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The Challenge of Moving from Performance Based Logistics to an Operational Logistics Framework

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ABSTRACT

There are many efforts and areas of progress for improving overall support to the frontline warfighters during the Global War on Terrorism and the continued transformation to produce the trained and qualified forces for the combatant commanders of the 21st century. One focal area is within the logistics area of overall warfighter support, commonly referred to as performance based logistics (PBL). Many sections of the Defense and National Security community will discuss this area in differing terms and contexts, however within this paper the author will endeavor to outline a different framework of context, parameters, validation, and metrics for a more encompassing framework and value stream. A framework that may offer another level of understanding; and thus, improved alignment of resources and efforts toward improved PBL results in the warfighter framework. This is done through an evaluation model which assists in generating a cause-and-effect linkage chain to be measured and evaluated against the capability needs of the warfighter, vice only short term or local optimal solutions of the supporting organizations and components.

INTRODUCTION

Performance Based Logistics (PBL) is a rather encompassing area of acquisition, development, and support, that has come to the fore following the release of the most recent QDR (2001), with the objective (among several) to find innovative logistics initiatives to support the forces (paraphrased), along with a shift to performance based evaluations of programs and tests. The shift of evaluation method was typified by the Ballistic Missile Defense Organization (MDO) shift to the Missile Defense Agency (MDA), and the concurrent announcement that the organization would shift to performance based evaluation criteria. Both of these can be viewed as offspring of the early –mid 90's steps to only retain government specifications and standards from mandatory sunset or cancellation by specific exception.

PBL likewise is in step with the recently released revisions to DoD 5000s (2003) and the Joint Capabilities Intergration and Development System (JCIDS) outlined in CJCSI 3710.01D (Meyers, 2004), which both highlight (neigh) strongly support and encourage the employment of a 'performance based' mindset when dealing with all aspects of acquisition, development, and support for and of the warfighter. In short, the 'performance based' mindset can and should be utilized in evaluating the entire cradle to grave aspects of logistics for the warfighter. (See (DOD, 2001) for JP 1-02 definition of Logistics – provided in reference listing.)

The challenge within this milieu of efforts is 'how to establish a "unified theory", and approach to the integrated stream of stakeholders and providers'. To say the least, this is a rather large group of individuals and organizations, which often have potentially conflicting 'self' performance metrics within the total value stream. This large set of metrics crosses the full width and depth of stakeholder organizations involved, including strategic to tactical considerations. The spectrum of the challenge is emphasized through the recent ASD (AT&L) memo (Wynne, 2004) which highlights that "PBL 'performance' is defined in terms of military objective" and provided five (5) criteria and examples. (These are included in the reference listing.) This memo specifically calls out contracting for performance and the DoD partnership with defense industry stakeholders.

Industry stakeholders can be an important source of experience and ideas for leverage toward further synergism and improvements. This type of solution point is noted Stephen E. Flynn's (2000) article

"Beyond Border Control"; where while commenting on industry lowering its costs associated with support of sales and just-in-time resupply, he points out that:

> "In order to lower this cost [static inventory], logistics and transportation providers are investing in faster and more efficient shipping, aviation, rail, and trucking fleets; constructing seamless chains; consolidating distribution networks; upgrading tracking, communication, and database technologies. This "value-chain inventory opportunity" is a powerful driver of the transportation and logistics revolution." (p. 61.)

When considering that the logistics chain for the warfighter can be considered an extended value chain with inventory and process opportunities for improvement, this indicates that industry has been executing the same things we, the government, are also attempting to address, and there are opportunities (as well as liabilities) for riding along with industry is this area. Specifically, the challenge presented here is to evaluate our governmental PBL efforts against a large integrated 'value-chain', and look at the full spectrum of improvement opportunities from front line warfighters (the ultimate user and customer) backwards to all the suppliers, supporters, and managers with their parent organizations. (That evaluations and analysis parallels the process of doing a constraints analysis and removing constraints and delays (described in Goldratt & Cox (1992)), while also doing Program Management Institute style risk assessments.)

WHY A DIFFERENT MODEL FOR PBL EVALUATION?

There are many models and efforts underway for addressing improvements in the many subsections of providing warfighting forces to the combatant commanders. In the vein of organizations and threats there is the point of looking at the edges that our front line forces represent when looking at the uncertain world conditions and threats. The international threats are both challenges and opportunities. We regularly view them as the challenges, but not as frequently is the view adopted that they also represent opportunities for improved understanding and mitigation of the root causes of the perceived threats to actually remove them. (A detailed examination of this aspect is outside the scope of this paper. See Bryant (2004) for beginning treatment and discussion.) These points also show that there are processes involved in supporting the warfighters and combatant commanders, which can be examined for revealing the constraints and shortcomings within the cause-and-effect value-chain supporting the end user's (front line warfighters') mission capability packages for assigned tasks related to national sovereignty, democratic principles, economic freedoms, and citizen protections, when viewed as an integrated logistics value-chain. The edges of organizations and systems, the threats and opportunities, and process constraints and restrictions, along with the gaps in capabilities and constraints associated with deliveries in the OL value chain components are all similar items from slightly differing models, yet they can be viewed as being associated and working together. The following sections will offer some tool sets and metrics for evaluating and acting upon them, along with some possible details for utilizing them for improvements. In this way, opportunities may be exposed which will allow groups and organizations supporting the warfighters to not be satisfied with local optimizations which may not make significant support improvements for the warfighters.

Concept and Framework – 'Of Edges, Constraints, Opportunities, and Gaps (ECOGs)'

In this section the author will introduce the evolved concept of Operational Logistics (OL) as a larger value-chain model for PBL for evaluation and cause-and-effect influence net analysis framework for improvement path choice. That path choice must result in execution of improvements the warfighters' framework of integrated logistics value-chain deliveries for improved mission capabilities and results.

Toward that larger framework, the reader is invited to view Figure 1, when considering what is meant by OL. It is a larger form of PBL with a fully integrated logistics value-chain of all the organizations and components that support delivery of war fighting capabilities to the warfighter and combatant commanders. (The author's model for Operational Logistics is an evolution of a previous model introduced and discussed in prior conferences and publication through the American Society of Naval Engineers (ASNE) (Bryant & Flynn, July 2000; and Flynn & Bryant, Winter 2003), and several DoD conferences sponsored by the Command and Control Research Program (CCRP).) The central section of this larger framework model is the individual Program Manager Acquisition model introduced by Piplini, et al (1994). This is a limited framework for a specific program element within the continuum of DoD acquisition programs under a specific Program Management Office. It is imbedded within a much larger environment for evaluation which includes: a) the overall Logistics; b) the Manufacturing methods and processes; c) the Training, Tactics, Techniques, and Procedures (TTPs), and Concepts of Operations (CONOPs); d) the ability to employ a Distributed Interactive Simulation environment; e) supported by the National and Defense Information Infrastructure (NII/DII) computing framework and architecture; and, f) delivering Mission Warfighting Capabilities contributions to the warfighter and combatant commanders which will employ that product of a program in a fully integrated joint and allied employment scheme. This last point is a potentially powerful metric for checking delivered output, vice any particular optimum associated with the six surrounding sections.

That delivery of Mission Warfighting Capabilities (with all the other included pieces) is related to all five (5) areas of PBL performance cited by Wynne (2004). The true question for improvements and measurements is what methods and tools to use when measuring, monitoring, and making improvements in those performance factors (of OL – PBL), and against what primary reference benchmark criteria. A truly large challenge, and the focal point of this paper.

If one is able to draw back a certain amount, this model can be considered scalable from components within our systems whether they be planes, armor, soldier systems, ships, or members of the large combat support and combat service support community. This offers the possibility of extensibility and scalability for this evaluation model, thus supporting generalization. Further when looking at the systems as well as the organizations and people involved within the many sections and segments, it is possible to develop cause-and-effect relationships between the flows of parts and information, which will be addressed within the following several sections.

To summarize, OL (larger PBL framework) is a small step beyond an original Operational Engineering model, with its larger performance evaluation framework added to the Program Manager's acquisition model. It represents a shift of evaluation to the Combatant Commander's framework for National and Service missions their task list structure. It supports a shift from the no less important framework of optimization at the Program Manager level, occasionally somewhat detached from national security mission implications; to a framework heavily attached and fully integrated into the National Security mission of the Combatant Commanders, with its very demanding outcome requirements. Thus the OL (larger PBL) model sets the stage for identifying the granularity of edges, challenges, opportunities, and gaps (ECOGs) – the constraints analysis parameters for improvement opportunities and action in the fully integrated logistics value-chain supporting the warfighters and combatant commanders. This is precisely the style of performance factors relationship cited by Wynne (2004).

Fleshing out the Framework – Identifying the ECOGs:

With the introduction and framework for evaluation described, it is time to move to a more granular point of view, for in truth the devil IS in the details, and there are many levels with large quantities of details as will be demonstrated in later sections.

Interfaces within the acquisition, engineering, and logistics communities are regularly considered as the technological and electronic interfaces, though many in the leadership and organizational theory areas will quickly point out that interfaces and gaps in communications are a regular hurdle, constraint, and challenge both within and between organizations and organizational sub-groups as well. These are another way of representing Alberts & Hayes (2003) description of DoD transformation regarding empowerment and improvements:

> "*Power to the edge* is about changing the way individual, organizations, and systems relate to one another and work. *Power to the edge* involves the empowerment of individuals at the edge of an organization (where the organization interacts with its operating environment) or, in the case of systems, edge devices. Empowerment involves expanding access to information and the elimination of unnecessary constraints. For example, empowerment involved providing access to available information and expertise and the elimination of procedural constraints previously needed to deconflict elements of the force in the absence of quality information." (*Italics in original*.) (p. 5.)

These points are the embodiment of disruptive change, where business as usual is no longer good enough, and more specifically, not able to respond fast enough. They also represent a change in ownership and trust that requires education, understanding, and information about the edges and interfaces to remove the impediments and constraints to information flow and solutions generation. By solving those internal, intra- constraints, the result should be improved support flows to the warfighter on the front line, who is on the edge.

This is literally viewing the PBL 'value-chain' as the steps and processes that are generating the support and capabilities of those warfighters on the edge. It involves not just providing the capabilities needed and promised via the budget, but helping those warfighter be completely ready to utilize those capabilities immediately upon delivery. This is empowered through the warfighter being fully integrated into the overall acquisition and logistics delivery and support value-chain during all the steps leading up to delivery – in other words, fully plugged into the OL model as the ultimate customer of the fully integrated logistics value-chain.

When one considers the number of individuals and organizations that touch, bend, move, develop, deliver the products and capabilities to the warfighters, the number of handoffs becomes staggering as they all represent the possibility of constraints and edges. Constraints and edges that detract from delivery of capabilities to the warfighter. A great first step for completely identifying those edges and constraints is to identify where disagreements and agreements exist within the interaction process. Employing the 'glass-half-full' philosophy, the positive interactions can be leveraged to start removing, closing, minimizing, mitigating and retiring the challenging mismatches where the handoffs take place. This then reduces consumption of resources, as well as potentially generating more throughput for the warfighter on the front line. The alignment of objectives noted here is what is discussed by many authors such as Goldratt & Cox (1992), Kaplan & Norton (1996), and Labovitz & Rosansky (1997). Goldratt & Cox introduce the linking of all the production process steps to the organization's long-term objective. Kaplan & Norton introduce the scorecard for balancing the internal and external interactions, investments, and organizational processes to support all involved parties in a balanced arrangement. Labovitz and Rosansky introduce essentially the merger of the two into a mechanism for organizational change and improvement that can produce alignment and overall understanding between all the component organizations, units, and individuals. They even point out that this can be employed for government and non-profit organizations, besides the obvious provided examples with profit organizations.

This is another way of saying that the interests of the parties involved are monitored for agreements and disagreements, and then the agreements are leveraged to solve and minimize the disagreements to prevent escalation, delayed delivery, late investments, etc., which can impede the delivery of capabilities to the warfighter on the edge. It also opens the door for grouping and collecting those interests from the highest national/international strategic level to the warfighter front line tactical and operational level and establishing that cause-and-effect linking value chain across the complete continuum – to support the warfighter on the frontline.
Several questions are generated at this point. First, how to quantify and characterize these linkages? Which will be discussed in the following two sections. Second, what is the potential payoff and result of this effort?

The intent cited above by Alberts & Hayes (2003), is to help the warfighter with power and capabilities. This is important, it represents a larger and complementary view to that introduced by Grey (1989), in the U.S. Marine Corps FMFM-1, when discussing the tenet of paying attention to enemy vulnerabilities and opportunities to which

> "we should focus our efforts against a *critical enemy vulnerabilit*y. Obviously, the more critical and vulnerable, the better. But this is by no means an easy decision, since the most critical object may Rot be the most vulnerable. In selecting an aim, we thus recognize the need for sound military judgment to compare the degree of criticality with the degree of vulnerability and to balance both against our own capabilities. Reduced to its simplest terms, *we should strike our enemy where and when we can hurt him mos*t." (original emphasis and spelling.) (p. 36.)

Thus if through OL (larger PBL framework) and power to the edge, the warfighter is truly supported and empowered, their full attention and mission capabilities can be applied to the critical opposition weaknesses with all the tools, capabilities, and speed of operations provided via the larger, fully integrated OL value-chain of PBL. This can be viewed as the embodiment of performance factors 1 and 2 of Wynne (2004).

As mentioned previously, both of these quotes represent interpretations related to systems and systems-of-systems interfaces and boundaries, as well as the interfaces and boundaries between the systems of organizations and groups (executive branch agencies, national organizations, international groups and countries, and even transnational groups, i.e., internal and external groups). Thus the offered OL model shows a degree of scalability and extensibility. That discussion assists in applying the model to developing consensus and ownership for common ground areas, assists in minimizing or mitigating the divergent areas of interests, and opens the door for generating the metrics framework for reducing those disagreement or constraint areas, which will be discussed in the next two sections.

Clothing the Framework – Sheathing the ECOGs:

In the prior section the interpretation and criticality of ECOGs has been explored. The implication is 'what to do about them?' As previously alluded, the objective is to remove those hurdles and constraints to improve final product delivery to the warfighter.

The next challenge is associated with the large number of groups and organizations that are involved with supporting the warfighter. As mentioned previously, the opportunity is to establish a set of factors that allow agreement. It has been suggested that areas of agreement can be leveraged for expanded results. (Besides those areas, specific group areas mentioned above need additional consideration and expansion, and are beyond the scope of this introductory discussion.) The author suggests that still another starting point for agreement is utilizing the prior investment to generate breakdown framework of tasks included in the Universal Joint Task Lists and Services Task Lists of the Universal Joint Task List Chairman Joint

Chiefs of Staff Manual (CJCSM) 3500.04C (Hawkins, 2002), from J7. These provide numerous factors for utilization within the performance factors three, four, and five (3, 4, and 5) of Wynne (2004) and the OL framework.

This manual's lists of component elements cover many sections and areas, and a top-level summary is provided in Figure 2 (figure 2-1 of CJCSM 3500.04C, Ibid). That initial top level breakdown is composed of four levels: a) Strategic – National military tasks (with nine (9) components); b) Strategic – Theater tasks (with nine (9) components); c) Operational level tasks (with seven (7) components); and, Tactical level tasks – including joint/interoperability tactical tasks (with seven (7) components) and Service tasks (composed of three (3) components). This summary comprises a total of thirty-five (35) components which each have several levels of sub- and sub-sub-components. These constitute a very extensive initial set of granularity factors that then have to be mapped, linked, and allocated into the groups, organizations, components, and value-chains that provide the full spectrum of OL support to the warfighters on the front line. (They also represent factors associated with all the other components of Figure 1 besides the Warfighters' Mission Capability Contributions.) These factors represent a framework of metric factors which can be utilized in evaluating the contributions to the warfighters fully integrated OL value-chain improvements using the methods and aids of Goldratt & Cox (1992), Kaplan & Norton (1996), and Labovitz & Rosansky (1997).

Here again, the devil IS in the details. The challenge is to establish, map, and communicate the linkage, value-chain factors of all these elements, or metric factors, with accepted details, definitions, allocation fractions of contribution, allocation fractions of responsibility, and accountability fractions for delivery and support. This effort stated differently establishes the cause-and-effect value-chain (an influence net) for evaluating support and contribution to the warfighter and their mission capability packages. A method for determining these allocation fractions and mapping the linkage paths between these granularity factors will be discussed next and then will be followed with a discussion of a measures hierarchy.

Thus Figure 2, much like an initial work or task breakdown structure, provides a multi-level starting point for analyzing support from all the contributing perspectives of the previously mentioned stakeholders and components to the mission capabilities that the warfighter and combatant commander are expecting to employ. Stated differently, the items in task lists are effectively the contributing factors of the warfighters mission capability packages, which they are expected utilize for mission success. (Note they are essentially DoD factors, and may not necessarily represent the complete necessary and sufficient condition set for mission success. See (Bryant, 2004) for an initial discussion of a higher level of metrics and linkages associated with Homeland and National Security.)

A question that logically arises is how to assess the varying importance of the items included within the task lists. There are several methods of approach: one is to say they are all equally important, which has its own shortcomings; another is to spend all the time available to try to completely characterize the relationships between all the factors and organizations, with potential analysis paralysis. A balance must be reached, and the opportunity for a path between these levels is provided by two differing applications of Bayesian algebra principles and methods. One relies on the community of subject matter experts for the topic area considered, the other is a group of generalists with varying backgrounds and experiences who may not be as constrained by the community of experience. Both provide the useful inputs, both have limitations. Choosing only related subject matter experts may cause community or organizational blinders to restrict potential solutions support. The other side is that the generalists there may offer too defused a focus, even though drawing on the collected members' diverse and varied experience base, which means they are less community and organizationally restricted. Both can be used, and a mix can also be used – adaptation is more important for finding solutions.

Remember, while the specific groups and organizations supporting the front line warfighters and combatant commanders may currently focus on their own local improvements and resulting local optimizations that may not be sufficient to provide improved support to the warfighters. Thus there is a need to expand the boundary of experience, understanding, and environment of interaction through connection and contribution to elements contained within the Figure 2 family of task lists applied to the mission capabilities segment of OL framework of Figure 1. Through the task lists, contribution breakdowns, and allocations to the groups, organizations, and components involved, the construction of the integrated logistics value-chain is started, and made available for alignment of efforts and contributions. Then by the judicious employment of measurement tools applied to the linkages (and restrictions), data can be collected to support making individual, distributed, and organizational changes to support the warfighters as final customers and users. Stated differently, the characterized and suggested linkages, can be displayed as cause-and-effect influence nets from which action points can be generated or selected, which offer change opportunities and choices for action to execute steps for improvements to mitigate those restrictions (ECOGs) in the value-chain to the warfighters.

Building Muscles for Change and Results – Addressing the ECOGs:

Through the prior sections the author has highlighted the importance of capabilities assessment and delivery within documentation and some actions for implementing that effort. The discussion of ECOGs that interfere with those efforts at several levels from systems themselves, to processes, and even into organizations has been presented. The intent has been to provide a framework for action against those differing levels of inhibitors to realizing overall improvements and delivery of products and capabilities to the combatant commanders and the front line warfighters. The prior section discussed a potential starting source for criteria (with initial granularity) to deliver improved capabilities to the end users, as the product of interest (*the goal* as Goldratt & Cox (1992) describe the product) through using value-chain contribution analysis as described by Flynn (2000) and discussed in this paper. This section will discuss a family, or hierarchy, of measures which can assist in rank ordering the criteria discussed previously, when used at several group and organization levels within the larger OL model for contribution delivery to the combatant commanders and warfighters mission capability packages.

The author suggests that the 'Measures of Merit' hierarchy introduced within NATO Code of Best Practice (COBP) for C2 Assessment (CCRP 1, 2002). Figure 3 (Figure 5-1 of CCRP1, 2002) shows a nested set of five (5) measures (from outer layer to inner component): a) Measures of Policy Effectiveness (MoPE); b) Measures of Force Effectiveness (MoFE); c) Measures of C2 Effectiveness (MoCE); d) Measures of Performance (MoP); and, e) Dimensional Parameters (DP). In truth this hierarchy can be applied at all the levels presented within the UJTLs (with the Services Lists included) for making assessments (and supports all five (5) performance factors cited by Wynne (2004)). These can also be used for the organizations, groups and sub-groups that provide the support and logistics needs within the Operational Logistics model for the warfighters. The challenge is again in determining the cause-and-effect chains or value-added chains for those contributions. Additionally, the included act of data collection has to be seen as valid, accurate, and not causing process perturbation during measurement, so that ground truth information is obtained (remember the Heisenberg principle). This is the point of Alberts & Hayes (2002) – Code of Best Practices (COBP) for Experimentation, to establish and construct a data set, with a collection and analysis plan, which truly supports answering the questions and hypotheses being testing. In this case, the overall data program must assist in group, organization, process, etc. assessment and analysis for actual changes (or even for projected changes) within all the factors included within the OL model (Figure 1) to support the warfighters.

Returning to the nested hierarchy of metrics, the author notes the following adopted initial points and examples (CCRP 1A, 2002):

"-Measures of Policy Effectiveness (MoPE), which focus on policy and societal outcomes (e.g., transition measures, which focus on the progress in the transfer of responsibilities to a follow-on military or civilian agency, and normality indicators which measure the quality of life of the civilian population).
-Measures of Force Effectiveness (MoFE), which focus on how a force performs its mission or the degree to which it meets its objectives (e.g., loss exchange ratios, combat effectiveness, number of targets destroyed and desirable adversary behavior).
-Measures of C2 Effectiveness (MoCE), which focus on the impact of C2 systems within the operational context (e.g., time to develop a Course of Action, ability to provide information in required format, impact of information operations, and planned quality.)
-Measures of Performance (MoP), which focus on internal system structure, characteristics and behavior (e.g., time to recognize an event, correctness of perception and system reliability).
-Dimensional Parameters (DP), which focus on the properties or characteristics inherent in the physical C2 systems (e.g., bandwidth, data access times, cost, and size; characteristics of organization forma, attributes of personnel)." (p. 15-16.)

Of particular note with this extraction is the degree these measures can be applied to the UJTLs and Service Task Lists, the over-all and included factors within the offered OL model, as well as to the many inter- and intra-group and sub-group interactions of the acquisition, engineering, manufacturing, logistics, etc. segments supporting the combatant commanders and front line warfighters. Thus the judicious use and employment of the best data points and metrics (all five (5) performance factors of Wynne (2004)) offer the starting point metric tools, and breakdown framework for execution of value-chain, cause-and-effect, influence net improvements for the warfighters and combatant commanders integrated OL value-chain framework.

EXAMPLES AND REALITY CHECK

With the completion of these sections above there are two other areas which are due some discussion and expansion. This section and that which follows will accomplish that through some examples of application, analyses, and real world reality checks; then there will be a step back and 'so what!' impact discussion in the following section.

In the article "Hierarchical Probabilistic Models for Operational-Level Course of Action Development", Falson, et al (2001) there is a general introduction of the use and features of producing an influence net through analysis of cause and effect linkages and employing the colored petri net (CPN) programming tools and programs. This article also includes background references on those tools, along with some uses and employment opportunities. This lays a part of the ground work for saying that through analysis of the process where influence is to be applied, or results are to be changed or improved, there are tools available to help with that analysis and determination of points of action. As discussed in this paper this can be applied to the overall logistics value chain in support of the warfighter and the accomplishment of their missions through their mission capability packages.

Bienvenu, et al's (2001) article "An Architecture for Decision Support in a Wargame" provides an example of applying an analyzed influence net for improving the information processing for better flow of information in the weapons release chain. This is a type of process constraint analysis to find constraints in the information flow for target acquisition to weapons release. It discusses in general terms how to determine which constraints would result in the best improvements in the flow of information for the investment of resources to mitigate those constraints. Stated differently, this shows that return on investment analysis is not limited to just manufacturing processes, but can also be applied to a process chain of information. Within the logistics value chain discussed in this paper, information availability and timeliness in centrally important, and can be expected to support overall logistics chain

improvements, as well as specific applications within any one of the larger components and organizations involved with the timely support of others within that larger logistics value chain

The article "Modeling Support of Effects-Based Operations in War Games" (Wagenhals, Lee W. and Alexander H. Levis, 2002) provides an actual example of influence net analysis and application of influence or course of action to result in changed net outcome favorable to joint-allied plans. In this case the analysis cell was working within a war game exercise and producing results predictions that could be acted upon. This action path (investment of resources) could be through application of influence, persuasion, coercion, or force (in individual, combined, sequenced, or coordinated combinations) to generate the desired response and behavior modification via the cause and effect linkages that had been analyzed to provide desired outcome. In effect, modeling support provided a method to find the best locations within the chain of cause and effect relations eligible for applying 'investment of effort' to produce the favored outcome (effects based result on a value chain or process). (This article received the Best Paper Award for the Symposium held in Monterey at the Naval Postgraduate School sponsored by the Command and Control Research Program of DoD.)

Miller's article (2004), "Value Focused Thinking: Guiding C2 System Interface Design" provides example of the subject matter experts and users evaluating the contribution factors, weights of the breakdown contributions, and facets of an 'intelligence analyst assistance tool' contributing to improved execution of their duties. Article includes analysis and application of the weighting factors for the various component parts of the tool, as well as discussion of the users' desire to understand the internal algorithms as criteria for how the analysis tool was programmed to provide 'expert' advise. This allows them (the future users) to make the tool more useful, as well as provides buy-in for employment of the tool so that it will be employed to help them accomplish their tasks and produce more products and through-put for the customers at various levels (warfighters). Additionally, these subject matter experts were a representation of one type of source community for developing the Bayesian application of weighting contribution factors for the 'intelligence analyst assistance tool' discussed within the article.

Webb (2000), in his article "First Operational Requirements Document (ORD) of the Millenium-Next Generation Aircraft Carrier (CVNX)", utilizes this 'community of subject matter experts' for the evaluation and development of the ORD for the CVNX. This article discusses these experts as major stakeholders of the user community for the future aircraft carrier. It describes employing the family of subject matter experts that through consulting analysis and multi-voting prioritization of factors, assisted in developing the weighting and contribution factors of the capabilities being included within the CVNX ORD. Through these stakeholders' involvement, acceptance and input was gained and provided to assist in making the needed capabilities of the CVNX be in alignment with not only the normal mission areas of the vessel, but also the mission areas of the national and service employments of the CVNX. This is a larger environment approach like the overall value chain of the total logistics support of the warfighter introduced in this paper. Likewise, it is evocative of the approach and tools discussed above via objective (Goldratt & Cox, 1992), BSC (Kaplan and Norton, 1996), and alignment (Labovitz and Rosanski, 1997), to provide the linkage example for CVNX to the service missions, in addition to the traditional war fighting areas, with consideration of stakeholder interests and priorities.

The book "Blind Man's Bluff – The Untold Story of American Submarine Espionage" by Sontag et al (1999), provides an excellent example addressing the employment of subject matter experts and Bayesian principles. Sontag includes a discussion of the employment of Bayes theorem and probability principles of group weighting of options to determine most probable and likely course of events associated with the loss of the *USS Scorpion*, to locate its most likely resting place. The analysis and application of Bayesian theorem and algebra resulted in a prediction whose accuracy was confirmed through finding the wreckage ~200 feet from predicted location. This points out the strength of using a selection of subject matter

experts to make predictions and selections of options which can have significantly higher that expected returns on investment if applied to large and complex problems or tasks as suggested within this paper.

With these examples and the previous sections of this article the author calls the readers attention to the final three figures: Figure 4: Universal Naval Task List – Tactical; Figure 5: Army Universal Task List – Tactical; and Figure 6: Air Force Task List – Tactical. When taken together with Figure 2, these add more granularity to the factors which are included within the complete logistics value chain to be evaluated within the model of Figure 1, and employing a methodology and family of metrics depicted via Figure 3. (Future efforts will address this point in more detail, but not that any degree of analysis at strategic through tactical applications with all the stakeholders is a complex multi-dimensional analysis.)

As a lead-in to the last section of this paper the point 'Why is this important?' is worth asking. When considering the Joint definition of logistics with the capital L of DOTML-PF (of JV-2010/2020 (1996/2000)), it is not surprising to see this connection, and the possibility of a foundation for a 'unifying model or theory' of overall value chain improvements for supporting the warfighter and delivery of capabilities to those warfighters – the right capabilities, the right materials, at the right time, for the right cost . . . all the time. That is the point of going another step beyond just monitoring and tracking. Through the use of the value chain analysis and the contribution to the warfighter support outcome, improvement efforts can be initiated focused on the warfighters execution of assigned missions (think effects based operations and outcomes), just as demonstrated in Goldratt and Fox (1992), and discussed within the action plan sections of Kaplan and Norton (1996), and Labovitz and Rosanski (1997).

STEPPING BACK AND SUMMARY

With the arrival at this point, it is appropriate to step back and address the offered contribution, to assess the 'so what' factor of the offering, along with points for future discussion and execution.

There are many ongoing efforts assisting organizations, movement toward increased responsiveness and adaptability to both internal and external environments and the uncertain future reference frame that September 11, 2001 announced. One aspect is improved environment understanding; another is improved understanding of the products and processes of the complete defense and national security organizations and components. (In this article the author has focused on the DoD components among that larger family.) It is through the increased use and analysis of data, information, and knowledge, that understanding of connections and opportunities for improvement and course-of-action selection are revealed.

The resulting revelations will offer the challenge to act and respond, the question and 'so what' point is how to respond. The courses of action resulting from those revelations fall into three basic categories: denial or detrimental course of action; taking no action, the status quo model; and the acknowledgement and proactive execution of efforts for improvements and adjustments toward some greater goal. The author feels that this type of response falls in the latter category. This is not to say that all initial reactions and responses will truly be in that direction. Neither is this to say that all the responses will necessarily be for the absolute best solution to the immediate problem (edge), or constraint (challenge), within a particular local organization, sub-organization, or component. The response may have to be positive for the larger overall goal and betterment for the largest number of individuals, and at the same time a less than optimal solution and response to a smaller group. This is quite literally a style of subordinating lesser group or individual organization goals to the larger common benefit and good.

Placed in the larger framework of the earlier discussions, the logistics, manufacturing, acquisition efforts can be assessed, analyzed, and then acted upon for organizational and process improvements (constraints mitigation) for the greatest contribution to the mission capability packages (OL – larger PBL framework

improvements) for the combatant commanders and warfighters in execution of their assigned missions. Missions which run from the various peacekeeping and peace enforcement efforts, humanitarian assistance and disaster response efforts, diplomatic and economic interests protection, and to the many levels of armed conflict, and protection of national interests and citizens. (These are broken down into the components and efforts outlined within the UJTL high-level breakdowns within Figure 2, and Services tactical breakdowns of Figures 4 through 6. (derived from: (Collins and Clark, 2001), (Schoomaker, 2003), (Ryan, 1998))) The missions and tasks constitute a significant multi-dimensional analysis system that is usually only viewed in quite small segments.

Where to go in the future? The course for the future is to flesh even more of the details and education efforts associated with establishing the cause-and-effect linkages mentioned above. Also, to provide additional details and suggestions for how to allocate the contribution and weighting factors for the contributing factors and linkages. Additionally, through fora like this publication and others, to communicate the opportunities and challenges to making improvements, and especially the potential detriment of status quo in-action, or making no efforts to adjust or change because 'we have always done it this way'. Change is called for through using PBL, and the larger framework of OL introduced in this paper offers a chance to have a significant impact through its evaluation framework to improving the integrated logistics value-chain behind the warfighters and combatant commanders.

CONCLUSION

The author has attempted to stimulate the readers and offer a possible example of how to view and stimulate the process improvement efforts of a very large multi-segmented organization focused on long term support of the front line warfighter and combatant commanders. In other words, to stimulate and provide new utilization opportunities to existing tools and techniques to all those individuals and groups within the Department of Defense (and collaborative partners) charged with the military aspects of the National Security Strategy. A framework and supporting methodology has been offered, which points out the value-chain (also considered an influence network) of cause-and-effect items which when linked, facilitate the desired outcomes the warfighters are charged to achieve in support of national security. These links of the value-chain could be analyzed and acted upon for the improvements that provide the intended long-term delivery of mission capabilities to the warfighters (and by extension for the nation). By utilizing the principles of Bayesian math to act on the value-chain constraints, the end result is a style of business case analysis (return-on-investment) required of PBL, determining which constraints (ECOGs) mitigation offers the greatest return-on-investment in the warfighters and Combatant Commanders' mission capabilities for the already constrained resources. In short, this article provides a framework with a coordinated breakdown analysis framework, evaluations tool methods, and metric measurement system, which offers a new view of effects based operations expanded from the basic PBL perspective to the larger, fully integrated Operational Logistics value-chain supporting the warfighters, Combatant Commanders, and the Nation.

Opinions, conclusions, and recommendations, expressed or implied are those of the author. They do not reflect the views of the Command and Control Research Program, DoD, U.S. Navy, Naval Sea Systems Command, or Program Executive Office for Integrated Warfare Systems. The author likewise assumes responsibility for any errors in this work.

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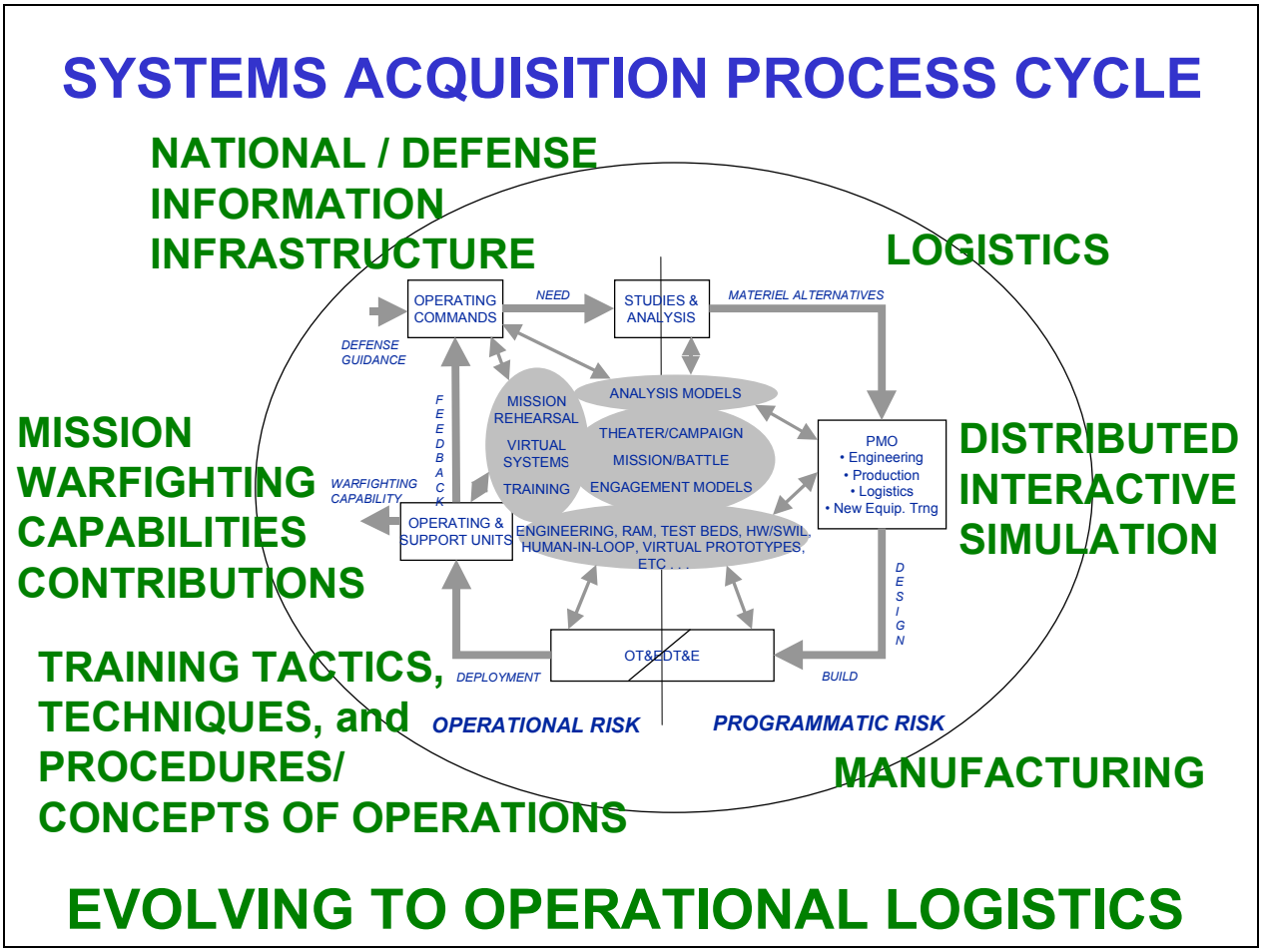

Figure 1 - Moving from Systems Acquisition to Operational Logistics

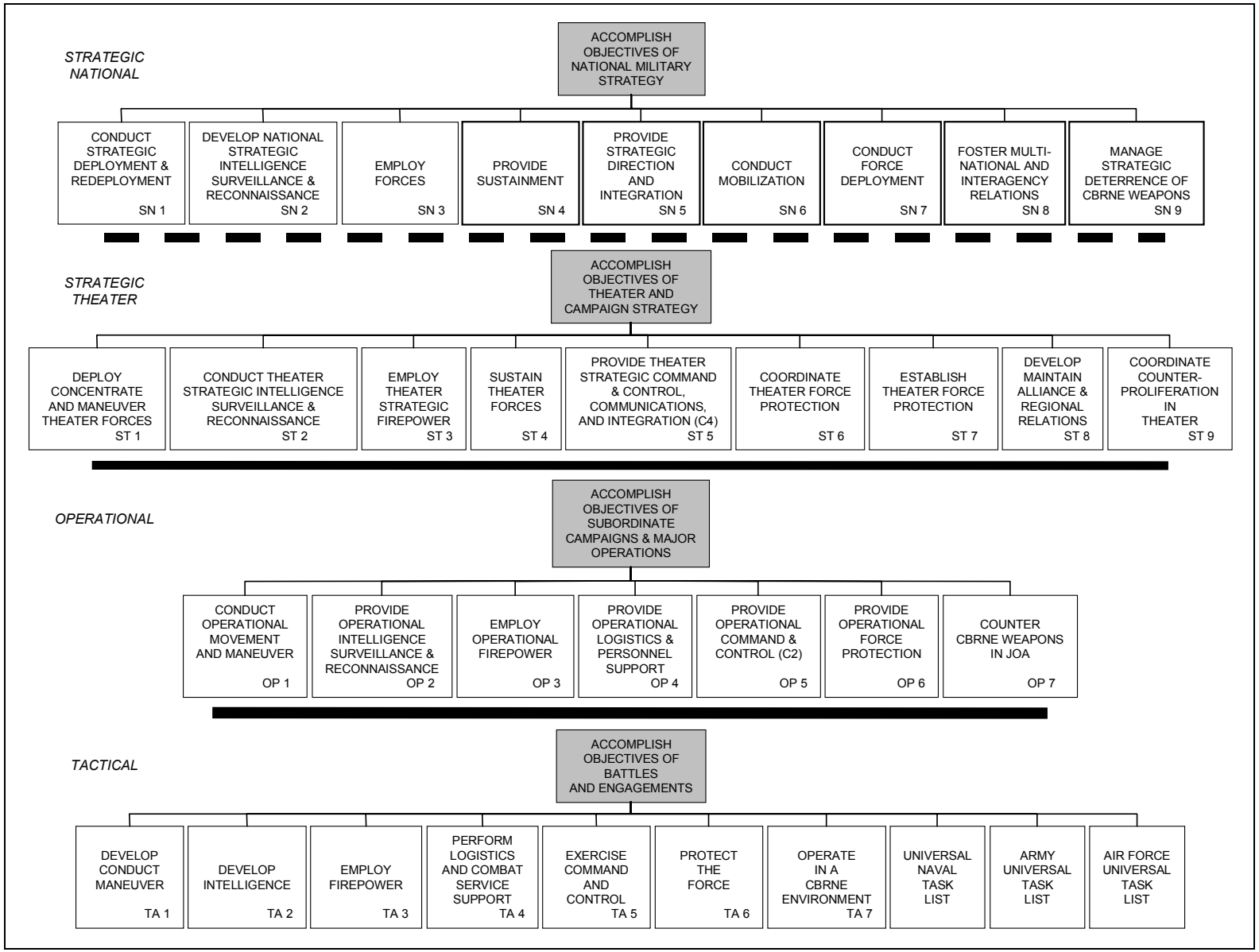
STRATEGIC NATIONAL
ACCOMPLISH OBJECTIVES OF NATIONAL MILITARY STRATEGY
CONDUCT STRATEGIC DEPLOYMENT & REDEPLOYMENT SN 1
DEVELOP NATIONAL STRATEGIC INTELLIGENCE SURVEILLANCE & RECONNAISSANCE SN 2
EMPLOY FORCES SN 3
PROVIDE SUSTAINMENT SN 4
PROVIDE STRATEGIC DIRECTION AND INTEGRATION SN 5
CONDUCT MOBILIZATION SN 6
CONDUCT FORCE DEPLOYMENT SN 7
FOSTER MULTI-NATIONAL AND INTERAGENCY RELATIONS SN 8
MANAGE STRATEGIC DETERRENCE OF CBRNE WEAPONS SN 9
STRATEGIC THEATER
ACCOMPLISH OBJECTIVES OF THEATER AND CAMPAIGN STRATEGY
DEPLOY CONCENTRATE AND MANEUVER THEATER FORCES ST 1
CONDUCT THEATER STRATEGIC INTELLIGENCE SURVEILLANCE & RECONNAISSANCE ST 2
EMPLOY THEATER STRATEGIC FIREPOWER ST 3
SUSTAIN THEATER FORCES ST 4
PROVIDE THEATER STRATEGIC COMMAND & CONTROL, COMMUNICATIONS, AND INTEGRATION (C4) ST 5
COORDINATE THEATER FORCE PROTECTION ST 6
ESTABLISH THEATER FORCE PROTECTION ST 7
DEVELOP MAINTAIN ALLIANCE & REGIONAL RELATIONS ST 8
COORDINATE COUNTER-PROLIFERATION IN THEATER ST 9
OPERATIONAL
ACCOMPLISH OBJECTIVES OF SUBORDINATE CAMPAIGNS & MAJOR OPERATIONS
CONDUCT OPERATIONAL MOVEMENT AND MANEUVER OP 1
PROVIDE OPERATIONAL INTELLIGENCE SURVEILLANCE & RECONNAISSANCE OP 2
EMPLOY OPERATIONAL FIREPOWER OP 3
PROVIDE OPERATIONAL LOGISTICS & PERSONNEL SUPPORT OP 4
PROVIDE OPERATIONAL COMMAND & CONTROL (C2) OP 5
PROVIDE OPERATIONAL FORCE PROTECTION OP 6
COUNTER CBRNE WEAPONS IN JOA OP 7
TACTICAL
ACCOMPLISH OBJECTIVES OF BATTLES AND ENGAGEMENTS
DEVELOP CONDUCT MANEUVER TA 1
DEVELOP INTELLIGENCE TA 2
EMPLOY FIREPOWER TA 3
PERFORM LOGISTICS AND COMBAT SERVICE SUPPORT TA 4
EXERCISE COMMAND AND CONTROL TA 5
PROTECT THE FORCE TA 6
OPERATE IN A CBRNE ENVIRONMENT TA 7
UNIVERSAL NAVAL TASK LIST
ARMY UNIVERSAL TASK LIST
AIR FORCE UNIVERSAL TASK LIST

Figure 2 - Top Level Breakdown of Universal Joint Task Lists

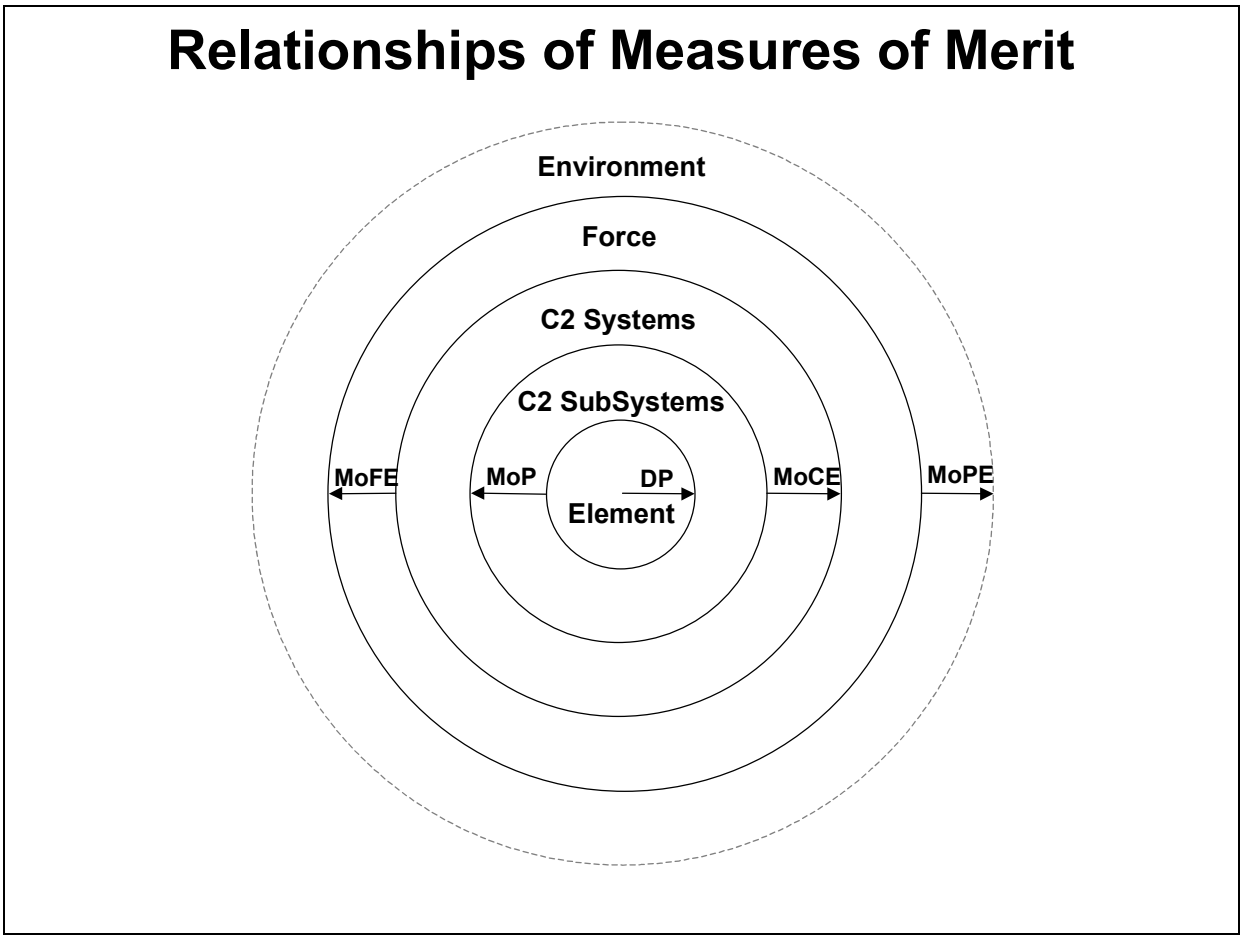

Figure 3 - Family of Measures of Merit

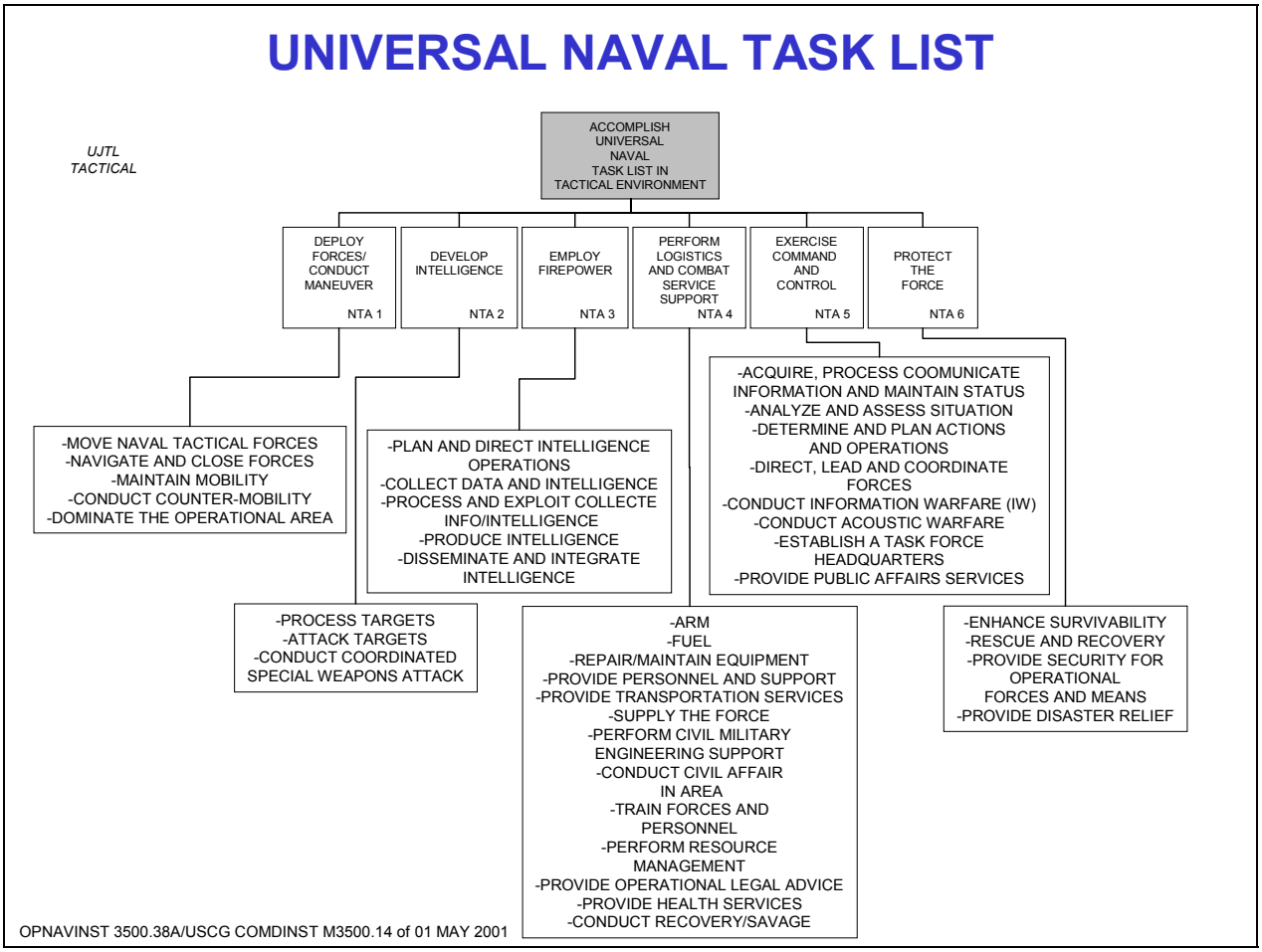

Figure 4 - Universal Naval Task List – Tactical

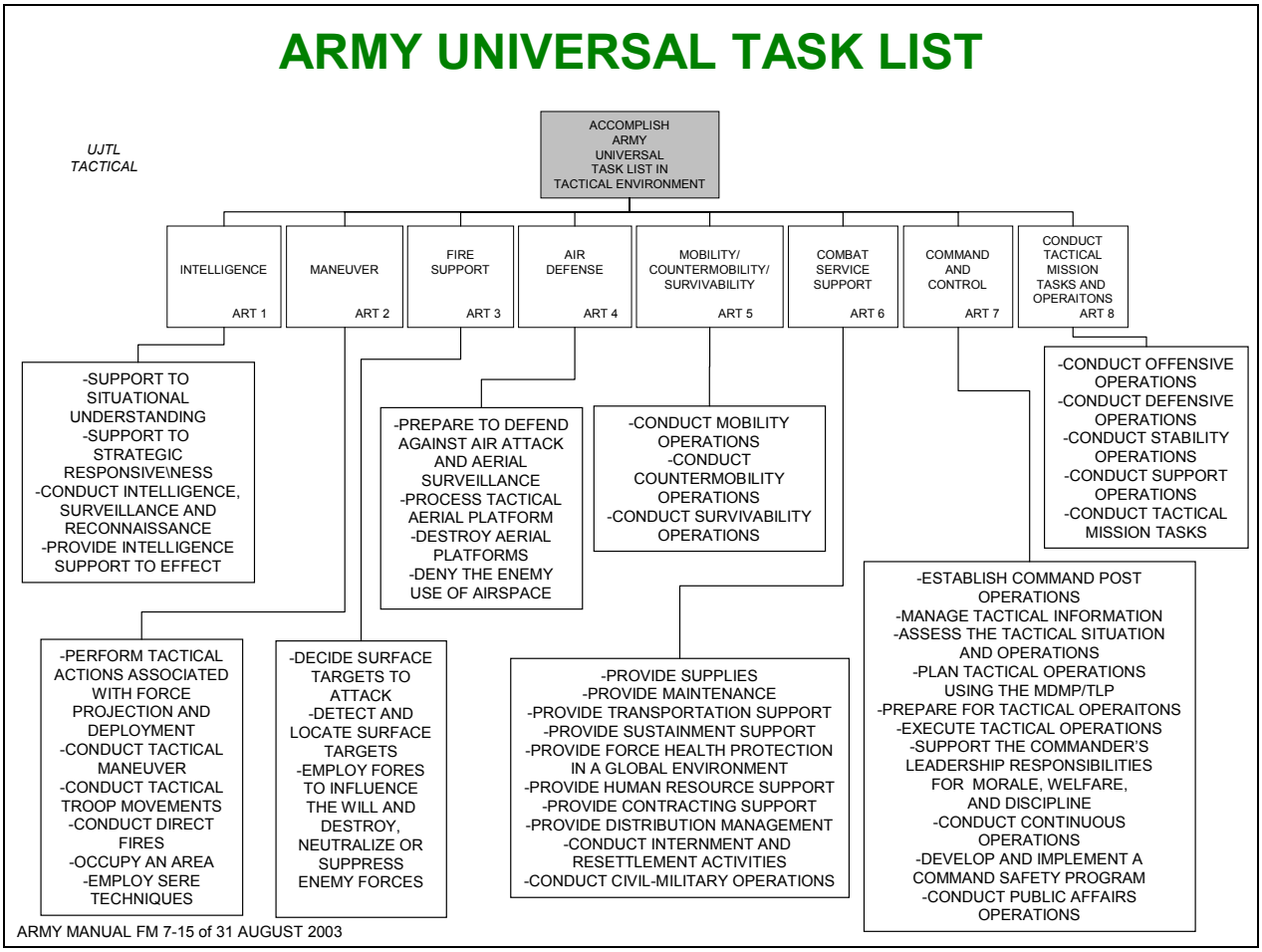

Figure 5 - Army Universal Task List – Tactical

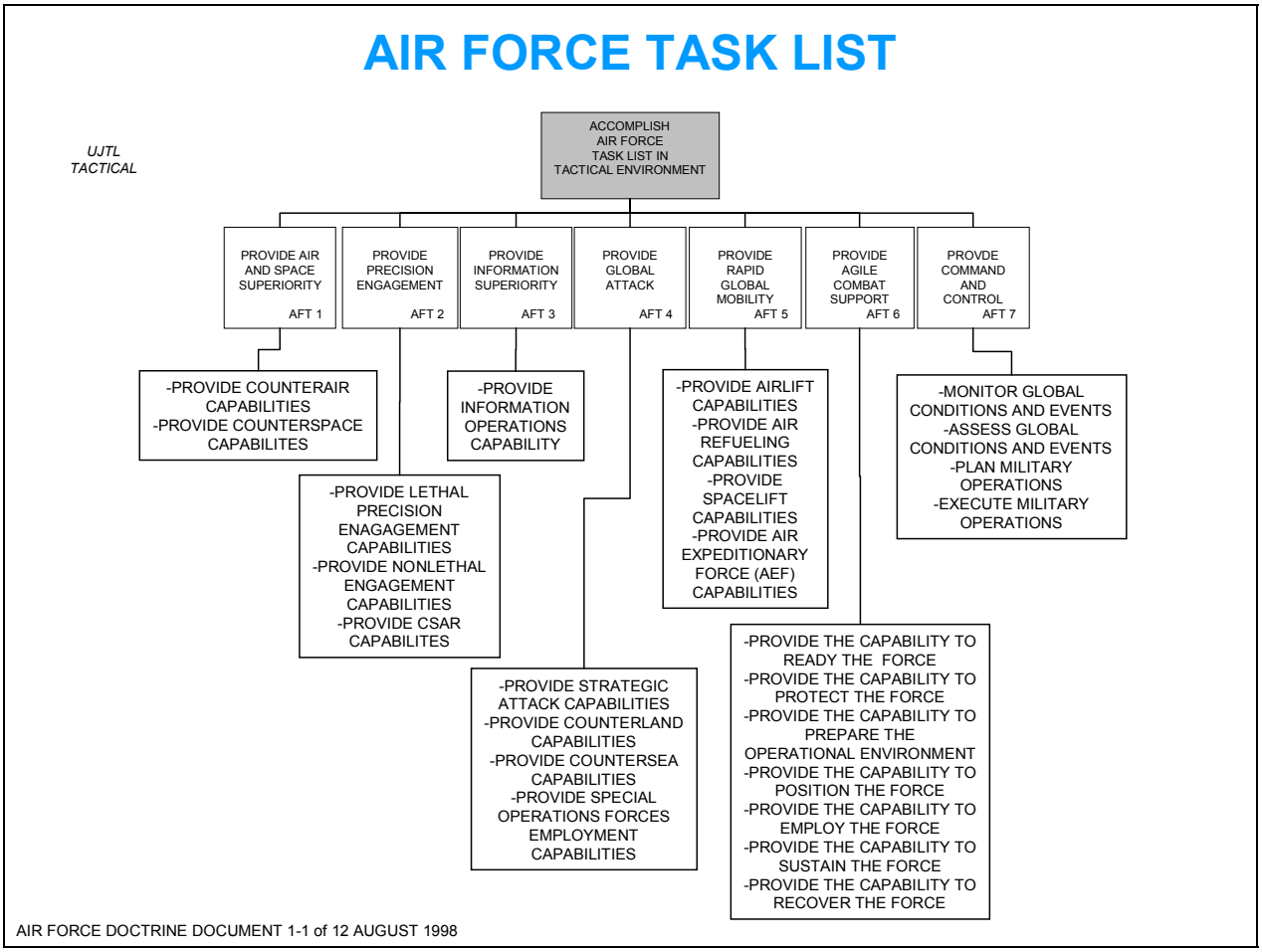

Figure 6 - Air Force Task List - Tactical