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COMMAND CONCEPTS AND STAFF ORGANIZATION FOR JOINT VISION 2010

by

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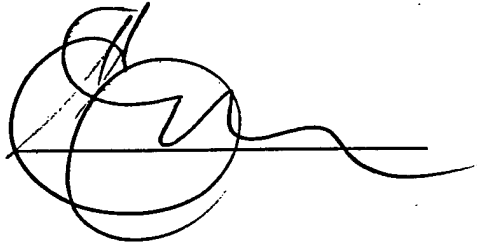
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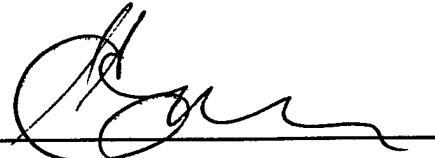
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Abstract

Joint Vision 2010 (JV 2010) describes the need for new procedures and organizations to implement its concepts. Two significant and inseparable issues are how forces will be commanded and how the Joint Force Commander will organize his staff to conduct the type of operations described in JV 2010. JV 2010 places a premium on Information Age concepts such as non-linear dynamics, speed of command, network-centric warfare, and blurred levels of war. Our present hierarchical command structure, which is based upon linear reductionism, is inappropriate for Information Age operations. Additionally, the doctrine of "centralized planning, decentralized execution" is not flexible enough to handle the full spectrum of envisioned military operations. A more flexible command concept is required. A "Flat Ring" model for staff functions which emphasizes speed of command and network operations is described and recommended.

Preface

This paper assumes a working knowledge of Joint Vision 2010 (JV 2010). It also assumes that JV 2010's anticipated technology will be fielded and perform as required. In a more controversial vein, JV 2010's viability is not questioned--even though many have criticized its ambition and fragility.

My methodology presumes that command doctrine and organizational form are inseparable. Therefore, current doctrine establishes a reference point. The predicted trends of future warfare bound the discussion, and a set of derived processes of JV 2010 further refine the focus. The result is a pair of recommendations: one for a more flexible command doctrine and another for a complementary organization.

Our present concepts of command date from 1947 and have been shaped by the bipolar world of the cold war. As the U.S. military is used for an ever-expanding diversity of missions which range from peace operations to war, it is interesting to consider that by the year 2010 our methods and organizations could survive to be over 50 years old unless a force for change like JV 2010 takes hold. This, in a period of incredible--even revolutionary--socioeconomic change brought about by information technology.

How can we not change?

Introduction

The broad brush used to paint grand strategic visions is rarely used to depict the finer strokes of operational detail. This is the case with "Joint Vision 2010" (JV 2010), the most recent conceptual template¹ for the U.S. military's operational and doctrinal future. Specifically, the vision does not attempt to portray either the form or nature of the future command and staff function, other than dryly noting that implementing JV 2010 will require "developing new operational procedures and organizations"² to accommodate the template's four key operational concepts of Dominant Maneuver, Precision Engagement, Focused Logistics, and Full-dimension Protection.³ Basking in the bright light of "Information Superiority," the Joint Force Commander (JFC) has new options about the way he draws his lines of command, allocates his resources, and channels his information. How should the future JFC conceptualize his command function? Is he a new "Great Captain" or will he remain a distant architect of war? How should he organize his staff to exercise his control over the future battlespace?

To synchronize forces, mass effects, and wage non-linear war; the JFC will centralize the planning and execution of certain newly defined core processes, and will arrange his "staff" to optimize his speed of command and information flow, substituting a flatter network organization for today's vertical hierarchy. An impending information-based Revolution in Military Affairs (RMA) will bring with it furious forces of change. Non-linear network-centric warfare, seamless joint operations, and a new cyberspace "fog of war" will shape JV 2010's procedures and organizations. The current focus on "strategy, structure, system" will shift to "purpose, process, people" as the commander and his staff prepare to conduct the vision's "Full Spectrum"⁴ of military operations.

The shifting relationships between authority, tasks, and people which are characteristic of the Information Age will force us to acknowledge that there is a social dimension to JV 2010. It will push the American military culture to separate its core values from "the way we do things." The two are distinct: the first is set in the bedrock of our national psyche and is immutable, the second is merely convenient process--to be discarded or changed as necessary. But "the way we do things" is exactly the issue. An RMA happens when "...the application of new technologies into a significant number of military systems *combines with innovative operational concepts and organizational adaptation* in a way which fundamentally alters the character and conduct of conflict."⁵

The challenge before us is to study the nature of Information Age dynamics, extract the key concepts, and apply them to our military purpose. Out of this process will emerge recommendations for exercising JV 2010 command and organizing to support it.

Current Command and Staff Doctrine: Deficiencies and Work-arounds

Joint Publication 3.0 defines command as a nontransferable authority to accomplish a mission. The commander organizes, directs, and employs forces; assigns tasks, and designates objectives; and gives authoritative direction over military operations, logistics and joint training. Operational execution is normally delegated to the component commanders for air, land, and sea. Doctrinally, this is known as "centralized planning, decentralized execution."⁶ Staffs exist to serve and assist their commander. They will mirror the commander's method of command and his conception of war. Our staffs are vertical hierarchies divided along static lines of expertise such as "Operations" or "Logistics." An authority-based system, the staff is oriented with its

“face” up to the commander. Horizontal communication is informal, and with few exceptions processes are ad hoc.

Our arrangement of “Operational Planners” and “Tactical Warfighters” has accommodated the demands of Industrial Age warfare. The planning orientation of the operational commander has pushed him to focus on the future, his concentration being predominantly upon the next operation. This focus is refined by the assumption that operations are distinctly divisible into air, land and sea “missions and roles.” Joint operational art revolves about the coordination and synchronization of these medium-based activities.

The JFC staff organization comprising component commanders for air, land, and sea institutionalizes a *tactical* reality at the *operational* level--medium-based warfare requires medium-based expertise. Will this conceptualization survive into Information Age Warfare? JV 2010’s key warfighting concepts and its call for new organizations strongly imply that it won’t. What is different about the future war that it so upsets our doctrinal applecart?

Command Requirements Across the Full Spectrum of Non-linear War

Warfare is expected to change as a result of the dawning of the Information Age, the so-called “Third Wave.”⁷ An RMA is underway where military forces employ advances in information, sensing, and precision strike technologies to exponentially lethal effects.⁸ RMAs are inseparably linked with new approaches to command and control. This is not a situation unique to our time. Von Moltke combined telegraph and railway technology with a new organization, the Prussian General Staff, to war-winning effect. It is now our turn. Embracing the Information Age is more than a technology insertion drill; it is “only through improved doctrine, ...innovative

leadership, agile and adaptive organizational structures (that) our force will be able to use these innovations.”⁹

This RMA is about information. The corresponding rise in lethality caused by information exploitation creates a requirement for dispersion, which in turn forces armies to integrate arms and capabilities at lower levels.¹⁰ As forces disperse over an ever expanding battlespace, the volume of information and information collection expands with it. To perform at a decisively high tempo; offensive deployment, maneuver, and engagement rely on information. Staff planning must also accelerate, moving from a step function to a continuous process to match the frantic pace of operations. Our organizational adaptation must encompass radically faster decision-making and effective processing, analysis, and dissemination of information.

To establish the connection between the Third Wave and future JFC command doctrine, its necessary to take a short random walk. At the root of Third Wave concepts is a set of mathematical theories called non-linear dynamics,¹¹ which are exceptionally good at describing the chaos of warfare. In their basic form, chaotic systems are neither predictable nor deterministic; inputs and outputs are not proportional. It is better to view them holistically; nearly useless to try to reduce them into component parts. Non-linear phenomena are unpredictable, but within “bounds,” self-organizing. The key variable of non-linear command is the “calculus of the bounds.”¹²

Our present system of command and staff is based not upon the precepts of Chaos Theory, but upon Newtonian linearism where “prediction is facilitated by careful planning, and a premium is placed on reductionism.”¹³ Reducing immense problems--the mobilization of hundreds of thousands of Prussian soldiers by railway, for example--to manageable pieces in order to solve them is typical of reductionist analysis, a trademark staff process in our military.

Reductionism goes a long way toward explaining the structure of our current multi-layered "traditional" hierarchy, with its ever expanding specialization and complexity.

The inherent limitation of straight-line thinking in war planning is that it does not reflect execution, and is increasingly philosophically at odds with the process it seeks to control. Moltke's warning about the impact of first contact on plans is legendary. Eisenhower's remark is at least as pertinent: "In preparing for battle, I have always found that plans are useless, but planning is indispensable."¹⁴ Both generals make a similar point: the linear framework of their planning process did not account for the non-linear chaos of combat. The current doctrinal answer is to restrict the JFC and his staff to planning operations and subsequently issuing "mission orders" which allow the field commanders adequate flexibility to handle the certain uncertainties of combat. To achieve victory, "JV 2010 depends on seizing the initiative early by using our *superior speed* to achieve overwhelming effects."¹⁵ JV 2010 relies on deft command of widely dispersed forces operating throughout the entire depth of the battlespace in non-linear modes. How can command and staff organized around linear models exert effective synchronization of a network-centric non-linear battle?

If history is any judge, it will have great difficulty.

In 1940, the *superior speed* of the Blitzkrieg's Panzer divisions was not only too fast for the Allies, it was too fast for the German operational staff.¹⁶ General Guderian continuously ignored his operational echelon's orders because he was rightly convinced that he was better placed--with his tanks--to judge the military situation wrought by the German RMA. To Guderian's right, Rommel's Panzers became known as the "Phantom Division" because the operational echelon could not find it for twenty four hours. The German high command lost its

nerve and ordered the Dunkirk halt--allowing 340,000 allied soldiers to escape and transforming a strategic victory into an operational one.¹⁷

Two themes have emerged.

First, JV 2010 command will be premised upon Information Age principles, the most important being the primacy of the network and the prosecution of network-centric warfare. Complex and rigid hierarchies with their single channel information flows starve networks of the multi-sourced data which is their lifeblood. This is not a revelation to successful Industrial Age commanders, who have frequently relied upon informal horizontal information flows to keep things moving.¹⁸ An attribute of successful commanders is that they actively search for information outside of the routine reporting system. Napoleon devised his system of "Directed Telescopes" to send trusted agents on personal information gathering systems. Moltke, who wrote that "no commander is less fortunate than he who operates with a telegraph wire stuck in his back,"¹⁹ used members of his general staff to augment his information flow. This process of removing filtering layers will accelerate with the arrival of a "Metasystem" (system of systems).

The second theme is to identify key command processes and then connect them in a networked organization. Emphasizing horizontal communication paths within the future organization will transform our present vertically stacked groups of static expertise into unified core combat processes. Operating between the boundaries defined by commander's intent, these combat processes will become the engines of dynamic interaction which will power both planning and execution. By focusing on process, we unite organization with non-linear dynamics. Instead of approaching war as a linear problem solvable by spiraling specialization, we see war as the cumulative result of flexible and interactive combat processes--themselves dynamic and unpredictable, but manageable by boundaries of intention ("the calculus of the

bounds"). A process-based organization optimizes speed of command by flattening its layers of authority.

Future Command Doctrine: Whither "Centralized Planning, Decentralized Execution"?

Historically, the command function has been designed to deal with uncertainty. "Uncertainty being the central fact that all command systems have to cope with, the role of uncertainty in determining the structure of command should be--and in most cases is--decisive."²⁰ This command requirement, while it may change, will not disappear. Unfortunately, the fog of war will persist despite JV 2010's vaunted "Information Superiority."²¹ No matter how perfect the reconnaissance, the enemy's intentions will remain difficult to discern and subject to interpretation. Consider the game of chess. Both opponents can clearly see all the pieces in their battlespace. Despite this perceptual perfection, Grandmasters consistently manage to achieve shock, surprise and simultaneity. In combat, no JFC would expect such certainty in his knowledge of enemy dispositions. To continue the chess analogy, some of the board would be hidden and some of the enemy's pieces would be unlocated. One can anticipate that the enemy will actively try to deny, deceive, and disrupt our sensors and information systems. Instead of dispelling the fog of war, JV 2010 has moved it into the realm of information operations--from the battlespace to cyberspace.

Doctrinally, we use "centralized planning, decentralized execution" to tackle the chaos of military operations, but there are other strategies for coping with uncertainty. Command can be exercised either by direction, plan, or influence. "Command by Direction" can be neatly summarized by the phrase "Great Captain". The Information Age makes it possible for a "Great

Captain” to dynamically control all of the forces all of the time. This method controls uncertainty by centralizing it. “Command by Plan” relies on the discipline of a highly trained force to carry out a preplanned course of action. JV 2010’s focus on identifying targets and centers of gravity, then proceeding against them in synchronized and simultaneous operations, has elements of command by plan. This scheme of command fights uncertainty by imposing its own order--the plan regime. “Command by Influence” relies on the intuition of subordinates as they act to satisfy their commander’s intent, which is normally conveyed by mission orders. The *Auftragstaktik* of the German army is an example of “Command by Influence”. The self-synchronizing aspect of “Dominant Maneuver,” as well as the expressed desire for decentralized execution are congruent with a “Command by Influence” philosophy. In this doctrinal scheme, uncertainty is dealt with by delegating it.²²

Debates about which doctrine is best suited to JV 2010 miss the point that elements of command by direction, plan, and influence all have a place in the future command environment. “Command by Influence” is most closely aligned with Third Wave ideas of non-linear dynamics and “the calculus of the bounds.” Who better to adapt to the situation than the soldier on the spot operating within the “bounds” provided by a clear understanding of the JFC’s intent? This approach recognizes the value of granting larger levels of control to the lower echelons. In military operations other than war, however, USAF General Ryan demonstrated effective “Command by Direction” during Operation Deliberate Force. Because “every bomb was a political bomb,” General Ryan personally oversaw, examined, and directed many tactical actions--including the selection of over a thousand bomb impact points.²³ His command was facilitated by a C-2 system which gave him the “sensory and cognitive ability to embrace

the...battle and the strategic flow of events.”²⁴ This situation foreshadows the JV 2010 “Metasystem” and its command possibilities.

JV 2010 command and staff organization must not preclude any of these doctrines. On the contrary, it must facilitate the commander’s option to assume the command style which he feels is appropriate to the situation. The staff must, therefore, be able to organize with respect to the task, instead of rigidly imposing its form on the problem. This type of agility and adaptability is the hallmark of successful re-engineered corporate structures which have made the transition from an Industrial Age organization to one centered on information exploitation.

Trends Driving the JV 2010 Command Concept and Staff Organization

In addition to Information Age chaos and flexible command doctrine, JV 2010 either explicitly or implicitly indicates that four warfare trends will shape its command concepts and supporting organizations.

Shift to Network-centric Warfare: Network-centric warfare is the term of art for a method of future war enabled by high performance information, sensors, and engagement grids. It presupposes geographically dispersed forces attached to a “Metasystem” and is characterized by access to all information sources; speed of response; and transparency of mission, force size, and force composition.²⁵ The “Metasystem” is at the heart of JV 2010’s call for procedural and organizational change. It will allow us to follow Sun Tzu’s dictum of “know the enemy and know yourself”²⁶ to an unprecedented degree. It is a key enabler of the JV 2010 concept of “Information Superiority,” which is defined as “the capability to collect, process, and

disseminate an uninterrupted flow of information while exploiting or denying an enemy's ability to do the same."²⁷

With "Information Superiority," friendly forces can expect to interact with a Common Operational Picture (COP) which shows the disposition of both friendly and hostile forces. The COP is also a medium through which the JFC may communicate his commander's intent and his concept of operations.

Two attributes of network-centric warfare will impact the organization of the JFC's Battlestaff: *Speed of Command* and *Self-synchronization*. Since an information advantage is frequently fleeting, speed of command is the process by which a superior information position is turned into a competitive advantage.²⁸ Typically, this is done by decisively altering initial conditions, developing high rates of situational change and consolidating success while denying the enemy alternative options. Perhaps most significantly, it seeks intense effects through the impact of closely coupled events--synergy. Self-synchronization is the process where a well-informed and connected force organizes and synchronizes complex activities from the bottom up.²⁹ Its most important effect is to convert combat from an interrupted process to a continuous mode. However, *tactical* self-synchronization cannot be expected to result in a consistently optimum *operational* allocation of combat power across the battlespace. Striking a balance between operational control and tactical self-synchronization will be a critical element of JV 2010 command.

Continuous Planning and Direction: Future operational planning will be a continuous process. The Battlestaff will strive to bring conflict to a successful conclusion by generating "shock" from simultaneous operations conducted throughout the entire depth of the battlespace. Currently, planning is a step function caused by the time consuming process of developing own

and enemy courses of action. Automated predictive simulation will allow operational planner to optimize the opportunistic aspects of network-centric warfare. Supported by the COP, this planning process will be continuous, collaborative with lower echelons, and cooperative among different services.³⁰

Functional Jointness: JV 2010 operational concepts rely on a “seamless integration of service capabilities.”³¹ Institutionally and organizationally, future operations will be fully joint. The “four pillars” do not neatly allocate themselves amongst core competencies unique to specific services as described in Title 10. It is clear that to some extent, all services will have elements of all of the “four pillars,” making interservice boundaries less relevant under JV 2010. In his organization, the JFC must account for this conceptual shift. More accurately, he need not accommodate a “service = mission” orientation. JV 2010 implies that the physical mediums of air, land, and ocean are neither remarkable nor adequate descriptors of future war. “Dominant Maneuver” may be from the sea or from the land; “Precision Engagement” may come from anywhere. As the service-oriented order of “the way *we* do things” vanishes, an organization performing information-based combat processes becomes the sensible successor.

Blurred levels of War: Connecting all levels of the military effort introduces new issues on the appropriateness of command and staff activities. “The capabilities of future information systems could provide such a level of battlespace awareness that senior commanders could have the ability to monitor and directly control the activities of junior leaders...the trend could be to centralized execution.”³² The JFC’s reach is extended not only downward, but also upward into the strategic and even national levels of war. The JFC’s imperative to mass effects from widely dispersed forces will require a new perspective on his span of control. Does a JFC located in Saudi Arabia have the authority to task B-2s in Missouri? Can the JFC task national level

information warfare assets to perform missions within his theater? It is likely that the JFC's need is time sensitive and extremely intolerant of an extended decision making process. For missions other than war, the JFC's concept of command and staff must expand to include non-military organizations and expertise which may lay outside the traditional levels of war. Rigid hierarchies do not lend themselves to outsider inclusion, leading to the conclusion that a more flexible form is necessary.

Recommendations for Command and the Future Battlestaff

Many reasons suggest that the JV 2010 JFC and his staff base their organization on a newly defined set of processes. Synchronization, phasing, and simultaneity require a new standard of performance in speed of command. The frequently strategic and operational effects of "Precision Engagement" demand centralized control over targeting and allocation of assets between operational and tactical objectives. Protecting the forces from tactical ballistic missiles and weapons of mass destruction (WMD) is such a difficult problem that it may require a specialized command and control function of its own. Employing "Dominant Maneuver" also will require a new level of involvement from the JFC, if for no other reason than to exploit sudden openings in the operational picture. Finally, information operations (IO) will be the most critical aspect of the future command process. The extent to which IO are successful will directly translate into operational acceptability, feasibility, and success. Without "Information Superiority", the JFC will be operating at a significantly higher risk level than with it, and some operations might not even be possible.

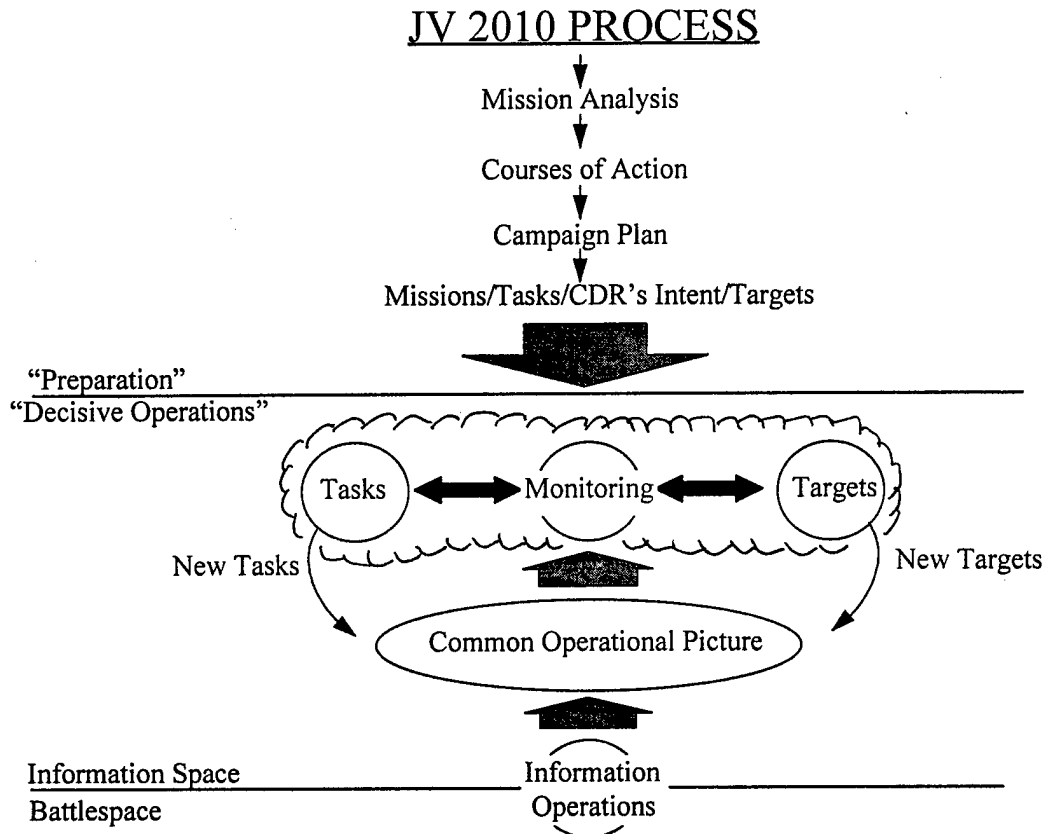


Figure 1

Figure 1 depicts a recommended JV 2010 process for staff functioning. Under JV 2010, the staff exists in two distinct phase states: prehostilities planning (JV 2010's Preparation phase) and combat (Decisive Operations). During "Decisive Operations," it becomes a "Battlestaff," operating like a "stormcloud" within an "Information Space" where the virtual battlespace is visualized; and where time, space, and uncertainty can be actively managed. Reality is perceived through the COP representation; the COP also acts as the transmissive medium for Battlestaff input and feedback.

During the preparation phase, the JFC and his staff will undertake much the same mental visualization process as they do today. The level of automation and simulation may greatly abbreviate the process, but the commander will still develop his estimate of the situation,

determine courses of action, and evaluate them before passing them to the lower echelons for tactical planning. Once "Decisive Operations" commence, the Battlestaff will coalesce around the following key processes as shown in figure 1:

Monitoring to detect situations requiring planning or direction is the starting point for further Battlestaff action. *Monitoring* not only provides inputs to *Tasks* and *Targets*, it allocates combat power among the combat processes in accordance with the JFC's concept of operations. This process strives to maintain the operational flow in accordance with commander's intent and his concept of operations while remaining alert for sudden opportunities.

Tasks are actions which the Battlestaff orders in reaction to its assessment of the operational situation. The typical task will involve executing a "Dominant Maneuver" operation --a turning maneuver produced as a result of an amphibious landing, for example. The Battlestaff will weigh the proposed task against available capabilities and logistical sustainability before making the assignment action. The task function is closely tied to synchronization and massing of effects. *Tasks* is a continual cyclical process which may operate on several different time horizons simultaneously such as a two, twelve and twenty-four hour looks. Because *Tasks* has an operational effect and may be ordered on short notice, some increase in the centralization of execution is logical.

Targets is the direct lineal descendant of the Joint Targeting Coordination Board and the Air Tasking Order. JV 2010's comparatively larger domain of "Precision Engagement" capabilities requires a new process to achieve synchronization and massing of effects. Between *Tasks* and *Targets*, there must exist a dynamic interplay regarding asset allocation. The JFC's intent and guidance are the determining factors affecting allocation decisions. *Targets* will sweep up unused engagement capabilities and bring them to bear upon the problem with the maximum

efficiency. *Targets* must coordinate with *Information* to perform rapid and accurate battle damage assessment. There are two reasons for centralizing the *Targets* process: (1) It operates primarily at the strategic and operational levels of war, and (2) It is necessary to deconflict its actions with *Information* to avoid disrupting ongoing IO.

Information is the process of maintaining the maximum possible fidelity COP, and denying similar information to the enemy. This activity aims to create an exploitable information differential upon which *Tasks* and *Targets* can operate. This process is responsible for the operation of the "Metasystem", its sensors, computers, and communications systems. The *Information* process must accommodate the commander's requirements for a "Directed Telescope" capability when the JFC needs to obtain information outside of the regular reporting system. *Information* is the JV 2010 linchpin process. Because the JFC will have operational and national level capabilities to employ, *Information* is logically centralized.

Protection is an operational activity which coordinates force protection against weapons of mass destruction, ballistic missiles, and cruise missiles. It is not designed to supplant or direct tactical level measures, although it will provide indications and warning if this information is not held by the COP. *Protection* will "integrate defensive systems across services into a collaborative capability that exploits real-time retasking to optimize resources...while still taking advantage of distributed empowerment."³³ Offensive *Protection*, such as the destruction of WMD, is clearly an operational-level activity.

JV 2010 requires an organization which facilitates flexible command of non-linear operations, enhances speed of command through efficient information flow, accommodates the identified trends in future war, and focuses on JV 2010 operational processes. The solution is to

discard our existing “wiring diagrams” and substitute a “Flat Ring” command and staff concept embodying a concentric series of processes, as illustrated in figure 2.

“Flat Ring” JV 2010 Command and Staff Concept

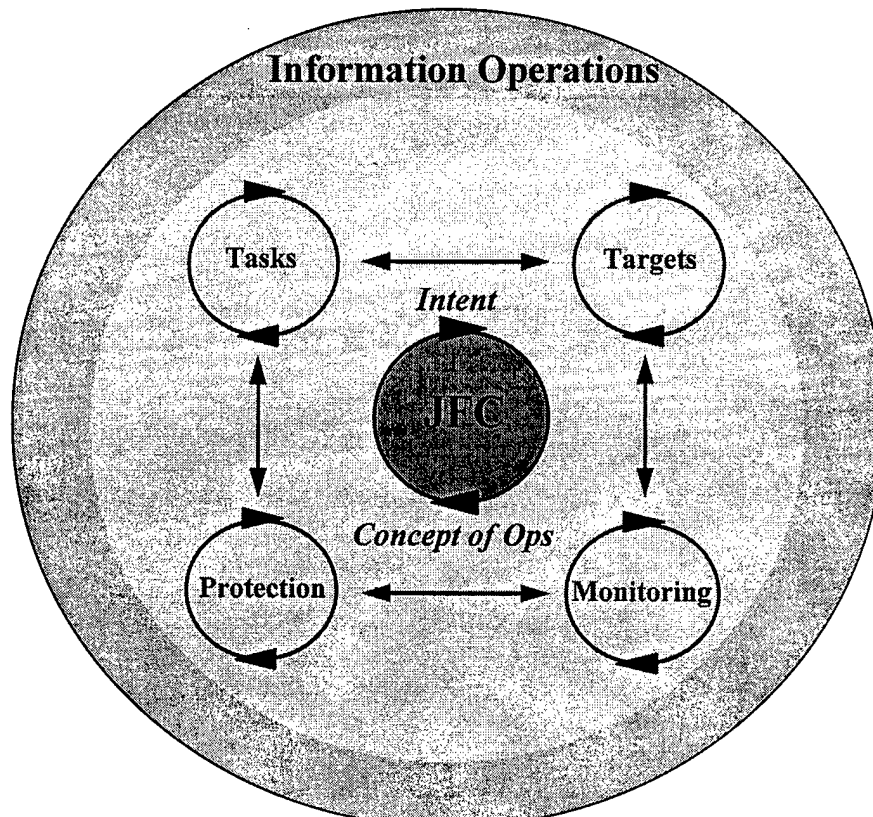


Figure 2

At the center, the JFC formulates his intent and concept of operations. This broad guidance flows outward to the previously defined core combat processes. In war, logistics are integral with each combat process. During peace operations, logistics may be its own process. At the outermost ring, information operations surround and permeate all aspects of the command and staff function. All processes interact through both horizontal and vertical communication paths. Additional processes may enter the ring as required by the JFC's mission. Each process should be led by a Flag Officer or the civilian equivalent. The supporting Battlestaff should be composed of joint experienced officers, who have progressed along a career path in which they

have experienced operational tours with separate service branches. This cross-functionality will give the collective organization the required intuitive "feel" to design JV 2010's seamlessly joint operations. The short-fused nature of the decision-making environment and the cross-service application of capabilities require a specific career training program in order to adequately employ JV 2010 concepts

Conclusion

Decentralized brains are being declared ready to triumph over centralized brawn, but we can see that muscle will be needed at the top. Are we ready for seamlessly joint operations? The JV 2010 Battlestaff is disconcertingly empty of the usual service suspects: the joint force component commanders for land, sea, and air. Their vertical ordering of capabilities is at odds with the horizontal coordination required by information-driven warfare. In place of the Component Commanders, JV 2010 substitutes a new set of operational processes--some implied, others explicit. The focus of future military operations will be upon knowing, deciding, and acting³⁴ faster than the enemy. With few new weapons at its disposal, the military must harness the potential of the Information Age to gain decisive advantage. Flexible command doctrine and an Information Age organization will be among its best weapons in 2010.

This submission replaces Industrial Age "strategy, structure, system" with Information Age "purpose, process, people." There is an inherent disconnect between the linear reductionism of our present command and staff doctrine and the non-linear chaos of war. So far, "centralized planning, decentralized execution" and mission orders have bridged the gap, but JV 2010 presses the issue beyond the capability of the present conceptualization. RMAs are built upon changes in

command and control, and the Information Age brings with it its own imperatives. A joint commander and an organization which remain trapped in functional silos runs the risk of becoming "prisoners of the deeply ingrained assumptions, information filters, and problem solving strategies that make up their world views--turning the solutions which once made them great into problems to be resolved."³⁵

NOTES

- ¹ Joint Chiefs of Staff, JV 2010, (Washington DC: 1995), 1.
- ² Ibid., 32.
- ³ Ibid., 1.
- ⁴ "Full Spectrum" is a JV 2010 term which covers the entire spectrum of military operations from peace to war.
- ⁵ Andrew F. Krepinevich, "Cavalry to Computer: The Pattern of Military Revolutions," The National Interest, No. 37 (Fall) 1994, 30. (italics added)
- ⁶ Joint Chiefs of Staff, Doctrine for Joint Operations, (Joint Pub 3.0) (Washington DC: 1 February 1995), II-11.
- ⁷ Alvin Toffler and Heidi Toffler, War and Anti-War, (Boston: Little Brown and Company, 1993). The Toffler's term "Third Wave" is used interchangeably throughout this writing to indicate the Information Age.
- ⁸ Michael P. Mazaar, The RMA: A Framework for Defense Planning, (Carlisle, PA: Strategic Studies Institute, US Army War College, 1994), 2.
- ⁹ Joint Chiefs of Staff, JV 2010, 33.
- ¹⁰ Douglas A. Macgregor, Breaking the Phalanx: A new Design for Land Power in the 21st Century, (Carlisle, PA: Strategic Studies Institute, US Army War College, 20 May 1996), 46.
- ¹¹ Thomas J. Czerwinski, "Command and Control at the Crossroads", Parameters, (Carlisle, PA: US Army War College, Autumn 1996), 125.
- ¹² Ibid., 126.
- ¹³ Ibid., 126.
- ¹⁴ Ibid., 132.
- ¹⁵ Naval War College, Center for Naval Warfare Studies, Global 97 Preliminary Report, (Newport, RI: 1997), 1. (italics added)
- ¹⁶ Karl-Heinz Frieser, Operational Thinking in C-2, Moltke, Schlieffen and Von Manstein, (Frieburg im Breisgau: Militargeschichtliches Fourschungsant, 1988), 71.

- ¹⁷ Ibid.
- ¹⁸ Martin Van Creveld, Command in War, (Cambridge, MA: Harvard University Press, 1989), 270.
- ¹⁹ Ibid., 268.
- ²⁰ Ibid., 146.
- ²¹ Naval War College, Center for Naval Warfare Studies, Global 97 Preliminary Report, 6.
- ²² Czerwinski, 121-2.
- ²³ Robert C. Owens, "The Balkans Air Campaign: Part 2," Air Power Journal (Montgomery, AL: Air University, Maxwell AFB, Fall 1997), 8.
- ²⁴ Ibid., 9.
- ²⁵ Arthur K. Cebrowski and John H. Gartska, "Network-Centric War--Its Origins and Future," Proceedings, (Annapolis, MD: Naval Institute Press, Jan 1998), 35.
- ²⁶ Sun Tzu, The Art of War trans. by Samuel B. Griffith, (New York: Oxford University Press, 1971), 129.
- ²⁷ JV 2010, 35.
- ²⁸ Cebrowski and Gartska, 35.
- ²⁹ Ibid.
- ³⁰ Joint Chiefs of Staff, Advanced Battlespace Information System Task force Report, Vol. III, (Washington, DC: 1996), 2-42.
- ³¹ Joint Chiefs of Staff, JV 2010, 8.
- ³² Joint Chiefs of Staff, Concepts for Future Joint Operations, (Washington, D.C.: May 1997), 68.
- ³³ Joint Chiefs of Staff, Advanced Battlespace Information System Task force Report, Vol. III, 2-78.
- ³⁴ Naval War College, Center for Naval Warfare Studies, Global 97 Preliminary Report, 6.

³⁵ Rebecca Henderson, "Managing Information in the Information Age," Harvard Business Review, (Jan-Feb 94), 100.

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