TOWARD A PRIMER ON OPERATIONAL ART

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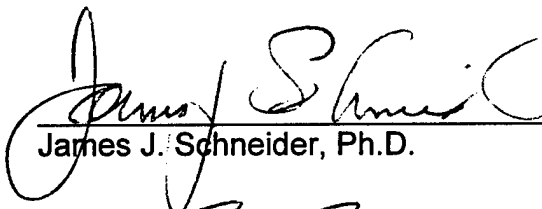

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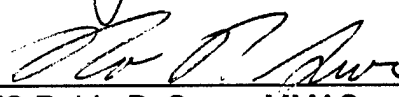

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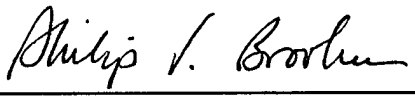

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Abstract

TOWARD A PRIMER ON OPERATIONAL ART by MAJ David L. Ward, USA,

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The 1993 version of FM 100-5 advertises itself as concentrating on the operational level of war. It defines several terms that are used in operational art, but inadequately explains how they relate to one another. The terms and definitions contained in the 1993 version of FM 100-5 do not match the definitions and terms of the characteristics of operational art included in Joint Publication 3.0 *Doctrine for Joint Operations* published in 1995. These gaps and disconnects in understanding have often led to confusion and hindered the intellectual development of the field grade officer in the US Army.

This monograph will answer the research question, "Can an Operational Art Primer be developed to train field grade officers?" in the affirmative. The author will propose a mental framework that allows users to develop a concept of operation at the operational level. It will answer the four requirements of operational art and address the fourteen characteristics of operational art listed in Joint Publication 3.0 *Doctrine for Joint Operations*. This framework will incorporate General System Theory and allow the user to design a campaign to shock the enemy system.

The mental framework consists of considering operational art in three interrelated groups. They are systems, operations and force mixes and composition. Systems, operations and force mixes are melded together to form a conceptual framework. The framework provides the user with what needs to happen when, in order to induce shock into the enemy system and what resources are required. This framework is explained in chapter four.

The framework will serve as a memory aid for the SAMS graduate and allow for the education of the non-SAMS or CGSC graduate. It will result in a more efficient battlestaff and the practice of a higher level of operational art.

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I. Introduction

Operational art has received increased emphasis in the education of the military officer in the past thirteen years since the 1986 version of Field Manual 100-5 *Operations*. The 1986 FM 100-5 was the first US army manual to acknowledge the operational level of war. Operational art and its components have been the subject of numerous articles in *Military Review* and other related literature. The 1993 version of FM 100-5 advertises itself as concentrating on the operational level of war.[1] It defines several terms that are used in operational art, but inadequately explains how they relate to one another. The terms and definitions contained in the 1993 version of FM 100-5 do not match the definitions and terms of the characteristics of operational art included in Joint Publication 3.0 *Doctrine for Joint Operations* published in 1995.[2] These gaps and disconnects in understanding have often led to confusion and hindered the intellectual development of the field grade officer in the US Army.

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The importance of operational art is recognized by all services. The Army, Marine Corps and Air Force have created special programs to teach select individuals operational art. The formation of the School of Advanced Military Studies (SAMS) was directly related to the need to train operational artists. After studying at the Command and General Staff College, students spend an additional year studying theory, military history, and joint subjects as well as participating in a robust exercise program. The students are well educated with the mental tools, but without the techniques and procedures in a coherent framework to be operational artists. In the thirteen years after the publication of the first FM 100-5 *Operations* to mention operational art, the US Army has still not published what is best described as a "How to Book" on operational art.

This lack of a "How to Book" is only a minor problem for the SAMS graduate. He has the education and training to construct a personal mental framework for use in

practicing operational art. The problem is the majority of officers do not attend SAMS and do not receive formalized training in operational art. This lack of education and understanding degrades the ability of commanders and staffs as well as the SAMS graduates in the unit to form effective battlestaffs. If the commanders do not have a full appreciation of operational art, it is difficult to possess operational vision and verbalize it to subordinates.

As mentioned earlier, there has been a good deal of literature published on operational art over the past thirteen years. Unfortunately, not all of it is correct or useful. Authors have confused operational art with operational artists and developed their own understandings of some of the terms such as center(s) of gravity and decisive points.[3] This leads to greater confusion for the non-SAMS graduate attempting his own course of education. This personal education while important, may actually lead to the detriment of the SAMS graduate attempting to form a coherent battlestaff. The majority of a SAMS graduate's battlestaff will not be SAMS graduates or even CGSC graduates. Even if the SAMS graduate has developed a personal framework for applying operational art, it may conflict with the self-educated officer's interpretation. Although this difference of opinion will be settled eventually, it affects the efficiency of planning.

Operational art is not a subject which can be reduced to a sequential checklist that guarantees a product at the end in a manner similar to the military decision making process (MDMP). It is definitely an art. It is also not easy. Moreover, like all art, there is a science or craftsman portion which must be mastered before one can be an artist.

Just as an artist knows yellow and blue mixed create green, an operational artist must comprehend the relationship between centers of gravity and decisive points and culmination and termination. A holistic approach is necessary to practice operational art. A holistic approach means several things must be considered at once including their relationship to another. Operational art concentrates on systems and their inter-relationships. It is necessary to have an understanding of General Systems Theory to effectively practice operational art. A brief introduction to general system theory is included in chapter two.

This type of thinking differs enough from the normal military education to cause problems among the officer corps trained according to ARTEP checklists, MDMP and crew drills. An operational artist must know the basics such as tactics, forms of maneuver and the domains of combat.[4] The domains of combat are especially important. The physical, moral and cybernetic domains are key when attacking or rebuilding a system.

Operational art has sixteen characteristics according to Joint Publication 3.0 *Doctrine for Joint Operations*. This monograph will define them according to the joint publication along with any further clarification the author deems necessary. The intention is to show how the terms and characteristics are inter-related and how they build up on one another. A brief history and origin of the term along with any major interpretations will be included where necessary. This history of the terms and alternate interpretations are necessary to prevent officers from misunderstanding the terms and

developing what can best be described as heresies. The author defines a heresy as one term redefined to make it simpler or more susceptible to one form of attack. Although the heresy may seem logical at face value, it has a corrupting effect on the rest of the system. It may have second and third order effects on the interrelationships.[5] This is not to imply a dogmatic approach is required, but that reinterpretation and redefining for simplicity's sake must be carefully done. The characteristics will be explained in chapter three.

The mental framework for operational art is evaluated against three criteria. They are of equal importance. The first is simplicity. Can the mental framework and accompanying text be understood in one reading? Do they build logically, one idea upon another? This does not imply that practicing operational art will easy. Only that the mental framework will be simple.

The second criteria deals with depth of understanding. Are the terms defined and explained and the relationship between on another coherently explained? The reader needs to understand the background of the term and why it is a characteristic of operational art. The last criteria concerns Utility. Since this monograph describes a "How to", its utility is important. Can the mental framework and accompanying text be used to develop a campaign plan concept and operationalize a plan? It is important to remember that this framework is not a fill in the blank model. This mental framework is designed to develop the concept. It is not designed to produce a written campaign plan. Campaign plans and their relation to operational art will be explained in chapter two. As

far as a written product, the five paragraph field order is a satisfactory format for transmitting the instructions to subordinate units.[6] The mental framework will be evaluated against the criteria in chapter five.

Although this monograph concentrates on operational art at the CINC or joint task force level, the thought process, ideas and terms have utility at the corps and division level when it is necessary to operationalize a plan.[7] The next chapter will explore the rise of operational art and explain some of the closely associated concepts.

II. Operational Art

> "Operational art: the use of military forces to achieve strategic goals through the design, organization, integration, and conduct of strategies, campaigns, major operations and battles."[8]

One of the major hurdles in learning and practicing operational art is the definition, while clear, is not much help. It merely acknowledges that there is something between strategy and tactics. It is easy for the traditionally educated military officer to identify with tactics. Tactics is what he is trained on during his basic and advanced courses and for the majority of his time in CGSC. It is equally clear that strategy is something civilian and military authorities in the National Command Authority (NCA) develop. This familiarity leads to a tendency in the military officers to over identify with the decisive battle in tactics. The idea is to destroy or defeat the enemy at the point and time of your choosing. In fact, this search for the decisive battle dominated military practice and theory until the twentieth century.

Clausewitz's *On War* and Jomini's *The Art of War* were predominantly focused on how to bring about and win the decisive battle. Clausewitz concentrated on the center of gravity while Jomini focused on lines of operations and decisive points. All other engagements were designed to bring about the final decisive battle which would decide the fate of empires. This was called the strategy of the single point.[9] During the early years of the Napoleonic Wars, this decisive battle often had the desired result. However by the end of the Napoleonic Wars, something had begun to change. Armies were beginning to become too large and resilient to be destroyed in a single battle.

By the time of the American Civil War, Union armies were no longer converging on a single point. They were conducting distributed operations. Technology allowed armies to be effectively and quickly commanded and controlled to a common goal. They were able to conduct successive and simultaneous operations which are at the heart of operational art.[10]

The era of the decisive battle had past, but not all armies were aware of it.[11] The Schifflen plan of World War I was an attempt at a decisive battle which failed. The Axis and Allies spent the next four years in trench warfare trying to create a decisive battle that would win the war. The Allies concentrated on technology with the tank and artillery while the Axis experimented with new tactics such as infiltration. Neither worked.

During the inter-war years, the Germans perfected the infiltration tactics by mechanizing them. The result was called blitzkrieg by the west. The Soviet Union experienced a different type of warfare on the eastern front during World War I and the Russian Civil war. Warfare had consisted of a series of mobile, fluid operations where it was difficult to bring about a decisive battle. Soviet authors such as Trindafillov and Svechin did some of the first writing in serious thinking about operational art.[12] The most important thing they did was to name it. With a name, it could be studied, discussed and debated.

Operational art reappeared in American military thought during the controversy and discussion surrounding the 1976 version of FM 100-5, *Operations* and its emphasis

on active defense. Although Clausewitz states the defense is the stronger form of war, he also writes you need to go on the offense to win. [13] The 1976 FM 100-5 with its emphasis on winning the first battle was inadequate to deal with the Soviet form of war. It was discovered through exercises and simulations that winning the first battles was not enough to win the campaign. The element of operational art was missing. As a result a new doctrine was expressed in the 1982 version of FM 100-5 *Operations*. This new manual acknowledged the operational level of war and created a new doctrine: AirLand Battle. AirLand Battle had some of the facets of operational art such as depth, but it was still a tactical manual. It was a more effective way of fighting the Soviets or other echeloning armies but it still did not explain how to practice operational art. The 1986 version of FM 100-5 and AirLand battle were focused on warfighting and did not address the other operations that the US Army undertook. This oversight led to the current 1993 version of FM 100-5 *Operations*.

Often the hardest thing in explaining operational art or its importance is convincing someone it exists. Strategy, Grand Tactics and Tactics as described by Jomini seem to be enough.[14] This leads the uneducated to question the existence of the operational level and art or dismiss its importance. The operational level does exist. The operational level provides the vital link between strategic objectives and tactical objectives.[15] When this link is not the dominant force in the planning process, operational and tactical considerations begin to determine strategy.[16] The operational level differs from the tactical level in quality and quantity and from the strategic level in

substance.[17] While strategy is concerned with all the elements of power, the operational level is concerned primarily with the military element. Tactics is concerned with winning the current battle. Operational art determines which battles to fight and when to fight them. Without operational art, the campaign would be a series of unrelated engagements which may or may not accomplish strategic aims.[18] These battles would become attritional in nature and without any clear focus would begin to determine strategy.

While individual battles and engagements are attritional in nature, the focus in operational art is on the system. In operational art, actions are directed against the enemy system. General Systems Theory is the underlying principle of effective operational art.[19] General system theory is the formulation and derivation of those principles which are valid for systems in general. Systems theory takes a holistic approach to problem solving. Systems thinking is a framework for seeing interrelationships rather than things. There are qualitative and quantitative parts of the system that always need to be considered. A system is a group of interacting elements. The whole is greater than the sum of the parts. This will become apparent when the characteristics of operational art are examined. None of them exist in isolation. They all affect one another to varying degrees. The interrelationship between the battlefield operating systems at the tactical level is another way to understand systems thinking in the military environment.

There are two categories of systems. They are open and closed. Closed systems are considered isolated from their environment while open systems are not. Military systems are considered open systems since they are not isolated from their environment.

Two characteristics of open systems are succession and echelonment and the absolute dominance of the system's aim. Within a military system, succession and echelonment refer to the military's hierarchical structure and the relationship between the system's components or between the subsystems in the overall system. Militaries have very defined relationships and communication channels between subordinate units and capabilities.

The directing authority's aim predetermines a comprehensive whole. In other words, the aim is the "reason for being" of the entire system. Without the aim, the system would not exist. In a military system, the aim is directed towards the accomplishment of the mission. It provides the focus for the system and therefore creates the framework for the interrelationships between its components. The aim is what creates the system and determines direction and patterns of action.

General system theory consists of three main aspects or areas. Each of them has an impact on the practice of operational art. They are systems science, systems technology and systems philosophy. Systems science is the scientific exploration and theory of systems in the various sciences and general system theory as a doctrine of principles applying to all (or defined subclasses of) systems. The science is the study of systems. The theory states that all systems have common aspects and characteristics.[20]

The second realm is systems technology. Systems technology deals with the issues arising with society and modern technology. This includes the actual hardware and software as well as the way it is used in society and the system. There are several systems that require scientific control in order to function effectively. They require feedback and information in order to function.[21] This area is gaining importance with regards to information warfare. It is important to realize how systems process information.

The last realm is systems philosophy. It is the reorientation of a worldview from the introduction of "system" as a new scientific paradigm. This philosophy is different from analytic, mechanistic, one-way causal paradigm of classical science. The important thing to remember about systems philosophy is that one action can have many resultant reactions. Systems are non-linear dynamic equations. There are often second and third order effects which are difficult to predict. When applying operational art, it is important to remember this fact. Actions are not repeatable cause and effect equations. The practitioner of operational art must understand how the system he is going to attack or rebuild will respond. The difficulty is that there is no set formula for answers.

The idea of operational shock is one of the most important ideas to come out of general systems theory research in relation to military operations. Operational shock is when a fighting system can no longer accomplish its aim. This could be the result of physical and/or psychological factors. Physical factors can be attrition or culmination. Cybernetic failure could be the result of physical and psychological components.

Operational shock is what a commander wishes to impose on an enemy system so that he can impose his will while the enemy can not resist him.

This idea developed as a result of the World War I experience and the failure of the decisive battle when troops were linearly formed. The Russians explored an alternative means of achieving victory over an enemy system. They analyzed the military systems strengths and weaknesses.

The military systems primary source of strength as well as its potential weakness is the absolute dominance of the aim. The aim is what provides the reason and purpose for combining subordinate independent units into a coherent operational team. If this reason and purpose is removed, the independent units drift away from the common operational context. It is the notion of command control which maintains the cohesion of the system. The aim needs command and control to accomplish its purpose. The loss of this command from the system will lead the system to not functioning and failure of the mission. [22]

Another weakness of the military system is its deep structure and hierarchical logic of action. All fighting formations have two dimensions. The horizontal or linear dimension is responsible for expressing energy. It does this by striking an enemy system or absorbing an enemy blow. This dimension is normally static. It can be thought of as the front. The depth or vertical action is oriented toward delivering shock since it expresses movement and response. This can be thought of as the rear generating combat power for the front. This combat power is developed sequentially and is dependent on

other systems to come to fruition. It is commanded by a hierarchical system. If this mechanism for bringing combat power forward is destroyed or hindered, the aim can no longer be achieved and the system collapses.

The destruction of this mechanism is done horizontal and vertically. In the horizontal mode, the idea is to break up the front and prevent formations from cooperating with one another. In the vertical or depth dimension, the purpose of the strike is to separate reserves and rear echelons from those in the front and cut off operational command from the entire structure. These dividing attacks disrupt the synergy of the operational mechanism and break down the system's whole into its independent parts. [23] These individual parts can be defeated easier since they no longer have the strength of the system supporting them.

In warfighting operations such as offense and defense, the destruction or shock to the system is the goal. This must be done without allowing the enemy to destroy your aim. The desired endstate is to prevent the enemy system from achieving its aim, thereby collapsing. This is very different from fighting attritional battles against a functioning system. Although in an ideal state, once you had destroyed or attritted all the pieces of the system, the system would cease to function. In reality, as long as the general system is still functioning, it will reorganize its subsystems to adapt to any loss of a particular piece faster, more economically and more efficiently than the attacking system. A shock that prevents this from happening is what is required.

A simple analogy of a lancer on horseback can demonstrate the idea of a system and shock. When a lancer is attacking, it is not effective to merely defend against the tip of the lance to be effective. Eventually, the system attacking with the lance has a good chance of finding a weakness and winning. It will keep probing until it finds the weakness. Even if you destroy the tip, the shaft can do damage. The system of the tip, the shaft, the rider and the horse must be attacked. An attack on the eyes of the rider in conjunction with a feint and a short jab to the horse may cause the lance to miss, the horse to stumble and the rider to fall. The system has collapsed and the lance was never attacked head on in an attritional battle. The pieces can now be attacked individually. A series of sequential and simultaneous actions produced shock to the system. These acts occurred in the physical, moral and cybernetic domain. The system was not destroyed but rendered incapable of functioning.

The other aspect of operational art which leads to confusion is its relationship to the operational level of war. They are not the same thing.

> "The operational level links the tactical employment of forces to strategic objectives. The focus at this level is operational art—the use of military forces to achieve strategic goals through the design, organization, integration, and conduct of strategies, campaigns, major operations, and battles."[24]

Operational art is not just bigger tactics at the operational level. Tactics is concerned with fighting the battle and winning. Operational art is concerned with when and if the battle should be fought in order to bring down the enemy system. It is important to remember the relationships between engagements, battles and campaigns.

A group of engagements make up a battle. This is the arena of tactics. A group of battles makes up a campaign. This is the arena of operational art. Campaigns achieve strategic goals.

"A campaign is a series of related major operations that arrange tactical, operational and strategic actions to accomplish strategic and operational objectives. "[25] Campaign plans are inherently joint and have several considerations that distinguish them from other plans. They synchronize operations by defining objectives, establishing command relationships; describing concepts of operations and sustainment; arranging operations in time, space and purpose; assigning tasks; organizing forces; and synchronizing air, land, sea, space, and special operations.[26] While campaign plans are normally developed at the CINC level, subordinate commanders will often develop their own campaign plans to support the CINC's campaign plan. This includes joint task force commanders if the missions require military operations of substantial size, complexity, and duration.[27]

An U.S. Army corps could easily serve as a joint task force headquarters. It is this example which will involve most army officers who were not directly assigned to a joint headquarters. A corps staff may need to develop a campaign plan using operational art in order to accomplish its mission

Operational art is not a panacea. As with tactics, bad decisions can lead to disaster. An organization can execute operational art against an opponent and still lose.

The odds, however, are much better if operational art is practiced and executed effectively.

To practice operational art, there are four questions that must be answered before and while the concept is being developed. They are located in Joint Publication 3.0 *Doctrine for Joint Operations.*

1. What military (or related political and social) conditions must be produced in the operational area to achieve the strategic goals? (Ends)
2. What sequence of actions is most likely to produce that condition? (Ways)
3. How should the resources of the joint force be applied to accomplish that sequence of actions? (Means)
4. What is the likely cost or risk to the joint force in performing that sequence of actions?[28]

This is the familiar Ends, Ways and Means paradigm used at the operational level. It is how this paradigm is used that defines the art portion of operational art. There is not an equation where certain actions or variables can be inserted to generate an expected result every time. Operational art deals with a living system that adapts to variables and does not react in a easily predictable way.

Operational art is not easy. It requires the answering of the four requirements listed earlier while realizing you are dealing with a system that operates in the three domains of combat. There are fourteen characteristics of operational art that can be used to assist the design of campaign concepts at the operational level. They are not a

checklist, but can be used to ensure all aspects of operational art are being considered. Judgment and experience are needed to evaluate the effects in the domains of combat. The next chapter will describe the characteristics found in Joint Publication 3.0 *Doctrine for Joint Operations* and provide some of the required history and amplification on the characteristics of operational art to ensure depth of understanding.

III. Characteristics of Operational Art

The characteristics of operational art are found in Joint Publication 3.0 Doctrine for Joint Operations. They are the centers of gravity, decisive points, termination, simultaneity and depth, synergy, balance, forces and functions, leverage, anticipation, arranging operations, operational reach and approach, timing and tempo, culmination, lines of operation, and direct versus indirect approach. They are fully discussed in Appendix A. A reader desiring to review the characteristics and how they relate to one another, should read Appendix A before continuing with the Mental framework.

When thinking about the characteristics of operational art, it is helpful to group them in three broad categories or conceptual groups. There is some overlap, but it is easier to remember three groups than sixteen separate characteristics. The first group concerns the system, the second deals with campaign and supporting operations and the third deals with the force mix.

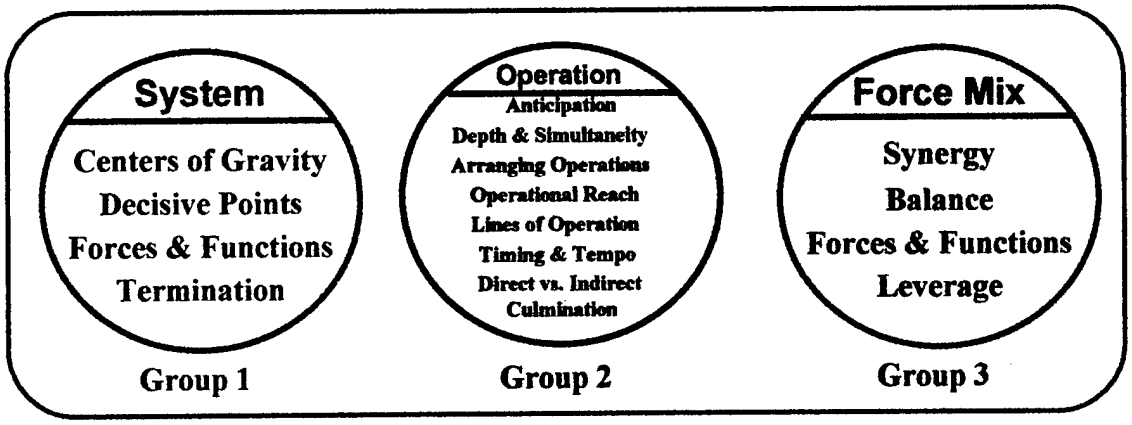

FIGURE 1 THE OPERATIONAL ART CHARACTERISTICS IN THREE GROUPS

The systems group includes centers of gravity, decisive points, forces and functions and termination. This group applies to enemy as well as friendly systems. These characteristics concern the composition of the system. The aim of the system belongs in this group as well. It is through these characteristics that the system can be described in a militarily useful manner. The first requirement of operational art, "What military conditions must be produced in the operational area to achieve the strategic goals?(Ends)" answers what endstates must be achieved. This provides the termination criteria. With this endstate, the enemy system is examined to determine what will bring about the desired conditions. How this is done will be explained in the mental framework discussed in chapter four.

The second group of characteristics deals with the conduct of operations in the campaign plan. They are anticipation, depth and simultaneity, arranging operations, operational reach, timing and tempo, culmination, lines of operation and the direct versus the indirect approach. These characteristics deal with what operations you do when, where, how and why to induce shock on the enemy system. As stated in the second requirement of operational art, "What sequence of actions is most likely to produce that condition?(Ways)" That condition being the desired endstate in the termination criteria. There is also risk involved. The fourth requirement asks what risk is involved in performing a particular sequence of actions. The mental framework will link these requirements and characteristics together.

The last group of characteristics deals with the force mix. It answers the third requirement, "How should the resources of the joint force be applied to accomplish that sequence of actions?(Means)" These characteristics are synergy, balance, forces and functions, and leverage. To achieve synergy and leverage, a force must have the appropriate balance of forces and functions. This force can then accomplish the operations envisioned in the campaign plan.

As mentioned earlier the groups are not perfect, but can allow a mental framework to emerge and when considered as a group, allow for a concept to emerge. As will be seen in the mental framework, the groups are initially done sequentially. As they are refined, they provide feedback to modify the other two groups. This is a why a holistic approach is required when practicing operational art.

IV. The Mental Framework

This chapter proposes a mental framework for the practice of operational art It explains the relationships between the four requirements and sixteen characteristics of operational art listed in Joint Publication 3.*0 Doctrine for Joint Operations* and general system theory. It is critical to understand their relationship in order to develop a primer for operational art. Without this understanding, operational art seems no different than tactics on a larger scale. This was the purpose of the previous two chapters.

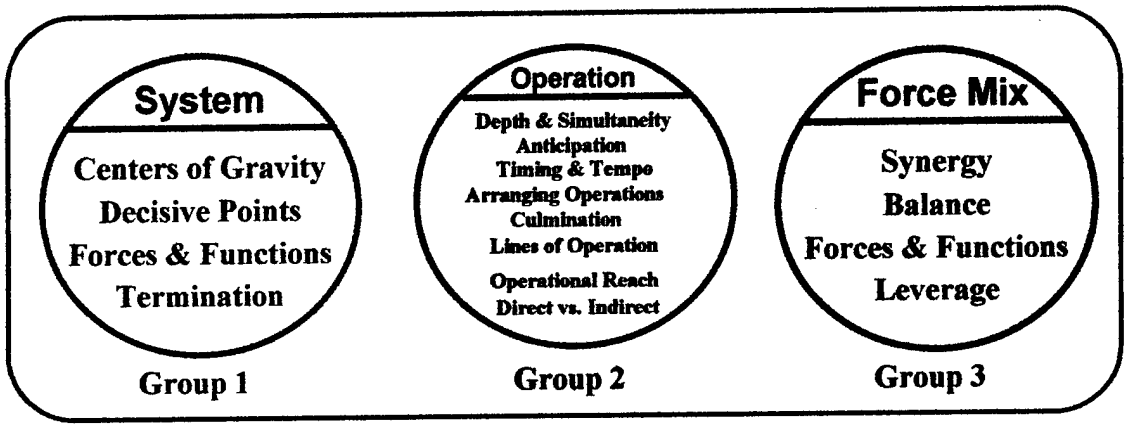

FIGURE 2. CHARACTERISTICS IN 3 GROUPS

The mental framework consists of considering operational art in three conceptual groups. Systems, operations and the force mix groups are melded together to form a conceptual framework. The framework provides you with what needs to happen when, in order to induce shock into the enemy system. It also provides the resources required. The mental framework will be developed through a series of diagrams that build upon one another. The diagrams will be accompanied by text that explain the relationships written in the preceding paragraphs. Diagrams were chosen so that the reader can see the

process holistically rather than build on it step by step which is what text only would lead one to do. The first group to consider is the system group consisting of centers of gravity, decisive points, termination and forces and functions. These characteristics will allow us to build the system. The realms of general system theory must be remembered. This is especially true of the science of systems and the general attributes of systems.

Since general system theory lies at the heart of operational art, it is necessary to build the enemy system using some of the characteristics of operational art. As will be recalled, the aim predetermines the comprehensive whole of the system. It gives the system direction and focus. Centers of gravity enable the system to function and accomplish its aim. Since the object of operational art is to shock the system and enable its defeat, the identification of the centers of gravity is the first step.

"Centers of gravity are those characteristics, capabilities or locations from which a military force derives its freedom of action, physical strength or will to fight." A center of gravity provides the power to the system. A word of caution is needed here to eliminate confusion further on in the mental framework. A geographic location can be a center of gravity or a decision point. A center of gravity can be force or function but not all forces or functions are centers of gravity. The center or centers of gravity may be difficult to determine. An accurate understanding of the enemy system is required. The questions listed in Appendix A are useful in determining centers of gravity.

If war is imposing your will on someone, a center of gravity prevents you from imposing your will. The second step in constructing the enemy system is to determine

what forces and functions provide the power for the center of gravity. Some of these forces and functions may actually be centers of gravity while others support the centers of gravity and thereby the system's aim and ability to function effectively. Friendly forces and functions will be discussed later in the chapter.

How the system functions is a critical piece of information. The aim must be correctly identified. How the aim is communicated to the components of the system and what components are critical to the accomplishment of the aim must be accurately surmised. If this is not done, the wrong elements of the system may not be attacked or attacked in the wrong order or at the wrong time.

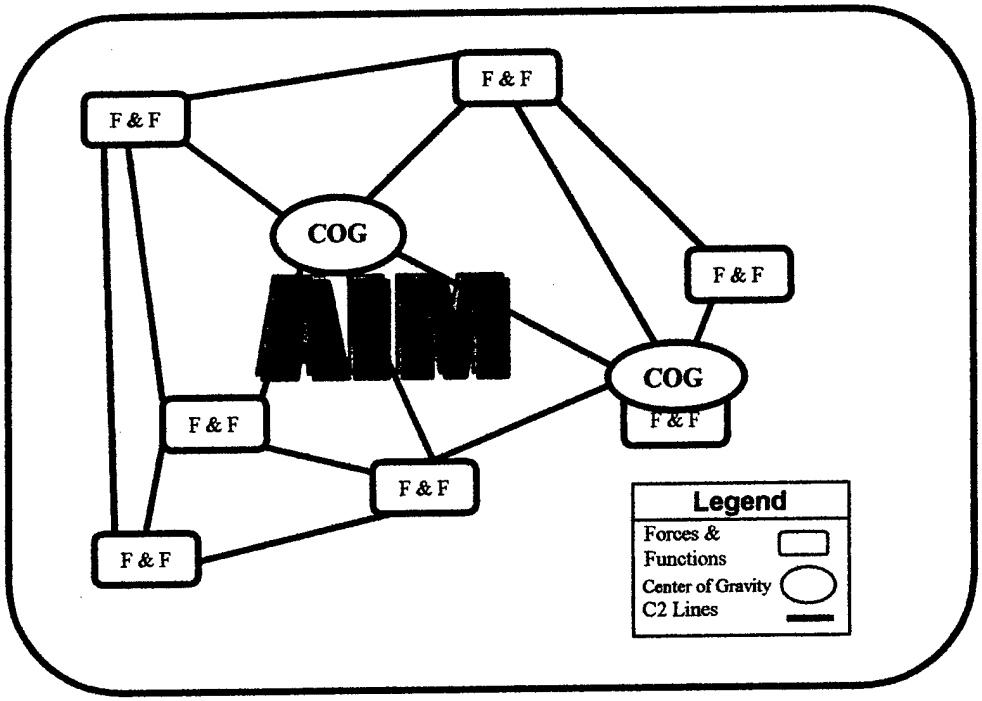

FIGURE 3. ENEMY SYSTEM

Once an enemy system is arrayed on the ground, geographic decisive points will emerge. These need to be identified. Non geographic decision points need to be

identified as well. To harness the power of the system, the different elements must be able to support one another. The control of decisive points prevents the enemy system from functioning at peak efficiency and will induce shock. The individual parts of the system will not be able to accomplish the aim. These decisive points will become objectives for later use in planning. Although predominantly geographic in nature, they can be a function or a capability such as part of the electromagnetic spectrum. The enemy system will then begin to emerge as pictured in figure four.

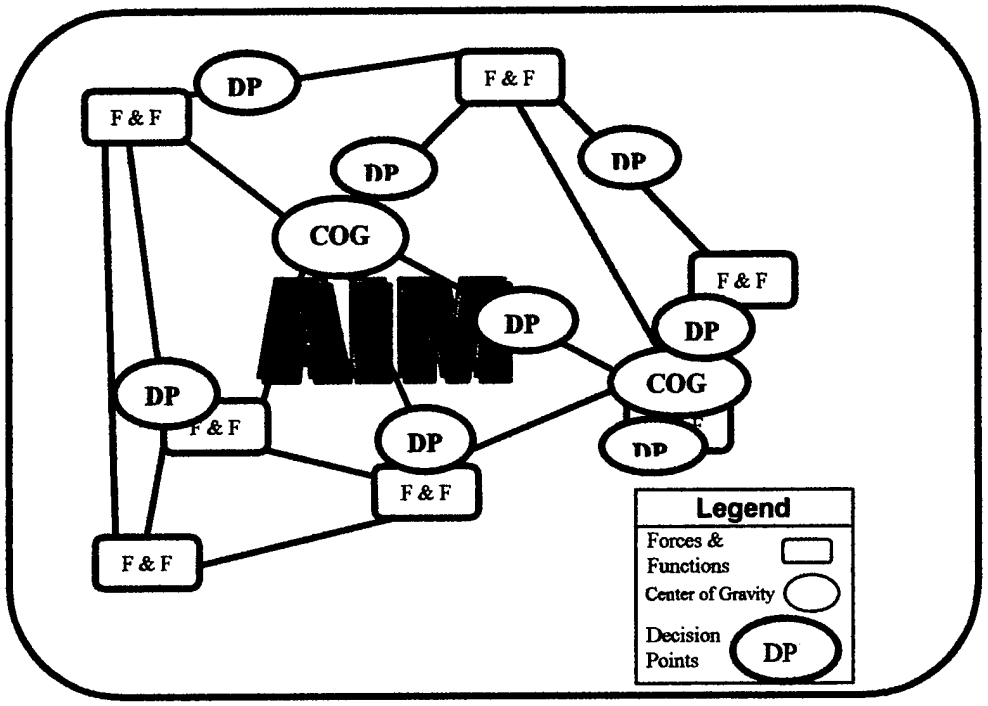

FIGURE 4. DECISIVE POINTS AND ENEMY SYSTEM

There will be more decisive points than can be attacked and it may not be necessary to attack all of them to achieve the desired effect. The desired effect is found in the characteristic of termination. Within termination, the endstate is found. The

endstate is the set of conditions necessary to resolve the crisis and transition from the predominate use of the military instruments of power to other instruments. If we are trying to impose our will on someone, what are the conditions that allow us to do that? What within the enemy's system is trying to prevent us from imposing our will? The enemy impediment must be removed. The system's ability to thwart us must be destroyed. What do we want the enemy system not to be able to do? The answer to this question can provide guidance to the military result desired. The endstate implies limits on the use of military power since there is a transition to other instruments of national power. These limits will change during the course of the campaign. The effect these limits have on shocking the enemy system must be carefully monitored. Certain objectives may be put off limits or new ones emerge. When the appropriate endstate is reached, the operation terminates.

Now the desired endstate is known and the enemy system is identified with respect to centers of gravity and decisive points, the other characteristics of operational art are considered and employed. This leads to the second group of characteristics: operations. For the framework, make the planning assumption that forces required to achieve the effects desired will be available. If this is not done, the unproductive circular reasoning of asking "what is available" will be followed by "what do you need". This is especially true for joint operations. Plan for missions and let components resource them.

The analysis of the desired endstate and the centers of gravity leads to the selection of the important objectives. These objectives could be selected decisive points

or forces and/or functions. Operations will be conducted against enemy forces and functions. These forces and functions are critical to supporting the enemy system's aim. To attack and shock a system, it must be done in depth and simultaneously. This does not imply that the attacks themselves will be simultaneous. The effects of some attacks take longer to be noticed than others. For example, an information operations attack on the population's will to resist may take weeks to produce effects while an electronic attack on a command post may only last for a few minutes or hours.

Simultaneity and depth are designed to produce cumulative effects. Deep attacks are meant to separate echelons and command and control elements from front line units. Deep attacks are necessary due to the systemic or distributive nature of armies. Deep attacks are also designed to separate front line units from supporting one another. These attacks should not be from a single source or dimension. This is why synergy is important. Operations should be synchronized in a manner that applies force from the different dimensions. Ideally, an objective should be attacked simultaneously from different dimensions such as information operations, air, land and special forces. An attack should force an adversary to fight in more than one dimension at a time, as mentioned earlier. Knowledge of how the enemy system functions is necessary to anticipate which elements rely on which other elements for support. The attacks then prevent this support from occurring.

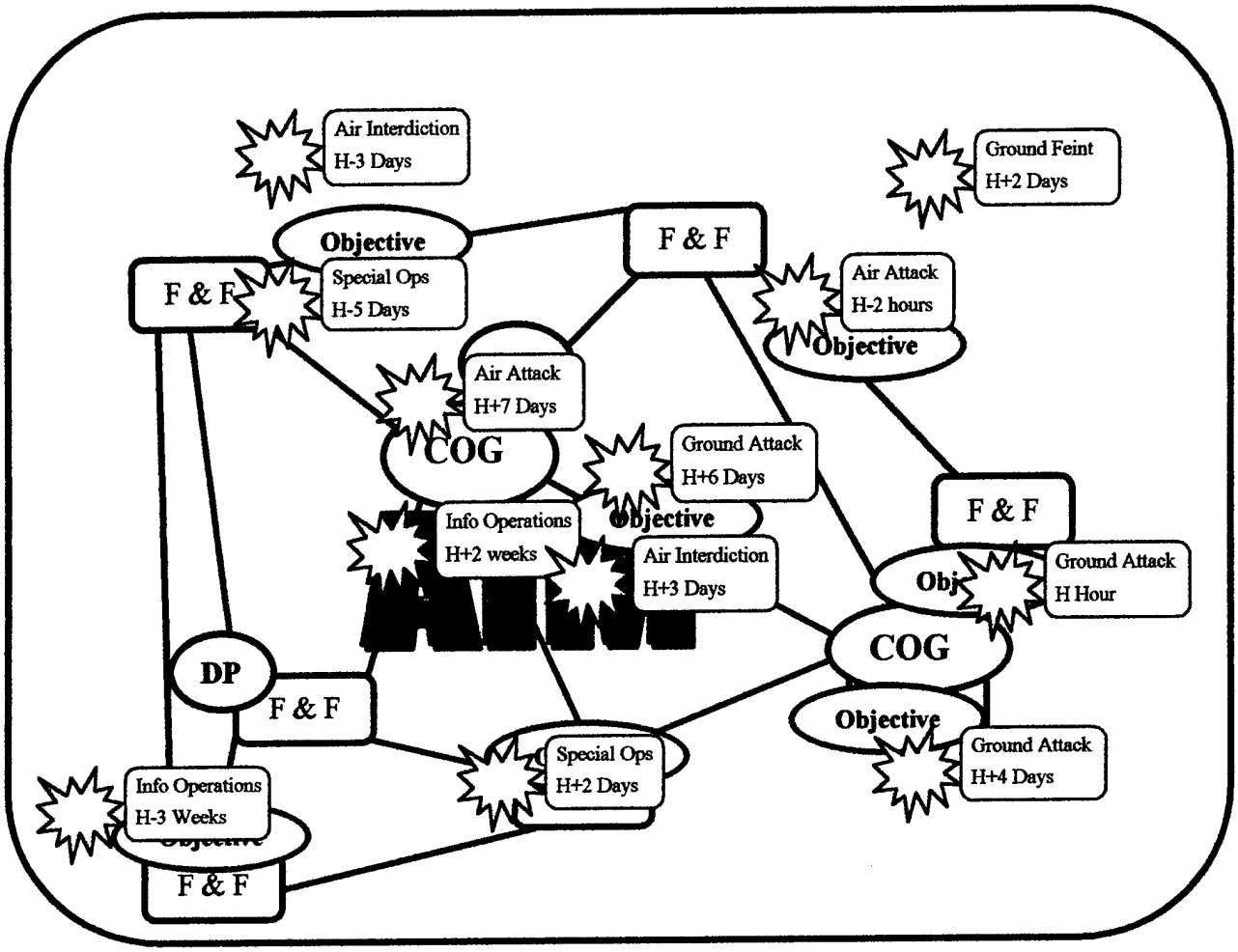

FIGURE 5. OPERATIONS: OBJECTIVES, DEPTH & SIMULTANEITY AND SYNERGY

As the figure illustrates, attacks take place on objectives throughout the depth of the battlefield and prevent components of the system from supporting one another. Although the attacks are not simultaneous in time, their effects are designed to be. Synergy is achieved by attacking in more than one dimension such as air, special forces, ground and information operations.

The next set of characteristics in the operations group can be thought of in the same way. Anticipation, the arrangement of operations, timing and tempo and culmination need to be thought of holistically.

As the definition of anticipation states, "anticipation is the key to effective planning." Assumptions have to be made as to the future situation and the effects of friendly and enemy actions. Intelligence preparation of the battlefield concentrates on the enemy, weather, and terrain. Assumptions need to be made on friendly forces, neutrals and civilian populations. Without these assumptions, effective operational art is impossible.

These assumptions will lead to the arrangement of operations to achieve the desired effect. Assumptions on the arrival of friendly forces and the disposition and capabilities of enemy forces will drive certain operations to take place at certain places and times. For example, peacekeeping operations cannot begin until troops such as civil affairs arrive in the area of operations. The assumption on their arrival based on troop transport and enemy capabilities and intentions will dictate when this operation commences. As can be seen, the arrangement of operations leads to phasing decision. All the factors listed on in Appendix A must be considered. When do you transition from one phase to another? The arrangement of operations provides the answer.

The arrangement of operations is highly dependent on timing. Some of the timing considerations are physical considerations. Units can only move so fast and sometimes the effects take longer to generate. The timing could also be dependent on the enemy. Based on anticipation, the enemy may have a critical vulnerability during certain periods of time. The speed at which these operations occur is the tempo of the campaign.

Three factors must be considered when planning the tempo of the operation. The tempo of the operation must be faster than the enemy can react. The tempo of operations must not force culmination before the endstate is achieved. (Culmination will be discussed in the next section). Finally, the tempo must be fast enough to satisfy the strategic decision-makers.

The first two are self-evident. It is the third factor that is often overlooked in operational art. The purpose of operation art is to satisfy strategic goals through tactical military actions. The tempo of operations must meet the expectations of strategic level decision makers.

The other characteristic which tempo affects is culmination. Man and machine operate at certain rates of consumption. The faster and longer they go, the more energy they use. The tempo must allow resupply and maintenance of man and machine but it must be quicker than the enemy can react within his decision cycle. The danger is that men and machine will be used up before the campaign is completed. They will no longer be able to attack or defend successfully. The selection of operational pauses based on the endurance of men and machine as well as the distance traveled must be considered to avoid culmination. Maintenance rates can often be determined mathematically while a commander's experience is required for the morale and endurance of units and soldiers.

Concerns regarding culmination impact on the decision of lines of operation. Once the objectives are chosen, the line to get to them must be chosen. Ideally more than one line to the objective will exist. This results in multiple lines of operations. Multiple

lines of operation keep the enemy guessing as to which line the attacker will choose. Concerns over tempo and culmination will drive selection of lines of operations that have the necessary bases along them.

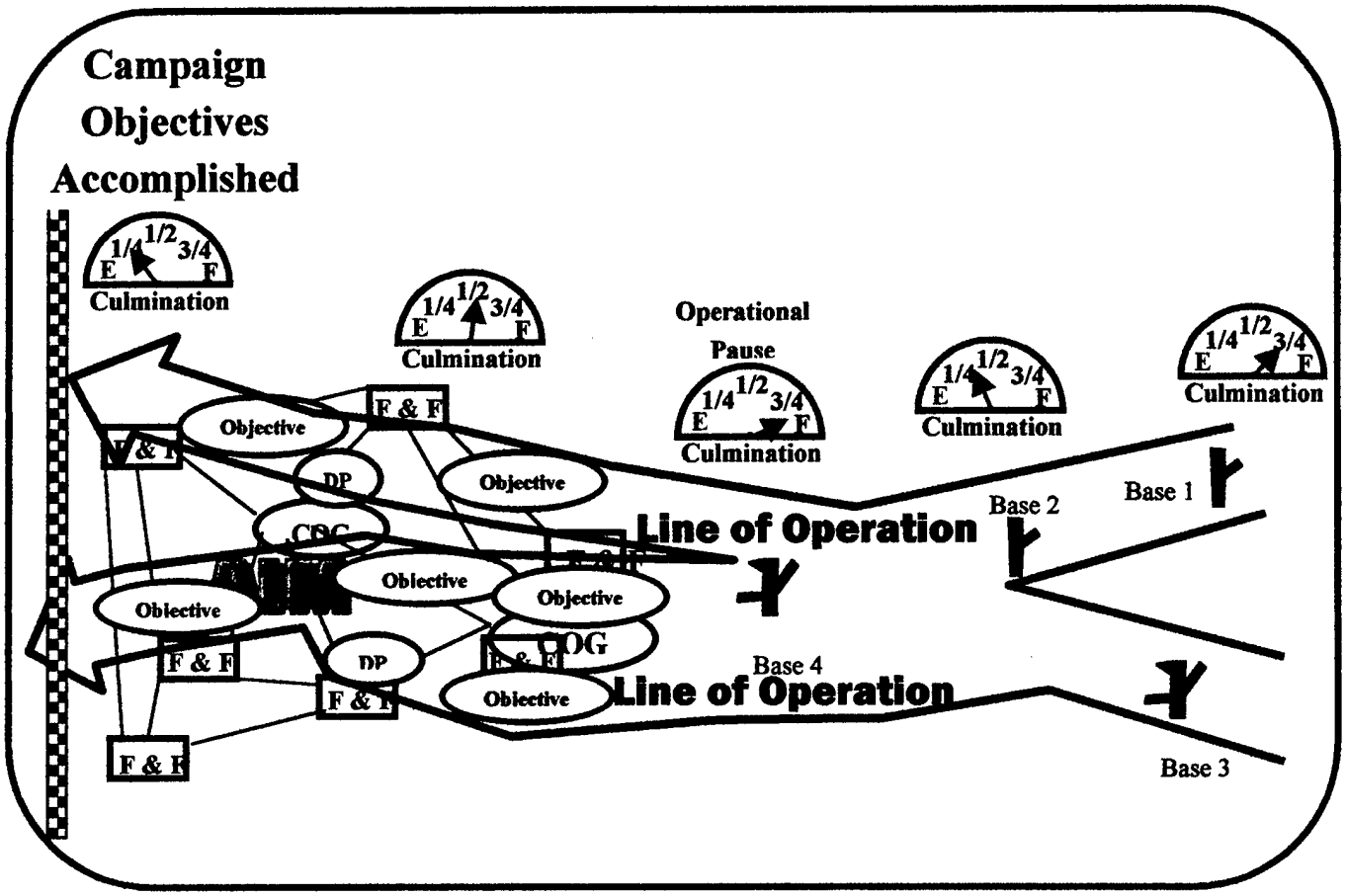

FIGURE 6. LINES OF OPERATION, CULMINATION AND TERMINATION

From these bases along the lines of operation, operational reach can be calculated. Of course, the selection of bases will be dependent on operational reach and culmination. This is another instance when three characteristics, culmination, lines of

operation and operational reach need to be considered holistically to determine the optimum selection.

When choosing lines of operation or deciding which objectives to attack, it is good to remember the last characteristic of operational art. The idea of the indirect versus line of approach has been a common thread throughout the framework. If at all possible, never attack the enemy strength with your strength. The only exception is when you so totally overmatch him and time is of the essence. Attack him where he is weak and indirectly weaken his strength until it is no longer relevant. Then you can attack it.

One thing that should be avoided is attacking an enemy directly strength against strength. This is how he is trying to arrange his operations and forces. The enemy wants his adversary to attack into his strength. If possible, always attack him indirectly. As written earlier in chapter three, the direct approach may be the most politically acceptable if the enemy system is so overmatched that its destruction would hasten the end of military element of power with the least amount of casualties. This will normally not be the case. It is counterproductive to divide an area of operations into attacks by one dimension. An example would be dividing an area of operations into air, special forces, navy and land force areas. This diminishes the synergistic effect and should be avoided.

Synergy is one of the four characteristics considered in the final group: force mix. Some of the characteristics such as synergy and forces and functions have been briefly mentioned in the earlier groups. They will now be further discussed.

Synergy involves integrating and synchronizing operations in a manner that applies force from different dimensions to shock, disrupt and defeat opponents.[29] The best way to achieve the capability for synergy is through balance. A force must be balanced. It must have the appropriate mix of forces and capabilities needed to disrupt the enemy's balance. There is a fine line between spreading out capabilities amongst the force to where it is impossible to mass at the decisive point and massing capabilities under a single force and it loses responsiveness and flexibility. Some missions will require more of a specific capability than others. The force must be balanced to accomplish the mission. It must be joint. The mental framework requires some feedback at this point. Operations are planned. If there will not be appropriate forces or functions available, then the operations may need to be modified. The operations and effects are designed around planning assumptions of forces available. If these assumptions are modified, then the operations may need to be modified.

A closely related characteristic of operational art is the idea of forces and functions. It can have an enemy related facet as described earlier or can be thought of in a friendly manner. A force must have certain forces. Sometimes only the function needs to be destroyed rather than the force itself. An example is an integrated air defense. Another would be a command and control system. Not all of the equipment or forces need to be destroyed for the enemy system for not to function.

The idea of leverage is closely intertwined with balance, synergy, forces and functions. Commanders should array their strengths against enemy weaknesses. If a

target is vulnerable from the air but not from land, a commander should leverage his ability to attack from the air. A strong air defense may have to be attacked with special forces. This impacts directly on forces and functions as well as balance. An adversary may be susceptible to information operations and unable to protect himself. A commander may be able to achieve effects out of proportion to the resources expended. This is the idea of leverage.

Leverage is not solely related to technology. It is easy to think about technological advantages of one force over another. The areas to leverage may be in training, doctrine and will. While it is easy to quantify and remember the physical domains of combat, the moral and cybernetic domains are just as important. This is especially true when attacking a system.

After considering the force mix concept, an idea of the number and types of forces emerge. The required capabilities are identified. This assists the planner in proposing force structures to the CINC or JTF commander. These force structure changes may cause changes in the operations planned by changing lines of operations or selection of additional bases. This is the force mix feedback into the operations concept.

As can be seen from the preceding paragraphs it is difficult to treat each characteristic in operation art in isolation. They directly relate to one another. This is especially true with synergy, balance, leverage and forces and functions.

In summary, the mental framework for operational art consists of dividing the characteristics and requirements of operational art into three conceptual groups with

general system theory being the main underlying factor. The idea of general system theory is what prevents the conceptual groups from being used to plan a campaign of annihilation. General system theory allows for the selection of the appropriate targets which will shock the system and prevent a costly and often indecisive campaign of attrition. Although, the mental framework initially treats each conceptual group individually and sequentially, each decision causes changes in the groups. The conceptual groups may be more accurately thought of as three balls being juggled in the air while being molded into a larger ball which is eventually caught. The larger ball is the concept which turns into the written campaign plan.

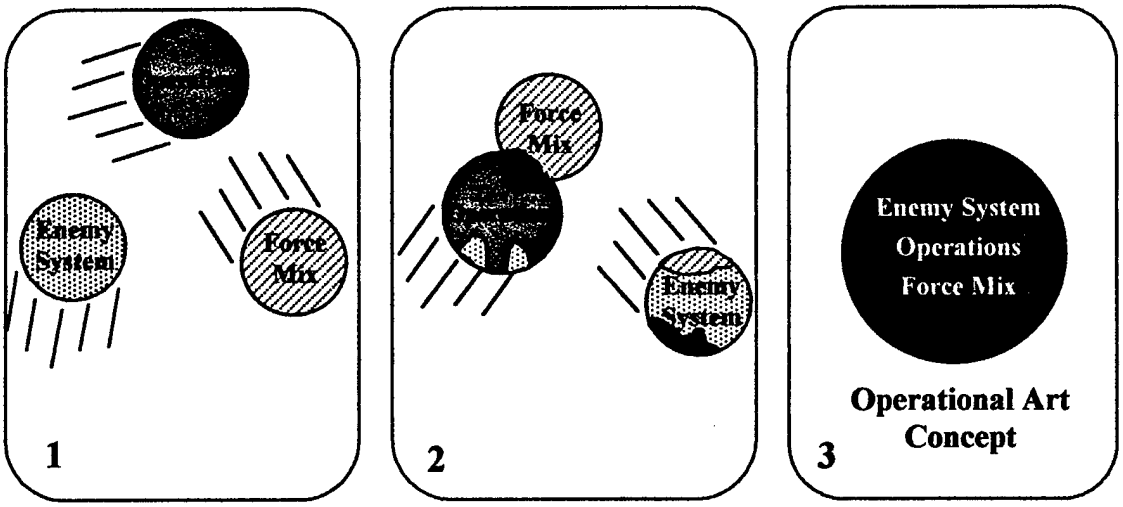

FIGURE 7. JUGGLING BALLS INTO OPERATIONAL ART CONCEPT

It is this idea of all the characteristics being constantly considered with the infinite variations that is the art portion of operational art. It takes operational vision to know what the larger ball or campaign should look like in the end. The mental

framework provides the means for the planner to begin bringing the pieces together and creating the concept.

V. Analysis and Conclusion

The mental framework provides a "how to" for developing a concept for use in operational art. It fills a vacancy in joint and U. S. Army doctrine. The framework will now be evaluated against the three criteria presented in Chapter One. The criteria will be graded as either excellent, good, or poor.

The first criteria is simplicity. Can the mental framework and accompanying text be understood in one reading? Do they build logically, one idea upon another? The mental framework rates an excellent in this regard. This is the framework's strong suit. The sixteen characteristics of operational art are gathered into three related groups. These groups are analyzed and synthesized as individual groups. The groups are then synthesized as a whole. The groups allow for general system theory to be applied in small sections. The four questions required of operational art as outlined in Joint Publication 3.0 are answered by the three groups. This is much simpler than considering developing an operational art concept while thinking of sixteen characteristics, general system theory and the four requirements all at once.

Understanding operational art in one reading is difficult. This is one reason that the next criteria "Depth of Understanding" rates only a good. The primer serves as a useful memory aid for the SAMS graduate, but is not a stand-alone document. The terms are defined and explained as well as their relationships between each other are covered in Appendix A. To achieve depth of understanding more study is required. This is especially true of general system theory. There are certain nuances in operational art

situations such as military operations other than war that warrant further examination. The mental framework is still valid, but the exact meaning of some of the characteristics is refined. Information operations are also broadening the meaning of some of the characteristics.

Utility is the last criteria by which the mental framework is evaluated. It is the most important. The mental framework rates an excellent. It fills a void in doctrine and tactics, techniques and procedures. Currently, doctrine merely lists characteristics of operational art and the four requirements. Doctrine never directly addresses general system theory in conjunction with operational art. The current practitioner of operational art does not have anything to guide his thoughts other than education and experience. Unfortunately, the quality of education or experience may not have been good. The mental framework gives him a model he can use.

This utility directly impacts on the development of the concept. The problem of developing a concept for operational art can be divided into manageable segments. These segments are manageable mentally as well as physically. This is especially true in staff environments. Parts of the problem can be delegated to the subject matter experts.

Certain questions naturally develop when the characteristics are divided into the three groups. For example, questions about the enemy system will be tasked to the intelligence community. Information about operational reach and culmination can be directed to the logistics system.

These groups allow for a focusing of the questions. This eliminates wasted effort. The developer of the concept can keep the relevant information mentally straight in his own head. He knows where the information belongs and how it affects the rest of the groups. He can also keep straight in his mind how the different elements of information relate to one another.

By considering the characteristics of operational art as three separate groups and then synthesizing them into one large group, an operational concept will emerge. This concept will address all the characteristics of operational art and answer the four requirements. The concept can then be further refined as new information becomes available. The concept is translated into tasks through the five paragraph order format to subordinates.

The proposed mental framework fills a serious gap in joint and U. S. army doctrine. Doctrine addresses what characteristics operational art should exhibit. It also list four requirements or questions that must be satisfied. It does not, however, provide any guidance on how to practice operational art. In other words it relies on the logic of the famous Supreme Court Justice, "I'll know it when I see it." Operational art will have the characteristics and answer the requirements. This is of little help in developing a concept for operational art.

The proposed mental framework solves this problem. It uses the characteristics to help develop a concept thereby ensuring their consideration. The result of the analysis and synthesis of the groups provides the answers to the four requirements. General

System Theory which is not addressed in doctrine is also integrated into the concept. Operational art cannot be practiced in the absence of general system theory. The mental framework ensures it integral role.

The mental framework will serve as an invaluable memory aid for the SAMS graduate and a guide for further education of the non-SAMS graduate. The SAMS graduate can use the mental framework to educate and train his battlestaff on operational art. Within a common frame of reference, the battlestaff will practice a higher level of operational art. The mental framework proposed in this monograph makes this possible.

Appendix A The Characteristics of Operational Art

The characteristics of operational art are found in Joint Publication 3.0 Doctrine for Joint Operations. They are the centers of gravity, decisive points, termination, simultaneity and depth, synergy, balance, forces and functions, leverage, anticipation, arranging operations, operational reach and approach, timing and tempo, culmination, lines of operation, and direct versus indirect approach. They will be discussed in a slightly different order than presented in Joint Publication 3.0.

In FM 100-5 *Operations*, 1993, these characteristics are referred to as elements of operational design and there are only eight listed.[30] When appropriate, they will be compared to the joint definition. The more important and controversial characteristics will be discussed first. It is upon these that the rest of the characteristics derive their relevance. These are centers of gravity, decisive points, and termination or endstate.

The most written about and controversial characteristic of operational art is centers of gravity. According to Joint Publication 3.0:

> "The essence of operational art lies in being able to mask effects against the enemy's sources of power in order to destroy or neutralize them. Centers of gravity are those characteristics, capabilities or locations from which a military force derives its freedom of action, physical strength or will to fight. "[31]

Each of the different services have slightly different definitions of what the center of gravity entails. The U.S. Army definition in FM 100-5 *Operations* is taken directly from Clausewitz's *On War.*

> "The center of gravity is the hub of all power and movement upon which everything depends. It is that characteristic, capability or location from which

enemy and friendly forces derived their freedom of action, physical strength, or will to fight. "[32]

The two differences between the joint and army definition are the single versus multiple centers of gravity and the addition of the word "Military" in front of forces. The selection of centers of gravity is the most difficult aspect of this concept. There are some individuals who feel that there is a center of gravity at the tactical, operational and strategic level. There is also a debate as to whether a new center of gravity will emerge if the original one is destroyed. Since this primer is designed to facilitate operational art, it will be assumed that there is at least one center of gravity at the operational level and there may be more than one. Since operational art deals with systems, it follows that if one center of gravity is destroyed, there is the possibility an another center of gravity emerging.[33]

Part of the problem with the concept center of gravity is that the author of the idea, Clausewitz, left contradictory messages in his book *On War*. He generally led one to believe that it was the place where the opponent's military mass was located. This is in keeping with the strategy of a single point and the battle of annihilation. He did not limit himself though and stated it could be alliances.[34] The concept cannot be understood strictly in the manner in which Clausewitz understood warfare. The meaning must be adapted to modern warfare. Where as Clausewitz was thinking in terms of a single decisive battle to destroy the hub of all power, operational art envisions a series of battles whose cumulative result and effect is to destroy the hub of all power-the system and its aim.

Since the center of gravity often becomes a target in some officer's minds, it is thought of in terms of attacking it by certain weapons systems. This reasoning leads to asking whether it is a weaknesses or vulnerability. The center of gravity is not necessarily a weakness or vulnerability. It is the hub of all power and will be protected. Even though it is the hub of all power, it may be vulnerable in respect to certain capabilities that overmatch the enemy's ability to protect it. It requires very detailed intelligence to determine the centers of gravity and how they derive their strength. The centers of gravity will often be difficult to detect. As mentioned earlier the centers of gravity may change as the operation progresses. This could be due to the friendly or enemy situation. An example could be the political will changing from a weakness to a strength.

The utility of the concept of centers of gravity is as a planning tool. It allows the identification of strengths and eventually weaknesses and the means to exploit these weaknesses and vulnerabilities to shock the system. Battles and campaigns may need to be designed to create vulnerabilities. It may be impractical to directly attack the center of gravity. They could be too well protected or out of reach militarily or politically.

As mentioned earlier, the most difficult aspect of centers of gravity is the process of identifying them. At the operational level, a good question to ask is "What is it that is preventing me from achieving my mission?" "What is the source of power which is blocking the mission?" This line of questioning is often useful in narrowing the focus. There is a tendency to start at the strategic level with ideas such as public opinion,

national willpower, or the army and never really narrow it to a usable concept. If the armed forces are given a mission, there is generally some obstacle in the form of an enemy or environmental event which must be dealt with for mission success. This obstacle, if it is in the form of an enemy, is a moving, thinking, adapted enemy. He is not going to let you just start chipping away at him until he crumbles. This is attrition warfare and will normally be unsuccessful.

After centers of gravity, decisive points are the next characteristic of operational art. Decisive points are sometimes confused with centers of gravity.

> "By correctly identifying and controlling decisive points, a commander can gain a marked advantage over the enemy and greatly influence the outcome of an action. Decisive points are usually geographic in nature, such as a constricted sea lane, a hill, a town, and air base. "[35]

The term decisive point first entered military usage in Jomini's *Summary of the Art of War.*

> " . . . Decisive strategic point should be given to all those capable of exercising a marked influence either upon the result of the campaign or upon a single enterprise . . . The decisive point of the battlefield is determined:
>
> 1. Features of the ground.
> 2. Relation of the local features to the ultimate Strategic aim.
> 3. Positions occupied by the respective forces. "[36]

As with Clausewitz, Jomini was thinking of a single decisive battle in the napoleonic fashion.

The U.S. Army definition in FM 100-5, 1993, is not much different.

> "Decisive points provide commanders with a marked advantage over the enemy and greatly influence the outcome of the action. Decisive points are often geographical in nature, such as a hill, a town, or a base of operation. "[37]

The manual goes on to state that decisive points are not to be confused with centers of gravity. They are keys to getting at the centers of gravity. These keys or decisive points allow a commander to gain leverage. In an offensive or defensive operation, a commander may gain leverage by separating the enemy's forces from his command and control, lines of communications or reinforcements.[38] The seizing or destruction of decisive points may prohibit the functioning of the enemy's system there by inducing shock upon it. Decisive points can be seized to prevent forces from cooperating or bringing combat power forward thus defeating the system's aim.

Decisive points are important in that they often become objectives. There will often be more decisive points than resources available. The decisive points will need to be prioritized in a manner to achieve the desired outcome. As warfare has evolved, decisive points have emerged into those that are not necessarily only geographic in nature. This is especially true in informational warfare.

One of the advantages of the single decisive battle was that you knew at the end who had won and who had lost. The end state was clearly defined. You beat the other guy and then dictated terms to him. This is usually not the case anymore. Total and unconditional surrender as practiced during World War II is simply not a viable solution anymore. This is where the characteristic of termination becomes important in operational art.

"Before forces are committed, the joint force commanders must know how the National Command Authority (NCA) intend to terminate the operation and ensure that it's outcomes endure, and then determine how to implement that strategic design at the operational level. " [39]

Commanders must end operations on terms favorable to the United States. These terms are referred to as the end state.

"The term and state simply represents the set of conditions necessary to resolve the crisis and transition from predominate use of the military instrument of national power to other instruments. "[40]

Defining the endstates is critical to designing a campaign plan. Military leaders should provide input to the NCA on when to end combat operations. It should also be realized that conditions of the endstate might change as the operation progresses. Other possible endstates must be considered in the planning process. The endstate may not be clear as the operation begins. This is to be regarded as normal. Assumptions will have to be made to continue planning and operations.

The next characteristic is simultaneity and depth. The idea of simultaneity and depth in the area of operations in warfare appeared due to the advent of new technologies. Technologies such as the radio, telegraph, trains and gas turbine engine allowed operations to take place throughout the depth of the battlefield. Some technologies provided the mobility and others provided the command-and-control. This allowed the battlefield to enlarge. It became difficult to force a decision at a single point since forces were arranged throughout the depth of the battlefield.

"The intent of simultaneity and depth is to bring force to bear on the opponent's entire structure in a near simultaneous manner that is within the decision-making

cycle of the opponent. The goal is to overwhelm and cripple enemy capabilities enemy will to resist."[41]

It is necessary to attack throughout the depth of the area of operation to affect all the enemy's systems. To produce the shock, this must be done simultaneously. Otherwise he will merely be reacting to a series of attacks and adapt individually to them. The battlefield must be in a single framework. It cannot be divided arbitrarily into segments. All the segments are interrelated. Effects need to be cumulative.

While simultaneity is time related, depth should not be thought of only as space related. Depth has an element of time ingrained in it. This is especially true in Military Operations other than War (MOOTW). In information operations, shaping enemy perceptions or public opinion requires time in order to achieve the effects required at the decisive point. One of the ways to attack throughout the depth of operations simultaneously is through the use of synergy.

Synergy involves integrating and synchronizing operations in a manner that applies force from different dimensions to shock, disrupt and defeat opponents.[42] Air, land, sea, space, special operations and information warfare forces are used to attack the enemy system. They are not individually used against separate parts of the enemy system, but in combination to overwhelm the system's ability to react. In operational art, it is counterproductive to break up the area of operations, and assign a piece to each capability. This must be avoided otherwise minimal synergy will be achieved. The enemy system will be able to adapt to that one threat and continue functioning.

Synergy is also necessary to protect U.S. Forces. This synergy can protect our center of gravity and reduce vulnerabilities. Synergy can be achieved through the use of balance, the next characteristic of operational art.

> "Balance is the maintenance of the force, its capabilities, and its operations in such a manner as to contribute to freedom of action and responsiveness. Balance refers to the appropriate mix of forces and capabilities within the joint force as well as the nature and timing of operations conducted to disrupt an enemy's balance. "[43]

Each force must have the capability to act with synergy. This entails having all the capabilities necessary to react to the enemy and to be able to force the enemy to react. This does not imply that all forces should have equal capabilities. It does imply that no force should be left defenseless against an enemy capability or not have the capability to affect the enemy's systems.

This concept can be demonstrated by the development of the corps in the later Napoleonic wars and the American Civil war. Armies used to move as a mass of infantry, artillery and cavalry. They were organized as divisions or brigades and then formed into an army. Infantry and cavalry often fought battles individually augmented by interspersed artillery. These masses were too large to control easily. The development of the corps system combined infantry divisions and cavalry units together with centrally controlled artillery. This led to smaller, more maneuverable and easily controlled units that could mass effects versus soldiers on the decisive point and were not as easily destroyed as a single division might be. They could even fight independently for periods of time. They had the capability to attack and defend themselves.

A joint task force should maintain the same capability. The development of command-and-control relationships is essential to maintaining this capability. It must be responsive and not rely solely on the technological capabilities for speed. The command relationship must be clear and responsive to take advantage of the enemy vulnerabilities. The balance in operational art is often dependent on the forces and function that will be attacked.

"Commanders and planners can design campaigns and operations that focus on defeating enemy forces or functions, or a combination of both. "[44] The destruction of forces and core functions is designed to shock the enemy system. This concept is similar to the idea of terrain or enemy oriented operations familiar at the tactical level. These targets must be carefully selected to produce the desired effect and not merely selected on their ease of attack. If this is improperly done, valuable resources can be wasted. The temptation to attack just because it is possible must be avoided. This can lead to premature culmination. Culmination will be discussed later in the chapter. It is through the use of synergy against the forces and functions that the commander attempts to gain one form of leverage. Leverage is the next characteristic discussed.

> "Leverage is gaining, maintaining, exploiting advantages in a combat power across all dimensions among the forces available to JFCs is the centerpiece of joint operational art. "[45]

Leverage among friendly forces is either supported or supporting. The support relationships are means of weighing or allocating resources to a main effort or ensuring

unity of effort. Each different component may be supporting or supported at the same time to achieve a desired effect at the same time.

Leverage is also used against the enemy. Commanders array their strengths against the enemy weaknesses. At the same time, a commander must use his strengths to guard against the enemy's attacks against his vulnerabilities. To use leverage, commanders must anticipate where the enemy's or his vulnerabilities will exist. At the operational level, actions take time to develop. Forces and capabilities must be positioned to exploit the windows of opportunity. This is why anticipation is an essential characteristic of operational art.

> "Anticipation is the key to effective planning. Joint force commanders should remain alert for the unexpected and for opportunities to exploit the situation. "[46]

Two of the important elements of anticipation are situational awareness and intelligence preparation of the battlefield (IPB). Commanders must know the capabilities of their forces in relation to the enemy in the future. Anticipation involves risk because there is an element of uncertainty in predicting the future. This is the risk mentioned in the fourth requirement of operational art listed in chapter two. A sequence of actions is required to exploit a future vulnerability. If the future vulnerability does not appear, can the forces or capabilities be reoriented to deal with another vulnerability? This is where the risk is involved. Forces must be committed before the situation is clear if they are to be in the right place at the right time.

To insure forces and capabilities are at the right place at the right time, major operations must be arranged.

> "This arrangement of operations will often be a combination of simultaneous and sequential operations to achieve the desired endstate conditions quickly and at the least cost and personnel and other resources. "[47]

The operations must be arranged with branches and sequels to deal with planning assumptions that also may come true. These situations must be anticipated for a plan to be successfully developed. These situations or conditions were just not the most likely. The planning for branches and sequels is no different at the operational level than it is at the tactical level.

As one author has written, "The hallmark of operational art is the integration of temporally and spatially distributed operations into one coherent whole. "[48] As can be expected, this is easier said than done. There are numerous factors which must be considered. Some are listed below:

1. Geography of the operational area
2. Available strategic lift
3. Changes in command structure
4. Logistic buildup and consumption rates
5. Enemy reinforcements capabilities
6. Public opinion[49]

Phasing decisions are the result of arranging operations. These phases will often overlap and can be sequential or concurrent. Logistics is often the most critical factor in

arranging operations. In some respects, the operations campaign is designed around the logistic plan at the operational level. The logistic capabilities decide the realm of the possible. This is easy to imagine when the factors of sealift and airlift are considered in a force projection force such as the U.S. Army.

The arrangement of operations has a direct effect on timing and tempo. Ideally, commanders want to maintain a tempo that is beyond the enemy's ability to react. The commander wants to act faster than the enemy can react. This helps induce shock to the enemy situation. Operations may need to be arranged at a reduced tempo to allow force buildup or reconstitution. As mentioned earlier, the timeframe or timeline on which an operation is conducted is critical. It must be synchronized to achieve the proper effect. How long the effect lasts is a critical component. Timing and tempo are indispensable characteristics of operational art.

> "Operational reach is the distance over which military power can be concentrated and employed decisively. Operational approach may be defined as the lines of operation."[50]

One of the last characteristics deals with the physical realities of man, machine and terrain or space. There are limits to the employment of man and machine in relation to terrain. Tanks can only drive so far before refueling, airplanes need bases to fly out of, ships need water to sail on and man can only walked so fast over types of terrain. Terrain also includes space which has its own physical peculiarities. This is one of the science pieces of operational art. Operational reach can often be calculated mathematically. Man and machines need bases from which to operate. There is no system which does not

need to be resupplied sometime. These basing considerations determine lines of operations.

> "Lines of operation determine the directional orientation of the force in time and space in relation to the enemy and connect the force with its base of operations and its objectives. "[51]

A commander should choose a base of operations that allows multiple lines of operation to the objective. This prevents the enemy from blocking only one line of operation and preserves flexibility for the commander. If the final objective is beyond his operational reach, the commander needs to choose lines of operation that allow him to secure additional bases. Operational reach is not defined solely by air power which has great range. All aspects of military power are considered so that they can be employed in a synergistic manner.

A characteristic closely related to operational reach and tempo is culmination. Culmination applies to the offense and the defense. Culmination in the offense occurs when the attacker's combat power no longer exceeds the defender and the attacker can no longer continue the attack.[52] The attacker must maintain a tempo that does not cause him to culminate before the endstate is reached. There is a material aspect as well as moral aspect to culmination. The human and machine factors must be considered. In the defense, a defender culminates when he can no longer successfully defend or counterattack.[53]

The arranging of operations and the selection of lines of operation and bases can delay culmination until after the campaign is completed. Operational pauses may be

needed for man and machine. Culmination should never be reached before the completion of the campaign. If it is, the initiative may pass to the enemy.

The last characteristic of operational art is probably the easiest one understand. It is the idea of the direct versus indirect approach. The direct approach implies a friendly force strength against an enemy force strength. This would logically follow if the idea were a battle of annihilation. The winner would have defeated the best the enemy could offer and then could impose his will.

The idea of the indirect approach was championed by Liddell Hart between the world wars in response to the trench warfare of World War I. He espoused attacking an enemy's strength indirectly by attacking his lines of communications and supplies thereby weakening the enemy's strength. He also saw being in the enemy's rear as attacking the enemy in the moral and cybernetic domain.[54] This was seen as being more effective than attacking strength to strength. The indirect approach simply attacks the enemy where he is vulnerable.[55]

ENDNOTES

[1] Field Manual 100-5, *Operations*. (Washington, D.C. Headquarters, Department of the Army, June 1993), v. "Since battle is translated into strategic objectives by operational art, a major portion of the manual address the operational level of war."

[2] Joint Publication 3.0 *Doctrine for Joint Operations*, (Washington, D.C.: The Joint Chief of Staff, 1 February 1995) and Field Manual 100-5, *Operations*. (Washington, D.C. Headquarters, Department of the Army, June 1993) 6-7 – 6-9.

[3] John A. Warden, "The Enemy as a System" *Airpower Journal*, (Spring 1995) Col. Warden's Five Theory Ring Theory is probably the worst of the popular theories. Its simplicity disguises the many gaps in his logic. He dismisses the moral element of war completely "Conversely, the morale side-the human side-is beyond the realm of the predictable in a particular situation because humans are so different from each other. Our war efforts, therefore should be directed primarily at the physical side." (p.43). This theory states that culmination is no longer a factor because of parallel warfare (p. 54). The five rings theory is a return to attrition oriented warfare (p. 43) and identifies centers of gravity as vulnerabilities. "Every state and every military organization will have a unique set of centers of gravity-or vulnerabilities." (p. 49) His definition of a system is not the same as Bertanffly's. He states that the center or leadership is always the most important target at the operational level. (p. 53) Warden's theory is a return to attrition oriented warfare that favors the use of airpower and increased lethality in munitions. It is not in concert with Joint or US Army doctrine.

[4] The domains of combat were best summarized in the June 1, 1998 draft of FM 100-5, *Operations*. They are also covered in J.F.C. Fuller's , *The Foundations of the Science of War*, (London: Hutchinson Co., 1928.)

[5] Warden's rings is one of the most obvious examples. Although it proposes to help identify centers of gravity, they are always the same. The key circle is leadership. This leads to an airpower attrition oriented warfare solution.

[6] William Mendel and Floyd T. Banks, Jr. *Campaign Planning*, (Strategic Studies Institute: US Army War College, 4 January 1988) 101.

[7] Ibid.

[8] Joint Publication 3.0 *Doctrine for Joint Operations*, (Washington, D.C.: The Joint Chief of Staff, 28 January 1999 (Revision Author's Draft))III-4

[9] Schneider, James J., "The Loose Marble—and the Origins of Operational Art," *Parameters* (March 1989) 86.

[10] Ibid., 87.

[11] A.A. Svechin, *Strategy*, (Minneapolis: East View Press, 1992) 69.

[12] A.A. Svechin, *Strategy*, (Minneapolis: East View Press, 1992) and V.K. Trindafillov, *The Nature of the Operations of Modern Armies*, (London: Frank Cass, 1994)

[13] Carl von Clausewitz, *On War* (Princeton, New Jersey: Princeton University Press, 1984) 526.

[14] Antoine Henri de Jomini *The Art of War*, (London: Greenhill Books, 1992) 69 "Strategy is the art of making war upon the map, and comprehends the whole theater of operations. Grand Tactics is the art of posting troops upon the battlefield according to accidents of the ground, of bringing them into action, and the art of fighting upon the ground, in contradistinction to planning upon a map."

[15] FM 100-5 *Operations*, 1-3

[16] Mendel, William, "Operational Logic: Selecting the Center of Gravity," *Military Review* (June 1993) 6.

[17] Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory*, (London: Frank Cass, 1997) 3

[18] Naveh, 9 and Joint Publication 3.0 *Doctrine for Joint Operations*, II-2

[19] Ludwig von Bertalanffy, General System Theory. (New York: George Braziller, 1968) It is beyond the scope of this paper to fully describe general system theory. Bertalanffy's book is a good place to start to understand general system theory. Shimon Naveh relied heavily on it in his excellent work on operational theory.

[20] Bertalanffy, xix

[21] Bertalanffy, xx.

[22] Naveh, 16.

[23] Naveh, 17.

[24] Joint Publication 3.0 *Doctrine for Joint Operations*, II-2

[25] Joint Publication 3.0 *Doctrine for Joint Operations*, III-7 (draft)

[26] Ibid., III-10

[27] Ibid., III-11

[28] Joint Publication 3.0 *Doctrine for Joint Operations*, II-2.

[29] Ibid. III-11

[30] FM 100-5, 6-7.

The elements of operational design listed in FM 100-5, Operations, 1993 are as follows: Center of Gravity, Lines of Operation, Decisive Points and Culmination. Sequencing operations and tempo are discussed separately from elements of operational design.

[31] Joint Publication 3.0 *Doctrine for Joint Operations*, III-20

[32] FM 100-5, 6-7.

[33] William Mendel and Lamar Tooke, "Operational Logic: Selecting the Center of Gravity," *Military Review* (June 1993) 4

[34] Clausewitz. 596

[35] Joint Publication 3.0 *Doctrine for Joint Operations*, III-21

[36],Antoine Henri de Jomini, *The Art of War*, (London: Greenhill Books, 1992) 86-88.

[37] FM 100-5 *Operations*, 6-7.

[38] Mendel, *Campaign Planning*, 100.

[39] Joint Publication 3.0 *Doctrine for Joint Operations*, III-22

[40] Joint Publication 3.0 *Doctrine for Joint Operations*, III-2

[41] Ibid., III-11

[42] Ibid.

[43] Ibid., III-13

[44] Ibid., III-17

[45] Ibid., III-14

[46] Ibid., III-12

[47] Ibid., III-17

[48] Schneider, James J., "The Loose Marble—and the Origins of Operational Art," 87.

[49] Joint Publication 3.0 Doctrine for Joint Operations, III-17

[50] Ibid., III-16

[51] Ibid., III-17 Lines of operation were first brought into military usage by Jomini. "The selection of this base and the proposed aim will determine the zone of operations. The general will take a first objective: he will select the line of operations leading to this point, either as a temporary or permanent line, giving it the most advantageous direction; namely that which promises the greatest number of favorable opportunities with the least danger." (Jomini, *The Art of War*, 66)

[52] Ibid., III-22

[53] FM 100-5, *Operations*, 6-8.

[54] Anton Massinon, "Course of Action Development in Support of Campaign Planning" SAMS Monograph, May 1994. p. 34.

[55] Joint Publication 3.0 *Doctrine for Joint Operations*, III-21.

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