives in order to create a much clearer understanding of why things are/are not being done.**

- **In order to find a solution: Create agreement among top executives on scope, priority, urgency, objectives of logistics transformation; prepare a single plan with trade-offs among resources, ROI, capabilities, organization, time, including metrics; clarify accountability for plan element achievements; Modify existing financial and planning systems to provide data and analysis for managing logistics.**

- **Implement the changes in the following manner: USD and VCJCS agree Executive leadership change is necessary; select minimum group, ground rules, define purpose and payoff; clarify priority of logistics transformation vs. other priorities; set objectives for stability of schedule, funding, and cost reduction; agree on information required for managing logistics**

Transformation Implementation

- **Logistics transformation is a complex, multi-year business process -- 5 to 10 year effort**
- **Strong persistent leadership is essential**
- **Requires**
  - Agreement at most senior levels (objectives, resources, priority, major trade-off decisions)
  - Comprehensive master plan
  - Enforcement
  - Staying power

Model after DOD's approach to managing the largest major weapon systems

In order to realize the tremendous benefit provided by the logistics transformation described, DOD must devote the same level of management attention to make it happen that is devoted to the largest weapon system developments or major shifts in operational concepts. Logistics transformation is a complex multi-year business project which affects $8008 and 100 logistics missions over the next 10 years. It involves changing practices in 4 services, 9 CINCs, over 20 logistics commands, DISA, DISTA, DCMC, DLA, and finance.

Strong persistent leadership is crucial to make the degree of changes that are necessary to accomplish the transformation in logistics. No commercial businesses are successful in transformation of this extent without giving the proper level of attention to the leadership issue. The leadership requires strong agreement among the senior executives regarding a shared vision for the enterprise, the objectives, the resources required, the expected outcome, the priority of the effort with regard to other activities, and the management approach. Proper leadership also insists that a comprehensive plan exists in sufficient detail to assure that key milestones are identified, appropriate resources are dedicated, tasks and responsibilities are defined, and accountabilities are understood.

Progress reviews are conducted in sufficient detail to assure schedule and budget performance and to address areas of poor performance. Since this transformation will take 5-10 years, it is important to implement a management approach and structure that will survive changes in personnel at executive levels.

This fundamental management approach is used by DOD whenever a very high level program or mission is initiated. It is ironic that the same level of attention has not been given to the logistics transformation since it has such a high potential to provide funds for future modernization and the success of future operations.

Implementation

- **Small senior executive group to guide (not delegate) with absolute authority (e.g., DepSec/USD(A&T)/VCJCS leading)**
  - **Top level master plan -- objective, metrics**
  - **Interfaces in control of funds**
  - **Guidance to "architect" regarding legacy systems**
  - **Establish accountability for the master plan**
- **System architect must control the resources to enforce the architecture implementation**
- **Senior working group (~20 persons) represent stakeholders to advise "architect" and/or senior executive group**
  - **Reflect customer needs**
  - **Develop detailed implementation plans**
  - **Establish budgets/milestones**
  - **Define personnel issues/options/training**
  - **Review implementation progress (metrics)**

To initiate logistics transformation, a small senior executive group representing OSD, acquisition and the services should reach agreement on the scope of the logistics transformation. They should set the overall objectives for the activity, establish top-level goals in terms of staff and budget reductions, establish guidelines for assignment of top-level division of responsibility and determine how funds are to be assigned and controlled. This group should define the role and responsibility of the logistics system architect and establish the proper reporting structure. They should continue to provide guidance and support for the logistics system architect regarding legacy systems and processes and assist in resolving significant issues. Guidelines regarding the extent of commercial use are also needed. It is important that the logistics system architect have control over the budget for implementing the logistics information system and allocation of funds in order to converge the transformation of the various processes and systems.

The senior executive group should establish a senior working group to represent the various stakeholders and reflect the user's needs. The working group develops the detailed implementation plan and monitors progress to the plan. They should define the appropriate metrics to assure success. A major effort will be to address the enormous personnel issues associated with such a drastic transformation (training, reduction in force, and reassignment of personnel.)

Guidelines For Change

- Minimum structural change
- Maximum cohesion among leaders
- Hard to reverse process
- Considerate of other pressures
- Use existing religion
- Use good past successes
- Meet minimum "threshold of change" requirements
- Reflect turnover, resistance and other disincentives

The above basic guidelines for implementation of logistics transformation can help achieve success.

To further ensure logistics transformation success, a distinct list of decision trade-offs required and a process for making those decisions is important.

Transformation Implementation: Decision Worksheet Trade-Offs

ODS Relationship
-CINCs (role) vs Services
-Demand reduction
-Urgency of new technology
- **Fuel - batteries - fast lift**

Vision 20XX
-20XX concept
-Urgency
-Measures of merit { Lighten, Cost, Time, Flex
-Acceptable risk
*Medical

Obstructionists
-Punishment

Industry
-Objective
-Public vs private
-Partnering/contracting
-Multinational corporations
-Capability scenarios
-CLS
-Cycle time

Plan
-20XX milestones
-Untouchables
-Prioritization

Money
- PPBS vs cost reduction
- Use of savings
- Color, flexibility
- Resources conflicts

Motivation
- Equity or asymmetric
- Promotion affecting/not
- Recognition mechanisms
- Punishments
- Neutralize resistance

Coalition
- Degree of dependence
- Prepo

-Architect power vs service power
-Money - decisions - protection
- Legacy vs new systems/processes
- Approve phasing, investment, risk

Technology
- Role/objective in transformation
- Portfolio approval/adequacy
- Modelling/simulation dependence
- Risk recognition
- Reactive vs predictive

Vulnerability
- Acceptable levels
- Unacceptable actions
- Minimum management

Organization
- WeapSys vs Svc vs Joint
- Role of reserve
- Degree of jointness

Fundamental Baselines for True Logistics Transformation

The following must be fixed to achieve true logistics transformation:

- DOD financial and accounting systems
- Total ownership cost awareness by all
- Institutionalization of "good ideas" in midst of churn and turnover
- Logistics integration with Acquisition cycle and process (joint requirements/acquisition)
- Logistics as a fundamental part of operational art of war
- Expenditures on legacy systems vs leaps
- Role, relationship, merger with commercial sector
  - Domestic
  - Global
- Integrated IS system
- Appointment of a Logistics System Architect

Panel 1 also looked at various critical enablers to implementation of logistics transformation. The previous slide summarized some of the major areas, while the next slide details the challenges facing DOD in effecting cost reductions.

Cost Reduction Practices

Commercial Practice	DOD Practice
• Clear Executive Commitment	• Unclear, words and actions conflict
• Clarity between volume reduction and cost reduction	• Confusion between volume reduction and cost reduction
• Constraints clarified early on quality, time, technical function	• Constraints unclear initially
• Separate project organization to accelerate	• Regular organization handles cost reduction
• Clear Plan	• Not clear
• Incentives (non monetary) made consistent	• Existing incentives (mainly procedural) are negative
• Difficult issues shared	• Difficult issues delegated
• Executives stay involved	• Little continuing involvement
• Approximate but acceptable measures	• Budget is measure

Key Logistics Transformation Implementation: Appoint An Architect!

- Appoint Systems Architect
  - Gain Service Chiefs and CINC agreement to position
  - Set objectives for information system from Chiefs/CINC veiwpoint
    - time, cost, risk, performance relation to other processes
  - Refine commanders needs
  - Inventory Legacy systems
  - Define architecture
  - Survey COTS
  - Modify requirements, other processes to COTS
  - Train government people
  - Set metrics

Logistics Transformation: A "Big Deal"

- Logistics unnecessarily constrains operations (OPTEMPO driven by LOGTEMPO)
- Also cost constrains modernization
- The logistic system
  - Consists of multiple processes and owners
  - Is inseparable from requirements, acquisition and operations
  - Consumes more dollars than any other DOD "system"
  - Does not satisfy warfighter requirements
- Our goal: Save $15B/year after 5 years
- More savings possible through greater DOD focus on total system costs

DOD Leadership must drive logistics transformation

In summary, the transformation of today's military logistics system is a "Big Deal". And implementation will require an extraordinary leadership commitment.

Logistics Transformation: Closing the Deal

"Talk the talk.. .Walk the walk'

- An area of extraordinary leadership commitment
  - Rhetoric - continuous emphasis
  - Policies - support transformation
  - Incentives - reward transformation
- Top leadership must determine priorities and direct resources
  - Establish clear goals, make clear assignments
  - Plan from now to completion, follow-up, ensure stability
  - Trade-off resources, time, and quality
  - Involve business and Industry

Logistics transformation leadership challenge far greater than any weapon system project!

Implementation Challenge

Transformation Champion Needed

Overall Political Realities

Commit to long-term vision . . . accept short term risk

Even with an extraordinary leadership commitment, logistics transformation will face numerous challenges.

General Barriers and Constraints

More questions than answers -- what are barriers that prevented implementation of other DSB recommendations?

Ability to forecast state of technology 10.20.30 years from now.

Projecting future on old paradigms (predictive powers poor).

Ability of people, policies, processes, and doctrine to keep pace.

Culture -- DOD.

National Culture, Will, and Values (complacency).

Organization barriers to debate; Service loyalty; trust in jointness.

Resource limitations; ability to reprioritize quickly.

Political, regulatory, and statutory limitations.

Inertia versus unrealistic expectations.

There are many reasons as to why previous needed actions have not been implemented. Logistics transformation implementation must address each up front. These are a few.

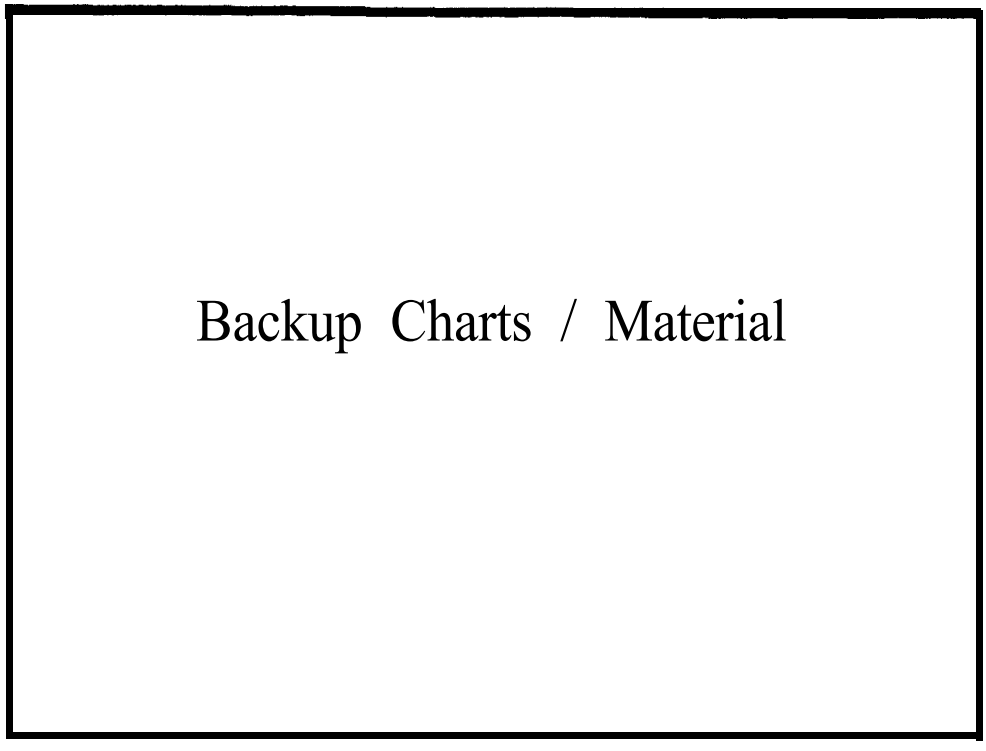
- Signal and data processing technology has had an order of magnitude every five years — so in 25 years, information technology will have 5x current capabilities.
- No one predicted rate of engagement of today's forces or the Asian financial instability.
- Already exhausting services with good intentions, high OPTEMPO, mismatch between ends and means
- DOD's ability to rapidly accommodate, learn, adapt and institutionalize change — still have a bi-polar mentality.
- Good ideas are overwhelming resources, including R&D.
- There exists a Depot Caucus, but not an equivalent Industrial Caucus — internal/external policies affect ability to change

Logistics Transformation: Make it Happen!

ACTION LIST

Authority →	DEPSEC/USD(A&T/VCJCS	USD(A&T)	Log Info/Business System Architect(once designated)	CINCS
IMMEDIATE	1. Form Logistics Transformation Senior Exec group to guide(not delegate) Plan, implement (see study Implementation appendices). (Bite the bullet!) 2. designate Logistics Info/Business system Architect (Reports to USD A&T/military guidance from CJCS) Give authority and resources to implement study IS recommendations (Just Do It!) 3. Red Team Assault on survivability (CJCS/Service Chiefs) 4. Direct Logistics unique CBW aspects included in all CBW planning (CJCS/service Chiefs)			
NEAR-TERM		- Modify TPFDL to reflect Survivability Issues * Apply same IW/IW standards to Logistics C3I System		
MID-TERM				
Require high level trades to do...keep oo Horizon				

XIV. BACKUP CHARTS & MATERIAL



In its deliberations Panel 1 generated numerous "notional" slides. The following are a few of these back up slides which may be of interest to readers.

Problems in Logistics Today
(Panel 1 brainstorming on Logistics System Problems)

- Limited precision visibility - (can't act upon what you see)
- no integrated joint combat support capabilities - GTN: no visibility for in process or in stage intransit visibility every 15 minutes (not real time)
- Functional stovepipe/rigid vertical organization/do it yourself rather than facilitate others
- Stovepipe supply chain management
- Huge inventory & huge footprint = MASS
- Lack of trust (just in case vs. just in time or anticipatory/predictive)
- Long. slow mobility & pipeline
- Revolution on DOD business affairs not a reality
- No common language; no COE
- Heavy, bulky, sluggish
- Industry contracted - less) LOGCAP - civil augmentation program) meshed
- Logistics is still "tail" in planning. requirements, acquisition, operations (not merged)

- Forward (not reach back or pull)
- Mystery containers
- Multiple levels of maintenance
- Choked ports
- LOTS of luck
- Piecemeal reform on CONUS
- Three levels of maintenance organic (unit)/intermediate/depot
- five stages: mobilization, reception, onward movement, sustainment, redloyment
- No "jointness" in 4 enablers: logistics. common, intelligence, medical
- TPFDL doesn't work
- JTAV doesn't cover reparables
- Contractor support not linked on battlefield
- PMs not linked to operations/logistics
- Poor link into commercial R&D

Deliverable 1: Set DSB Study Parameters

- DSB Study Timeframes
  - A: Study recommendations to achieve a logistics baseline: implementation (fully achieved / fielded) 2000- NLT 2010.
  - B: Study recommendations for logistics transformation: implementation 2000 -NLT 2025.

* Phases overlap to preclude self-fulfilling timelines for achieving both "baseline" capabilities and "transformation" capabilities. The concept behind these timeframes is to provide a baseline set of recommendations which will focus on achieving NLT 2010 logistics capabilities which support attainment of a second set of recommendations which comprise logistics transformation as projected out to 2025.

What Constitutes a True Logistics Transformation

Definition: ***Transformation in military logistics can only be achieved through a marked change in the nature and form of the structure and processes that equip, deploy and sustain military operations***

Attributes:

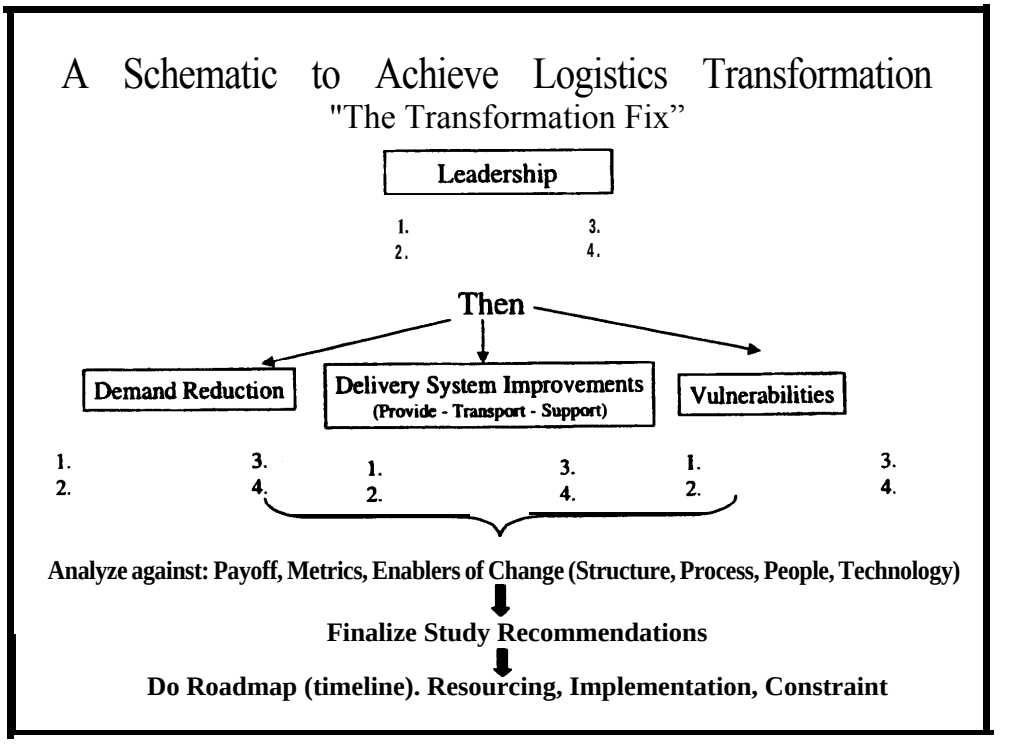
- Flexible responsive, capability based, configurable
- Reliable precise. smart - > brilliant
- Less cost/less people intensive
- Anticipatory/predictive
- Survivable (NBC & IW)
- Visible. integrated

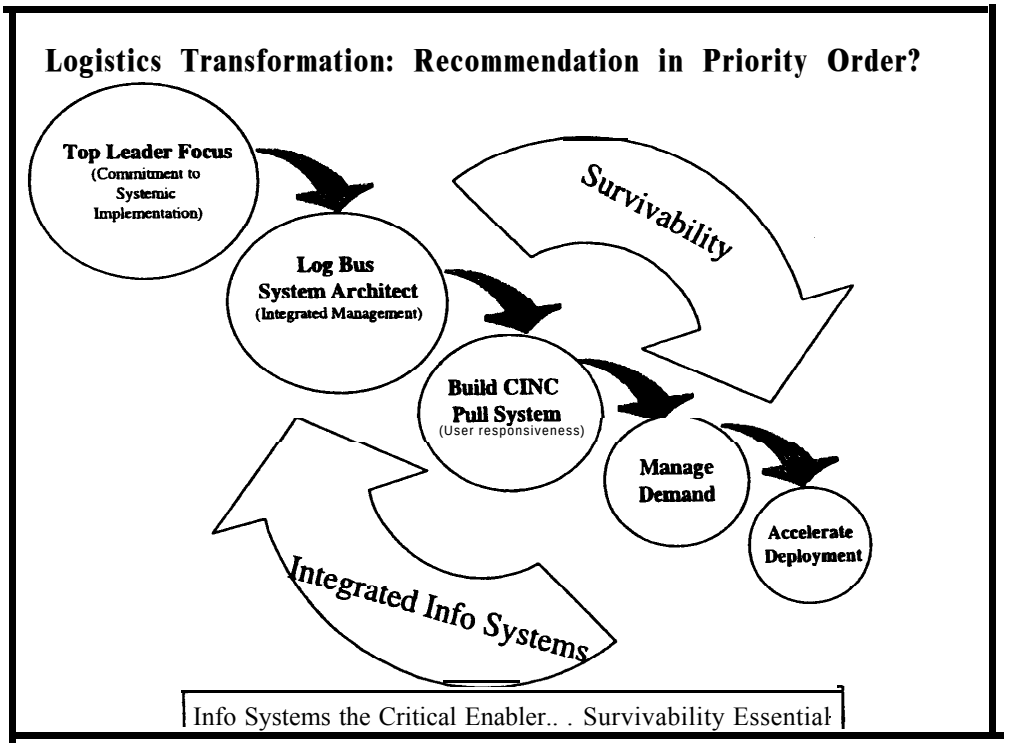
Vision of a True Logistics Transformation:

	Prime Enablers
1 Leadership (civilian & military)	
- Logistics is a fundamental part of the operational art of war (also not a CONUS/wholesale issue) →	-Planning budgeting, doctrine, simulation, training, doing
- CINCS know, understand and trust logistics (know whats needed, know will get at the right time, in right order) →	- Buit from tactical/operational user requirements plus embedded in above
2 Platforms/Systems	
- Platforms and combat system facilitate delivery and demand reduction →	- Total ownership cost/RDTE focus (Issue: legacy systems?)
3 Demand/Delivery Improvements	
- Logistics functional service stovepipes are transparent to any and all "need-to-have" users →	- Integrated, shared, correlated and standardized systems

2025 CONUS Logistics Transformation Vision

- BRAC a must
- 2 level maintenance
- DOD industrial activities outsourced
- Base community support infrastructure replaced (schools, commissaries, family housing, medical care, entertainment) with pay increases (including retire offset)
- Embeds military in community
  - **Economic value for community**
  - **Improved QOL**
  - **Cost savings through overhead reduction**
- Exploit commercial processes and capabilities


A Schematic to Achieve Logistics Transformation
"The Transformation Fix"
Leadership
1.
2.
3.
4.
Then
Demand Reduction
Delivery System Improvements
(Provide - Transport - Support)
Vulnerabilities
1.
2.
3.
4.
1.
2.
3.
4.
1.
2.
3.
4.
Analyze against: Payoff, Metrics, Enablers of Change (Structure, Process, People, Technology)
Finalize Study Recommendations
Do Roadmap (timeline). Resourcing, Implementation, Constraint


Logistics Transformation: Recommendation in Priority Order?
Top Leader Focus
(Commitment to Systemic Implementation)
Log Bus
System Architect
(Integrated Management)
Build CINC
Pull System
(User responsiveness)
Manage
Demand
Accelerate
Deployment
Survivability
Integrated Info Systems
Info Systems the Critical Enabler.. . Survivability Essential

Discussion #0: Key Elements of Weapon Logistics Support Costs

- Engineering
- Production/Manufacturing
- Maintenance Strategy
- Technical Data
- Spares planning
- Training
- Configuration Management
- Support
- Disposal

Sources of Support

- OEM
- Service Organic
- Hybrid

Alternatives: How to Support?

- By Key element
- By Weapons System
- By Subsystem
- Hybrid

Panel 1 Logistics Transformation Design Principles

- **Global assured situational awareness and delivery**
  - **Awareness real time (not near real time) -- combined air, space. ground, sea**
  - **In theater receive in hours, not days (pull, not push)**
  - **From CONUS to anywhere in the world: 2-4 days**
  - **From CONUS to anywhere else in CONUS: 1-2 days**
  - **Predictive, anticipatory, precise, tailorable, scalable, modular**
  - **Total global visibility (from individual to HQ. from supplier to acquiring source)**
  - **Global assured, "virtual" direct order, direct delivery, virtual inventories (eliminate redistribution)**
- **Simple, small, survivable**
  - **People simple/friendly -- less people intensive**
  - **Low to no mass (footprint: CONUS to theater and back)**
  - **Low to no maintenance/high reliability (diagnostics-prognostics-modular repair)**
  - **All next generation systems/subsystems have improved reliability equal to 1/2 delta between current benchmark and 100% reliability (AF TOC goal)**
  - **Capabilities (not commodities) managed (across conflict spectrum)**
  - **Systems and components "lightened" in bulk, weight, log support**
  - **C/BW and IW survivable - offense capability**

Panel 1 Logistics Transformation Design

- Organization/Operations/One Jointnes
  - Implode "owners, organization,
  - Integrated, correlated,
    - **Organization, requirements, owners (few as possible),**
    - **Common**
    - **Common language, documents, definitions, information, standard**
    - **Common operational doctrine and**
    - **Common threat assessments/predictive**
    - **Common training, modeling,**
    - **Common platforms (or interoperable by different**
  - OPS, I, CSjoint and
  - System capability across the
  - Lengthened operational o r
  - Issue: common/ioint vssegmented acquisition, doctrine, training merger?? Caterpilissue

Panel 1 Logistics Transformation Design

- Cost/Life
  - Designed for easy/rapid tech
  - Doctrine and systems evaluation criteria
    - **Tech insertion** *
    - **Supportability** *
    - **Retrograd** *
  - New systems replace or work with old systems with legacy
  - All next generation systems/subsystems equal or than current benchmark (AF TOC goal),
  - Highly reusable
  - Peacetime cost effectiveness = wartime agility
  - Fast
  - Integrates industry/academia (mergers, outsource

DEPLOYMENT PANEL REPORT

Panel Chairman:

General Al Hansen, USAF (Ret.)

DSB Members

VADM Mike Kalleres, USN (Ret.)

Mr. Milt Minneman

Panel Advisors

Mr. Lou Chaker

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Mr. Larry Glasco

CAPT Alan Harms, USN

CDR John Joerger, USN

Mr. Bill Leary

Col Rick Lien, USAF

BG Philip Mattox, USA

LTC Robert McCalmont, USA

RADM John Scudi, USN

Mr. Tom Sweeney

COL Rod Thomas, USA

Mr. Frank Webber

Panel Support

Mr. Christopher Szara, SAIC

Maj Wynne Waldron, USAF

Deployment Panel Report

1998 Defense Science Board Summer Study on

DOD Logistics Transformation

I. PANEL VISION

To achieve the most efficient combination of logistic velocity management, agility and commercial practices that result in Best Value to the Department of Defense (DOD) and the warfighting CINC.

II. PANEL STATEMENT AND OVERVIEW

The deployment process (intra/inter-theater lift') is critical to the success of any contingency operation. Based on the lessons and deficiencies learned during Operation Desert Storm, a major effort has been made over recent years to enhance both sealift and airlift. However, much still needs to be accomplished. With the reduction of U.S. Forces overseas, the capability to quickly deploy forces to the battle area has reached a critical state. In most cases, decisive early action can reduce the follow-on force requirement significantly. At the present time, the U.S. falls short of meeting the operational timelines for early entry and follow-on sustainment to take advantage of a rapid strike force. Transportation nodes in the U.S. and overseas are extremely vulnerable and even under the best conditions can congest very easily. While advances in transportation modes have been made, the basic infrastructure of our ports, rail, and loading/unloading systems have remained virtually unchanged for the past 50 years. Since only small amounts of R&D funds have been allocated to improve the infrastructure, progress has been extremely slow. Most improvements have been incremental and no "break-through" technology exists today.

The planning process remains fragmented and lacks discipline, even though much attention has been directed toward it. The Joint Chief's of Staff have identified USACOM as the single owner of the Deliberate Planning Process. While this is a major step forward, this report identifies several existing deficiencies that must be resolved to ensure a responsive planning process.

To achieve the warfighting CINCs' stated operational requirements as well as the objectives of Joint Vision 2010, DOD must try to influence evolving transportation technology. It should be noted that today's lift technology and capacity does not meet the future desired closure times (see Figure #1). To date, DOD has yet to identify any future military lift requirements to industry. Absent these military requirements, industry is moving ahead with their own expectations

1 Intratheater lift has been addressed jointly in the Joint Deployment Summer Study

and vision of these requirements. As a result, commercial requirements are dominating the development effort.

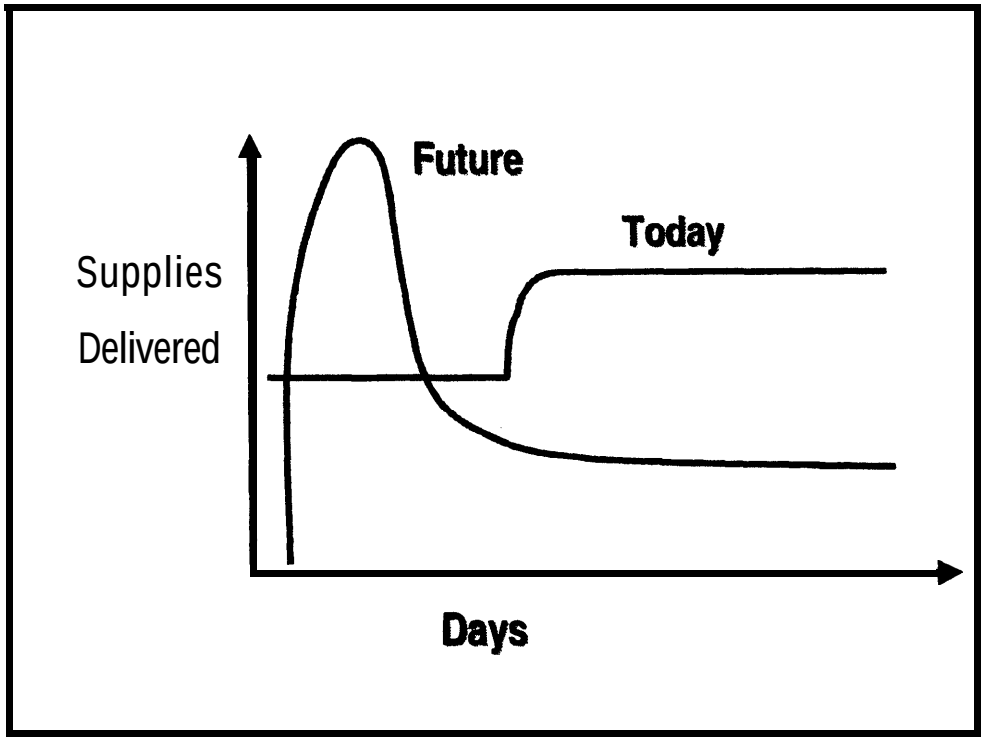

Figure #1 : Logistics Velocity

It would be in the best interests of DOD to establish overall military lift requirements to be further augmented by a modest R&D effort. This approach would ensure the proper recognition of military needs during the development phase. In the long term, this could result in substantial savings in future development costs and time. Relying on commercial development could be lengthy, however, the entire development process could be accelerated if DOD would commit to production as early as possible.

Today's deployment infrastructure is massive and inflexible to the changing needs of the warfighter. CINCACOM has recognized this and subsequently expressed serious concern about our ability to ingress / egress U.S. ports – air, sea, and land. When further considering the limited number of foreign capable ports and their inherent vulnerability, the problem becomes critical. Terrorist actions against one or two shipping nodes could stop the entire deployment process. Some effort by the Services has been directed toward the development of "Agile Ports," however, this effort has experienced minimum funding and progress is very slow. It is safe to say that major U.S. transportation nodes impose serious limitations on force deployment.

This Panel Report makes recommendations to reduce today's dependence on the transportation infrastructure by improving both aerial and shipping port infrastructure and processes. A top consideration must be made to bypass these bottlenecks and deliver forces directly to the theater. (See Figure #2) At this time, only major technology advances will make this possible.

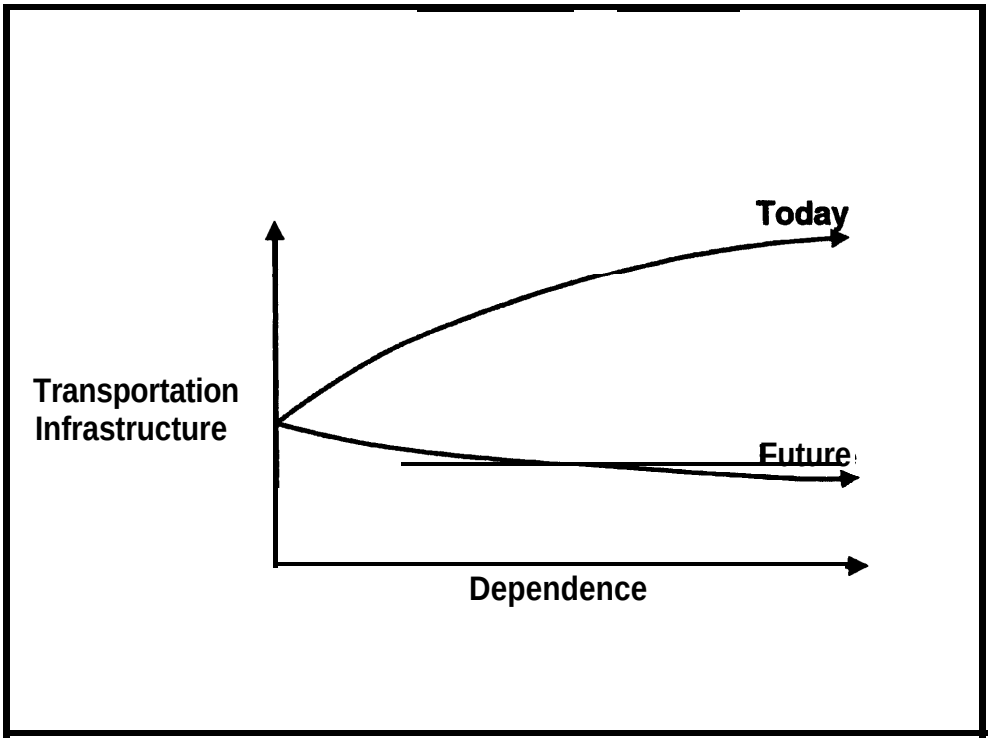

Figure #2: Minimum Logistic Infrastructure

Although a major acquisition effort would provide a leap-frog approach to transformation, this panel recognizes that fiscal constraints are imposed on defense budgets. Nonetheless, many other opportunities exist with modest associated costs that would lead to a firm baseline for transformation. Foremost are changes to, and the discipline of, the planning process. Today's planning process is extremely complex, inflexible and leads to "push" logistics rather than meeting the CINC's specific requirements. This single recommendation can result in major improvements. It is important to realize that major transformation will occur only if technology breakthroughs are possible.

This Panel also firmly believes that strengthening the role of USTRANSCOM in controlling both transportation and associated business processes will greatly improve the overall response to the war-fighting CINCs. At the present time, the transportation process is badly fragmented, resulting in excessive costs and inefficiencies. In many cases, USTRANSCOM is outside of the key transportation processes, such as finance, R&D, acquisition, standards,

and information systems. This strengthening action alone would not only improve the deployment response, but save hundreds of millions of dollars through the elimination of unnecessary costs.

Another illustrative recommendations concerns Foreign Military Sales (FMS). The FMS program was created to encourage allies to buy U.S. military equipment thereby enhancing interoperability. Over the years, the program has centered more on political, as opposed to, military benefits. Additionally, allies object to many of the policies and associated costs of the FMS process. We believe that a fresh look at the FMS program would encourage our allies to buy U.S. equipment and could result in interoperability improvements with an associated reduction in the logistic footprint. The U.S. should not exclude allied development and production since buying allied equipment would save millions of R&D dollars while simultaneously reducing the footprint.

Alternative methods of logistic support have also been examined and identified in the 1996 DSB Summer Study. We continue to endorse these recommendations and have highlighted some additional opportunities. For example, third-party logistic providers (3PL) responsible for all aspects of weapon system modification, maintenance, and item management, have great cost reduction potential. The 3PL approach should be applied to both developing and existing weapons systems. It would recognize the best of both the private and public sectors and join in a partnership that provides best value to DOD. While this Panel endorses the 3PL approach, it is also concerned that stovepipe logistic systems for each weapon system are not developed. It is extremely important that the overall battlefield logistic system be totally integrated.

Finally, while conducting research for the 1998 Summer Study, several logistics areas requiring management attention were discovered. These areas are presented in the following Panel Recommendation section along with recommended corrective actions.

III. PANEL RECOMMENDATIONS

1. High Speed Transport Technologies

The U.S. global deployment system is the only such system in the world. No other nation (ally, friend, past or future adversary) comes close to matching U.S. capability. The system consists of airlift, sealift, land and sea prepositioning, all buttressed by commercial air and sealift fleets and support elements. Upon the completion of current airlift and sealift programs, the required lift capacity will be achieved. However, there are other deficiencies that must be corrected to ensure the rapid movement of forces and equipment.

Today's mobility system can be characterized by the following:

a. Ability to move rapidly from forts, bases, and depots to the air/seaports of embarkation (A/SPOE);

b. Acceptable throughput in the SPOE to move rapidly to the dock;

c. Slow loading of airlift aircraft and sealift ships;

d. Airlift of adequate speed but moderate capacity and range;

e. Ships of moderate speed, but adequate capacity and range;

f. Enroute bases for refueling;

g. Air-refueling aircraft;

h. Land and sea-base prepositioning sites close to current forward bases;

i. Ability to rapid& unload at air/seaports of debarkation (A/SPOD) and over-the-shore under sea-state two conditions;

j. Intratheater movement of forces and supplies;

k. A developing global transportation network providing command, control, communications to locate all elements of the system and the personnel, forces, and cargo being carried;

l. Extreme vulnerability.

The required characteristics of a "21 st Century Global Mobility System", that is responsive to the theater CINCs for warfighting force deployment and sustainment, as described in JV 2010 and the DSB 1998 Joint Operations Summer Study, are:

a. Ability to deliver a light, agile, air transportable land combat strike force to kill enemy mechanized armor, with 24 hour global reach from CONUS, to forward secure airfields;

b: Ability to deliver the follow-on force, starting in 1 week, to ports, over-the shore, or to off-shore support ships/platforms;

c. Upon request, provide war-fighter urgent sustainment from CONUS anywhere in the world in 1 day to meet emergency needs;

d. Upon request, provide warfighter less urgent sustainment to the warfighter from CONUS in 1 week to assure confidence that requisitioned sustainment will occur as planned, thus avoiding double requisitioning and pile up of sustainment at bases;

e. Be independent of prepositioning, refueling and enroute bases.

As identified by this Panel, the current system has the following deficiencies:

a. Only very light forces can be air deployed in days. Military intertheater airlift range is too short, dependent on enroute stops and refueling, and cannot deploy an early entry force or deliver urgent sustainment in 24 hours to anywhere in the world;

b. The Civil Reserve Air Fleet (CRAF) cargo compartment configuration, APOD requirements, and range are inadequate to deliver forces to the theater in a timely manner;

c. Military sealift is too slow and cannot deploy follow-on forces or deliver less urgent sustainment in one week to anywhere in the world. Follow-on forces deployment and sustainment take weeks, when sailing from CONUS;

d. Significant early land combat power delivery thus depends on the availability of land and sea based prepositioning nearby to the combat area, at which point airlifted military personnel can unite with their equipment. Prepositioning is expensive, vulnerable, politically constrained, and may not be available when needed;

e. Commercial shipping configuration and speed is inadequate to deliver forces to the theater in a timely manner;

f. The throughput of CONUS SPOEs' is constrained and does not permit timely loading and sailing of sealift ships;

g. Theater SPODs often have primitive capabilities which are inadequate for intensive discharge operations;

h. Logistics-over-the-shore is limited to sea-state 2 conditions. Operations can only be performed 50 percent of the time in the Persian Gulf. [2]

Recommendations:

The following are recommended to meet the deployment and sustainment objectives:

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2 Data source: Carderock Division, naval Surface W arfare Center.

a. USTRANSCOM should establish the long-term objectives of the 21st Century Global Mobility System as follows:

1) A global airlifter capable of 24-hour direct delivery from CONUS airbases to forward theater airbases (Tentative Objectives: 12,000 NM range, 600 knots speed, 75 ST capacity, 3000 x 90 ft APOD runway);

2) A global mobility vehicle (replacement for present sealift) capable of one week delivery from CONUS to the theater (Tentative Objectives: 12,000 NM range, 150 knots speed, 100,000 sq. ft capacity, integral loading/discharge at ports, over-the-shore, or at a theater sea based support ship).

b. DOD should exploit selective commercial capabilities by modest investment to enhance the defense value of new air and sealift technologies. To initiate this, USD(A&T) should evaluate feasibility of the various technology concepts attaining these objectives as well as the potential for commercial partnerships. Examples of these technologies, their characteristics, and current limitations in meeting DOD objectives are:

1) Blended Wing Body Long-Range Aircraft (500 knots, 12,000 NM, 75 Tons) -Limited cargo height, excessive landing distance;

2) Hydro-ski (200 knots, range, and capacity TBD) - Tests did not verify speed, TBD;

3) 200 knot Surfing Ship (200 knot, 20,090 Tons) - Unproven technology;

4) Wing in Ground Effect (450 knots, 6,000 NM, 125 T) - Limited range and excessive landing dimensions;

5) Large Airship (150 knots, global range, SOOT)-Limited payload, excessive landing distance, uncertain takeoff/landing in high winds;

6) Fastship (40 knots, 4,000nm, 10,000T)- inadequate speed and range.

c. USD(A&T) should establish commercial partnerships, and provide seed R&D funds with a commitment to procurement as soon as possible for the selected concepts.

d. USTRANSCOM should develop a road map to introduce new systems into the DOD/Commercial fleet with an IOC of -2010.

e. The large, growing, commercial airlift fleet should be enhanced to support strategic deployment by:

1) Providing CRAF enhancements to maximize suitability for carrying a larger fraction of military cargo (larger door width and height, increased deck height, greater cargo floor strength, and increased deck height, and rapid ramp loading;

2) Using the enhanced CRAF characteristics as a key design criteria for land forces equipment development.

2. Deliberate Planning Process

The Joint Operations, Planning, and Execution System (JOPES) encapsulates the command and control system for the DOD. It consists of hardware, software, and standard operating procedures agreed upon by the Joint community, specifying timeframes, actions, activities, and responsibilities for planning and executing either deliberately or in a crisis mode. It is the deliberate process that has been root cause of many of the U.S. military's deployment/redeployment problems. Today, as in the past, there is not a single process owner. There are several partial "owners" of JOPES that have, over the years, created both seams that are not easily crossed in execution and procedures that are not easily modified to fit the real needs on an ongoing deployment.

The current process is extremely time consuming due to three factors. First, the process requires coordination and concurrence to extremis. Second, much of this is done without the aid of automated assistance except in the most basic sense. Third, one change anywhere in the plan can send the entire planning community back to "square one." These characteristics all lead to the first major problem, that of plan inflexibility and adaptability. Even though planning doctrine calls for "branches and sequels" or plan options, coming to agreement and arrangement of such options is extremely difficult. When plan execution begins, the inflexibility becomes evident and continued execution then depends on human intervention at all levels.

As an example, JOPES command and control procedures are not linked directly to the procedures and systems used by USTRANSCOM and the Defense Transportation System. Command and control measures increase the number of natural "seams" in the current system. As such, they increase the need for more command and control agencies, more checks in plan execution, and more people wanting more information. The resultant number of layers increases the number of required agencies to be coordinated. However, of all the organizations that need such data, the supported CINC needs it most, since he drives the priorities, and has less visibility over the entire system. Unfortunately, responsibilities for reception, staging, onward movement, and integration are still indistinct after concerted efforts to clarify roles and missions.

This is exemplified by the quantity of errors typically found in today's process. These errors, often as high as 40-60 percent, occur more frequently than imagined. During a recent Joint exercise, a deployed unit requested redeployment of more cargo than they deployed. Two vessels were programmed for the movement. Actual cargo was less than one shipload and the service paid for an extra vessel. On another occasion, actual unit load requirements were estimated at 40 percent of the real requirement. Upon port closure for loading, the 60 percent shortfall was evident and the unit closed late. In addition, allies and coalition partners are handled on an ad hoc basis for a variety of reasons and with the built-in "lethargy" of the current system, these additions have been very disruptive.

In addition, sustainment shipments which are destined to either bring theater level stocks to wartime levels or to automatically begin filling the "pipeline," are only notionally annotated in the deployment Time-Phased Force Deployment Data (TPFDD). This is done primarily to help with the overall feasibility estimation of the plan conducted by TRANSCOM. As soon as the Time-Phased Force Deployment List (TPFDL) is executed, these shipments are stripped out and reprogrammed through the "regular" booking systems. As a result of limited or negligible access to industrial data bases and lack of shipping documentation standards by commercial vendors, direct shipments from these commercial vendors are often not programmed nor planned in the TPFDL. In the end, the lack of supported CINC visibility of the actual sustainment bound for the theater creates huge mountains of stocks that clog facilities. This is a significant problem area that must be addressed. This Panel agrees that the operational and sustainment movements must be planned with real, accurate data.

Recommendations:

a. DOD adopt a dynamic planning system that incorporates operations and logistics requirements into the same process by 2002.

b. DOD fully fund and field the automation programs/applications that enable the above dynamic planning system by 2002. These should be: JTAV, GTN, TC-AIMS II, and JFRG.

c. DOD fully fund and field the virtual data base needed to populate the dynamic planning system by 2001.

d. DOD formalize USACOM as the overall deployment/redeployment process by 1999.

e. DOD immediately start disciplining these systems in terms of data accuracy and quality. The Department should begin to use real data in plans and planning efforts. This must include readiness and organizational data and the Services should be directed to start providing this data now.

3. USTRANSCOM Expanded Role

USTRANSCOM is a $7 Billion per year operation ($4.2B Transportation Working Capitol Fund (TWCF), $1.1 B Houshold Goods, and $2.1 B Air Mobility Command, Operations and Maintenance (AMC O&M).) Its peacetime operations sustain DOD's wartime base that is critical to any successful deployment.

While examining the transportation process for possible efficiencies, this Panel noted that USTRANSCOM is only one of several players on the Defense Transportation System (DTS). Because of this fragmentation of process ownership, USTRANSCOM has not been able to apply the cost reduction tools that corporate America has found so successful in eliminating, in many cases, up to 30 percent of process costs. There tools include:

a. Total process review and understanding,

b. Elimination of non-value added steps,

c. Identification of cost drivers,

Metric development and monitoring,

d. Responsive strategic planning,

e. Effective use of informational systems,

f. Positive customer relations.

The fragmentation of the transportation authority has resulted in the development of many process seams. While the agencies responsible for these seams recognize the cause of the deficiencies, conflicting priorities have prevented their resolution. One example is a non-responsive accounting system. Any successful cost reduction program begins with an overall understanding of costs and the ability to continually track cost reductions associated with improvements. At the present time, eight months elapse before the Defense Accounting System can identify costs associated with the DTS. Other examples are as follows:

a. Lack of timely, accurate financial and operational data,

b. Accounting process de-linked from responsibility and accountability,

c. Restricted ability to recapitalize equipment and infrastructure,

d. Rules and rate processes do not incentivize good customer behavior,

e. Cumbersome regulations and oversight,

f. Disconnect in contracting authority and responsibility,

g. Restrictive workforce regulations.

USCINCTRANS has already identified to the Secretary of Defense several improvement initiatives. There are listed below:

a. Designation of USCINCTRANS as head of agency for purpose of acquisition of common-user transportation and related services;

b. Assignment of defense transportation operational regulations and procedures authority to CINCTRANS;

Creation of a separate Working Capitol Fund account for USTRANSCOM;

c. Implementation of Transportation Working Capitol Fund Operating Gain Share process;

d. CINCTRANS consultation of Defense Transportation System (DTS) weapons system support;

e. Creation of a joint reporting responsibility of DFAS transportation accountants;

f. Designation of CINCTRANS as approval authority for DTS automated information system architecture and standards;

g. Creation of a streamlined process for tailored rates to influence customer behavior in the year of execution;

h. Establishment of USTRANSCOM as a test project for hiring and transfer of function flexibilities for civilian employees;

i. Designation of CINCTRANS as a Federal Government transportation provider for readiness related programs;

Workforce sizing flexibilities.

These initiatives make good financial sense and will lead to large cost reductions. In addition, the capability of USTRANSCOM to **support** the War-fighting CINCs will be enhanced.

Recommendation

In order for the Secretary of Defense to streamline the transportation process by eliminating fragmentation and seams, it is recommended that USTRANSCOM be assigned total authority over the DTS.

4. Joint Reception, Staging, Onward Movement, And Integration (JRSOI)

JRSOI is one of the major seams in the projection of power and as such demands significant attention. If deployed personnel and equipment cannot be merged into "fightable units", the entire reason for deployment is moot. Until recently, doctrine was disjointed and unclear as to what agency had what command authority, especially in the Joint arena. This is especially true when forces are transferred from one commander to another. Unless change occurs, these difficulties will continue to occur in operations running the full gamut from small humanitarian aid missions to full-scale war.

The greatest difficulty arises at the end of the JRSOI process, when forces under some definable characteristic of combat readiness are provided to the combatant commander for employment. The acceptance, turnover, and control of these forces between the two command authorities has been worked out on the spot or in a very deliberate process. Working out these details "on the fly" is

the worst possible scenario. Endemic in this decision is who, how, where, when, and under what command "authority" and although appearing simplistically easy to an outsider, inaccurate, imprecise, or unclear transfer mechanisms cause immediate and oft times extremely disruptive results. Doctrine has been vague for a variety of reasons, none of which appear valid any more.

The Panel recognizes the continuing work of the JSJ4 Deployment Process Improvement Working Group in this overall area. However, there are two JRSOI processes that need immediate attention. First, who is responsible for JRSOI and with what forces? Second, where does the transfer of command take place? The appointment of an overall deployment/redeployment process owner will go a long way in resolving these disconnects. This Panel supports the selection of USACOM as the overall process owner, but it is important to note that the complete resolution of these issues must be ensured.

First, the Joint doctrine must be clarified. There is currently, in draft, a proposed Joint Publication 4-01.8, JRSOI that warrants the attention of Department senior leadership so as to underscore the immediacy of corrective action. Because it is an integral part of the overall power projection process, the JRSOI activity should not be a detractor to either effectiveness or efficiency. The proposed doctrinal changes go a long way to clarity of responsibilities at all points in the process. With USACOM in charge of the "process", it should be understood that USTRANSCOM is the executor of the DTS and as such owns most of the organizations that do the A/SPOD missions. As a result, CINCTRANS best understands the critical function of port clearance and part of that process is the marriage of people and equipment into functioning units.

Recommendation:
USTRANSCOM should be responsible from the port to a mutually agreed assembly point. This will smooth the seams, especially the command and control hand-off point and process. In this capacity, CINCTRANS will be responsible to the Theater CINC and his logistic commander, as recommended in this report.

a. Establish the Joint Tactics, Techniques, and Procedures (JTTP) for training and then insist that JRSOI be exercised whenever and wherever practical. USACOM should put JRSOI high on its training resource list to ensure that adequate funding is available for combatant CINC training. CINCs must insist on adequate funding for training on this and ensure that joint and component exercises include JRSOI.

5. Commercial Solutions

Today's military logistics system is best described as one which inherently develops and uses organic capability and one in which demand is satisfied through standing inventories, inflexible policies and time-inflated procedures. Moreover, this is reflected in an infrastructure which uses large proportions of personnel and capital. In addition, the responsiveness and agility of the system

to satisfy the warfighter's requirements are arguably not the best in the world relative to industry standards. The Table 1 compares several logistics metrics of world class companies to those of DOD.

Process	DOD	Commercial Companies		
Distribution *(for in-stock items)*	Pick & Pull 7 Days Redist: 10 Days *(DOD average)*	1 day *(Motorola)*	3 days *(Boeing)*	2 days *(Caterpillar)*
Repair *(cycle time)*	4-144 days *(DOD average)*	3 days *(Compaq)*	14 days *(Boeing Electronics)*	14 days *(Detroit Diesel)*
Repair *(shop time)*	8-35 days *(Army tank/truck)*	1 day *(Compaq)*	10 days *(Boeing Electronics)*	5 days *(Detroit Diesel)*
Procurement *(administrative lead time)*	70 days ***(DLA)***	4 days *(Texas Instruments)*	0.5 days *(Portland General)*	Minutes *(Boeing, Caterpillar)*

Table 1

Note that the selection of the companies was based on the companies' profiles being similar to that of DOD — their equipment was fielded throughout the world, in various climates and terrain, and in the same magnitude of yearly requisitions.

It is self evident that the DOD logistics system has not kept pace with industry. In addition, the industry's emphasis on customer satisfaction (responsiveness, cost and quality) has forced a greater analysis on the core business processes while outsourcing those functions performed more efficiently by other suppliers. While some programs within the Department of Defense have transitioned a portion of their logistics elements to contractor support, the wholesale effort to outsource non-core functions have not been totally successful due to a number of reasons, as Figure 3 depicts,

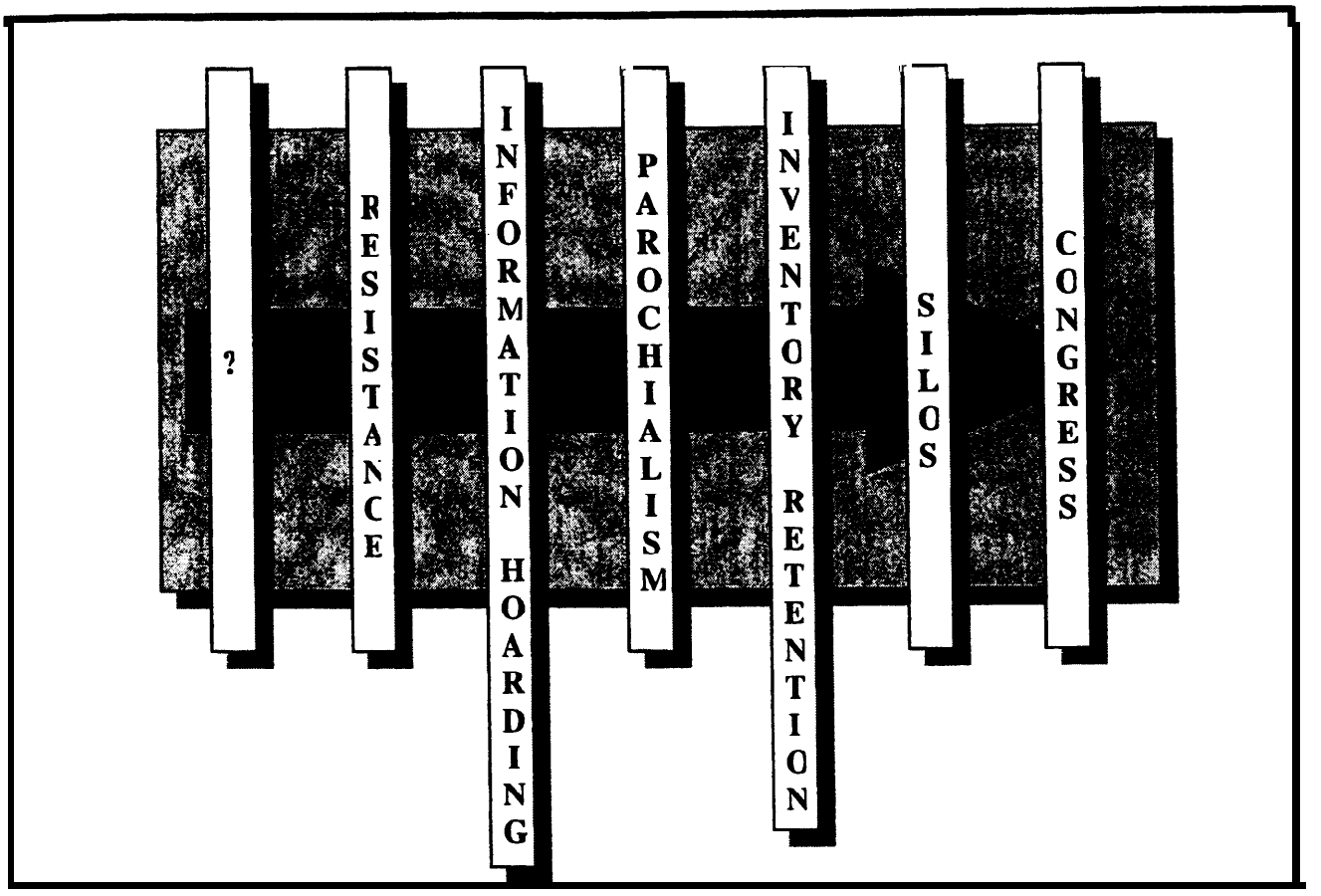


Figure 3

The natural cultural resistance to changing the long standing and embedded processes and policies of years of "doing it this way" is a significant barrier. However, other political influences significantly impact on the Department's ability to reach private industry world class benchmarks. Regardless of the "people" issues, some internal DOD initiatives have progressed over time to make the military logistics system still the best in the world today. Unfortunately, neither the progress nor the associated cost reductions have been fast enough. As shown earlier in the report, the procurement accounts experienced a 56 percent decrease (from $104B in 1988 to $46B in 1998) while the O&M account only decreased by 16 percent in the same period ($114B to $96B). One can see that DOD can no longer afford the system as we have it today. Increasing capability while at the same time reducing costs is of primary concern.

In addition to being responsive to the CINC needs, a key tenet of this DSB Transformed Logistics System is that it be well integrated with industry. This

translates to the application of commercial solutions to enable the DOD to meet or exceed world class benchmarks. The 1996 DSB Study on Innovative Support Structures for the 21st Century recognized this fact and recommended a shift to apply commercial solution to the DOD system. Although only some of the recommendations of the 1996 Study have been implemented, this Panel recommends that action be taken to implement the remaining 1996 recommendations once again. However since the 1996 Summer Study was completed, industry has leaped further ahead in developing new solutions - some of which are shown in the following chart. Unfortunately, DOD has not kept pace.

Figure 4

Some examples of successful industry initiatives and alternatives that DOD could embrace include:

a. Contracting "in"

- Revised business practices,
- Public-private partnerships.

b. "Leasing" arrangements.

c. Increased use and implementation of COTS products/systems/solutions.

d. Consolidation/elimination of selected (non-core) functions and activities.

This Panel would like to highlight two concepts of note: Integrated Supply Chain Management (ISCM) and 3rd Party Logistics (3PL). The former is a partnering of multi-enterprise suppliers to meet the mutual (and not always

identical) needs of all the players. This will focus on replacing inventory and transportation with advance planning systems and communications and at the same time, achieving cost effective operational excellence across the chain. The success of ISCM is heavily dependent on evolving IT capabilities. The application of this concept can be exercised with either DOD as the lead or by being totally contracted out — a process called 3rd party logistics — wherein an independent contractor manages some or all of the parts of the supply chain as shown in Figure 5.

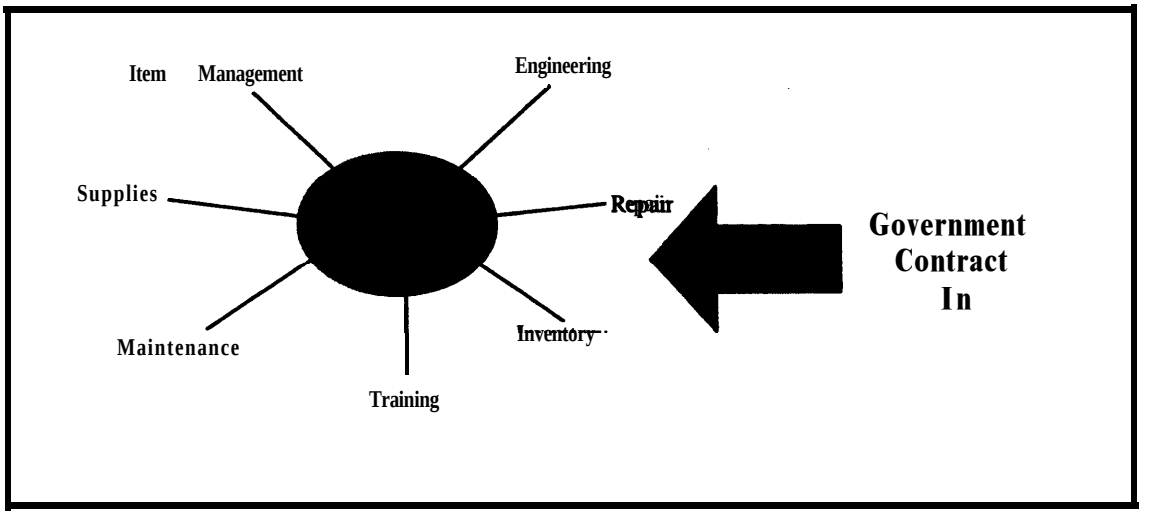


Figure 5

It also must be noted that this a fast growing sector of a commercial practice is increasingly utilized in industry as an efficient, effective means of satisfying customer demands. Some examples of the results companies adopting 3PL is shown below. (See Table 2: Examples)

There are more numerous example of industry outpacing DOD in innovative logistics applications and in the use of alternative logistics support methods. These companies, of varied commodities, have benefited from leading edge processes, technologies and policies - building upon earlier improvements - and experiencing a faster rate of innovation as time passes. DOD has not capitalized on many of the processes, technologies or policies available in the private sector – conceivably widening the gap.

1996 DSB Summer Studv. Although some of the tenets of the 1996 DSB Summer Study have been embedded into DOD policy such as the DODD 5000.2R , adoption of the 1996 recommendations has been inconsistent. Where recommendations have been adopted, DOD has not seized upon the new technologies and capabilities emergent in the past 2 years on which to build.

Existing System Inflexibility Retards Full Exploitation of Improvements.

Functional and financial stovepipes prevent optimizing maintenance, distribution of materiel and supply chains, within and across components, industry, and allies/coalition partners.

The mechanisms and policies in place within DOD contain many internal and external political and cultural barriers that hinder change. Because of that nature, many industry improvements - especially those that have an effect on employment - become issues under the purview'of Congress.

Company	Initiatives	Results
• $2.78 worldwide leader in medical technologies	• Leader in NA quality services and promoting SC integration • Supplier Choice • Product suppliers involved early	• Fulfillment cycles of <=4 days • Reduce infrastructure costs by 25% • Reduce write-offs by 50% • Reduce freight costs by 10% • Eliminate returns • Became easiest and most cost effective
- Leading mail order PC Producer • Sells directly to customers • Sales $3.78 • Build to order, 5-6K PCs/day	• UPS alliance • Co-designs and operation · Dock merge program for components . Outsource parts order and delivery · Plan to outsource joint quality program	• Operates w/ virtually no inventory • Deliver to all customers in 2 days using high cost air transportation • Less damage • Real time delivery status
• Worlds largest retailer - All 50 states · -2000 Stores · -240 Super Centers • Over $90B Sales	. EDI with QR • Superior logistics and SC • Best IT & tracking systems • Use of Internet for sales · Partnerships w/ suppliers • Own & operate own fleet & DC's · Advd. materials handling & IT	- • Reduce prices from suppliers 2 -6% · Inventory turns overall 6 times • Suppliers managed inventory · Effective cross docking • SC supports continued growth and competitive edge

Table 2: Examples

This DSB recommends the DOD logistics system become an efficient arranger of services and support as well as a provider of products and services. The "arrangement" recommended is to use best commercial business practices to the greatest extent. The 1998 DSB Summer Study recognizes that balance and judicious management must be exercised to ensure control of future costs **And** sub-optimization. The wholesale privatization of functions obviously leads to loss of organic capability that can't be easily restored. There are other risks that need to be assessed in detail to ensure that warfighter support does not deteriorate but is enhanced.

In that sense, the Summer Study recommends that a comprehensive plan be developed to address all the aspects of incorporating the best of commercial practices and benchmarks into the DOD system as well as furthering those open 1996 DSB Summer Study recommendations. However it should be emphasized that the warfighter requirements should PULL the system thereby decreasing the footprint and increasing responsiveness.

6. Foreign Military Sales

The current system for Multinational support and coalition logistics is effected through 3 vehicles, Foreign Military Sales (FMS), Acquisition and Cross-Servicing Agreements (ACSA) and Host Nation Support/Agreements.

FMS

Under the laws passed in 1961 and 1976 (and further emphasized by President Clinton in 1995), FMS is used as a legitimate instrument of U.S. foreign policy. However, over time this process has been politicized and is seen to have lost the ability to, enhance U.S. military capabilities. What was once essentially a grant in aid program, where the U.S. could attach strings, has now evolved to one where sales are mostly on **a** cash basis and customers are wanting to share technologies with their own defense industries. FMS perceived as a slow, 2-step process where the U.S. Government negotiates with the Foreign Government (customer), then negotiates with industry for obtaining the supplies and services. It is further encumbered by the extensive use of National Defense Policy exceptions and lead-times for Congressional notification.

It is becoming increasingly popular for foreign governments to request participation in the contracting/production process and to leverage the purchase through a hybrid arrangement where industry provides the end-items/weapons systems and DSAA provides the support/spares/training (or vice-versa).

In addition, the current system does not easily lend itself to allow the U.S. Military to capitalize on the interoperability aspects or thinking of FMS as part of their war-planning to enhance the regional capability. In many cases the foreign policy objectives of selling weapons systems to certain countries to change the balance of power in the region does not coincide with the CINCs war-fighting needs and does not optimize military capability. The lack of this exploitation increases the U.S. footprint and places an unneeded burden on our logistics system.

Recommendations

a. We must achieve interoperability with our allies - an essential element of coalition warfare. Accordingly we recommend amending FMS legislation to promote use of FMS to augment U.S. Military capability.

b. Development of incentives with potential partners to foster a warm base concept for U.S. force requirements.

ACSA / HNS

The NATO Mutual Support Act of 1979 authorized ACSA with NATO allies and NATO Subsidiary bodies. This covers logistics supplies, support and services and bypasses nine aspects of U.S. procurement law. Terms were for reimbursement of replacement-in-kind (RIK). Transfers of nuclear, chemical and

specific “smart” conventional munitions were prohibited. Other significant restrictions apply including statutory annual financial ceilings (one for all of NATO and another for non-NATO nations). The exchanges are not charged against ceilings and ceiling limitations do not apply during contingency operations. In 1982 legislation expanded authority to Japan, Australia, Korea, Israel and Egypt. In 1987, ACSA authority was expanded to non-NATO nations who, a) have a defense alliance with the U.S., b) permit stationing of U.S. forces, c) allow prepositioning of U.S. assets, or d) host U.S. forces for exercises or operations. Legislation in 1991 and 1995 removed geographic restrictions on ACSA’s and allowed for the negotiation of agreement with the UN and other regional organizations, allowed the exchange of airlift services, clarified ACSA use during international exercises and allowed loans as well as sales. Presently there are 34 ACSA’s worldwide with an additional 57 nations now eligible for ACSA. Negotiations are underway with Austria, Indonesia, Singapore and other nations.

ACSA is becoming more important as the U.S. moves to support UN and coalition operations. ACSA agreements provide the operational CINC the ability to rapidly respond to urgent requirements ranging from natural disasters to contingency operations.

The process is initiated by the CINC through channels to JCS, OSD, Department of State. and ultimately back to the CINC for negotiation. The process is not centrally controlled within the U.S., is perceived by many to be a one-sided "take and no give” on the part of allies, and despite agreement, the reliability of support is always in question. There is no single office that has worldwide oversight of planning and coordination in concert with U.S. foreign policy.

Host Nation Support follows similar concept as ACSA’s however, it addresses specific countries responsibilities to support the U.S. military within limits. As has been seen in the recently, many provisions of what was once thought to be negotiated rights have been withheld by host nation governments due to overriding political reasons (i.e. fear of terrorist activity or retaliation). This poses a problem for U.S. strategists and begs us to develop a “go it alone’ posture that burdens the logistics system.

Recommendations

a. Establish a MOA between Department of State and DOD to define roles and responsibilities and develop a streamlined process that will provide worldwide visibility of needed agreements in concert with U.S. foreign policy.

b. Use information technology to track and provide/exchange accurate information to the CINC’s as to what is being negotiated in other theaters.

c. Provide better training at the CINC-staff level and awareness at the supply officer/sergeant level for reporting requirements.

7. Reduced Theater Footprint

During the Cold War, the United States' deployed logistic footprint grew larger and larger as weapon systems doubled and even tripled in size or tonnage. As a result, air and sealift assets and theater support areas grew to accommodate these new weapons. Today, however, the Army After Next (AAN) is moving towards smaller vehicles with increased lethality. This presents the opportunity to make corresponding reductions in support requirements that will make possible a significant theater footprint reduction.

For example, a family of light weight vehicles that are maneuverable and rugged has already been developed. These vehicles could replace the Humvee in all its present configurations and could further be expanded into the 2 1/2 ST truck replacement. An added mobility feature is that these vehicles can be stacked for transportation. This concept would reduce transportation requirements and provide faster response to the Theater CINC.

Another example concerns alternative fueled vehicles, which could reduce fuel requirements that are presently major deployment resupply commodities. Electric vehicles offer significant advantages over internal combustion engines vehicles, such as reduced fuel consumption in the operating environment and stealth (battery only) capability. Additionally the hybrid has the potential of providing ancillary benefits including the capability to provide AC and DC power to the aircraft and provide external lighting with minimal modification to the baseline vehicle configuration. Providing these ancillary benefits will enhance the military utility of the vehicle. In addition, demonstrating the availability of these benefits will accelerate the commercialization of hybrid electric technologies.

Recommendation:

That a joint service development office be formed to evaluate the use of hybrid vehicles.

8. Mobile Off-shore Basing (MOB)

Development of MOBs, while lacking a well-defined operational concept, suggests a tremendous capability, but also presents a very large investment requirement. At first glance, the MOB will provide a wide range of capabilities and deployment flexibility, but it may also be very slow to deploy and difficult to assemble at an operating site. Consequently the entire concept needs to be better defined, the engineering feasibility and technical risks need to be investigated, and its utility needs to be evaluated through simulation and insertion into various exercise scenarios.

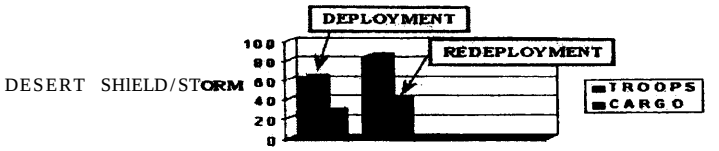
Recommendation:

That the JCS review this concept and determine its feasibility and value to future war fighting scenarios. Appropriate development guidance should be provided to the services based on this evaluation.

9. Civil Reserve Air Fleet (CRAF)

During Operation Desert Storm, the Civil Reserve Air Fleet (CRAF) played a major role in the transportation of military personnel and cargo. Several problems were encountered with CRAF activation that slowed the deployment effort. While several of these problems have been resolved, the fact remains that for military cargo, CRAF aircraft are, for the most part, insufficient. Special cargo handling equipment is required and aircraft configuration with narrow access and weight-limited floors restrict the cargo that can be transported. Another factor that could limit flexibility is that the majority of CRAF members are domestic, with only a limited number of foreign carriers participating in the program. Restriction placed on these foreign carriers by either parent corporation (or government) severely restricts their use. Even with these deficiencies, CRAF continues to play a major role in deployment as shown in the following figures.

CIVIL RESERVE AIR FLEET
A KEY MOBILITY FORCE ELEMENT



- ☑ 93% OF TROOP AND 32% OF UE AIR DEPLOYMENT CAPABILITY
- ☑ SUPPORTS DOD OPERATIONS...PEACE AND WAR
- ☑ FIRST ACTIVATED IN DESERT SHIELD...RESULTED IN DOD REVITALIZATION STRATEGY
  - MANDATORY DOD USE OF CRAF PARICIPANTS
  - MAXIMIZE LEVERAGE OF GOVERNMENT PEACETIME BUSINESS
  - NON-TRADITIONAL INCENTIVES - COM'L USE OF MILITARY FIELDS

BOTTOM LINE: NEED CONTINUED SUPPORT TO MAINTAIN CRAF VIABILITY

Figure 6 CRAF

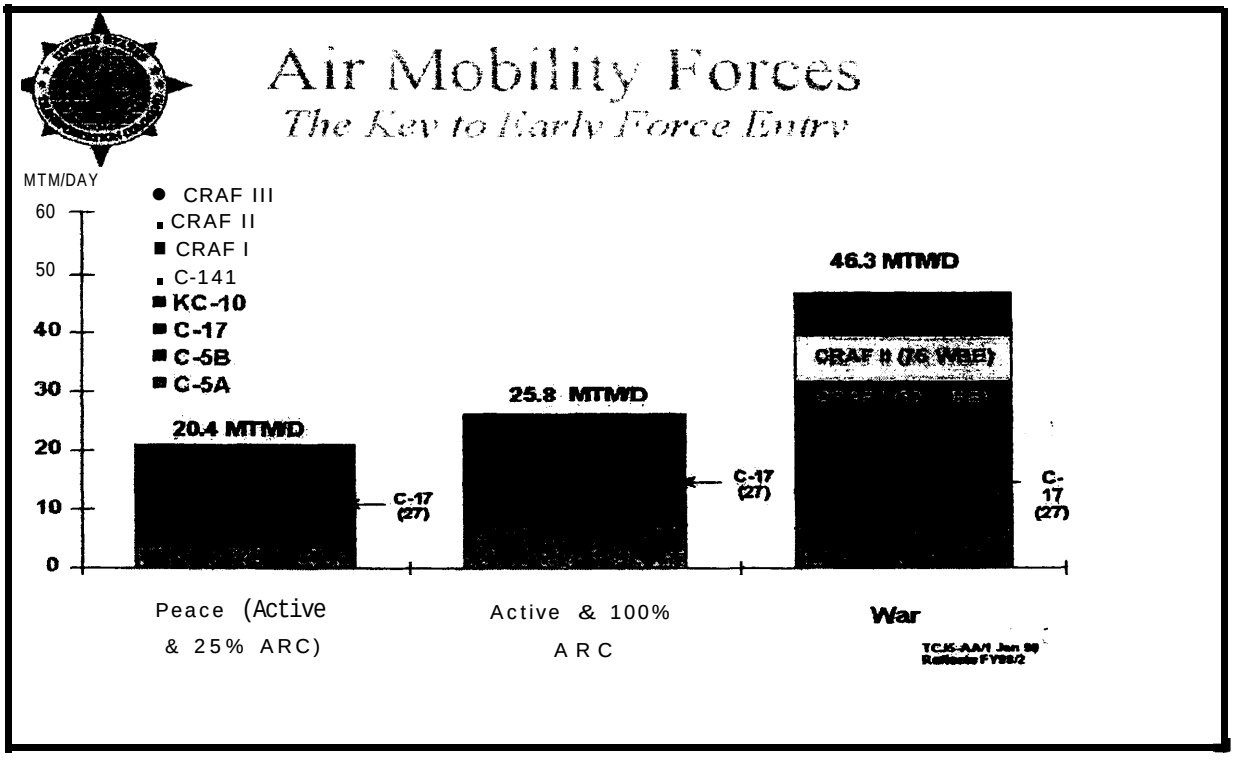


Figure 7 Air Mobility Forces

Recommendation:

USTRANSCOM leverage its business potential to encourage commercial aircraft developers and manufacturers to incorporate military requirements into their designs (door width and height, deck height, and floor strength). The use of new light weight materials should offset the weight increase of these military requirements and associated increase in fuel consumption. Where possible, military equipment designs should take into account CRAF military specifications during their design phase. Additionally, host nation agreements should be developed that provide the unrestricted use of foreign carriers assets during wartime operations.

10. DOD Container Policy[3]

DOD Regulation 4500.9-R-1 prescribes uniform policies, responsibilities, and procedures governing management and control of the DOD intermodal container system. The system includes intermodal containers and container services, either DOD-owned, -leased or commercially provided, and other ISO-configured equipment held by DOD activities before, during, or after intermodal

3 The terms "DOD intermodal container system" and "DOD container system," as used herein, are synonymous, and refer to all DOD-owned, -leased, and -controlled 20- or 40- foot intermodal ISO containers and flatracks, supporting equipment such as generator sets and chassis, container handling equipment, information systems, and other infrastructure that supports DOD transportation and logistics operations, including commercially provided transportation services.

shipment in the DOD Transportation System (DTS). This Regulation establishes responsibilities and guidelines for DOD container system asset acquisition, control, facilities, funding, handling, in-transit visibility, maintenance, management, training, disposition, ISO registration, and accountability. It is the intent of this Regulation to provide a seamless transportation system that cooperatively interacts with commercial operations to enhance combat effectiveness, safety, and efficiency.[4]

DOD Policy

It is DOD policy that components shall establish an intermodal container-oriented distribution system of sufficient capability to meet DOD-established required delivery dates for mobilization, deployment, employment, sustainment, and redeployment. Additionally, components shall use the DOD intermodal container system for movement of supplies and equipment across the range of military operations consistent with the supported commander's concept of operations, requirements, and capabilities. Components must also make optimum use of the vast capability of intermodal container resources and services furnished by the commercial transportation industry when doing so is responsive to military requirements and consistent with prudent business practices. Finally, to ensure commonality and interoperability of intermodal containers and infrastructure, components must include information systems to communicate between the DOD Components and commercial industry. At present, twenty-foot and 40-foot American National Standards Institute (ANSI)/ISO containers are the designated standards for DOD unit equipment and sustainment. The 20-foot ANSI/ISO container is designated as the DOD standard for containerized munitions shipments. However, despite the trend of volumetric growth, the majority of the U.S.-owned standard dry cargo container fleet remains as 20- and 40-foot units, with each type continuing to grow. Currently, the U.S.-owned container fleet is essentially equally divided in number between 20- and 40-foot units. This means that approximately two-thirds of the total standard dry cargo carrying capacity is in 40-foot units.

Recommendation:

The 20-foot ISO container is the DOD standard size for the movement of ammunition (Class V). Both 20. and 40-foot containers will be used to move all other classes of supply and unit equipment subject to theater reception and onward movement capabilities. It is recommended that all Services must be prepared to handle both 20. and 40-foot units, with each type continuing to grow. It is further recommended that LSMRS dedicate space topside to an agile matrix that can stack 20 or 40-foot containers.

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4 Additionally, Joint Publication 4-01.7, Chapter 3 (reference (a)), and the annual Container System Hardware Status Report provide an overview of containers and associated container handling equipment available to or in use within Department of Defense.

11. ISO Container Incompatibility with Airlift System

The 163L system constitutes the majority of materials handling equipment used in support of airlift operations. This system is comprised of 60,000 pound loaders (60K), 25,000 pound loader (25K), wide-body loaders, wide-body elevator loaders, lower-lobe loaders, 10K forklifts, and 10K all terrain lifts.

The Airlift System is capable of handling ISO Containers, however one of the largest drawbacks of the ISO Container is its empty (or tare) weight. Due to shortfalls on national strategic airlift capacity, the movement of large numbers of ISO containers in the Airlift System would be done only in the most extreme situations. When moving in the Airlift System, ISO containers are loaded in aircraft utilizing 463L pallet as a platform to adapt the load to the 463L roller system found in all cargo configured aircraft. Most aircraft configured for forward and aft loading are capable of handling 20 and 40 foot containers.

Recommendation:

It is recommended that DOD allocates new IR&D funds to develop modular lightweight containers that can be re-configured to be ISO-, TEU-, or FEU-sized for shipment by air or sea.

12. Use of Unmanned Aerial Vehicles (UAV)

Traditional aerial delivery methods of providing personnel, supplies, and equipment direct to. the battle area are no longer viable. Technology has made the air space directly over and adjacent to the battle area extremely hazardous, especially for low and slow aircraft which must maintain a steady course to effect an accurate airdrop.

Significant advances have been made in recent years with UAVs. The combination of the UAVs and highly accurate Global Positioning System (GPS) navigation make possible the aerial delivery of supplies and equipment directly to the battlefield without risk to human life. In addition, the UAV provides a range of design possibilities to take advantage of modularity, multi-purpose design parameters and varying sizes to cope with a broad range of missions. The UAV also provides great potential for a responsive intra-theatre logistics support vehicle.

Many types of vehicles have been suggested,' ranging from guided parafoils to the "Sky Barge" [5]. There are also a wide range of proposals dealing with the size, composition, and capabilities of the future force, be it early entry, battle force, etc. Some of these recommendations have been in the Army After Next (AAN) series of wargames, the July 1998 Army Science Board and the DSB Summer Study on "Joint Operations Superiority in the 21st Century.

5 Armed Forces Journal International, July, 1998, p. 52.

Recommendation:

That the JCS support research on the technical characteristics and refinement on the mission support roles that could be conducted on UAVs as a means to satisfy the logistics support requirements for the future force in high threat areas.

13. Abuse of the Transportation Priority System

In the after-action lessons learned from Operation Desert Shield/Desert Storm, it became evident that the Transportation Priority System was broken. Requisitions were more than duplicated, flooding the pipeline with excess cargo because soldiers/airmen/marines/sailors in the field and resulted in commanders losing confidence in the system. In addition, there was no method or means of monitoring business processes to see where the item was in the pipeline. As **a** result, many items were reordered.

As a means of solving the situation, OSD and the Joint Staff appointed USTRANSCOM, as the Executive Agent and the functional proponent, with the mission of delivering DOD in an in-transit visibility automated information system that would provide the visibility. The objective was to put confidence in the system.

Recommendation:

USTRANSCOM undertake a review of the priority system to determine the degree of discipline that exists. Subsequent appropriate actions should be taken based on this review.

14. Strategic Air Mobilitv En-Route Structure

Because of the range limitations of our present airlift fleet, the Air Mobility Command (AMC), a component of USTRANSCOM, maintains an extensive enroute support structure. At the present time, 13 overseas locations manned by approximately 4,000 personnel exist. During contingency operations, these locations are augmented by Tanker Airlift Control Elements (TALCE) from AMC CONUS locations. These enroute locations are supported by an extensive infrastructure consisting of runways, storage tanks, pipelines, fuel hydrants, ramps, operation/maintenance facilities, and fire-fighting equipment.

A 1997 JCS directed study confirmed severe infrastructure deficiencies that would jeopardize war plan execution. Additionally, USTRANSCOM identified the need for improvements to the enroute structure as a critical requirement.

At present, The Defense Logistic Agency (DLA) is making an attempt to fund high priority POL projects within existing funds.[6] Until these and many other operational infrastructure projects are completed, the successful deployment of

6 DLA POM FXOO-05 funds all defined enroute POL projects with the majority after FX02.

forces remains a high risk. A far term solution would be the procurement of long-range airlifters that can bypass the enroute structure.

Recommendation:

That the JCS and DOD review the enroute basing infrastructure status and ensure that funding is applied to critical projects to reduce the deployment risk

15. VISA (VOLUNTARY INTERMODAL SEALIFT AGREEMENT)

Purpose and Concept:

The Voluntary Intermodal Sealift Agreement (VISA) is a program, administered by the United States Department of Transportation, Maritime Administration (MARAD), designed to provide DOD the commercial sealift and intermodal shipping services/systems necessary to meet national defense Contingency requirements.

USTRANSCOM procures commercial shipping capacity to meet requirements for ships and intermodal shipping services/systems through arrangements with common carriers, with contract carriers and by charter. DOD, through USTRANSCOM) and Department of Transportation (DOT) (Through MARAD) maintain and operate the Ready Reserve Fleet (RRF), a fleet of ships owned or chartered by the Federal Government to meet the logistic needs of the military services which cannot be met by existing commercial service. These government controlled ships and ships of the RRF area selectively activated for peacetime military tests and exercises and satisfy military operational requirements that cannot be met by commercial shipping in time of war, national emergency or military Contingency. Foreign flag shipping is used in accordance with applicable laws, regulations and policies.

The objective of VISA is to provide DOD a coordinated, seamless transition from peacetime to wartime for the acquisition of commercial sealift and intermodal capability to augment DOD's organic sealift capabilities. This Agreement establishes the terms, conditions and general procedures by which persons or parties may become VISA Participants. Through advance joint planning between USTRANSCOM, MARAD and the Participants may provide predetermined capacity in designated stages to support DOD Contingency requirements.

VISA is designed to create close working relationships between among MARAD, USTRANSCOM and Participants through which Contingency needs and the needs of the civilian economy can be met by cooperative action. During Contingencies, Participants are afforded maximum flexibility to adjust commercial operations by Carrier Coordination Agreements (CCA) in accordance with applicable law.

Participants will be afforded the first opportunity to meet peacetime and contingency sealift requirements within applicable laws and regulations, to the

extent that operational requirements are met. Participants' capacity which may be committed pursuant to this Agreement may include all intermodal shipping services/systems and all ship types, including container/bulk, container/roll-on/roll-off, roll-on/roll-off, (of all varieties), breakbulk ships, tug and barge combinations, and barge carrier (LASH, SeaBee) In the event VISA Participants are unable to fully meet Contingency requirements, the shipping capacity made available under VISA may be supplemented by ships/capacity from non-Participants in accordance with applicable laws and by ships requisitioned under Section 902 of the Merchant Marine Act, 1936. In addition, containers and chassis made available under VISA may be supplemented by services and equipment acquired by USTRANSCOM or accessed by the Administrator through provisions of 46 CFR Part 340.

VISA provides for the staged, time-phased availability of Participants' shipping services/systems to meet NCA-directed DOD Contingency requirements in the most demanding defense oriented sealift emergencies and for less demanding defense oriented situations through pre-negotiated Contingency Contracts between the government and Participants. Such arrangements will be jointly planned with MARAD, USTRANSCOM and Participants in peacetime to allow effective, and efficient and best valued use of commercial sealift capacity, provide DOD assured Contingency access, and minimize commercial disruption, whenever possible.

Stages I and II provide for pre-negotiated contracts between DOD and Participants to provide sealift capacity against all projected DOD Contingency requirements. These agreements will be executed in accordance with approved DOD contracting methodologies.

Stage III will provide for additional capacity to the DOD when Stages I and II commitments or volunteered capacity are insufficient to meet Contingency requirements, and adequate shipping services from non-Participants are not available through established DOD contracting practices or U.S. Government treaty agreements.

The following is a prioritized order for the utilization of commercial sealift capacity to meet DOD peacetime and Contingency requirements:

a. U.S. Flag vessel capacity operated by a participant and U.S. Flag Vessel Sharing Agreement (VSA) capacity of a Participant;

b. U.S. Flag vessel capacity operated by a non-Participant;

c. Combination U.S./foreign flag vessel capacity operated by a Participant and combination U.S./foreign flag VSA capacity of a Participant;

d. Combination U.S. /foreign flag vessel capacity operated by a non-Participant;

e. U.S. owned or operated foreign flag vessel capacity and VSA capacity of a Participant;

f. U.S. owned or operated foreign flag vessel capacity and VSA capacity of a non-participant;

g. Foreign-owned or operated foreign flag vessel capacity of a non-Participant.

Activation of VISA Contingency Contracts:

VISA may be activated at the request of USCINCTRANS, with the approval of SECDEF, as needed to support Contingency operations. Activating voluntary commitments of capacity to support such operations will be in accordance with pre-negotiated Contingency contracts between DOD and Participants.

USCINCTRANS will notify the Maritime Administrator of the activation of Stages I, II and III. The administrator shall notify the Attorney General and the Chairman -Federal Trade Commission (FTC) when DOD has determined that activation of any Stage of VISA is necessary to meet DOD Contingency requirements. Throughout the activation of any Stages of this Agreement, DOD may utilize voluntary commitment of sealift capacity or systems. In the event that Participants are unable to fully meet Contingency requirements, or do not voluntarily offer to provide the required capacity, the shipping capacity made available under VISA may be supplemented by ships/capacity from non-Participants. When voluntary capacity does not meet DOD Contingency requirements, DOD will activate the VISA stages as necessary. Stage I will be activated in whole or in part, with the necessary approvals, when voluntary capacity commitments are insufficient to meet DOD Contingency requirements. Stage II will be activated, in whole or in part, when Contingency requirements exceed the capability of Stage I and/or voluntarily committed resources. Stage III will be activated in whole or in part, when contingency requirements exceed the capacity of Stages I and II, and other shipping services are not available. This stage involves DOD use of capacity and vessels operated by the Participants which will be furnished to DOD when required in accordance with this Agreement. Upon allocation of sealift assets by SecTrans, through its designated representative MARAD, USTRANSCOM will negotiate and execute Contingency contracts with Participants, using pre-approved rate methodologies as established jointly by SecTrans and SECDEF in fulfillment of section 653 of the Maritime Security Act of 1996. Simultaneous with activation of Stage III, the DOD Sealift Readiness Program (SRP) will be activated for those carriers still under obligation to that program.

Recommendation:

In order to assure that a strong partnership develops between DOD and MARAD's VISA members, USTRANSCOM, as the principal DOD agent, must

also be made a principal agent in VISA to ensure accountability and the cost effectiveness of the program. This is similar to USTRANSCOMs role in CRAF.

16. Training

Joint Vision 2010 discusses six central considerations for success. They are high quality people, innovative leadership, joint doctrine, joint education and training, agile organizations and enhanced material. In order to accomplish this for joint education and training, there must exist a program that teaches personnel strategic concepts in the future environment, as well as in-depth understanding of individual service systems and how the integration of these systems enhance joint operation.

There are currently three new efforts underway to meet that requirement:

1. Joint training initiative to establish a joint professional military education course by 2010.
2. Joint course in logistics at Ft. Lee Virginia, emphasizing focused logistics and joint vision 2010.
3. USTRANSCOM is currently seeking support form the services to create a "Center of Excellence" at Ft. Eustis Virginia to teach officers /executive about deployment process. The class is currently funded through 1999 but if it is to be viable will have to be funded by the services starting in 2000.

Unfortunately, there presently exists a conflict between the Services and the above educational efforts since many of the identified training is already being performed in individual service schools. Not only is this duplication a waste of resources, but it could also create gaps that would lead to inconsistencies.

Recommendation:

a. That the JCS establish a functional working group to determine any inconsistency between current service and proposed joint classes. Group should consist of service, Joint Staff, CINC, and other members as appropriate. As previously mentioned in the 1996 DSB Summer Study consideration should be given (as a way of containing cost and TDY requirements) to

   - Increased use of distance learning,
   - Commercial computer aided teaching technologies,
   - Just in time training.

b. Establish "Logistics" as a core area of study in college ROTC programs. There are currently numerous universities that have established Logistics Degree Programs. As we continue to move

toward commercial practices, taking a person already majoring in logistics would provide a great opportunity to start teaching the military side of logistics prior to entering the service.

17. Army Railcars

In the update to the Mobility Requirements Study, the Army identified the need for railcars to support the early loadout requirements. The commercial railroad industry either does not have these types of cars or cannot furnish them in the time required to meet the deployment guidelines of the Army Strategic Mobility Program (ASMP). The Army POM currently contains funding in FY99 ($12.8 Mil) to acquire 151 multi-purpose 100Ton cars to deploy Army rolling stock other, and'in FY00 ($5 Mil) for 31 cars to carry containerized ammunition (referred to as COFC cars). This acquisition should eliminate the railcar requirement. The contribution to rapid deployment provided by these railcars make this a very useful investment.

Recommendation:

That the JCS and DOD ensure the funding of these critical deployment assets.

SUSTAINMENT PANEL REPORT

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I. INTRODUCTION

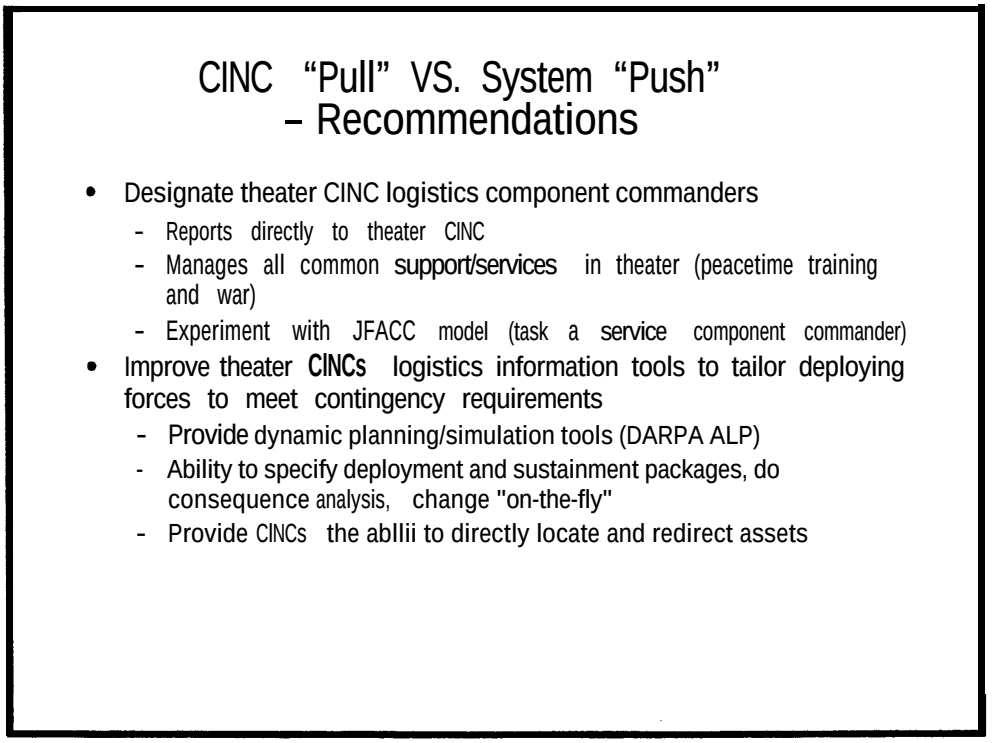
The sustainment panel addressed two main areas in its deliberation: CINC "Pull" versus "System" push, and how demand needs to be reduced. Following are the key findings and recommendations of the Sustainment Panel. There is more detail in the panel report then is in Volume I of the Study Report. All thoughts are those of the panel and may be slightly different then what is contained in the Volume I, which takes precedence over this report.

II. CINC "PULL" VERSUS SYSTEM "PUSH" - FINDINGS

The current process for introducing the materiel of war into a theater of operations is essentially one of service-determined support levels (negotiated, certainly, with the unified commander), on a "push" basis. The CINC or JTF Commander, however, controls transportation by unit description. Combat forces have little confidence in the resupply systems and tend to hoard in compensation, creating the storied "iron mountains" of materiel. Both the CINCs and service component commanders have less than the required visibility to plan and manage the resultant readiness and footprint, and the J-4 and his staff are, quite simply, overwhelmed. The situation diverts lift and pipeline space to non-priority items, crowding out or delaying some other required resources. In the case of overstated equipment requirements, this system also poses an unnecessary sustainment burden on the theater logistics resources.

While planning and logistics management tools have improved since the Gulf War, principally with GCCS and some isolated processes such as early stages of Global Transportation Network, Service and Joint Total Asset Visibility, the tool kit is sparse. A command and control arrangement to manage common support, supplies and services is the product of ad hoc "executive agent" assignments. There is nothing comparable to the Joint Forces Air Component Commander (JFACC) process to manage logistics. With no opportunity to "train as they will support" the logistics organizations would be sorely pressed to meet the needs of high tempo operations.

III . CINC “PULL" VERSUS SYSTEM “PUSH” - RECOMMENDATIONS



Provide CINC Logistics Command Capability

Providing the CINC or Joint Task Force Commander a robust capability to exercise Title-10 authority to plan and direct “common” logistics support is a major step in achieving the CINC's control of the logistics pipeline. A theater logistics command would manage the inflow of forces and sustainment packages according to CINC/JTF priorities, providing the means for reception, staging, onward movement, and integration (RSOI) for the theater and operate the required facilities, i.e., ports, airfields, staging and storage areas.

The theater logistics command should plan for and provide all common support and services to the forces in theater, e.g., theater distribution; movement control; construction, medical, fuel, food, water, etc., outside the service component areas of responsibility. Elements of DLA and TRANSCOM should be added to the logistics command to manage the Receipt, Staging, Onward movement and Integration (RSOI) and DLA commodities (fuel, food, medical supplies, etc.). They will facilitate easy peace-to-war transition and avoid the ad hoc logistics C2 of previous conflicts.

The theater logistics command also could provide the base for the "multinational joint logistics command" envisioned for NATO operations or for other coalition operations where U.S. leadership is necessary.

An experiment using the JFACC model, which provides for tasking one of the service component commanders with the logistics C2 mission would shed light on how best to arrange the responsibilities for both peacetime training, and contingency planning and execution.

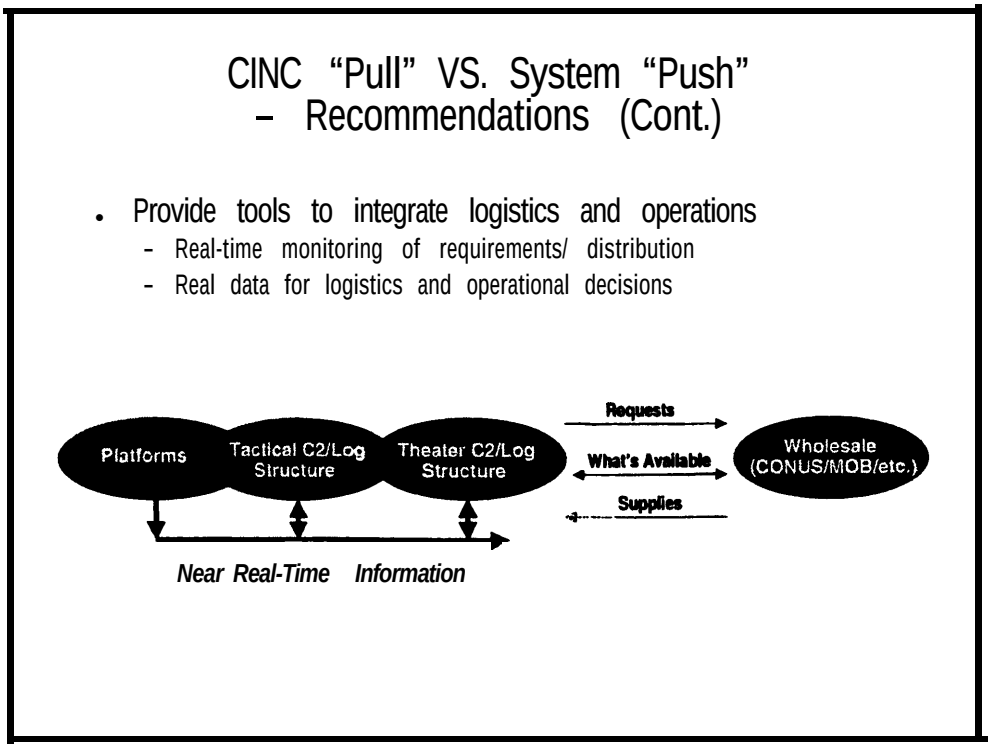
Improve ClNCs Ability to Tailor Deploying Forces to Meet

Contingency Requirements

The ClNCs staffs need better tools to hone service-recommended time-phased force deployment data to eliminate unnecessary force structure, ammunition, and other sustainment supplies. New planning and simulation tools will enable replanning and consequence analysis. These tools are essential for the inevitable replanning necessary in crisis. DOD should continue to fund the development of the DARPA Advanced Logistics Program (ALP). The tools being developed under ALP are critically needed to develop "right-sized" deployment and sustainment packages, analyze various courses of action, and change plans "on-the-fly".

Tools like ALP not only benefit the CINC's staff but also Service component commanders who must do tradeoff analyses within CINC-allocated lift as well as the Joint and Service staffs who prepare force structure and sustainment analyses. This capability, including the ALP techniques, should become an important part of the Logistics System Architecture recommended in thisreport.

IV. **CINC "Pull" versus System "Push" - Recommendations**



Provide Tools to Integrate Logistics and Operations

The theaters and the tactical units are the location of the source data that define the real logistics needs. Using the data that originates in the theater and with the tactical units, the tactical requirements – as interpreted and defined by the theater CINC – can and should drive the logistics process.

Real Time Monitoring of Requirements and Distribution

Source-data automation from the tactical platforms[7] will provide revolutionary operational benefits, in addition to its value for logistics and other Combat Senrice Support (CSS). Source-data automation will reduce the time it takes to communicate supply status and operational status (e.g., "How many weapons systems/people-in my battalion/squadron/ ship are combat ready for tomorrow?"), and dramatically improve the logistics planning process at all echelons. Combining aggregated platform source data on supply and operational status with status of orders for supplies, their in-transit location and estimated time to repair systems into the recommended information/decision support system will allow planning that is accurate enough and detailed enough that the logisticians will be able to tell the operators when they will get their

7 Note: the Source Data Automation should include both output of diagnostics of weapons system/equipment "health," e.g., components failed or near-failure and consumption status of fuel and munitions vs. capacity. A more complete discussion is found in the next section on "platform based, user-friendly IT . . ."

materiel. The resulting present and projected operational status of systems and tactical organizations communicated in near-real-time will greatly facilitate course-of-action analysis.

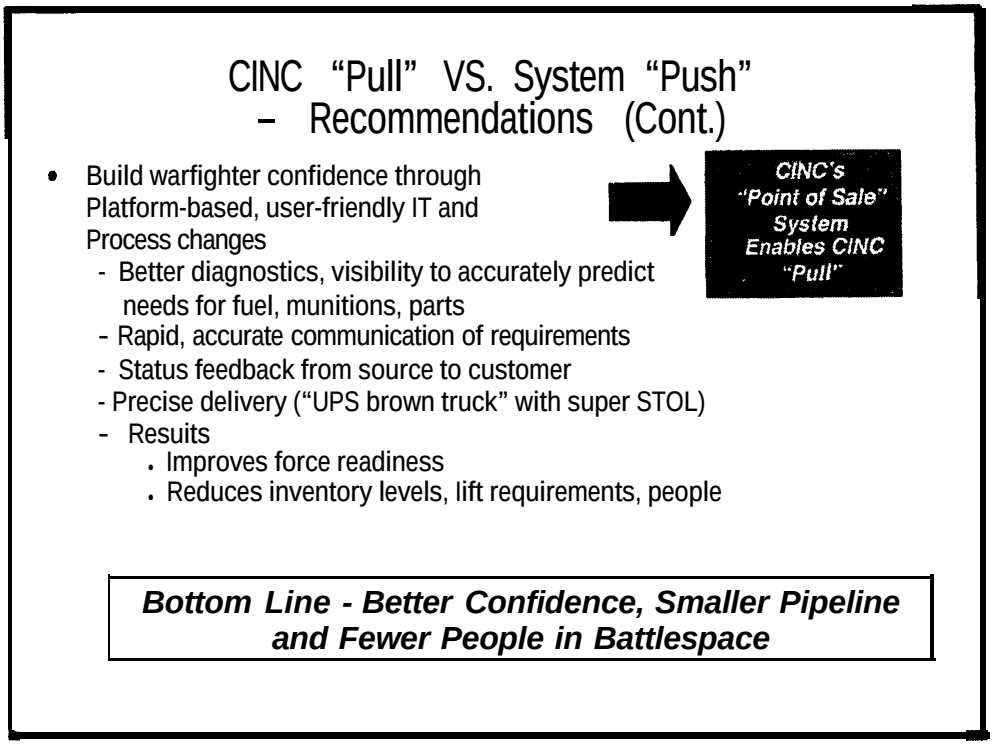
Real Data for Logistics and Operational Decisions

The integration of source-data automation with operational situational awareness, i.e., "real data" — not guesses, will open additional possibilities. For example, logisticians will be able to exert unprecedented control over the movement of supplies within the tactical area (by using the operational situational awareness and movement planning capabilities applied to the combat trains and other supply vehicles), and coordinate better than ever before the rendezvous of re-supply vehicles and ships with tactical units. This system will also permit operations planners and logisticians together to reallocate programmed materiel (fuel, munitions, etc.) and redirect shipments as operational needs, status and priorities change — all with confidence in the impacts on operational results.

We view the cumulative effect of these recommendations as decisive in potential impact to the revolution in 'battlespace" logistics in all the Service's combat organizations. Together, they will enable dramatic improvements in speed, precision, reliability, and predictability of logistics and CSS actions within the battlespace, and thereby provide improved support to the war-fighters at significantly lower total cost and total lift.

We also believe that they serve a separate (but related) purpose – they will create the information needed to enable the realization of another of the key recommendations of the panel: the creation of a logistics component C2 capability in each operating theater discussed earlier. Placing "someone in charge" is valuable by itself, but when combined with the power of the information we propose to provide, this new command component will be able to achieve the needed improvements and command focus. It is this fusion of new information with "someone in charge" that will bring about the long-desired integration of operations, planning, and logistics.

Build warfighter confidence through platform-based, user-friendly Information technology, and process changes



"CINC's point-of-sale information system will enable CINC pull".

Information will enable the CINC and his staff to tailor logistics activities to operational needs, and will provide the insight into status and progress that will build warfighter confidence in the new approach. In a fundamental sense, the proposed new information systems are a key enabler of the revolution in military logistics, just as commercial point-of-sole systems have revolutionized supply-chain management in leading firms. They are, therefore, an inseparable part of the strategy to-transform logistics to "CINC pull".

Better Diagnostics, Visibility To Predict Needs

As noted above, the process of confidence building begins with ***platform-derived data*** – in essence, real-time information that tells both operators and supporters detailed information about the supply status and operational status (drawn from measures, diagnostics, and prognostics) of each platform (and their crews), and aggregates that information into appropriately-focused summaries. These platform-based IT components also serve the purpose of the "order entry" process in this militarized "supply chain management" system. They would provide "orders" to the sources of supply whether for a replacement component of a system or for fuel, munitions or other consummables through an "internet" much like personal "internet" ordering now garnering widespread use and acceptance.

Diagnostics on the platform are an important part of the source-data automation recommendation. It is important to note, however, that relatively few current platforms (especially ground platforms) have embedded diagnostics, and almost none of those have the ability to provide remote notification (e.g., to off-platform and other "orderers of parts and resupply") of the results of those diagnostics. The panel believes that these technologies are readily achievable within the time-frame considered, and will provide benefits that far exceed their cost.

The recommended platform-based source-data automation, linked to tactical and theater information systems, provides significant benefits to many members of the combat team. Consider, for example, the organizational mechanic – he/she would have access to current information based on platform diagnostics (evolving to prognostics), interactive electronic technical manuals containing diagnostics decision-trees and repair instructions, plus easy "help-desk" access, all of which should yield high confidence in accurate fault diagnosis and choice of component to be replaced. Coupling this capability with easy, rapid order entry access to the communications network and immediate confirmation status feedback of ordered parts will improve the productivity of mechanics and strengthen the operational units' confidence in the logistics system. Similarly, operators and supporters can use the platform-based data to derive the operational status of units, to predict near-term requirements for fuel and munitions, to continuously update orders, and to track distribution of parts and materiel in real-time.

Prognostics

The panel also examined prognostics, and believes that – while generally beyond the current state of the art – they represent a technology that will be viable and valuable well within the specified time-frame. Prognostics are, in our view, an essential component of the efficient logistics support of the future. If status — counts / measures / embedded diagnostics — from each platform tell you about the present and the ***recent past,*** prognostics from each platform will tell you about the ***near future.*** Prognostics are in essence "future status". A fuel gauge is a simple prognostic; more interesting prognostics include oil viscosity, bearing friction, engine inlet / outlet temperature differences, etc. In the future, these data signals could be collected in real-time on the platform, processed on-board the platform, compared on the platform against norms based on usage and operating conditions (e.g., speed, external temperature, mileage / time since last maintenance, etc.), and be used to predict likely failures in advance. Reporting off the platform to a maintenance / analysis center (which itself could be a mobile platform) would be on a "by exception" basis (e.g., report only off-nominal events and predicted failures within a particular time-span), which would keep the bandwidth requirements of the prognostics to tolerable levels.

Having logistical knowledge of the near future will add a new dimension to status reporting, with break-through potential for logistics. For example, such knowledge of the near-future via prognostics would enable condition-based

maintenance (perform maintenance when needed, rather than by mileage or by the calendar). It would also enable "predictive parts flows" and maintenance interventions – i.e., send a part to meet a platform when a prognostic signal received over-the-air at a maintenance / monitoring facility from that platform indicated the likelihood of a forthcoming failure. We believe that condition-based maintenance and predictive parts flows and maintenance interventions are key elements of the revolution in battlespace logistics.

The areas of prognostics, in the view of the panel, still need technical-base work. Despite fanciful claims from the commercial sector, our analysis is that prognostics are not yet "here" as a technology ready for widespread incorporation onto platforms, especially less expensive platforms (like ground platforms). We therefore recommended the corresponding focus in service S&T & R&D programs, with the goal of the incorporation of prognostics into selected legacy platforms, and all new / major modified platforms on an expedited basis, well within the time-frame considered by this study.

The incorporation of prognostics into the platform-based source-data automation scheme in the future will enable significant additional logistics improvements, both cost savings and improved support to the fighting force. They will open the door to lower maintenance costs, while providing higher operational availability.

An incremental approach is viable; start with fuel and ammunition on selected platforms, and grow from there. For source-data automation, the technology is here today. This ought to be, in the view of the panel, a priority for service funding, as the payoffs (cost reductions, improved equipment readiness) are enormous. Platform-based information provides the information the theater CINC and his team need to lead the U.S. to a new level of logistics responsiveness.

We note that there is a derived need for a non-platform infrastructure to read / use all of these data. We believe that the tactical C2 / tactical decision-support systems can perform this function. Again, the Army's FBCB2 is an example of the beginnings of the required technology. Similar technology is incorporated in the Navy's "Smart Ship" design.

It is the opinion of the panel that such ***source-data automation*** will have great value, and is now within the state-of-the-art. Embedding source-data automation onto key platforms will provide ***real-time data*** to the logistics process upon which to make logistics decisions — positioning the military to take advantage of technologies that have proven to be of great value in the commercial world.

A very important benefit of source-data automation, in addition to its benefits to the logistics process, is that it provides the data needed to create real-time ***"logistics situational awareness"*** — a near-real-time summary of the status of the battleforce. These data are important to operators and provide the currently-missing link between planning, operations, and logistics.

The only possible source of such data are the platforms themselves . . . which are being "digitized" and linked to the tactical command-and-control systems for other reasons. As noted in the previous section, the platforms — linked to the logistics C2 through the tactical C2 systems — can be a source of data upon which all battlefield logistics decisions can be made more accurately and more timely than today. An example of current work in this area is the Army's use of FBCB2 (platform digitization) to capture platform data, which is sent to CSSCS (tactical logistics decision support) and then to the Standard Army Management Information System (STAMIS) (logistics stock status). It is already clear from the results of the Army's Advanced Warfighting Experiments that integrating these logistics status data ("logistics SA") with battlefield situational awareness and C2 data will be highly beneficial.

Rapid Communications

The necessary companion piece to platform sensors is the communication system to transmit the orders and status information. Wireless modem technology coupled with multi-layer satellite or other air vehicle relay now makes this process feasible and critical to realizing the benefits of source-data automation. The communications architecture should integrate both collected data from platform sensors and computer systems, and selectively those data over-the-air in real-time to other collection and analysis functions within the battlespace.

Process Changes

It is important to note that the successful exploitation of the proposed investment in source data automation depends upon changes in the supply management process. It would do little good to install these semi-automatic order entry processes if the mechanic/technician had to obtain signatures for expensive reparables or get two supervisors' approval for munitions resupply. And these processes need to be changed in peacetime, for example, making use of government debit or credit card account numbers built into the authentication/sign-on process for the mechanic. The supply chain management process needs to focus on placing the needed items/supplies into the "precise delivery" system as quickly as possible so as to reduce the need to carry inventory.

There is a significant implementation opportunity that must not be missed for source-data automation: this function can be "piggy-backed" on top of planned platform digitization activities (e.g., use same computer, display, communications network, spectrum, etc., as platform digitization equipment), resulting in low marginal cost for source-data automation — just the cost of the sensors and the software to connect the sensors to the platform digitization equipment.

It is clear from the above discussions, that most of this information system is on the tactical platforms. In our view, this implies that the source-data automation and prognostics activities discussed earlier must be service

responsibilities. But they must also be integrated into the theater GCCS / GCSS. This can be achieved through the use of the logistics architect recommended in other portions of this report.

Precise Delivery

Source-data automation, in combination with over-the-air linkage from platform to the tactical C2 systems, creates an opportunity for "precise battlespace delivery" of resupply. Supply requirements can be aggregated and grouped for optimal delivery. Steer-to guidance (see figure A) with way-points can be provided to the "delivery trucks" and to the intended recipients, permitting synchronization of re-supply movements. Supply vehicles can be re-tasked in real-time to meet emerging needs. The location of every supply platform can be known to the tactical staff, who can then ensure protection and avoid friendly-fire incidents. This is a "closed-loop" system! The results – already validated by Advanced Warfighting Experiments — will be to improve force readiness and OPTEMPO, and to reduce total materiel, lift, and support personnel requirements.

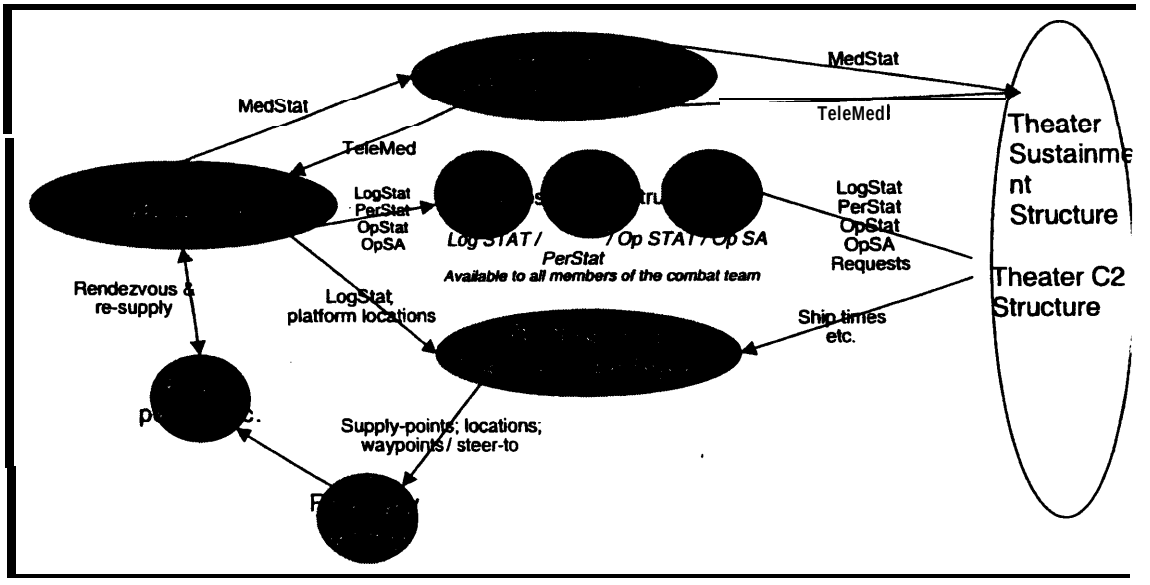


Figure III-A

Results

The battlespace logistics information process should aggregate platform and force requirements generation, and distribution status monitoring through an "internet" at designated logistics and operational nodes, so as to portray a common picture of the health of warfighting assets and organizations. This picture can then be integrated into the overall operational picture for continuous course of action analysis.

There is a major need to develop information systems that will allow for continuous re-planning of both deployment and sustainment operations as conditions change. The collection of platform data via the recommended source-data automation is a prerequisite for any future dynamic re-planning / re-tasking capability, as it will provide the current status that provides the basis for effective re-planning and re-tasking.

This platform-based, source-data focused information system with companion process changes should be a principal component of the recommended Logistics System Architecture. For its successful implementation will enable better force readiness with lower inventory, fewer people required to maintain and manage supplies thereby reducing lift requirements to the theater and the logistics "footprint" once deployed. Reduced costs are an important by-product of this system that will "pull" specific items to the operational force user, when needed by that user.

V. DEMAND REDUCTION – FINDINGS

Demand Reduction – Findings

- **Today's** forces are too heavy to permit rapid deployment unless most equipment is prepositioned in the theater
- Big payoff for early entry and continuous combat
  - Faster deployment of combat forces
  - Smaller footprint in theater
  - More agile forces
  - Lower costs
- Reduces subsequent sustainment burden
- Opportunities to reduce demand include:
  - Redesigned force structure and equipment
  - Other demand management techniques

Critical to 21st Century Logistics Vision

Demand Management Techniques – a Major Focus and a Major Success Story of the Commercial World.

Reducing the demand for logistics support not only requires exploiting technology to develop better forces and equipment, but it requires a set of management changes in the way the Unified Command customers and the Services manage demand. Demand management has become a critical component in commercial firms' drive for competitive advantage. The best firms

are learning to anticipate changing consumption patterns and learning how to respond quickly to anticipated changes. Fashion-sensitive firms link their ordering, manufacturing and distribution processes directly to retail point-of-sale systems so that the development of "hot-sellers" does not leave empty shelves. Rather, the whole supply chain is quickly stimulated to increase the production of "hot-seller" products, and reduce the production of slow-moving products. This supply chain management approach is precisely what the DOD logistics system needs, and what we recommend in this section of the report.

CINC "Pull"

We described the first part of the demand management approach earlier — from the CINC's "point-of-sale" system residing on weapons system platforms and with mechanics and combat supply distributors in the combat forces. Their changing needs stimulate the military supply chain to respond with parts, fuel, etc., so as to leave no "empty shelves" — but no burdensome "iron mountains" either. The decision to adopt "CINC pull", implemented with the process changes and information systems recommended in the "CINC pull" section constitutes a major step forward in managing the flow of supplies and services into the battle space.

Reducing demand for logistics services, people, and material has a big payoff — enabling early entry of more combat power than now is possible, and also enabling continuous combat. Since the demand for logistics support creates a major demand for deployment lift and inter-theater transport and support units, reducing demand would translate into a reduction in the weight and volume of the materiel and people to be moved, especially critical in the early portions of an expeditionary activity. Reducing demand will facilitate faster deployment of combat forces, a smaller support footprint in the battle space (and, therefore, a smaller force protection requirement), more agile forces, and lower operating and support costs. The challenge is to assure the high level of operational availability of weapons systems and the health of personnel in the battle space that is necessary to sustain continuous combat. There is a major element of risk management in pursuing demand reduction. In this section we will attempt to show how the benefits can be achieved within acceptable risks.

Two principal approaches can be used to significantly reduce in-theater logistics demand. The first is the deliberate designing of combat and support organizations and their equipment to reduce their size, weight, and consumption rates, e.g., fuel, munitions. The second approach is to adopt a suite of management techniques to reduce demands for maintenance of systems/equipment and for consumable supplies. Both reduce the requirement in the battle space for support personnel and inventories of supplies. The results would be a sharp reduction in the "iron mountain" and a much more agile structure.

VI. DEMAND REDUCTION – RECOMMENDATIONS

Demand Reduction -- Recommendations

- **Force structure**
  - Reduce size & weight, and use fewer people
    - Examples: army after next (AAN), smart ship
  - Must overcome the cultural barriers, e.G., Crew size, use of unmanned vehicies, artIllery vs. Missile
    - Focus R&D on "agile force" with fewer platforms
  - Apply R&D to reduce consumption rates, LE., PGM; fuel efficient, super reliable equipment

Critical to goals of DSB 96 SS on Tactics and Techniques ...: DSB '98 SS Joint Operations Superiority in the 21st Century

Force Structure and Equipment

Reducing force structures, in terms of weight and manning, is essential to reducing costs of deployment and sustainment as well as enabling DOD to deploy forces more rapidly and with reduced risk.

New Designs

The Army After Next (AAN) is an example of how concept development uses technology to reduce demand. AAN is a "system-of-systems" approach to force design to leverage U.S. technology advantages in materials, energetics, information, and other fields. The AAN effort seeks to develop land combat and support systems and their deployment means that can achieve high strategic and operational mobility and tactical agility. Design parameters focus on the reduction in the demands for logistics support through attaining high reliability, use of precision munitions and knowledge management leading to superior operational, tactical (and support) decisions. Similar efforts are taking place in the Air Force examination of "Air Expeditionary Forces" and in the Navy's reviews of its operational concepts and force and ship designs.

Also, new start acquisition programs with specific requirements to reduce total ownership costs (TOC) and logistics demand are making progress in this area. The Navy's "Smart Ship" program is a useful example of payoffs available

in reducing manpower requirements to operate and maintain legacy platforms. Applying commercially available technology can reduce workloads and crew. Another example is the LPD-17 Shipbuilding Program, which expects to achieve a 20 percent total ownership cost (TOC) reduction under the cost of a similar existing ship. The Navy is achieving this requirement largely through workload/manning reductions. Such reductions in logistics demand are significantly more challenging for in-service platforms because an investment is generally required up front in order to achieve demand reduction (i.e., reliability and maintainability improvements).

Removing Cultural Barriers

However, there are cultural barriers that must be overcome. Reductions to platform manning (i.e., crew size, etc.) and use of unmanned air and ground platforms will require strong leadership commitment to become a reality- Two prime motivators for equipment (and force) design are "cost as an independent variable" (CAIV), with its TOC goals, and the strategic lift/footprint limits necessary to the candidacy of a system to be part of an "early entry" force. Our panel was briefed by the PMs for LPD-17 and F-22. Clearly the demand to reduce TOC has permeated program planning, design, and engineering development. Air Force battle space support requirements for the F-22 look to be significantly less than for F-15E. LPD-17 will embark a smaller crew than current amphibious vessels of similar capability. Culture had to change in both Services to permit these improvements. More is necessary. For example, can remotely launched precision munitions substitute for artillery in the early entry land combat force (beyond the close-in indirect fire capability of a mortar-like system)? Can future Army/Marine direct fire systems be crewed with two rather than the four needed for the M1A2, and could some of the platforms be unmanned? Can operating concepts (and culture) be changed to permit these "demand reductions" which technology changes would suggest are doable?

Implementing Demand Reducing Force Designs

It was clear to this panel that pursuit of early entry and continuous combat capabilities demands an R&D focus in each of the Services on the concept of the "agile force." The "system-of systems" visions of AAN, Air Expeditionary Forces, Operational Maneuver From The Sea, and the Navy's future operating and platform concepts (DD21, CVX) can become "blueprints" for this R&D focus. With TOC as a driver, assisted by force simulation analyses (technology wargames), these concepts can help focus R&D on achieving technologically dominant early entry platforms. They may constitute only 20 percent of the Services' combat capabilities, but they can "get there fustest with the mostest." We believe that the Services should plan for the "early-later" entry mix which includes aff ordably-modernized legacy platforms.

The important implementation tasks which should be put in place as soon as possible are the road maps for each Service's vision of its "agile force" integrated by the road maps for each of the JV 2010 (and beyond)

implementation plans, programmed in the FYDP and "extended planning annexes."

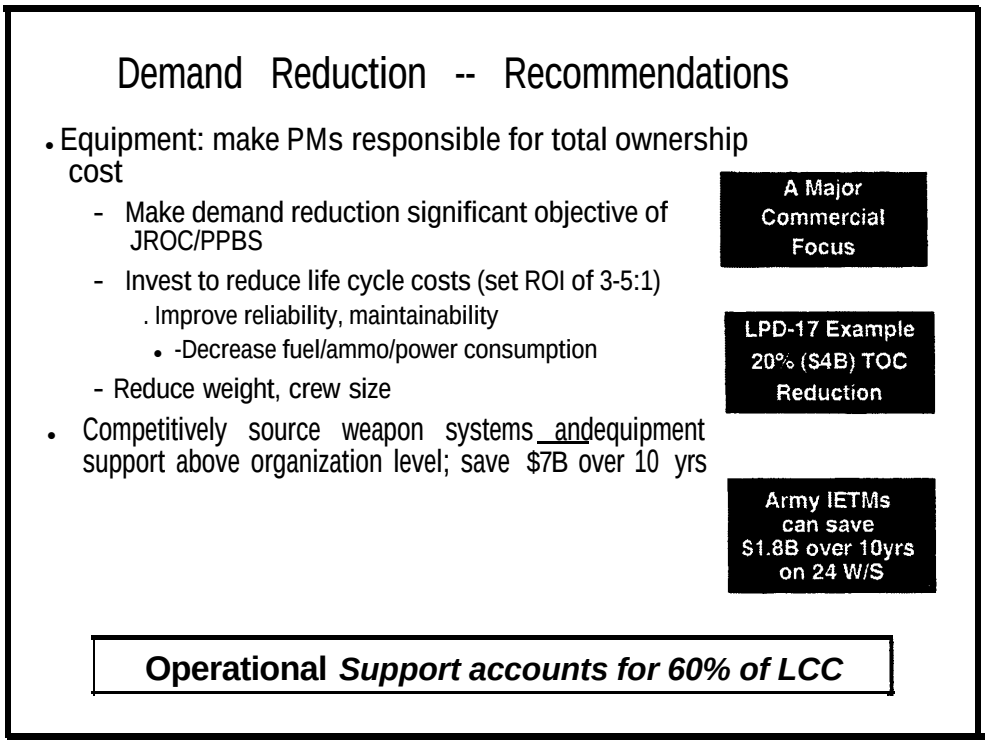
Force Consumption Rates

Technology is a key enabler for demand reduction through lower consumption rates, especially for parts. Therefore, it is key that DOD R&D efforts be focused on research that will reduce consumption requirements for both new and legacy weapon systems/equipment. Technologies are needed to enable weight and fuel/power reduction; precision-guided munitions; increased reliability/durability; "self-healing" and graceful degradation; and ease of repair.

-This is the second component of the proposed strategy for using technology to reduce logistics demand — one that can result in reduced consumption requirements for the new platforms described above, but also for existing platforms that would follow early entry forces. That follow-on force also needs to avoid "iron mountains" and a large support footprint. The panel was briefed on a study done by CENTCOM which showed that a mix of PGMs could reduce munitions demand to ***25 percent of present estimates with the same target effects.*** Likewise, fuel consumption reductions of 50 percent or more now appear feasible for land, air, and sea platforms through both commercial and DOD R&D efforts on hybrid engines, fuel cells, electric drive, and other technologies. While battery technology improvements are slow, reduction of power consumption requirements in electronic equipment is moving briskly. Adoption of enhanced commercial irradiation of perishable fresh fruits, vegetables, meat, poultry, and fish would dramatically reduce lift and storage refrigeration requirements in the entire theater as well as guarantee disease-free food.

And, of course, a major consumption reducer would be improvements in the reliability of platform components and of the accuracy of diagnostics (including technician proficiency). The Services have seen the impact of the dramatic, often 50-fold, improvements in reliability of electronic components over the last decade. Insertion of such technologies as fly-by-wire in place of hydraulics can make nearly as dramatic changes in mechanical/hydraulic components. Likewise, the commercial auto industry has doubled fuel efficiency over the last 15-20 years when faced with motivation in the form of a Government mandate.

Implementing the reliability changes requires resources/investments by the Services of only $300 to $500 million per year (as recommended by the DSB's "Logistics Modernization" study of April 1996), but could produce high payoffs in demand and O&S cost reduction for those systems to be retained well into the 21st Century.



Role of JROC/PPBS

Additionally, stronger joint requirements should reduce redundant and single-service unique logistics requirements. Logistics demand reduction will only occur, in either the short or long term, if it is a priority at every step in the JROC and PPBS processes.

Make PMs Responsible for Life Cycle Support and Funding Control for New and Legacy Systems. Focus on Total Ownership Costs (TOC).

The purpose of this second part of the set of "demand management techniques" is to fix responsibility for influencing logistics demands of the major consumers — the weapons systems and equipment used by the CINCs' forces. Only for a few systems is that responsibility fixed in the PM; for most systems responsibility for the systems post-fielding support is widely diffused among organizations and commodity and maintenance managers in the Service materiel commands and DLA.

The current policy in DODI 5000.1 is to do just as we recommend — for new systems. The problem of diffused life-cycle responsibility described above has been well recognized, and the policy changed. The policy has not been extended to legacy systems — which is where the current diffuseness of responsibility now contributes to high O&S costs and a large logistics demand.[8]

8 This policy was recommended by the DSB Acquisition Work Force Sub-Panel in its March 1998 report, and partially adopted by the Secretary of Defense in his report to the Congress ("Secretary of Defense Report to Congress: Actions to Accelerate the Movement to the New Acquisition

To restate briefly what previous DSB recommendations have said, responsibility for managing weapons system's from "cradle to grave" should be explicitly assigned for the life of the equipment to appropriate Program Managers, whose reporting chain is either through a Program Executive Officer or Systems/Materiel Command to the Service Acquisition Executives (acquisition reporting chain includes Service Acquisition Executives, but in-service chain often differs).

One alternative, used by the Army during the Gulf War, was to give the PM for major systems, e.g., Abrams tank, Bradley, the life cycle support responsibilities and spares funding control. The PM continued to report to the PEO for execution of production and modifications but was responsible to the Army Materiel Command for sustainment of those systems. This arrangement is at work now for many systems whose production has ended yet modifications continue. The service materiel command component acts as the PEO and responds to the Service Acquisition executive for modification and to the materiel systems command for sustainment

Controlling Total Ownership Costs

For such responsibilities to be meaningful, a standard process should be established for defining and measuring total ownership costs (TOC), including standard rules for allocating indirect costs, and a method for assessing the impact on contingency lift requirements. TOC and lift goals – along with other demand-reduction requirements and goals — should be passed along to industry in contracts. Contracts would incentivize reductions in crew size, improvements in equipment reliability/ maintainability, reductions in equipment weight and in the weight and volume of the major drivers of sustainment deployments – fuel and ammunition usage. Today's contracts tend not to provide such incentives, but are actually structured such that revenues to the OEM and component manufacturers rise as reliability falls. We will not achieve major TOC and demand reductions until we have accomplished a complete "turn-around" in these incentives.

Gaining Funding Control

Currently platform-level Program Managers often have direct control over approximately 30 percent or less of the TOC of their systems. In this regard, Service budgeting and financial procedures should be modified to facilitate:

1. Increased flexibility in shifting funding between sustainment and investment accounts in new budget years. (It seems futile to attempt shifts during the year of budget execution.)

Workforce Vision," dated April 1, 1998, pages 9 and 10) committing to having the Services designate ten major systems for PM management of product support. Similar recommendations are included in the DSB 1996 Summer Study "Innovative Support . . ." and the report of the DSB Task Force on Logistics Modernization of April 1996.

2. Investments that reduce the operational support requirements of legacy systems when such investments are indicated by a business case analysis that includes the potential reductions in lift as well as TOC, that would result from such investments.

Invest to Reduce Life Cycle Costs

Legacy platforms should be evaluated to determine where meaningful investments can be made, based on business case analysis, in TOC reduction, service-life extension, or, where costs outweigh operational utility, disposal. Several high-leverage areas for potential investment have been identified by the panel, including re-engining ground platforms (e.g., hybrid-electric in place of existing gas, diesel, and gas-turbines), band tracks, fuel cells and other non-battery power technology.

As noted earlier, similar investments in reliability, durability, and maintainability were identified by the DSB's 1996 study; Logistics Modernization. Program managers and producers continually propose other investments. The trick, also as noted earlier, is finding the $300 – $500 million a year to invest. But there are other ways to fund these investments. Planned buys of repairables can be competed as long-term (base year plus option years) contracts, with form-fit-function performance specifications and incentives for reliability/durability. "Best value" source selection would stress expected improvements over the current component. A second similar approach utilizes the contractor-logistics support mechanism recommended below to incentivize overall operating and support cost reduction based on lower spares demand — an incentive the prime would be persuaded to pass on.

The experience of the Army's Mobile Subscriber Equipment partnership (CECOM and GTE) is that this technique (accompanied probably by the incentive of future business) incentivizes the producers of components to propose component modifications — or new designs that will have longer lives.

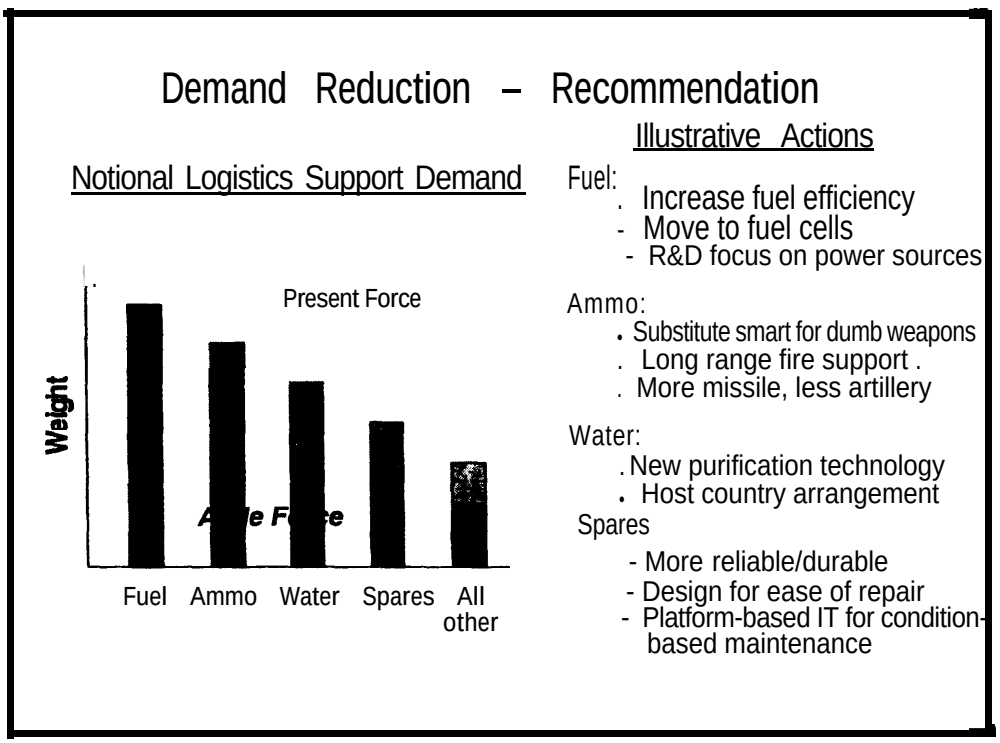
Competitively Out-Source Product Support

Finally, Weapons System Program Managers, once assigned "cradle to grave" management responsibility, should be required to competitively out-source all equipment support requirements above the "organizational" level. This issue is covered extensively in the report of the DSB Acquisition Workforce Sub-Panel of March 1998, beginning on page II-27 and including Appendices K and L. To the extent that such sourcing can be reflected in initial competitive contracts for the production of equipment, it can, for example, take the form of extended warranties that strongly incentivize suppliers to provide equipment of growing reliability with correspondingly declining support requirements. For fielded equipment, such competitive out-sourcing, will create continued downward pressure on support needs.

Competitively contracting for support that has historically been provided by government personnel demands improved DOD contracting sophistication and

skills if the potential benefits of this element of the transformation are to be obtained. Dedicated training, development and publishing of "lessons learned," developing model contracts, extensive dialogue with industry — all can help to achieve the objective of fostering a healthy integrated partnership with industry to focus both on high performance of systems and minimization of TOC — and logistics demands.

VII. ILLUSTRATIVE ACTIONS FOR DEMAND REDUCTION



The panel has identified the key demands on lift and sustainment, and believes that significant reductions in demand for each can be realized over the time-span considered by this study. We believe that this series of seemingly "evolutionary" changes can have a total impact to force projection that is revolutionary.

We have identified illustrative actions — some of which already have been mentioned — for each of the "classes of demand" listed. The panel reviewed "real" technologies with potential for useful improvements in all of these areas, and others besides.

Fuel

Fuel is an area where significant progress can and should be made. The significant increase in fuel efficiency of the US automobile fleet over the last 25 years is indicative of the scope of improvement we believe possible . . . and also

of the magnitude of the leadership effort required. Use of fuel cells and the replacement of current ground platform engines with hybrid-electric power trains featuring direct electric drive have the potential to increase the "gas mileage" of the ground fleet by 50 percent or more, even for a force structure that contains a large number of legacy platforms. This is an opportunity that must not be missed. We believe that considerable work will take place in the commercial market in these areas, and that therefore the DOD will not have to do basic science, only application engineering. In Desert Storm/Desert Shield, the host nation provided almost all of the fuel used, but that support cannot be depended on for all deployments in the future. Efforts to reduce platform weight (through new types of armor appliques, etc.) will also contribute to reducing fuel use, but are important in-and-of themselves, because of their implications for lift.

Ammunition

Previous DSB and other studies have identified revolutionary decreases in total ammunition weight that are enabled by new technologies. The substitution of smart weapons for conventional weapons can enable order-of-magnitude decreases in the number of rounds fired to accomplish an effect. The use of super-precision long-range fire support rather than local conventional artillery has been shown to offer similar weight reductions, and significant operational benefits besides. In the time period under consideration, the use of directed energy for some fire missions – to counter, for example, rockets and artillery, and for point defense of key assets – is likely to be feasible. The weight and cost of directed energy "ammunition" per kill is in another one or two orders-of-magnitude benefit class.

Reliable, Durable, Maintainable Spares

The use of more reliable and longer-lasting spares will, in the view of the panel, significantly reduce total demand for spares. An example that is working in the commercial field is band tracks as replacements for conventional segmented link tracks on ground vehicles. The commercial world has built 250-ton vehicles that can go 60 miles per hour using band tracks, and expects that the life-cycle cost/maintenance requirement for these tracks is on the order of one-order-of-magnitude for this improvement alone.

Platform Based IT

Additionally, the panel believes that the use of the platform-based information technology described earlier will enable condition-based maintenance (that is, fix it when prognostics say that it might fail soon, rather than based on miles, hours, or the calendar). Analysis for both the commercial and military domains shows that condition-based maintenance will provide significant decreases in cost and improvements in operational availability in many areas. These include maintenance actions, improved operational availability of the fleet, significant decreases in the number of maintainers required, decreases in the time to determine the problem with a platform, and decreases in the total weight and quantity of spare parts required

TECHNOLOGY PANEL REPORT

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Larry Lynn

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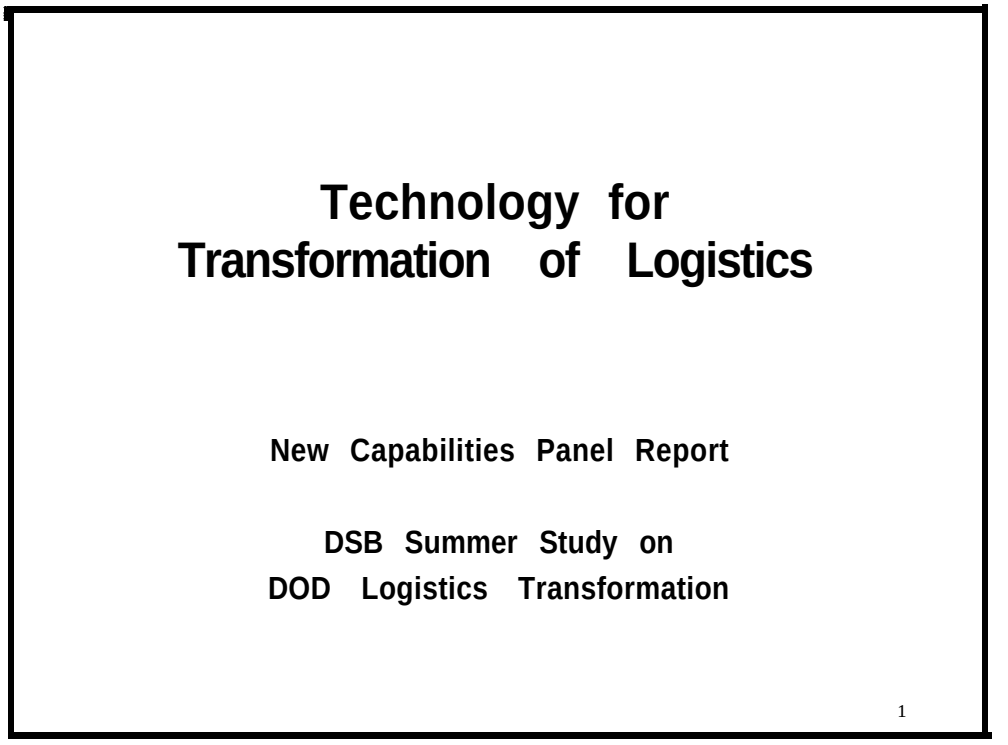
Panel Support

Mr. Richard Balzano, SAIC

Maj Wynne Waldron, USAF

I . INTRODUCTION



Technology maturity is generally not the limiting factor in improvement of logistics. However, there are at least four areas where technology will heavily impact our ability to create robust and integrated logistics that are responsive to the CINC needs. These are:

- Information systems technology
- Reduction of vulnerability to CBW and IW attacks.
- Reduction of logistics demand
- Improvements in supply, particularly in strategic and tactical lift

Information systems technology is critical to transformation of the logistics system and is dealt with separately in this report.

Likewise, the CBW and IW threat is a national problem which is being addressed in a much broader context. However, these threats are particularly applicable to logistics in disruption or negation of port and airfield capability. The technology to counter these threats is quite similar to that for population protection. While this study did not comprehensively examine the topic, it is clear that logistics would be a prime target for these forms of attack and that the impact of at least a CBW attack would be very disruptive or worse. Every effort must be made to minimize these effects through robust logistics system design and application to logistics protection of all that is developed in this field.

The logistics aspects of the other two topics are discussed in subsequent pages of this Panel Report.

II. INTRODUCTION

Technology for Transformation of Logistics

New Capabilities Panel Report

DSB Summer Study on
DOD Logistics Transformation

Technology maturity is generally not the limiting factor in improvement of logistics. However, there are at least four areas where technology will heavily impact our ability to create robust and integrated logistics that are responsive to the CINC needs. These are:

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must be made to minimize these effects through robust logistics system design and application to logistics protection of all that is developed in this field.

The logistics aspects of the other two topics are discussed in subsequent pages of this Panel Report.

III. 1996 DSB SUMMER STUDY OVERVIEW

DSB 96 Summer-Study:
Tactics & Technology for 21st Century Military Superiority

- **Focused on reduced in-theater footprint but increased effectiveness**
  - **Radically increase combat-zone tooth-to-tail**

	Support	Combat
Today	60%	49%
Future	20%	80%

  - **Remote support where possible (weapons, sensors, logistics)**
  - **Maximize "brains over brawn" approach**
- **Double effectiveness of combat forces through improved tactics, training and technology**
- **Addressed challenges of**
  - **C2 for distributed force, force injection/extraction, force survivability**
  - **Sustainment via smart logistics ("right stuff, right place, right time" and vastly reduced logistic footprint/personnel in combat zone) 2**

The goal of the 1996 DSB Summer Study on "Tactics and Technology for 21st Century Military Superiority" was to modify the early arriving forces to achieve a greatly reduced footprint in theater while achieving a greater level of effectiveness. The proposals spanned tactics, doctrine and equipment.

DSB 96 Summer Study:
Tactics & Technology for 21st Century Military Superiority

- **Recommended work in**
  - **Precision resupply**
  - **Fire and lethality**
  - **Information infrastructure**
  - **Sensor systems and situational understanding**
  - **Insertion, extraction, sustainment, survival**
  - **Exercises, training and operations**
  - **Non-lethal systems for crowd control**
- **Many of these are now active DARPA or Service programs but much more could be done**

The reduction of in-theater footprint and the shift to remote support would have a major impact in improving the logistics and lift situation

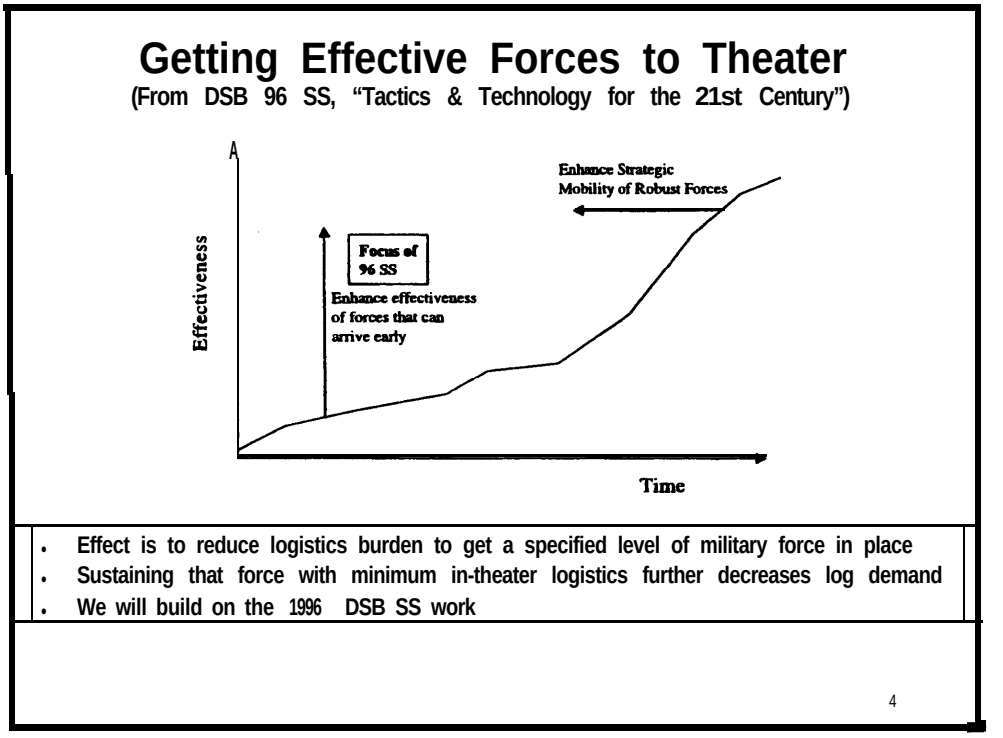
The 96 DSB Summer Study provides a comprehensive approach to reducing the "demand" and we encourage DOD to more actively pursue those recommendations

3

Recommendations covered work in many areas. Some of those with the most potential impact are shown in the previous chart.

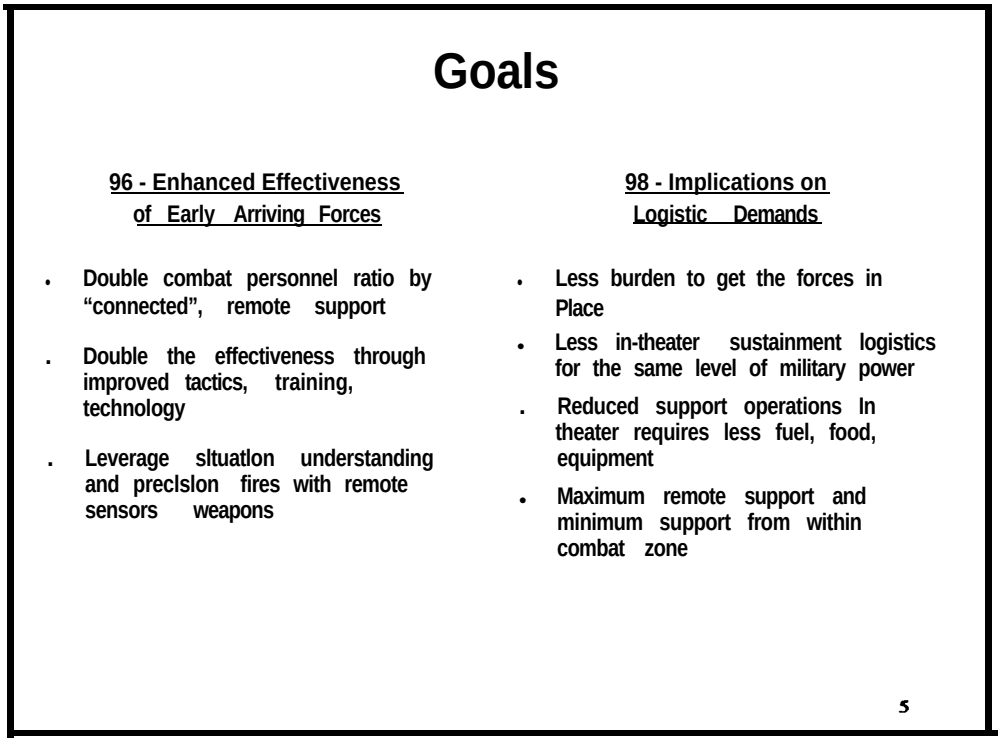
It is clear that reduction of the footprint affects the requirements for both deployment lift and sustainment, in effect a double payoff.

The 1996 Summer Study was comprehensive in its coverage of this reduction of footprint and its recommendations are still appropriate. The DOD should increase the tempo of response to these 1996 recommendations.



This chart shows notionally the intent of the 1996 Summer Study.

IV. PANEL GOALS



The next level of detail of goals were as shown in the above chart.

The force structure considered was a 5000-man brigade with 3-4 light infantry battalions, organized into combat cells and with a small brigade staff.

The principal challenges that were identified in this 1996 study were:

- C2 for the distributed force
- Force injection and extraction
- Force survivability
- Sustainment via smart logistics
- "Right stuff, right place, right time"
- Vastly reduced logistic footprint/personnel in the combat zone

The principal candidate areas for attention were identified as shown in the following chart.

The ultimate goal was changing the notional "tooth-to-tail" ratio from what it is today, approximately 0.7, to what was believed achievable at 4.0.

More Combat, Less Support in Theater
(96 DSB SS)

Candidates for reduction of in-theater footprint

- Sensors, Intel functions (reachback)
- C4ISR infrastructure
- Ammunition - precision technology and theater fires (organic, supporting)
- Telemedicene, biomedicene
- Logistics
  - Total asset vislbility and containers
  - Tailored maintenance, improved reliability, replace vice repair
  - Direct precision delivery and in-theater conversion for fuel, food, water, power
- Reduced tactical mobility footprint (fuel, power supplies, materials)

Bgde-sized TF lift allocation - notional		
	Combat	Support
Today	40%	60%
Future goal	80%	20%

6

Broken down into classes of logistics, the broad footprints of the support requirements are shown in the following chart for both the current and goal systems.

The Future of Combat Service Support
(From 96 DSB SS)

CSS support for *3000* man Brigade for 30 Davs

Class of Supply	Current Footprint	Future Footprint
Class I (MRE)	270,000 meals	No change
Class I (water)	1,350,000 gals	Treated indigenous water (30% footprint reduction)
Class II (consumables)	3,400 batteries	300 rechargeable batteries
Operations ashore ---- chargers		Prototype windmill generator Solar battery
Class III (bulk fuel)	100,000 gals (avg)	Alternate fuels, freeze dried (50% footprint reduction)
Class V (Ammo)	350 tons	Standoff precision (70% footprint reduction)
Class VI (repair parts)	Approx. 30,000	Tailored maint/distribution (75% footprint reduction)

V. RECOMMENDATIONS

Recommended Areas of Work (1)

(96 DSB SS)

. **Precision resupply**
  - **Joint precision offset delivery system (JPODS)**
  - **Guided parafoil leiivery**

. **Fire and lethality**
  - **RFPI ACTD**
  - **Counter MRL ACTD**
  - **Loiter weapons, armed UAVs, sea-based long-range guns, dynamic force & fire management, "arsenal aircraft"**

. **Information infrastructure**
  - **BADD**
  - **Secure personal comm**
  - **SUO**
  - **Tactical personal into ensemble, comm payloads for UAVs, urban comm nets**

. **Sensor Systems and Situational Understanding**
  - **Combat ID**
  - **Precision target ID**
  - **Rapid Battlefield Visualization**
  - **Counter CC&D**
  - **SAIP**
  - **UGS**
  - **Integrated sensor tasking**
  - **HAE, MAE, TUAV**
  - **Sensor galaxy management, enhanced JSTARS**

8

This and the subsequent chart show the areas that the 1996 Summer Study recommended for work. Many or most are related to a reduced footprint in the combat zone.

Recommended Areas of Work (2)

(96 DSB SS)

. **Insertion, extraction, sustainment, survival**
  - **Joint log ACTD**
  - **Survivable combat vehicle**
  - **Stealth transport aircraft, team mobility vehicle, GPS parafoil delivery, Stealth clothing and treatments, remote BW monitor, anti-sniper systems**

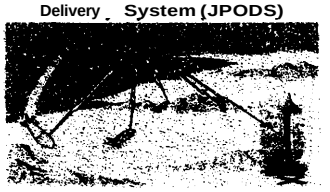
. **Exercises, training and operations**
  - **Digitized battlefield**
  - **MOUT**
  - **Sea Dragon**
  - **STOW at combat cell level**
  - **IW**

- **Non-Lethal systems for crowd control**

9

Precision Resupply

Joint Precision Offset Delivery System (JPODS)

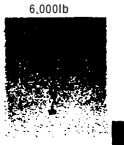


Parafoil Systems

1,000 lb

- Mass Resupply
- Large Payloads
- GPS Guided

6,000lb



10,000 lb

- Clandestine Resupply
- Scaleable Vehicle
- Accurate in Adverse Weather
- Uses Existing Technology
- Propulsion Could Be Added to Increase Range

Characteristics Summary		
JPODS		Parafoil
300 - 2000 15 - 90 Up to 50 100 Low 1 - 4 Various - A-10, B-2, C-130, C-2, C-17, F-15, F-16, F/A-18	Payload Wt - lb Payload Vol - ft³ Range - NM Accuracy - m Signature Time of flt - min Delivery Systems	1000 - 40,000 as Req'd 14 From 30K ft Wind Dependent High 10 - 20 Transports - C-130, C-17

10

One of the more interesting and novel approaches from a logistic point of view is the elimination or reduction of the port/airfield nodes which are both vulnerable and inefficient. These bottlenecks might be eliminated completely if delivery from ships off-shore, directly to troops who need supplies, could be effective.

Several ideas have been investigated at low levels of experiment. JPODS is one; delivery by air-launched “glide bomb” using GPS guidance. Another which is potentially useful for greater payloads is the guided parafoil shown in this chart. Both offer standoff delivery.

DEMAND SIDE

- 1996 DSB Summer Study was comprehensive treatment and DOD should increase tempo of implementation
- Some of the concepts/technologies most important to logistics
  - Remote operations and sensing
  - Robotics/semi-robotics support (min. people)
  - Precision/smart armament
  - Precision resupply
  - Exercises and training

11

To summarize the technology related to reduction in demand, the 1996 Summer Study was a comprehensive look at this subject and we endorse its recommendations and encourage the DOD to accelerate implementation. The payoff for logistics improvement is enormous.

VI. TECHNOLOGY OF NOTE

Particularly Interesting Supply Technology

- **High speed, heavy lift capabilities**
- **Mobile Offshore Base Systems (MOBS)**
- **Direct to Foxhole Delivery (DFD)**
- **Improved energy sources**
- **Irradiated food**
- **"In-theater" manufacturing**

12

Several technological developments are of particular interest in improvement of the logistics capabilities.

High speed, heavy lift includes: high speed sealift, large aeroships (heavier than air but with lighter than air approaches). There are a number of proposals circulating for ships that range from 40 knots to 200 knots. At the lower end, the technology is mature and the issue is economics. At the upper end (above 75 knots) there are significant technology issues which tend to be obscured in the marketing pitches. While some of these may well prove feasible, that remains to be proven and again, the economic viability in the commercial world is an open question.

MOBS offer attractive potential to reduce our dependence on overseas basing. The principal technical feasibility issue is the connection of 2 units by 2 units (i.e.: 2-D architecture) in heavy seas. While the motion of these huge platforms will be small, the forces on the coupling will be very large unless there are innovative ways of connecting them.

DFD was covered in a prior slide (# 10).

Batteries are a continuing problem to the war fighter. Generally, there appear to be only marginal gains from different battery chemistries since energy density is the primary issue. However, fuel cells in the nearer term (functionally equivalent to rechargeable batteries) and micro-turbines and "harvesting energy"

in the far term may offer relief. The latter draws energy from the environment in any of a variety of ways; the current practical example is solar energy but a number of other approaches are under investigation at DARPA and other R&D organizations.

Irradiated food has been tested and promises reduced spoilage and potentially better taste.

In-theater manufacturing (actually on board a nearby ship) may offer computer aided manufacturing to alleviate the time to provide spare parts of a variety of kinds.

Principal Gains & Issues of New Technology

Advantages	Issues
Heavy lift	
100 Kt plus speed of transit	Commercial viability and support
Potential to avold shore issues	Rpidity of overall system, not just transit
	Maximum range which is essential
MOBS	
Forward basing under US control	Performance of very large (airfield)
Ability to move with world situation	structures In heavy seas
DFD	
Avoids all logistics of combat zone "middle men"	Payload and ranges achievable
	Corresponding tactics and doctrine
Support of dlstributed forces	
Energy sources and radiated food	
Reduced logistics burden from current batteries, food and fuel	Feasibility and practicality

13

The recommendations with respect to the cited technologies are as follows:

High speed, heavy lift: It is very unlikely that DOD will (or should) invest heavily in this area. The primary issue is the ability of these various proposals to compete economically with current forms of lift in the commercial venue. DOD however, should stay closely coupled to the various programs and, if the commercial world decides to invest in a fleet of any of these, DOD should attempt to influence the detailed designs to maximize the utility for military lift and CRAF-like arrangements should be negotiated.

MOBS: While the utility is likely to be very high, the resistance is also high and the cost of proving the feasibility is likely in the $1-2 billion range. DOD should seek creative ways to test the feasibility in heavy seas at lower costs.

DFD ideas should be pursued at the feasibility and performance level and should be seriously considered in activities such as the Army After Next to establish appropriate doctrine and tactics.

R&D for battlefield energy sources, irradiated food and potential in-theater manufacturing should be continued and encouraged.

APPENDIX A - GLOSSARY OF ACRONYMS

3PL	3rd Party Logistics
A	
AAN	Army After Next
ACAT	Acquisition Category
ACOM	U.S. Atlantic Command
ACQ	Acquisition
ACTD	Advanced Concept Technology Demonstrator
ADCSLOG	Assistant Deputy Chief of Staff Logistics
AF/IL	Air Force/ Installations and Logistics
AIT	Automated Identification Technology
ALP	Advanced Logistics Program
ALP	Air Load Planning
APOD	Air Port of Debarkation
ASB	Army Science Board
ASD/HA	Assistant Secretary of Defense/ Health Affairs
B	
BDE	Brigade
BW	Biological Warfare
C	
C2	Command and Control
CAIV	Coat As an Independent Variable
CASCOM	Combined Arms Support Command
CB	Chemical Biological
CBW	Chemical/Biological Warfare
CECOM	Communication Electronics Command
CHE	Container Handling Equipment
Chem/Bio	Chemical/Biological
CINC	Commander-in-Chief
CINCTRANSCOM	Commander-in-Chief, U.S. Transportation Command
CJCS	Chairman, Joint Chiefs of Staff
CLS	Contractor Logistics Support
COE	Common Operating Environment
CONOPS	Concept of Operations
CONUS	Continental United States
COTS	Commercial, Off-The-Shelf
CRAF	Civil Reserve Air fleet
CROP	Container Roll-In/Out Platform
CSS	Combat Service Support
CVX	Carrier Experimental
CW	Chemical Warfare
D	
DAB	Defense Acquisition Board

DARPA	Defense Advance Research Projects Agency
DCMC	Defense Contract management Command
DFD	Direct-to-Foxhole Delivery
DIS A	Defense information Security Agency
DIV	Division
DLA	Defense Logistics Agency
DMC	Defense Management Council
DOD	Department of Defense
DRIDs	Defense Reform Initiative Documents
DSB	Defense science Board
DTS	Defense Transportation System
E	
ED1	Electronic Data Interchange
ERP	Enterprise Resource Planning
EW	Electronic Warfare
F	
FEBA	Forward Edge of the Battle Area
FMS	Foreign Military Sales
FY	Fiscal year
G	
GATM	Global Air traffic Management
GCCS	Global Command and Control System
GCSS	Global Combat Support System
GTE	General Telephone
GTN	Global Transportation Network
H	
HNS	Host Nation Support
I	
IAW	In Accordance With
IS	Information Systems
IT	Information Technology
ITV	In-Transit Visibility
IW	Information Warfare
J	
J4	Director for Logistics, Joint Staff
JCS	Joint Chiefs of Staff
JFACC	Joint Forces Air Component Commander
JFRG	Joint Force Requirements Generator
JLOTS	Joint Logistics Over the Shore
JOPES	Joint Operational Planning and Execution System
JRSOI	Joint Reception Staging Onward Movement and Integration
JSF	Joint Strike Fighter
JSOC	Joint Special Operations Command
JTAV	Joint Total Asset Visibility

JTF	Joint Task Force
JV2010	Joint Vision 2010
JROC	Joint Requirements Oversight Committee
L	
LCC	Life Cycle Cost
LMI	Logistics Management Institute
LOG	Logistics
LOTS	Logistics Over The Shore
LPD-17	Landing Platform Docking
M	
M	Million
MA	Marshalling Area
MBTF	Mean-Time Before Failure
MHE	Material Handling Equipment
MILSPEC	Military Specifications
MOBS	Mobile Off-Shore Basing
MSC	Military sealift Command
MRC	Major Regional Conflict
MTM/D	Million Ton Miles/Day
MTW	Major Theater War
N	
NDP	National Defense Panel
NLT	No Later Than
NM	Nautical Mile
O	
OCONUS	Outside Continental United states
O&M	Operations and Maintenance
OEM	Original Equipment Manufacturer
OOTW	Operations Other Than War
OPS	Operations
OSD	Office of the Secretary of Defense
P	
PACOM	U.S. Pacific Command
POD	Port of Debarkation
POE	Port of Embarkation
POM	Program Office Memorandum
PM	Program Manager
PREP0	Preposition
R	
R&D	Research and Development
RIBS	Rapid Installed Breakwater System
RORO	Roll-On, Roll-Off
RMA	Revolution in Military Affairs
RML	Revolution in Military Logistics
PPBS	Planning, Programming, Budgeting System
RSOI	Reception Staging Onward Movement and Integration

S	
SA	Staging Area
SC21	
SECDEF	Secretary, Department of Defense
SOCOM	U.S. Special Operations Command
SPOD	Sea Port of Debarkation
SS3	Sea State Three
ST	Short Tons
STAMIS	
STOL	Short take Off and Landing
T	
T	Tons
TAA	Tactical Assembly Area
TAV	Total Asset Visibility
TC-AIMS II	Transportation Coordinators-Automated Information Management System II
TCC	TRANSCOM Component Command
TOA	Transfer of Authority
TOC	Total Ownership Cost
TOR	Terms of Reference
TPFDD	Time-Phased Force Deployment Data
TPFDL	Time-Phased Force Deployment List
TRANSCOM	U.S. Transportation Command
TY	Then Year
U	
USACOM	U.S. Atlantic Command
USCENTCOM	U.S. Central Command
USD(A&T)	Under Secretary of Defense (Acquisition and Technology)
USEUCOM	U.S. European Command
USFK	U.S. Forces Korea
USMC	U.S. Marine Corp
USPACOM	U.S. Pacific Command
USPS	U.S. Postal Service
USSOCOM	U.S. Special Operations Command
USSOUTHCOM	U.S. Southern Command
USSTRATCOM	U.S. Strategic Command
USTRANSCOM	U.S. Transportation Command
W	
WWI	World War I
WWII	World war II
WMD	Weapons of Mass Destruction

APPENDIX B – BRIEFINGS RECEIVED BY THE SUMMER STUDY

The DSB Summer Study on DOD Logistics Transformation, received briefing, both to the entire study group, and the four individual sub-panels. The table below lists the briefings received. They are listed alphabetically, by date, and to which group or groups received the briefing.

Date	Title	Organization	Briefer
4/16/98	A Pathway to the Future Implementing Joint Vision 2010	JV2010	MG Close
4/16/98	DOD Logistics Transformation	US Atlantic Command	CAPT Jeff Wagner
4/16/98	General Counsel Briefing	JCS	Mr. David Ream
4/16/98	JC2010 Focused Logistics, Logistics Directorate (J-4) the Joint Staff	J-4	CAPT Dave Shanahan
4/16/98	Joint Vision 2010 - Focused Logistics Initiatives	US European Command	COL Henderson
4/16/98	Logistics Transformation	US Southern Command	COL Neil Hattenstein
4/16/98	Logistics Transformation - The Way Ahead for U.S. Logistics in Korea	U.S. Forces Korea	COL Ronald Rollison
4/16/98	PACOM Logistics	US Pacific Command	COL Thomas
4/16/98	Quiet Professionals	Special Operation Command	COL Donald Betts
4/16/98	US Central Command	US Central Command	Col Chris Kauffmann
4/17/98	Brief to the DSB - Summer Study Task Force	Defense Logistics Agency	RADM Dave Keller
4/17/98	DOD Logistics Transformation	USN N-41	CAPT Bill Bristow
4/17/98	DOD Logistics Transformation	TRANSCOM	Mr. Dan McMillin
4/17/98	DOD Logistics Transformation JV 201 0/USSTRATCOM Uniqueness //Requirements	US Strategic Command	Col Lynn Willadsen
4/17/98	Logistics and the 21 st Century	US Marine Corp	Col Jim Strock
4/17/98	Power Projection Logistics	US Army - ADCSLOG	MG Charles Cannon, JR.
4/17/98	The Revolution in Military Logistics	US Army - ADCSLOG	

5/18/98	Changing Logistics	DLA	Mr. Jeff Jones	#1-4
5/18/98	Concepts and Technologies for the ARMY After ARMY 2010		Dr. Joe Braddock	#1-4
5/18/98	Logistics Vision and Requirements for "True Transformation"	Panel One	Ms. Susan Livingstone	#1-4
5/19/98	About Bechtel	Bechtel	Mr. Futcher	#1-4
5/19/98	Joint Total Asset Visibility	JTAV	Ms. Nancy Johnson	#1-4
5/19/98	Notional Deployment CONUS View	LMI	Mr. Ron Frola	#1-4
5/19/98	OSD Transportation Initiatives	OSD	Ms. Mary Lou McHugh	#1-4
5/19/98	Qualcom Story	Qualcom	Mr. Stephen Snow	#1-4
5/19/98	The Caterpillar Road to Re-inventing Logistics	Caterpillar	Mr. Bob Mylott	#1-4
6/9/98	(Advanced Logistics Project	DARPA	Mr. Todd Carrico	#1-4
6/9/98	DOD Logistics Transformation	SeaLand	Mr. Louis Lambremont	#1-4
6/9/98	GCCS / GCSS Update	DISA	Mr. Bill Leary	#1-4
6/9/98	Global Transportation Network	TRANSCOM	Ms. Donna Lance	#1-4
6/9/98	Logistics Transformation	AF/IL	Mr. Grover Dunn	#1-4
6/9/98	Long Range Plan	USSPACECOM	LtCol Don Alston	#1-4
6/9/98	NAVAIR Affordable Readiness – Reducing Total Ownership Cost (TOC)	NAVAIR	RADM John Chenevey	#1-4
6/9/98	Transportation Coordinators' – Automated Information for Movement System II (TC-AIMS if)	TC-AIMS	LtCol Walt Munyer	#1-4
6/10/98	ARMY Distribution Based	CASCOM	LTC Julienne Powel	#3

6/10/98	Assessment of the Impact of Chemical and Biological Weapons on Joint Operations in 2010	Chem/bio	Ms. Aime Hoeber
6/10/98	Assessment of the Impact of Chemical and Biological Weapons on Joint Operations in 2010 - Summary Report	Chem/bio	Ms. Aime Hoeber
6/10/98	Assessment of the Impact of Chemical and Biological Weapons on Joint Operations in 2010 - VIGNETTES	Chem/bio	Ms. Aime Hoeber
6/10/98	C-130 Floatplane Program Review	Lockheed Martin	Mr. Andy Swick
6/10/98	Contracting Out Contingency Response	AFCAP	Mr. Dwight Clark
6/10/98	Fast Ship Review	OPNAV / NSWC	Mr. Colen Kennell CDR Steve Lehr
6/10/98	JLOTS Overview for DSB	Joint Staff, J-4	LTC Chris Barbour
6/10/98	Joint Deployment Process Improvement (JDPI)	Joint Staff, J-5	COL Jerry Kennealy
6/10/98	Joint Medical Logistics 2010 - New Concepts in Medical Readiness	ASD/HA	LTC Don Wideman
6/10/98	Managing Mail Surge	USPS	Mr. Gary Thuro
6/10/98	Mobile Subscriber Equipment	CECOM	Ms. Joanne Iorio
6/10/98	Munitions Distribution - CONUS Initiatives	IOC	Mr. Daniel Stackwick
6/10/98	Ultra-light Aerocraft	Lockheed Martin	Mr. Ed Glascow
6/ 1/98	How Does Joint Vision 2010 Affect Global Projection?	Lockheed Martin	Mr. Andrew Bennett
6/ 1/98	On Load / Off Load	TRANSCOM	
6/ 1/98	: Sea-Based Aircraft Development – Revolutionary Capability for the 21st Century	/Lockheed Martin	Mr. Andy Swick
6/ 1/98	Strategic Air Mobility En Route Infrastructure Update	TRANSCOM	
6/11/98	US Transportation Command -Cargo , Prioritization	TRANSCOM	

6/30/98	Center for the Commercial Deployment of Transportation Technologies (CCDoTT) High Speed Sealift / Agile Port Program	TRANSCOM	LCDR John G. Meier III	#2
6/30/98	Improving the Deployment Process	TRANSCOM	Mr. Phil Boyer	#2
6/30/98	Joint Deployment Training Center (JDTC)	TRANSCOM	Ms. Julie Frisby	#2
6/30/98	Organizational Structure – An information Brief for The DSB	TRANSCOM	Mr. Frank Weber	#2
6/30/98	Transportation Working Capital Fund – TWCF Rates TWCF Cost Drivers TWCF and Budget Process	TRANSCOM	CAPT Michael T. Rader	#2
6/30/98	Transportation Modeling & Simulation for the DTS	TRANSCOM	Mr. Bill Key	#2
6/30/98	US Transportation Command – Defense Transportation The Keystone of American's Defense Strategy	TRANSCOM	Mr. Jerry Walker	#2
7/13/98	Amy After Next Insights	Army Training	Col Bourgoine	#4
7/13/98	High Speed Sealift / Agile Port Program	CCDoTT	Mr. Keith Seaman	#4
7/13/98	Quiet Professionals	SOCOM	LTC Mike Roesner	#4
7/14/98	Autonomic Logistics Briefing	JSF	Col Russ Currer & Dr. William Scheuren	#4
7/14/98	Boeing Integrated logistics	@&g	Mr. Bill Delaney	#3
7/14/98	F-22 Transforming Support	F-22 Program Office & Lockheed	LtCol Mike Carpenter & Mr Tom May	#3
7/14/98	Fast Economic Sealift	Vehicle Research Corp.	Handouts Only	#4
7/14/98	Fast Ship Review	Fastship Inc.	Mr. David Giles	#2
7/14/98	Fixed Site Decontamination	DECON	/Major Joe Kiple (handout)	#4
7/14/98	High Speed Sea Lift	Research Corp.	Dr. Scott Rethorst	#2
7/14/98	Improved Logistics for the 21st Century	DARPA	Dr. David Whelan	#4

7/14/98	Naval Expeditionary logistics Support Force	COMNAVELSF	Capt Ed Horres
7/14/98	Naval Logistics	Carrier Battle Group	Mr. Jonathan Kaskin
7/14/98	Optimized Equipment Asset Management via Condition-Based Maintenance	Penn State APL	Mr. Bill Nickerson
7/14/98	Panel 1 Logistics Vision and Requirements for "True Transformation"	DSB	Ms. Susan Livingstone
7/14/98	Procurement Process At Northrop Grumman	Northrop Grumman	Mr. Carrier / G. Braga
7/14/98	Regionalization of the Mid-Atlantic Region	Norfolk, VA	RADM Zeemier
7/14/98	Small Unit Logistics (SUL) ACTD Proposal	1FSSG	Col Willie Williams
7/14/98	Tactics and Technology for 21st Century /Military Superiority	DSB	Mr. Don Latham

8/4/98	21stCenturyGlobalMobilityConcepts	Boeing	Mr. Gerald Janicki
8/4/98	Concepts and Technologies for the Army Beyond 2010	ASB	Dr. Joe Braddock
i-814198	Improving Business Practices and Relationships Among Supply Chain Partners	Ryder	Mr. John Torsak
8/4/98	The Commercial ERP Environment	Price Waterhouse Coopers	

APPENDIX C

INFORMATION TECHNOLOGY
LOGISTICS TRANSFORMATION ENABLER

INTRODUCTION Early in the DSB Review of Logistics Transformation it was clear that information Technology (IT) i.e. the most critical enabler for logistics transformation. Information is the key to linking worldwide assets and transportation into a seamless and integrated logistics process. Therefore, formation technology lies at the center of the strategy to achieve focused logistics and information periority as called for in JV 2010. Although there do not appear to be any technology limitations to hieving IT goals, there are significant implementation challenges – notably the need to integrate these Formation systems so that information can be accessed, integrated and distributed throughout war-fighter zas and CONUS based support. As the analysis and discussions evolved it became clear that management of this integration, and implementation, is the foundation for achieving both JV2010 and olving logistics transformation. This led to the recommendation to establish a Logistics Systems chitect. The other topics included below are central to the LSA's performance and his execution plan meet his responsibilities.

This report expands on that recommendation, providing background which led to the recommendation and riewing other key subject areas discussed by the DSB relevant to Logistics IT. Sections include the following:

1. The current baseline of logistics information systems and capabilities
2. Information requirements – Overall and selected specific mission requirements
3. Integrating Operational and Logistics Information
4. Logistics Systems Architect – Additional details
5. Use of COTS software to reduce costs, streamline operations, and speed fielding of capabilities.
6. Additional key success factors
    - Capturing source data and ensuring currency, accuracy and consistency of that data
    - Ensuring availability of communications connectivity and capacity.
    - Providing effective information security and assurance in light of vulnerabilities.
    - Creating people partners to effect change in business processes rapidly.
    - Reducing the cost and time of systems development and operations.

Additional subjects were discussed by the DSB but were not selected for special attention in the report. here important, they will naturally be addressed and resolved during implementation of Logistics ansformation.

THE BASELINE
LOGISTICS INFORMATION SYSTEMS AND CAPABILITIES

Over 400 Logistics information systems are in use or development by the DOD. These span traditional wholesale, retail, distribution and transportation functions. Many of these systems are built on function; architectures developed in the 60's and 70's. The total annual Logistics IT budget, including both development and operations exceeds $1.8 billion. This figure could be higher since this is a "cross-cut" of budget areas and many IT funds are "buried" in other budget categories. Additionally, IT systems development and software are normally funded by O&M funds, with some procurement for equipment. These funds do not have the same centralized control that R&D funds have in development of weapon systems. In any case there are inaccuracies in the counting of systems and the budget estimates for logistics information systems.

The most difficult challenge in achieving Logistics IT transformation is the existence and continuing culture of stove-piped systems. Today's systems:

- Are characterized by limited interoperability, too much custom code and "embedded" business rules, laws, and policy in software. Process change is disabled.
- Are caught in a quagmire - too costly and complex to modernize, running on old, expensive machines, with no simple path to modernization.
- Fail to recognize that information integration is critical to both war-fighter and CONUS based support.

Although DOD has many logistics stovepipes, their existence is a direct result of prior statutes, federal regulations, and DOD oversight directives, which require individual information systems to be budgeter managed and reviewed as stand-alone systems. The services (and some agencies), under their title 10 acquisition authorities, are motivated to manage their programs to cost, schedule, and "content" (or capability). There has not been strong motivation to integrate multiple systems to share information and achieve highly responsive interoperability, and finally, to integrate or "fuse" information into a common operational picture for logistics. Within the last few years the DOD has recognized that it must begin to manage these information systems as part of an integrated collection of information systems. Such an approach does not mean build a grand design, but it does mean that one must map business and missior processes and related information systems to ensure that these capabilities mesh and one can determine where the most important changes should be pursued. Concurrent with this development is the rapidly changing internet technology and the movement from stand alone stovepipes to a network computing architecture that provides access to and integration of information from all accessible information in the network.

LOGISTICS REQUIREMENTS
OVERALL AND SELECTED SPECIFIC MISSION REQUIREMENTS

OVERALL LOGISTICS REQUIREMENTS - JV2010 AND LOGISTICS TRANSFORMATION.

Future logistics as described by JV2010, is a much more precise, timely and focused process. To accomplish this the logistics information environment must provide an ability:

- to acquire timely, accurate and consistent source data for reporting
- to acquire, process, and distribute this information rapidly
- to integrate and "fuse" information from many sources
- to apply "what if" and modeling tools to assess alternative courses of action
- to provide communications access and connectivity to information sources and users throughout the world
- to tap into the "performance" of the logistics processes
- to know "what is where and when it is there" from industry source to the battlefield

and finally

- to achieve information superiority across all dimensions of JV2010.

As one reviews all of the major recommendations of the Logistics Transformation Study, it is apparent that information technology is an integral element in all aspects of logistics transformation, beginning with JV2010 and accelerating beyond those targeted capabilities.

MISSION REQUIREMENTS

Logistics support requirements have focused on the wholesale logistics activities--in recent years the mphasis has turned to more direct support of the CJTF and the CINC. The following two sections rovide a select group of key requirements for both Deployment and Sustainment. It is important to note rat the information technology elements, including computing, communications and data, are common 0r both processes and should be built as part of a common logistics information technology "network".

Deployment Requirements. Deployment surge and rapid response capability depends on information technology The complex activities involved in deployment planning (JOPES, Crisis Action Planning) nd deployment execution depend on information sharing, nearly in real time, among all the supported nd supporting commands. The execution phase requires a continuous tracking of transportation assets, monitoring the location of the all the assets and personnel and ultimately, the force closure. The range of eployment requirements includes:

- End-to-end Asset Visibility of weapons, people, supplies (static and ITV)
- Management of deployment activities at the local unit level
- Ability to monitor and project force closure
- Linkage with C2 JOPES to permit real crisis action planning based on actuals vice notionals
- Use of source data capture to provide current, accurate, protected information
- Information Assurance to protect delivery and access of information.
- Ability to dynamically adjust deploying activities based on changing needs and projections.
- CJTF ability to adjust or divert incoming logistics items (CINC PULL)
- Interoperability among service functional areas and across boundaries for joint systems.
- 0. Electronic access to industry for procurement, support data, problem resolution, rapid transportation, and end to end visibility

11. Transportation capabilities that provide planning, dynamic re-planning, redirection of assets, and ful C2 of the transportation system.

Sustainment Requirements Much of the information needed in sustainment activities parallels deployment but covers the whole cycle of wax-fighting. Therefore it is essential that information capture processing, communication and distribution have as much commonality as possible for the both sustainment and deployment. Sustainment requirements include:

1. Assets tracking from industry to theater destination, including ITV
2. Asset usage tracking and projected replenishment
3. Logistics impacts of alternative courses of action
4. Dynamic redirect of destinations and mix of sustaining resupply
5. Exchange logistics information with Allies and coalition partners
6. End to end information assurance
7. Adequate end to end communications capacity to support required responsiveness for data updates and queries
8. Visibility to support in-theater, inter-service asset transfers as needed
9. IT instrumentation to monitor performance of critical logistics processes

INTEGRATING OPERATIONAL AND LOGISTICS INFORMATION

Over the last several years, the DOD has achieved a new level of automated support for the warfighter commanders around the world. The Global Command and Control System has achieved interoperability and a common operational picture which provides an overview of the tactical areas, wherever they may in the world. This new picture provides CJTF and CINC commanders a comprehensive view of the battlespace. Linking together, and where practical, integration of logistics and other combat support allows a similarly comprehensive picture of the combat support picture, all the way back to the CONUS When the C2 and combat support information are integrated, warfighting commanders will see the full battlespace, beyond the tactical picture.

Information that must be shared across the boundaries of combat support and C2 includes the following

1. Deployment planning – asset visibility, readiness and availability (JOPES and Crisis Action Planning)
2. Deployment execution – In-Transit Visibility, Force closure
3. Dynamic replanning of transportation, supply assets, personnel
4. Consumption rates to determine resupply urgency and Sustainment needs
5. Evaluation of tactical options based on assured delivery of weapons, supplies and personnel well as the ability of the logistics pipeline to support the operations as they are executed

Overall, integration of the Operations and Logistics as called for in this summer study is recognition of the operational impacts of logistics on warfighting execution. Information technology is the vehicle by which this information will be shared. Designing and building new information bridges must be a maj focus in achieving JV2010 and logistics transformation. It will generate new operational and business concepts and provide a major force mulitiplier effect.

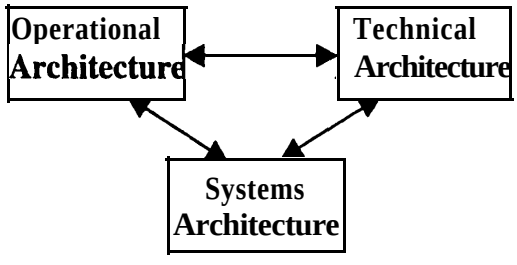
LOGISTICS SYSTEMS ARCHITECT – ADDITIONAL DETAILS

The Summer Study summary report and briefing describes the basic need, concept and functions of the logistics System Architect. This section amplifies details of this recommendation.

The Logistics System Architect is a carefully crafted position that:

Ensures a common vision for the business processes and information systems supporting logistics. Although Focused logistics represents major strides, the concept does not have sufficient detail to guide the development of an integrated logistics system for the DOD. The DOD uses the Joint Technical Architecture to develop and document the visions and templates to implement these processes and systems, The LSA should utilize the appropriate JTA tools to ensure interoperability. The following figure portrays the essential architectural elements of the JTA.

JOINT TECHNICAL ARCHITECTURE



There are significant risks in centralizing development of these processes and systems. To avoid the "grand design" syndrome, the LSA must develop a flexible architecture that will accommodate the unique requirements of the services and agencies, focus on joint capabilities and ensure information exchange. The Services and Agencies should accomplish actual development wherever possible. One view of the LSA is that he or she is one who guides processes and systems from "stovepipes" to an integrated logistics system. The advent of network oriented computing systems provides a major advantage locating and accessing information across many sources. The LSA can make tremendous, and rapid progress by utilizing WEB and internet technologies to integrate and field capabilities.

The Architect is not a manager of studies – his job is to lead change and that means implementation is his focus. In order to accomplish that he must avoid long drawn out process reengineering before deciding to proceed with change. He must also champion implementations that can be accomplished quickly and flexibly. He must provide the strategic road map and use a building block approach.

The LSA should be involved in requirements, primarily joint requirements, in a substantial way. Utilizing requirements of war-fighters and others, he should review opportunities to share common solutions and make recommendations to phase in capabilities or go for the 80% solution to reduce risks and fielding time. He must also use the requirements of existing programs to understand where information sharing is essential and fits in the "architecture".

Funding control is essential to achieving the common vision and accelerating the integration of logistics systems. For most logistics systems, funding is broken into three categories – procurement, development and modernization and operations and maintenance (O&M). Normally the largest portion of the $1.8 billion IT budget is for operations and maintenance of existing systems. The LSA would typically recommend or transfer these funds directly to the Services and Agencies at apportionment time. The procurement and development/modernization funds represent the

"investment funds" in new or enhanced systems. These are the funds which require the most scrutin and which need to be consistent with the road map established by the LSA. Where necessary, funds may be need to be reallocated to ensure corporate priorities are supported. The LSA should conduct funding reviews, make recommendations and take actions during preparation of the President's budg and the summer Program Reviews for the longer term funding stream. The specific mechanisms to implement funds control should be developed by the principals and the LSA.

- The LSA must maintain strong and continuing relationships with several communities. First, he must establish strong relationships with the operational logistics community, particularly the CINCs and the Services. Second, he must maintain strong ties to his OSD parent organization. Third he must work closely with the acquisition community to ensure that developing systems are implemented consister with the road map. Fourth, he must have a very close working relationship with the OSD/C31 and DISA to ensure that logistics systems and plans are consistent with communications and computing directions, including the DII Common Operating Environment.
- Because DSB has recommended a "CINC-pull" focus for logistics, the LSA must operate in very close partnership with the warfighter community. It is very strongly recommended that the Deputy LSA be a flag level logistician with the stature and leadership to work closely with the most senior logistics military principals. Without such leadership commitment to this staffing, the influence of the LSA will be diminished.
- During the CIM period of the early 1990's, the DOD attempted to standardize applications software The Joint Logistics Systems Center was one of those manifestations. The CIM strategy failed because it did not recognize that agreement on business processes was mandatory to fielding common software. It is important to stress that the LSA proposal does not that focus on that goal or attempt to centralize development. Rather, the challenge is to develop an architecture where the information available across these individual systems can be located, accessed and integrated. In a fundamental way, a world of "plug and play" logistics applications systems needs to be evolved or built around a network of intemet like capabilities.
- It may be most effective for the LSA to start with war-fighter logistics and work back toward CONUS This will build on major recent initiatives and is consistent with other DSB findings. It is essential that the LSA implement the architecture and roadmap in bite size chunks, while maintaining a broad vision.

The LSA must provide leadership in both logistics processes and information systems. These are the operations of logistics will be performed. Choices of which areas to attach process and system are at th heart of the challenge. To do so requires a fundamental change from current approach to building DOC logisitics information systems. The LSA must be the major leader in this change. The following represent several of the guiding principles that should be followed by the LSA:

1. Understand the logistics process and systems map and use it to chart directions
2. Build and manage systems for a network computing environment, stop stovepipes
3. Establish oversight processes and budgeting approaches that support this transition to a larger information network.
4. Focus on the warfighter requirements first and work back to CONUS
5. Build the bridges to share/integrate Logistics and C2 operational information
6. Design capabilities to leverage Internet and Web technology
7. Design and implement information systems to support rapid change and technology insertion as well as rapid changes to information technology.
8. Invest in COTS software, where it fits, to reduce costs, streamlines business rules provide opportunities for integration with other functional applications software.

USE OF COTS SOFTWARE AS A MAJOR COMPONENT OF TRANSFORMATION

Software modernization, including development, enhancement, and maintenance factors is central to logistics transformation. Rather than unique software development for all of DOD logistics needs the SB believes that Commercial Off-The-Shelf (COTS) software packages should be aggressively used for logistics and Supply Chain functions wherever appropriate. However, there are important issues in determining when and how they should be applied.

OTS software can be broadly grouped into two categories: First are general purpose packages that can be applied to a wide variety of applications systems and processes. These include data base management stems such as Oracle, Sybase and Informix, as well as email, mapping, telecommunications, electronic commerce and graphics packages. The proper use of these COTS packages not only reduces costs amatically, but also increases interoperability and information integration. Further, finding a select set packages meeting broad user needs provides tremendous savings through enterprise licensing which fers discounts well in excess of 50% of normal fees or prices. A select set of general purpose packages components of the COE and are being applied in both C2 and combat support arenas.

The second type of COTS software is directly relevant to Logistics. These are vertical market packages ecializing in functional areas of business practice such as payroll, inventory management, human source management. Within this second group are really two different capabilities – first is the farnily vertical packages such as those developed by SAP/3 or People-soft. These packages provide a portfolio of capabilities from personnel, payroll, general ledger, supply chain management and these pabilities work together to provide an enterprise solution. These are called enterprise resource planning pabilities.

The second group are individual vertical software packages. The following commercially available capabilities are applicable to DOD logistics as shown:

1. Transaction processing - ok - applicable now
2. Inventory - ok - applicable now
   - Identification and tracking
   - Storage hierarchy management/planning
3. Planning – ok – but mostly static capability, not yet dynamic
   - Capacity planning
   - Demand planning
   - Delivery commitments
   - Operations planning
   - Transportation needs
   - Load planning
4. Scheduling – ok – mostly static, net yet dynamic
   - Static scheduling
   - Dynamic scheduling
     - Transport
     - Equipment utilization

Several crucial factors influence DOD expanded use of COTS software. These are:

1. The availability of COTS software packages, both general purpose and vertical, will grow dramatically. Costs of software development and maintenance can be substantially reduced through use of COTS. Hardware performance will continue dramatic increases and performance loss from COTS packages will be more than offset.
2. Vertical COTS packages allow for customizing some business rules and processes. The major challenge for the DOD is to determine how many present business rules must be carried over into the future. Many of these packages provide a ready 80% solution. However, pushing these COTS packages to provide 100% of requirements can be self-defeating. Normally the customer must fund all of the custom code and support the maintenance of that code into the future. Therefore rather than a COTS package, a custom coded hybrid package results and th entire concept of "riding" commercial developments is defeated.
3. There are legitimate areas where COTS packages cannot meet DOD needs and it is not practical to force fit these packages. The DOD should analyze its options carefully before commitment to development and implementation. Opportunities for using evolving capabilities in transformation will remain strong.
4. There are opportunities for the services and agencies to share common packages but to implement different business rules that fit their needs. This is not moving toward standard applications, but it does offer the potential for increased interoperability and integration within common functional areas.
5. As an overall strategy, the DOD may find that "forcing" reduction and streamlining of business practices through implementation of COTS packages may be the most effective way to achieve changes toward more efficient business practices. When the requirements are traded off against speed of development, operating costs and efficiency it may very well be that this could be a cornerstone of transformation and modernization strategies.
6. It is clear hat DOD logistics should make a strategic commitment to the use of COTS software - ***the issues are when, how, and it what area.***

ADDITIONAL KEY SUCCESS FACTORS

Capturing Source Data, And Ensuring Currency, Accuracy And Consistency Of That Data.

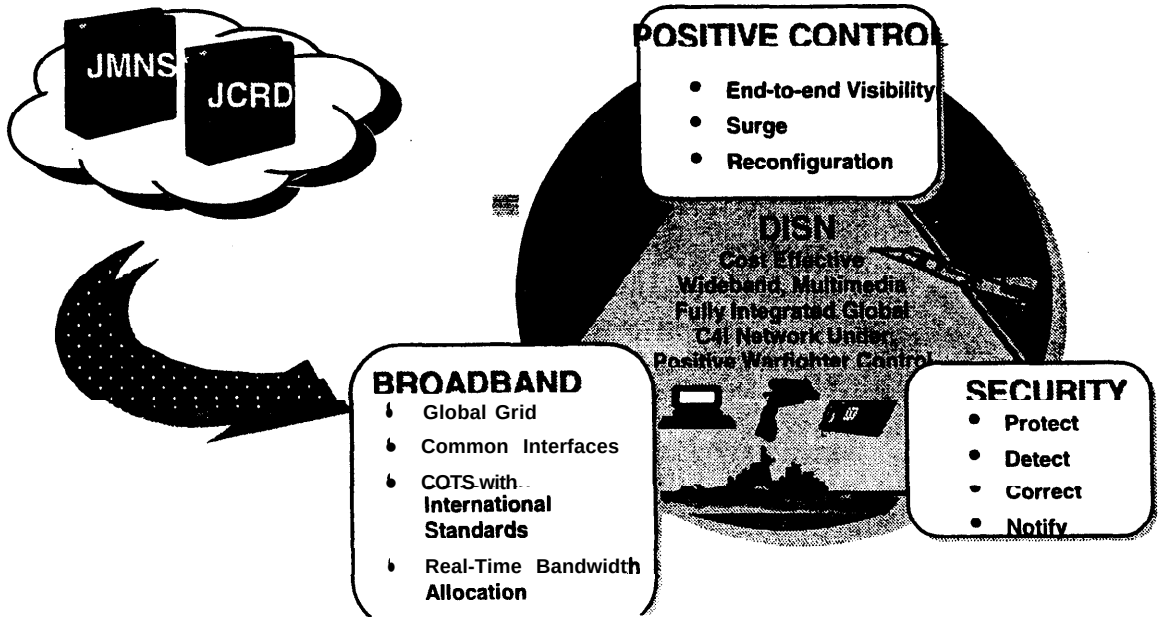
he old adage of "garbage in - garbage out" remains valid today and will be so in the future. Capturing Accurate, timely, consistent source data is the foundation for an effective logistics information technology capability and for achieving focused logistics. The recent use of the Automated Information Technology Europe has demonstrated that these technologies save time, save money and provide the essential asset information needed to support the logistics pipeline. Without a highly accurate and responsive source ata capture capability the information systems higher in the chain will not be trusted by logisticians or perators.

Although nothing should slow the deployment of the automated information technology (AIT) capabilities, the DOD should anticipate major technology developments which will reduce the cost and nprove the effectiveness of these AIT devices. Major new capabilities in the commercial tranport industry and supply chain management systems are already being deployed and the combination of smart card, RF readers and satellite tracking will provide the DOD with improved and less costly technology. and held devices will also continue their geometric grow and provide another tool for supply chain acking.

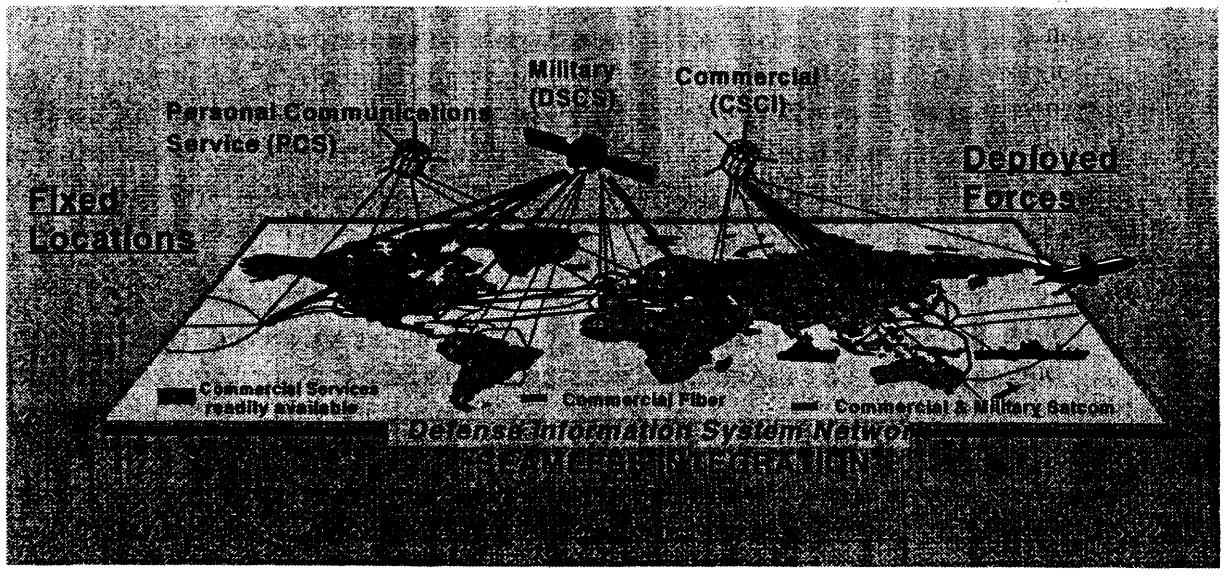
Accountability for the source data is essential and management policies are needed to designate the specific commanders responsible for the different source data. Standards of reporting performance and data quality will be needed and will likely vary between peacetime and conflict.

Ensuring Availability Of Communications Connectivity And Capacity

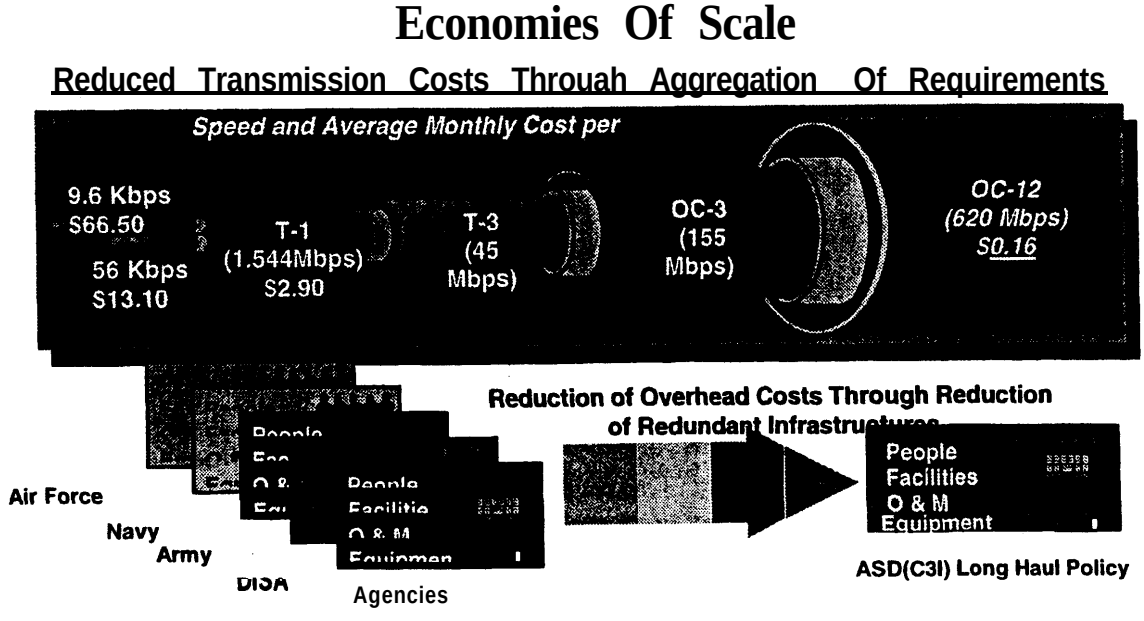
With the added dependence on information technology comes a parallel dependence on communications. sers and operators must have connectivity to communications capabilities and must have the ability to locate and access information they need across the "network". Such technology exists in the Internet day and many of these capabilities are being put in place in the DOD now. DISA, in implementing the defense Information Systems Network (DISN), is dramatically increasing the overall capacity of the network in CONUS, Europe and the Pacific following the principles and process shown below.



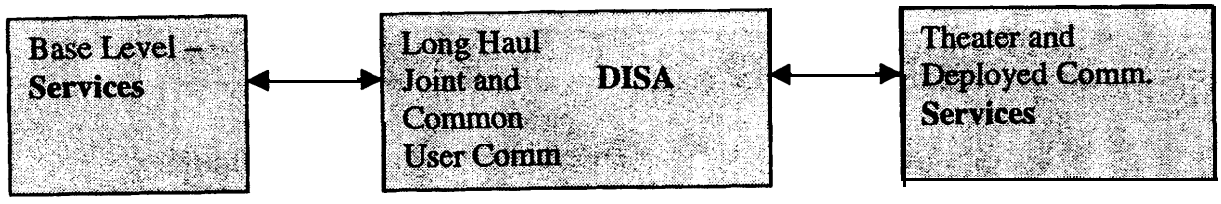
The actual topology shown below summarizes the communications backbone network improvements being made. In addition to heavy use of fiber cable and satellite, provision is also made for purchase of satellite channel capacity from commercial vendors. This provides a significant approach to meeting surge requirements during deployment / conflict. In addition to these new communications "pipes" additional capacity is being provided by moving to the "ATM" or Asynchronous Transfer Mode which provides much more efficiency in the utilizing the available bandwidth. Finally, bandwidth "managers are being put in place that again to obtaining the maximum available bandwidth for users. The followir chart summarizes the overall changes being made in the backbone communications areas in the next several years.



Just as added communications capacity is essential to transformed logistics operations, so is the cost of this new communications capacity. There are clear economies of scale inherent in added capacity and following figure shows the relative cost of different bandwidths.



Overall Communications Responsibilities Communications is divided into three basic domains in the DOD The following picture portrays those three elements. It is pivotal to understand that insufficient apability in any of the three segments can seriously degrade communication support. At present, indications are that the base level infrastructure and the theater capability are not likely to support the dramatic growth in logistics data communications. This, as outlined below, is a subject that must be on the short list of critical issues for the Logistics Systems Architect to attack.



he dramatic increase in data capture, processing and retrieval, particularly in theater, represents a major change for the logistics community. Because bandwidth can be severely limited or dedicated to perational data transfers dictated by the CINC, it is critical that theater communications requirements ad planning become top priority for the Logistics community and the LSA. Here are a few of the central issues which need management attention:

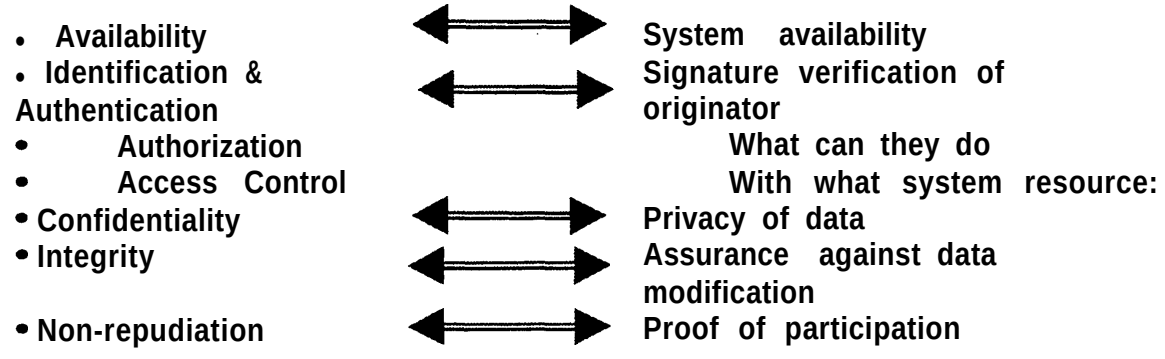
1. Significant insight will be needed into the volume, response time and locations for logistics data.
2. Communications availability, particularly during surge or conflict, must be resolved with the CINC and operational community.
3. Careful consideration of the volume and frequency of data reporting must be considered to ensure adequate bandwidth for the needs and mission environment.
4. Wherever possible standard DOD communications capabilities should be used – serious interoperability problems can arise from apparent narrow economies. This could seriously hamper the integration of logistics and operational data.
5. A "communications architecture" is a natural outgrowth of the LSA's efforts to integrate logistics and should be invaluable in managing connectivity of logistics and other combat support capabilities.

Providing Effective Information Security And Assurance In Light Of Vulnerabilities.

The report on vulnerabilities of the logistics system provides the best insight into the specific threats and vulnerabilities involved. That report is section 5 (?) of this overall report. This short discussion is tended to reinforce the information security and assurance issues only. As warfare, becomes more Imputing dominant, the dependence and value of information increases. Thus the ability to plan and implement deployment and sustainment options will be highly dependent on the available computing and communications. This will result in it being targeted by hostile forces to deny or disrupt our responses. Further, the integration of operations and logistics information into total situation awareness will cause previously unclassified data to become classified. The chart on the following page provides an overview the elements of information assurance which the DOD must employee to meet this high intensity information era.

Information Assurance
Defense in Depth

Essential Information Assurance Services



Creating People Partners To Effect Change In Business Processes Rapidly.

The information technology theme, focused on the establishment of a Logistics Systems Architect, must also consider the impact of process change and IT change on the people involved. Every successful change effort documented has devoted time and attention to the personnel effected by the changes. Although the Logistics Systems Architect can lead these efforts, it is up to the base commanders and others in the command chains to bring their employees into a partnership for change. There are many examples of failed change efforts because the people involved had not accepted and supported the char

Reducing the cost and time of systems development and operations.

The natural directions in the market place are making hardware a commodity and some aspects of software a commodity. The technologies available today dramatically shorten the time to access WEB based systems and to deploy new capabilities at much lower cost. The IT professionals in the military civilian elements of DOD must understand how to utilize these new capabilities and rethink systems development. The concepts of the DII COE are fundamental to saving money and achieving interoperability that is so dramatically needed. However, even deeper savings will be possible once the DOD achieves consistent data that can be integrated reasonably and quickly. The most critical issue tc understand is that cost savings and achieving interoperability/integration are parallel, not opposing goal.