Analyzing The Tactical Risk Decision: Does The Commander Need Help With Versatility?

A Monograph
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First Term AY93-94

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	17 DEC 93	Monograph

4. TITLE AND SUBTITLE
Analyzing the tactical risk decision: Does the commander need help with versatility?

5. FUNDING NUMBERS

6. AUTHOR(S)
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
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com (913) 684-3437 DSN 552-3437

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*
See Attached

14. SUBJECT TERMS
Risk, Versatility, Decision Support, Intuition, Risk Analysis, Decision Making, Commander's Intent

15. NUMBER OF PAGES
57 Pages

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

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This monograph proposes an answer to the question: Can the current tactical mission risk analysis process adequately support the doctrinal tenet of versatility? The conclusion is that true versatility in unfamiliar operations may require a more structured approach, or possibly decision aids for commanders to analyze effectively and then monitor course of action risk factors.

Doctrine holds the tactical commander solely responsible for analyzing and weighing risk when he selects his course of action in the military decision-making process. In both theory and doctrine, this cost-benefit analysis is purely a reflection of the commander's personal preparation, experience, and competence. Hence, his intuitive judgement of risk is rarely structured or adequately explained to his subordinates. This process is highly vulnerable to the loss of the commander and, in an era of new and challenging military environments, is highly dependent on the relevance of the commander's experience.

This monograph investigates the component of risk analysis in the art of tactical command as discussed by theoretical works and current/emerging doctrine. After establishing the theoretical and doctrinal foundation, the analysis explores the adequacy of the current process in the new era of versatile operations. Issues include distinguishing between the calculated risk and a gamble, the impact of rules of engagement (ROE), and the potential conflict between tactical and operational/strategic objectives. Finally, the monograph proposes a structured approach for risk analysis as part of the commander's estimate.

Ultimately, the subjective judgement of risk is purely in the art of command. However, the commander's perception of key risks to mission accomplishment and his force is integral to his intent. Inevitably, his method to achieve the mission's purpose and endstate must contend with identified risks. Particularly in operations other than war (OOTW), he must identify unfamiliar risks and communicate his vision to subordinates to achieve versatility.

SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

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Title of Monograph: ANALYZING THE TACTICAL RISK DECISION: DOES THE COMMANDER NEED HELP WITH VERSATILITY?

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Accepted this 17th day of December 1993

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"Decision as to a specific course of action is the responsibility of the commander alone. While he may accept advice and suggestions from any of his subordinates, he alone is responsible for what his unit does or fails to do . . . Commanders do not justify their decisions to subordinates, nor do they seek the approval of subordinates for their actions."[1]

I. INTRODUCTION

Doctrine holds the tactical commander solely responsible for analyzing and weighing risk when he selects his course of action (COA) in the military decision-making process. Traditionally, this cost-benefit analysis is purely a subjective reflection of the commander's personal preparation, experience, and competence. Similarly, in his *Nachricht* to On War, Clausewitz claims that history's great captains relied on their intuition and subjective "feel" of the situation in war.[2] Presumably even a great tactical leader's intuitive judgement of risk is rarely structured or adequately explained to his subordinates. This process is highly vulnerable to the loss of the commander and, in an era of new and challenging military environments, is highly dependent on the relevance of the commander's experience. The true *versatility* to conduct unfamiliar operations may require a more structured understanding of the risk environment for commanders to analyze effectively and then contend with course of action risk factors.[3]

In evaluating the relative risk of alternative courses of action (COAs) the commander weighs what he thinks he knows against what is uncertain, accounts for friction in execution, and finally makes an estimate of the enemy's probable action or response. His decision will establish the initial conditions for the

upcoming battle and will most certainly constrain in some ways his ability to respond to subsequent events. This commitment to a course of action also sets in motion a sequence of lesser decisions (or decision points) that will allow him to synchronize and mass his resources against the enemy in depth.

Although this command obligation has long been reflected in both theory and doctrine, little concrete guidance is available to assist the individual leader with his risk analysis. Current doctrine assigns this primary risk analysis to the "art of command" and reinforces the intuitive nature of risk decisions.[4] One finds little emphasis on sharing this analysis with staff and subordinates, while finding much emphasis on the importance of primary experience in training and combat. Will this apply when future operations trend towards versatility and unconventional scenarios? Perhaps the recent Army-wide increase in attention to risk analysis, risk assessment, and risk management suggests much can be gained by a better understanding of risk decisions.[5]

The focus of this monograph is the commander's primary course of action decision in the tactical decision making process and its attendant risk analysis. The commander decides where to concentrate force and thus where to accept risk in his area of operations. He then identifies subsequent decision points that allow him to modify his dispositions and exercise initiative as branches and sequels develop. Beginning with the first, each decision should maximize the effectiveness of the concept and reduce the risk of enemy effectiveness. These risk decisions are

central to the success or failure of the commander's intent, and, thus, are of primary importance.

A related, but less critical area associated with this subject is that of risk assessment and risk management. This normally addresses force protection, accident prevention, and the anticipation of training or combat hazards. This emphasis on reducing preventable injuries due to extraneous effects such as accidents, fatigue, fratricide, or these and other environmental factors is rarely mission critical. However, *protection* is a dynamic of combat power in doctrine and clearly a commander's obligation in the moral domain of battle. It is even conceivable in an era of increasing intolerance of casualties that the commander would have to weigh the operational/strategic significance of preventable casualties in his COA selection. Examples of tactical risk decisions resulting in operationally significant casualties might include the 1983 Marine bombing incident in Lebanon and the ill-fated raid against a primary warlord in Somalia in October of 1993.

Associated with emerging doctrine is the idea that tactical commanders will no longer expect to "fight outnumbered and win" in the post-Cold War environment. In the high intensity European scenario, the tactical commander could expect to make decisions that involved extremely high battlefield risks with which he would be intimately familiar. Under such conditions, the consequences of a bad risk decision would be dramatic with immediate local battlefield indicators of success or failure. With the rise of versatile operations and those other than war come more subtle risks. The

commander may make the appropriate battlefield decisions that generate tactical success, while misunderstanding the larger operational/strategic risks and consequences. Each scenario will differ in scope and character from the next, making a grasp of the tactical nuances crucial. This may remain one of the most difficult challenges for tactical and operational commanders during the next decade.

As with any timely innovation, improving the effectiveness of the tactical decisions through a better understanding of risk can provide a critical advantage. In war, defeating the enemy's decision cycle itself can be decisive. Change is warranted whenever improvements are clearly possible and practical.[5] Military leaders must aggressively test the conventions in pursuit of improved efficiency. Effective risk decisions are central to warfighting and improving the decision making process must not be learned from the competition.

> "Probability, and its cousin uncertainty, are the heart and soul of understanding risk."[6]

II. THEORETICAL FOUNDATION

This section is a review of the role of risk analysis in the art of command. The focus is how primary military writers and theorists (predominately Clausewitz) charge commanders to deal with major risk-related concepts. These factors are arrayed across the physical, cybernetic, and moral domains of war and consist of friction and fog, chance and probability, uncertainty, and the art of command in war.

In the physical domain the commander must concentrate his forces in space and time to overwhelm the enemy's physical capabilities at a decisive point in relation to his tactical center of gravity.[8] The effects of friction and fog in battle may be reduced in both the physical and cybernetic domains by technological capability, organization, training, and, most importantly, command and control. Battle command in the cybernetic domain will also have to cope with uncertainty stemming from willful opposition of a thinking enemy. In the moral domain the commander must attack the will which animates the enemy's physical center of gravity.[9] This will is embodied in the skill and determination of the enemy commander.

Friction

The friction of war introduced by Clausewitz consists of the many unforeseeable failures in execution that degrade performance in war. The elements of danger and extreme physical exertion in war aggravate the situation and amplify the consequences of these failures.[10] Intelligence failures often prevent the commander from "seeing" friction as it occurs and thus limit his ability to counteract it with timely decisions. This results in a "fog of war" where reports are lost, exaggerated, received out of sequence, and often outright false.[11] The enemy is acting, subordinates are reacting, friction is occurring, and the commander only captures glimpses of the actual situation. His experience must give him the ability to visualize the situation based on a few facts and the calm to act appropriately.[12]

As with machinery, friction acts only to retard performance, degrade combat power, and limit possibilities. A tactical organization can mitigate and compensate for friction, but not eliminate it. Reduction comes primarily from realistic training (or combat experience), proper integration of organization with equipment, and effective command and control. In any event, the commander must understand and account for friction in his risk analysis. Clausewitz is emphatic that the commander must have combat experience to appreciate friction and contend with the "fog" that often surrounds it.[13] He even recommends recruiting foreign officers experienced in foreign wars to provide the experience a commander lacks.[14] This highlights the value of human intelligence and local tactics associated with specific regions.

Friction is most pronounced in actual contact with the enemy. Here danger and the fear it engenders greatly amplify any unit's propensity for failures, breakdowns, and losses. Simpkin reminds us many theorists such as Jomini, Mahan, and Liddell Hart have stressed that the hazards of difficult terrain are far preferable to the hazards of combat.[15] On the other hand, a deliberately indirect approach increases complexity and friction in proportion to the greater requirement for maneuver.[16] This clearly has course of action implications for the commander.

Chance and Probability

The element of chance and probability in war is central to the art of risk analysis. As opposed to friction, chance on the battlefield will offer as many opportunities as setbacks. These

opportunities, often unforeseen, and the ability to exploit them have been the foundation of success for many great captains. Clausewitz calls chance and probability the realm "within which the creative spirit is free to roam . . ." and concerns mainly the courage and talent of the commander. Further, ". . . the scope which the play of courage and talent will enjoy in the realm of probability and chance depends on the particular character of the command and the Army."[17]

Accurately determining the level of risk in organizational decision making is a function of weighing event probabilities and associated consequences.[18] An event may be improbable, but have such adverse consequences that it takes priority over a more probable lesser threat and drives the COA risk decision. Also, familiar threats, although substantial, may seem more manageable than unfamiliar threats. This is normally a measure of confidence in dealing with these risks based on appropriate training, experience, and tools. At the lower end of the spectrum, highly likely, but less consequential threats begin to merge with predictable sources of friction and reflect relative mission difficulty. Ultimately, the commander contends with as many significant risks as he can identify to maximize his responsiveness and account for friction.

Risk of adverse consequences stems primarily from incomplete information about the environment, actors, and events that will influence the decision. Assuming a tactical force has sufficient combat power, all it requires is application at the right time

and place. Theoretically with perfect information (all probabilities for events and reactions equal one; P=1.0), a "least-risk" decision will result. Even with perfect knowledge, there will be no "risk-free" options (free of costs or losses), because in war even the "do nothing" option can entail unacceptable risks. Once the "fog of war" settles in absolute levels of risk for a COA become impossible to measure, and even relative risk is equivocal. As decisions increase in scope and complexity, the consequences of bad decisions can increase proportionally. At the same time, the number of random variables and independent interests involved can make calculating probabilities extremely difficult. These characteristics raise the importance of distinguishing between the highest- and least-risk options in any organization to an art.

This analysis concerns risk in military decision making; thus it will continue in the context of tactical course of action decisions. Specifically, risk is the likelihood that the commander's expected outcome does not occur and adverse consequences result. If he disposes his forces because he expects the enemy to act in one fashion with 60 percent assurance, he perceives a 40 percent risk of being wrong and having a suboptimal disposition. the vast majority of the time, the probability he assigns to certain events will be a subjective probability and not one based on an accurate analytical or statistical profile.[19] Thus, the probability of his expected outcome (and, hence, his risk) may be significantly higher or lower than he perceives. To adjust for the risk of inaccuracy, he might discount his subjective probabilities by

another five or ten percent to appreciate the potential worst case.

Whether the friendly means are fully adequate to achieve the commander's ends will have significant bearing on risk. However, the adequacy of means to ends is only fully known in retrospect and sometimes not even then. A force advantage that completely eradicates risk is virtually unheard of as the American experience in Vietnam and other operations reflects.

The commander is also likely to link events in a series of conditional probabilities.[20] Here, the probability assigned to an event is dependent on another event having taken place (e.g. if the enemy goes to the right--P_{right}=1.0--then there is an 80 percent chance he will attack with two battalions forward). The unfortunate tendency with conditional probabilities is to link several events that are not certain and still consider the final event probability in isolation. This pitfall has been called "compounding guesswork."[21] Before the fact, the probability of the enemy actually attacking on the right, or doing anything else, is not assured. Thus, probabilities based on that condition are questionable.

Extending the example, a commander may be working with the following strong (but subjective) probabilities: a 90 percent chance the enemy will attack; an 80 percent chance if he attacks he will attack at dawn; an 85 percent chance he will attack on the right; an 80 percent chance he will attack with two battalions in his first echelon; a 75 percent chance he will not use chemical warfare. Based on his subjective assessment of the probabilities,

the commander may well select an optimal course of action to stop a conventional daylight attack on the right with two battalions in the first echelon. Intuitively, the commander thinks this enemy course of action is highly probable, but even if his probabilities are accurate (and none are strictly conditional), the likelihood of this precise scenario is only 37 percent (P_b=.9 x .8 x .85 x .8 x .75= .3672).[22] Conversely, there is a 63 percent risk that the enemy's actual attack will vary from the projected course to some greater or lesser degree. If he discounts his assessments even five percent as a hedge, the combined probability becomes 27 percent with a risk of 73 percent.

Although no commander would conduct such an arbitrary mathematical exercise, it illustrates the misleading aspect of probabilities. At the outset of battle the commander has a specific picture of what the enemy attack will look like in the first few hours of combat based on a series of guesses. Even if the enemy generally conforms to the expectation, there is a high likelihood of small variation in the time, formation, or character of the attack from the predicted events. This will require a degree of flexibility in the plan to accommodate these highly probable differences. By the conclusion of the first day's engagement, events will have very likely strayed significantly from the situation template. This will make the previous day's predictions only marginally useful. Precisely predicting subsequent events based on confidence in initial events is tempting, but the sum of small differences in initial conditions often leads to wide variation in sequels.

Clausewitz shunned a purely mathematical approach and likened the risk in war to a game of cards.[23] This analogy is apt in that it combines the willful opposition, deceptive demeanor, and the all important "luck of the draw." Consistent with this analogy, the example above suggests that decision makers can be most reliant on intuitive assessments about events in the near term with fewer variables to cause deviation from the prediction. The commander should give much higher weight to probabilities and risks of the first several moves of an engagement and plan for maximum flexibility in subsequent phases. In his course of action decision he can set the initial conditions to his best advantage and then understand in detail the myriad opportunities that might present themselves. Napoleon exhorted the commander to master to possibilities then "Engage the enemy, and see what happens."[24] In the previous example, this might translate to planning and briefing multiple general contingencies, rather than one very specific reaction to a detailed enemy COA projection.

Uncertainty

Uncertainty in risk analysis stems primarily from the hostile environment inherent in warfare. Beyond the statistical uncertainty of random factors such as terrain and weather, the commander must face the willful opposition of the enemy commander. This "strategic uncertainty"[25] will clearly be the most challenging component of the commander's enemy estimate. One must assume the opponent will engage in deception, subterfuge, and diversion and go to great lengths to prevent the commander from making

his risk decisions confidently and correctly. He will try to deny the commander information and interfere with his execution, thereby expanding the fog of war and increasing the friction to be overcome.

Clausewitz proposed that nation-states pursue political objects through war, but that these change, being "influenced by events and their probable consequences."[26] The same is true of tactical objectives and tactical events. Initial events change the way subsequent events unfold and invalidate original appraisals, reflecting the nonlinear, unpredictable nature of war at each level. This fluidity can cause major components in commander's initial estimate such as key terrain and the desired endstate to be very different by the battle's conclusion.

Commanders make their assessments before the battle, but then take actions that immediately distort the reality of that assessment (e.g. a terrain feature is made decisive by an important asset positioned there; the unit reinforces terrain with obstacles which alter its military (OCOKA) significance; air interdiction renders a major enemy alternative infeasible).[27] Reflecting Heisenberg's Uncertainty Principle, even the effort to gain information in support of an assessment can change the environment and thus undermine the assessment's accuracy. For example, Van Creveld suggests staff officers acting as the commander's "directed telescope" can intimidate or infuse caution in the units they visit and observe.[28] Friendly reconnaissance efforts, if acquired, can cause the enemy to change his disposition.

Thus, prior to the engagement each commander acts to set the initial conditions to his advantage. Acting at cross purposes with only partial knowledge of the enemy's accomplishments, the uncertainty may be at its height immediately prior to and during first contact. Rommel asserted that neither commander's plan will actually prevail as envisioned, with the rare exceptions of overwhelming material advantage or complete incompetence on one side.[29] Thus, flexibility in planning becomes critical, as well as the need to create a situation the opponent cannot accommodate (i.e. surprise).

Potentially, the optimum initial condition obtains when the friendly commander is able to foster a high degree of false certainty in his opponent. This will cause the enemy to decide upon and confidently execute a flawed course of action. This is, of course, the height of surprise and the goal of any deception story. The commander must reduce the enemy's ability or inclination to force an unfavorable branch and thereby gain the initiative. If he remains alert and manipulates his opposite number effectively, he can dramatically increase the depth of enemy uncertainty.[30]

"war is nothing more than a duel on a larger scale."[31]

The Art of the Commander

This familiar passage from On War underscores the personal nature of the contest between opposing commanders. The commander alone is responsible for defeating his foe in the moral

domain of battle by superior judgement and cunning. Clausewitz also wrote that "Art is a developed capacity. . . to create. . . " by combining purpose and means. He further stated theory can teach this combination of purpose and means, but that ultimately talent and practice are required.[32]

This implies both a leadership (purpose) and a technical (means) dimension to the commanders role. In terms of leadership, Clausewitz suggests that, in particular, courage and self-confidence are the "finest and least dispensable of military virtues" and essential to counterbalance uncertainty.[33] He also makes a fine distinction between courage and daring, the former operating in the element of danger, and the latter operating in the element of chance.[34] However, he later links courage to resolve, calling it "the sense of one's own strength, . . . the principle factor that influences judgement . . . [and] the lens . . . through which impressions pass to the brain."[35]

This "courage and confidence" constitute the willpower of the commander and fuel what has variously been called the commanders' *coup d' oeil*, "inner light," insight, or intuition. It is probably nothing more than the commander's innate competence, developed over the span of his military experience. Napoleon himself valued personal preparation over inspiration and dismissed hails of genius, saying instead:

> . . . before entering on an undertaking, I have meditated for long and have foreseen what may occur. It is not genius which reveals to me suddenly and secretly what I should do in circumstances unexpected by others; it is thought and meditation.[36]

In essence, he did not just foresee the branch that occurred (genius), but prepared himself for many possibilities (competence). Once the engagement is joined, the commander must focus on relevant intelligence and, like Napoleon, ". . . see only . . . the enemy's main body . . . [and] try to crush it, confident that secondary matters will settle themselves."[37] In describing generalship, J.F.C Fuller said the key is to be original and do the unexpected to your enemy to "surprise him and disarm him morally."[38] The commander must possess the ability to discern what is necessary and the courage to execute his decision with speed, determination and, occasionally, abandon.[39]

In terms of technical capability, Van Creveld concluded that as the technology of war evolves so must the art of command.[40] The commander must exploit systems that improve the speed and accuracy of his decision making as an important combat multiplier. This is clearly where he defeats the person of the enemy commander. Rommel felt the psychological reactions of the enemy commander were key, and the friendly leader must strive to know the stresses of that commander's environment.[41] Clearly a commander must remain constantly aware of his shortcomings as a human and those based on his particular personality. Dixon portrayed risk taking more in the emotional province than the intellectual, thereby challenging commanders to understand their own psychology. He identified many psychological traits characteristic of military incompetence and, unfortunately, as states of mind these tendencies potentially threaten any important risk

decision. Inferring from Dixon's findings, the conscientious commander should protect against being defensive, and not allow dissenting opinion to threaten him. Those commander's most sensitive to failure normally make the worst risk decisions. Also, commanders can rigidly make decisions to be consistent with their own self image or conceits (e.g. in the extreme, the self-styled "bold and daring" commander will make decisions in character and be virtually incapable of a prudent withdrawal; the overly "prudent and judicious" leader may be similarly resistant to a necessary bold and spontaneous action).[42]

Other weaknesses Dixon identified include the impact of leader stress caused by uncertainty and the dysfunctional tendency of successful leaders to consider the impact of a decision on their own persona first and the needs of the unit only secondarily.[43] For many leaders excessive fear of personal failure increases after middle age, stifling risk taking. Either the person takes very small risks or such enormous ones, failure will be seen as beyond his control.[44] Another powerful tendency is once the decision is made the leader's psychology changes and objectivity decreases as resources are committed towards one version of future events. Partiality and bias towards the accepted course of action distort intelligence from that point forward.[45] Here, too much of Clausewitz' all important "courage and self confidence" may lead to obstinacy and undermine openmindedness.[46]

Finally, in addition to his own tendencies, the commander must understand the main limitations of human cognition adversely

impacting on decision making. Humans do not deal effectively with a broad base of alternatives in decision making. By typically limiting course of action analysis to three or fewer options, there is a major risk of not considering important possibilities. Alternatives considered under time pressure are often the most conspicuous or conventional (and the most likely from the enemy standpoint). Imaginative or innovative alternatives requiring more time to develop are overlooked. In assessing the environment, humans have better access to older reinforced knowledge (on such topics as enemy doctrine) than newer, situational information. Thus, as enemy tactics change or fail to reflect expectations, leaders will be slow to understand the implications. Judging a new threat against the old Soviet-based paradigm would present an example of this particular danger. Additionally, although situational awareness is key to flexibility during an engagement, humans tend to weigh information according to the sequence in which they receive it (new information has more weight) and not according to its intrinsic relevance or verity.[47]

In making a decision the commander initiates two important mechanisms. He commits at least some resources irretrievably, and he sets the critical initial conditions for his engagement. At any time after he first sets his decision in motion, some measure of combat power will be consumed and conditions in his sector will be altered. Generally the costs associated with making a decision are the opportunity cost of not executing one of his alternatives, a loss of flexibility, the cost of implementation, and the cost in

human resources (fatigue, available manhours) of continued planning.[48] After implementing the decision, change or significant adjustment to the disposition results in costs such as ineffective fighting positions dug, irrelevant contingency plans produced, and fuel consumed in movements that are reversed.

To minimize the cost of making a decision the commander can take several precautions. Initially he should strive to consider a full set of COA alternatives, as research shows this is rare.[49] He may also take action to buy time and delay commitment of his resources until more information becomes available. He can commit extra resources to gain information that alleviates uncertainty concerning the decision. He can focus on COAs that are either very conservative, minimizing worst-case losses or focus on those that give him maximum flexibility for branches and sequels.[50] Most commanders would instinctively employ some or all of these methods, according to the situation. However, opting for conservative, low risk solutions often results in low success while, in the alternative, the commander may sacrifice security for opportunity.[51] Unfortunately, of the two modes of thinking, at least one military commentator finds "the predominance of linear intuition is endemic."[52]

As an example a military leader might rely almost completely on linear analysis of force ratios and combat multipliers. If expecting an attack by enemy forces with 3X combat power, the commander assembles at least X amount of forces. To improve on his doctrinal one to three force ratio, he will reinforce terrain,

mass fire support, and possibly commit a reserve force to achieve superior mass at the decisive point. Understanding friction and the moral component of combat power, he will account for inefficiencies in execution by further weighting his main attack and aggressive leadership. This normally results in a competent, but very conventional scheme of maneuver which attempts to arithmetically overmatch enemy strength with friendly strength. Instead of thinning the lines to achieve economy of force in the traditional sense of "accepting risk," a creative, nonlinear solution might involve abandoning the line to attack directly at an enemy vulnerability to achieve effect "disproportionate to the effort made."[53]

This leads to the second aspect of implementing his decision, which may be the most important. If one accepts that war, like the vast majority of complex social and natural phenomena, is a fluid and nonlinear stream of events, then outcomes have a "sensitive dependence on initial conditions."[54] This means small changes to the situation at the outset of an engagement can dramatically alter the endstate.[55] Often one small gap in the defense or the fortuitous placement of one small subunit can have decisive impact on the battle. An insignificant delay due to friction can shut down a window of opportunity, strategic in proportion. In nonlinear systems a significant danger is that similar consequences do not always follow from seemingly similar preconditions.[56] On some days, sensitive dependence on initial conditions translates to ". . . for want of a nail, a battle was lost."[57]

III. DOCTRINAL FOUNDATION: CURRENT AND EMERGING

Generally, existing tactical doctrine concerning leadership, decision making and command and control is quite consistent with the primary theorists. "Risk is inherent in war; . . . to be successful, commanders must take necessary, calculated risks to preserve the force and defeat the enemy."[58] Furthermore "minimizing risk, may ensure survival, but may also preclude winning."[59] Current doctrine puts risk assessment squarely in the purview of the art of command, where the commander "is often guided by intuition and feel gained from years of practice and study."[60]

However, many of the primary manuals associated with decision making are undergoing major revision, making draft versions a more accurate reflection of current thought.[61] Similarly, the recent revision of FM 100-5, Operations introduces new concepts whose impact on risk analysis requires investigation. In particular, the fifth tenet of Army Operations, *versatility*, suggests a whole new dimension of tactical flexibility which may strain intuition gained from conventional operations. Versatility requires tactical formations to potentially accomplish "widely divergent missions. . . some of which may not be on their *mission essential task list* (METL). . . in quick succession."[62] FM 100-5 further states versatility derives from high standards of leadership, training, equipment and planning. This is undoubtedly true, but how does the commander approach self-development for operations outside his experience?

This leads to a second and related topic that has always characterized Army activities, but remained unacknowledged in doctrine. Operations other than war (OOTW) are normally begun as peacetime, non-combat operations, but have varying degrees of potential for violence. They also "often are of long duration and undergo a number of shifts in direction during their course."[63] This presents the tactical commander with a whole new doctrinal spectrum of probabilities, risks and uncertainties. Ostensibly, combat training makes units prepared to conduct OOTW, but this contradicts the battle-focused training principle of training as you intend to fight.[64] As a minimum, combat proficiency deteriorates during OOTW deployments, increasing risk for subsequent operations.

Doctrine describes two primary, independent risks associated with tactical decision making. The most critical is the risk that the course of action selected will not accomplish the mission or the endstate of the commander's intent (operational risk). The second risk is that of losing men and material in the effort.[65] Although the term "acceptable losses" has an aesthetically unpleasant ring, that is the goal of the force protection component of risk analysis. With the increasing political and operational emphasis on minimum casualties, it is conceivable that an "acceptable" level of losses may constitute a critical element of the commander's intent.

Army doctrine distinguishes between a gamble and a risk by borrowing a definition attributed to Rommel. Risk is a chance

from which one can recover a failure, whereas a gamble is a chance that with failure is irrecoverable. A high risk decision has been described as one in which the chance of success is subjectively set at less than 50 percent. FM 100-5 also reiterates that "war is a contest of wills" and that "combat power is the product of military forces and their will to fight."[66]

The commander's primary role is risk analysis stems from his estimate of the situation and its impact on the decision making process. The commander's estimate process is continuous and represents an integration of primary staff estimates and the commander's personal visualization of the situation, the mission and the alternatives.[67] The analytical framework for the estimate is the factors of *mission, enemy, troops (and equipment), terrain (and weather)* and *time available* (METT-T)[68] Although the commander's estimate process generates the course of action decision, it is critical that it is updated with new facts, tasks and alternatives as they become known.

Current command and control doctrine challenges the commander to provide a clear and concise statement of intent based on his mission analysis, higher commander's intent, and his own vision.[69] As a minimum, this includes the purpose of the operation, the fundamental method, and the operation's endstate with respect to enemy forces, friendly forces, and terrain.[70] This "single, unifying focal effort" communicates the commander's stratagem for unseating the enemy and must provide his creative insight to subordinate leaders.[71] Though not specifically a part of

a doctrinal intent statement, the commander's acceptance of risk somewhere during an operation is normally inherent in his intended method. Doctrine also encourages the commander to exert "mission-type control" whenever possible to "unleash subordinates" and give them maximum freedom of action."[72] Again, for this command philosophy to be effective, subordinates must appreciate their commander's understanding of potential risks and how he intends to react. Optimally, because of his position, experience, access to information, and "big picture" perspective, the commander will best balance the risks and opportunities presented by the situation.

In developing his appreciation of risk, the commander progresses through several stages of refinement. These roughly correspond with the following components of the deliberate decision making process: Mission analysis, the intelligence estimate, the course of action development/analysis, the course of action decision and contingency planning (See Appendix A, Risk Assessment in the Deliberate Decision Making Process).[73]

Beginning with Mission Analysis, the commander and staff apply the METT-T framework to grasp the essentials of an assigned mission. By identifying higher intent, his own battlespace, specified and implied tasks, essential tasks, available forces, limitations, critical facts, assumptions, and available time, the commander can restate his mission and issue appropriate planning guidance. In addition to the above tasks, newer doctrinal sources focus the commander on determining the level of acceptable risk

during mission analysis. At this point, three discrete levels of risk are identified as "failing to achieve the mission; achieving the mission, but failing to achieve the desired result; [and] achieving the mission with the desired effect, but at too great a loss of personnel or equipment."[74] Conceptually, these represent just two kinds of failure: a failure to achieve the commander's intent and a failure to protect the force.[75] The third included risk primarily underscores the importance of accurate mission analysis to find what series of military actions (essential tasks) will achieve the higher commander's intent.

The commander receives very little specific doctrinal guidance on identifying and assessing risks at this phase. He should determine acceptable risks ". . . to retain or gain the initiative."[76] He may also address his "risk assessment" in his post-mission analysis planning guidance, but it is largely left to his intuition to determine what that means.[77]

After establishing the initial friendly situation during mission analysis, the commander must integrate the detailed enemy, terrain and weather picture into his own estimate. The intelligence estimate portrays the current conclusions of the ongoing intelligence preparation of the battlefield process. The staff should update these conclusions throughout the planning process, and they should provide the commander with relevant facts, effects of friendly COAs, probable enemy COAs, and enemy vulnerabilities.[78] Although these are intelligence inputs to the process, the commander ultimately interprets the results for future staff

planning. He will have the staff develop COAs which counter his visualization of enemy alternatives.

This leads to the commander's (or operations officer's) estimate which, although also a continuous process, summarizes staff input and documents the planning process from COA development through COA decision.[79] Risk Analysis takes place primarily in this part of the process, but again with little doctrinal specificity. In developing course of action, the staff arrays forces in various COAs that "must be suitable, feasible, acceptable, distinguishable, and complete."[80] The suitability and acceptability analysis frame out the two basic components of risk and both depend on application of the "art" of war.[81] A COA is *suitable* if it accomplishes the higher commander's intent and is *acceptable* if potential gains warrant expected losses or costs. Feasibility refers to the quantitative dimension or "science" of war associated with force ratios and planning factors. This projects the consumption of physical resources over time and space according to the best available planning factors. Clearly, each of these rely heavily on leader intuition and subjective probabilities. In particular, suitability and acceptability force the commander to consider risk, but only acceptability (force protection) criteria are doctrinally expressed in terms of risk.

Once a "manageable number" of COAs are developed analysis and comparison looks at their relative suitability and acceptability.[82] By conducting an initial wargame on each COA, the staff projects battlefield events and probable reactions throughout the

engagement. This identifies COA advantages, disadvantages and requirements for major contingency plans to address branches. Subsequent comparison ultimately presents the commander with the requirement to make his decision based on significant factors derived from advantages, disadvantages, and risk.[83] These factors stem from a blend of mission specific requirements and doctrinal fundamentals, and will be unique for each engagement.[84] The subjective inclusion and weighting of these factors becomes key to the ultimate COA decision.

Wargaming provides the commander and staff its best opportunity to visualize the flow of events on the battlefield, while projecting enemy and friendly opportunities. Done methodically using action-reaction-counteraction analysis at each critical event, wargaming should identify key sources of risks and suggest associated decisions and decision points. Although emerging doctrine highlights risk assessment as a discriminator, the proposed methodologies are inconsistent and focused on force protection. The emphasis is on hazards, fratricide potential, and accident prevention.[85] Proposed matrices range from abstract and completely mission independent (Appendix B) to detailed for operation of specific equipment in specific units (Appendix C). In between these extremes is room for a METT-T based matrix example that might enhance the commander's intuitive comparison of different COAs (Appendix D, Proposed Risk Analysis Structure).

However he chooses to evaluate risk, the commander must now make his primary risk decision. In choosing a specific COA,

he decides where to concentrate and thus where to economize. This responsibility "brings with it the burden of foreclosing options, of incurring risks, and revealing intentions to the enemy."[86] Often by accepting more risk, he can increase the enemy's uncertainty and preparedness. This is the case when he chooses a suboptimal, but less conspicuous COA that allows effective surprise.

After making his COA decision, the commander must document the plan, issue the order and supervise execution. Depending on the time, this can be done formally and in great detail, or it can be a rapidly transmitted fragmentary order (FRAGO) with minimum radio coordination. Time will also determine the balance between *positive* and *procedural* (P2) controls used in execution. Positive controls are direct and require the personal involvement by the leader to make decisions and give guidance. Vague, dynamic, and unfamiliar situations require positive controls and demand direct communications between echelons of command. On the other hand, procedural controls are indirect based on doctrine, tactics, standard operating procedures and operations orders. This results in decentralized control for situations that are clear and relatively manageable.[87]

No matter which kind of controls predominate, the commander's plan must accomplish several essential tasks. This analysis will focus on five elements identified by Huba Wass de Czege from unit experiences at the National Training Center and the Battle Command Training Program. These elements are quite

useful as a centerpiece of the commander's risk analysis. The elements are:

- Find and track the enemy (before he finds you and throughout the battle).
- Prevent the enemy from finding and tracking you (until too late to influence the action).
- Fix the enemy in depth with supporting efforts (with minimum required to prevent repositioning or maneuver against your main effort)
- Maneuver so the main effort engages the enemy from a position of relative advantage (with overwhelming power at the point of decision).
- Follow through (to the next action).

Wass de Czege asserts that these elements "apply to all combat operations with appropriate interpretation," and, clearly, practice making the transition to less conventional operations will be important.[88]

After selecting a course of action, the commander and staff must also refine the wargame into a fully synchronized plan with contingency branches. This results in a fully developed Decision Support Template (DST) which integrates battlefield events and friendly decision points. This is now an extension of the commander's estimate and no longer part of the intelligence preparation of the battlefield (IPB) process.[89] This methodology helps the commander forecast as many of his operational decisions as possible and anticipate the information he will need to make them. In essence, each of these decisions is a minor risk decision made in the context of primary COA decision.

Another new component of the command estimate is the

concept of *commander's critical information requirements* (CCIR). These are relatively few commander-identified pieces of information, crucial to his understanding of the flow of the battle.[90] The commander updates the CCIR based on METT-T continuously like the rest of his estimate, but they become more mission-specific during mission analysis and COA analysis phases of staff planning.[91] Doctrine provides a suggested limit of six CCIR and provides 17 potential questions.[92] These generally deal with the friendly or enemy posture, actions, and opportunities in a given timeframe. Although one might argue enemy opportunities are friendly risks, the doctrinal discussion is not couched in terms of risk analysis. Ultimately, the answer to CCIR questions help the commander decide whether to continue with the base plan, execute a planned branch, or develop and execute an unforeseen branch.[93]

Army leadership doctrine stresses the value of risk taking in a unit's leadership climate.[94] By training subordinates to take risks and learn from them, leaders create an atmosphere of "opportunity to succeed"[95] However, this willingness to take risk is firmly anchored on the criterion of "whether it will further the intentions of the higher commander" .[96] Finally, doctrine concludes ". . . risk taking depends on competency, [and] senior leaders seek to hone all their professional skills so that when they risk their chances for success are high."[97]

In summary, doctrine provides a detailed decision making framework in which the commander makes his risk decision. Currently evolving doctrine deals with the risk analysis in more

detail than existing resources, but still leaves the commander completely reliant on his intuition. Risk is inseparable from opportunity, and the onus is on the commander to prepare himself to make the right decision, regardless of the eventual tactical circumstances.

IV. ANALYSIS

This is the backdrop for reviewing current doctrinal thought concerning the commander's risk analysis and the basis for a subsequent assessment of its adequacy. Theory establishes that given adequate means, risk stems primarily from uncertainty. With perfect knowledge of relevant information, the exact outcome of any decision would be known. Uncertainty then consists of the expected but unknown variation in the environment (friction and chance) and the "strategic uncertainty" of willful opposition. Of the two, the potential of an adversary to achieve surprise is the far more dangerous source of uncertainty. Here the creativity of the commander competes directly with that of his opposite number.

Environmental uncertainty is much more random and generally a function of probabilities. Planning factors based on some statistical analysis help staffs predict everything from casualties and weather to the impact of terrain on mounted movement. These factors, mitigated by unit experience, are intended to account for friction and fog under conservative conditions. Risk due to environmental factors increases as the commander decides execution must happen faster, farther, or with less combat power than staff estimates suggest.

As an example, if a unit's timing is thrown off because one element's movement is slower than expected, the risk of failure is increased. That risk of failure is dramatically increased, if that delay is deliberately caused by an enemy who plans to exploit it. The first case is one of pure friction that is often manageable. It would be bad luck if the enemy commander knew the error before the friendly forces could at least recover somewhat. The second case is that of surprise inflicted by the enemy, where there is a higher risk he can react faster and more effectively.

We have said that the commander's risk analysis must have two main thrusts. First, he must find a decisive COA with the highest probability of attaining the commander's intent. Second, he must gauge threats to his force and conserve maximum combat power for subsequent operations. In analyzing the components of operational or mission risk, we will use the METT-T mission analysis framework in conjunction with the Wass de Czege conceptual model. We will then extract the protection issue from the friendly troop's component of METT-T and look at it in its own right as an important dynamic of combat power.[98]

By adhering to the existing structure of METT-T, then adding protection, we can potentially establish a model that combines familiarity with renewed utility. The commander can analyze the risk characteristics of each course of action consistently and in detail. Upon making his decision, he has a framework that directly addresses his decision support planning and other staff execution of his intent. The commander's appreciation

of risk in his intent is as inherently important to his method as orientation with respect to terrain is to his endstate.

The main purpose of the analysis (and its related structure), is to identify all primary sources of uncertainty or risk for an operation. This will allow the commander to make the best COA decision, and then take action to mitigate the most worrisome risks associated with his plan. By formally including (or at least informing) his staff to some degree, he can enhance the process in three primary ways. He exposes his analysis to outside input, he shares and thus communicates his risk value structure, and, over time, he can refine the model for the environment in which he is employing it. This structure is arbitrary, as will be the distinctions between which are mission factors, vice friendly troops or enemy factors. The categories themselves are not important as long as they are roughly equal in magnitude and reflect the decision maker's preference structure.

In reviewing the factors of METT-T, to appreciate his risk environment, the ***mission*** analysis is a crucial first step and test of his competence. The commander identifies tasks and actions that will achieve his higher commander's endstate. The risk of assigning incomplete or inappropriate tasks may be the first risk he takes. From that point, the nature of the mission (complexity and familiarity), plays a major role in the risk analysis. The mission drives command and control requirements which are a major source of friction, fog, an thus, uncertainty. Ultimately, the adequacy of the plan and the success with which it is communi-

cated are subsumed under the analysis of mission factors. This overall effectiveness of the cybernetic domain includes the efficacy of the orders process, the completeness of control measures and guidance, and the cohesion of the leadership between echelons. Associated factors are the quality of rehearsals, staff synchronization, and the integration of primary, attached subordinate elements. The final question is how difficult is this mission (with all tasks), for this task organization, with this level of preparation.

The commander's ***enemy*** analysis becomes an intimate evaluation in the moral domain as well as a dispassionate look at the physical domain. Beyond force ratios and comparative technology, the commander must decide how well he understands his opposite number. He must strive to visualize all the enemy's options and inclinations, particularly in an unfamiliar operational environment. This is where openmindedness is key, and the biases of conventional combat operations must be left behind. Once the commander grasps the possibilities, he alone must weigh the chances of morally defeating his opponent through deception and initiative. The enemy's independence of thought and action is the primary and most elusive source of battlefield uncertainty. The commander must know his enemy, or acknowledge his own limitations before he can make the right decisions.

Other METT-T factors may also specifically benefit the enemy and apply to this enemy analysis. If he has a decisive terrain, technological, psychological, political, or preparation

advantage, it may be an important source of risk. The final question for the commander is what are the enemy's primary strengths and vulnerabilities in the moral, cybernetic, and physical domains.

Risk analysis of ***terrain and weather*** for the operation then becomes a function of how much friction it will impose on operations. Favorable conditions will minimize difficulties with trafficability, navigation, engagement ranges, and synchronization. This is primarily the function of planning factors and leader experience in the physical domain. As factors become adverse, it may have moral/psychological implications, but may also reduce risk if the enemy is relatively less capable. For U.S. forces, this might occur in night operations, desert operations, or with battlefield obscurants. The final assessment is how will the terrain and weather (or related uncertainty) potentially hinder or enhance our execution.

Friendly ***troops*** factors deal with the physical and psychological readiness of the force and impact primarily in the physical domain. The commander must appraise the validity of combat power calculations and adjust them based on environmental factors. This evaluation revolves around how well prepared the soldiers are in general, and, then how well prepared they are for a specific mission. The commander should match the unit organization and combat training experience against the operation environment for a closeness of fit. If units and their attachments are collectively proficient, they must also prepare for a specific

mission. Unfamiliar tasks, confining ROE, inadequate time, and unreasonable physical demands are all basic reasons a commander might perceive significant risk in the physical domain. A final potential tool that brings great associated risk, but must be considered among friendly assets, is the media. Only by carefully anticipating (and hopefully controlling) the media's influence can the commander gain and maintain the informational initiative against the enemy.

Equipment analysis is normally included with friendly troops; however, due to the increasing chance of technological asymmetry it surfaces as a major potential and independent source of risk. Critical task-related equipment will have a major impact in the cybernetic and physical domains. The commander must carefully assess his unit's operational dependency on devices such as communication links, intelligence collectors, navigation aids and night vision devices. Weapons systems may be incompatible with the tasks or ROE. Electromagnetic sensors may be incompatible with terrain or enemy capabilities. Fuel and other sustainment requirements may represent a major vulnerability. The basic analysis determines the magnitude of technological friction and the major capabilities lacking.

Probably the most sophisticated and subtle analysis must relate to ***time*** available. Leader preparation is a cybernetic area of risk and is covered under mission factors. Soldier preparation is primarily related to execution in the physical domain. The commander must gauge available time and decide <u>when</u> to act

based on his overall estimate. Each action from initiating movement and conducting reconnaissance, to crossing the line of departure is a risk decision. Issues at hand are what the enemy can observe, what will he know, how fast he will react, and in what way.

Generally speaking, the commander will need to act as fast as possible, being satisfied with the 70% plan. Small delays in war can have major consequence, and the enemy's urgency to thwart him will keep constant time pressure on decisions. Friendly *agility* can be a major source of enemy uncertainty by preventing the enemy from finding and tracking the force. The commander can use speed to exploit the effect of "sensitive dependence on initial conditions" and conform them to his own advantage. To provide prospective on the importance of time, Napoleon once said: "The loss of time is irreparable in war . . . I may lose a battle, but I shall never lose a minute."[99] Time analysis will eventually lead to the final synchronization of operations. In retrospect, by giving the coalition forces time, Saddam Hussein may have provided the decisive means of his own defeat.

Protection is the second area separated out from the traditional METT-T category of friendly troops and is a dynamic of combat power. It is also the secondary major thrust of risk analysis directed by doctrine. The commander has both a moral and a practical obligation to minimize losses. As mentioned earlier, casualties can have a major mission impact for several reasons. First, high casualty rates, particularly if they are perceived as

preventable, can greatly diminish morale and commitment. Second, if losses taken are unexpected, as with primarily non-combat operations, they can have adverse operational and even strategic impact. Third, by virtue of the American technological approach to war and the low intensity nature of potential operations, major assets may be at significant risk. Inattention to tactical force protection can allow the destruction of a major ship, aircraft, or supply base for strategic enemy informational purposes. The existence of these assets in the operations area alone constitutes a vulnerability to preemptive violence such as terrorism or sabotage. Doctrine states that protection derives from operations security with deception, preventive medicine and maintenance, safety discipline, and fratricide prevention.[100] The commander ultimately uses the doctrinal risk assessment methodology to eliminate unnecessary risks and act to mitigate those that are unavoidable.

> We had made up our minds to pay whist, and when we sat down we found that the game was poker.[101]

V. CONCLUSIONS

Although risk taking figures prominently in both military theory and doctrine, commanders are left to develop their own very personal approach to it. Clearly, risk taking is an accepted part of personal development in everything from learning to ride a bike, to founding a nation.[102] Risk taking as part of military culture must be more than accepted, it must be understood. This analysis proposes a more specific structure for capturing the

magnitude of various risks in the decision making process. By doing this, the commander and his staff may be better equipped for less familiar operations other than war and asymmetrical conflicts in general. Another benefit might be a better communication of risk factors in the commander's intent. This supports decentralized leadership and independent action to exploit opportunities without incurring risks unacceptable to the higher commander. If his critical information requirements (CCIR) in large part confirm or deny major potential risks, this similarly clarifies his intent for staff and subordinates.

Risk stems primarily from uncertainty in each of the three domains of battle. This uncertainty inhibits the application of adequate means at the decisive time and place. Friction and fog cause uncertainty in the physical and cybernetic domains, while enemy freedom of action causes "strategic uncertainty" in the moral domain. Risk analysis is the commander's struggle to discriminate between what he must know and what he can know. Where he cannot reduce his own uncertainty he must increase his enemy's. Theorists have said that only combat experience can effectively provide the intuitive skills required to appreciate this complex analysis. Given the potential versatility of future operations, few commanders will have the luxury of directly applicable experience. In actuality, local opponents will be much more predictably experienced in whatever regional conflict arises. This suggests that leaders must develop an intimate intellectual and practical familiarity with decision making under uncertainty. This

is consistent with Clausewitz' proposal that the combination of theory, talent, and practice result in the "art" of blending purpose and means in command.

Doctrine are characterizes operations other than war as being of long duration and of a changing nature.[103] In reality, they are also often high profile operations characterized by tentative, groping efforts that allow opposition to gain the initiative. If the commander is overly conservative in action and intent, he may gain some measure of security initially, but will accommodate his enemy by reducing his uncertainty. Only speed and continued energy throughout a long operation can prevent the enemy from imposing his own favorable set of initial conditions. Jomini warned not to be contemptuous of any power, while Clausewitz emphasized applying pressure in both the physical and the moral domain.[104] This is good advice for OOTW as commanders have often proven over-optimistic in their reliance on raw physical combat power. The commander's most appropriate means may easily diverge from brute force to deterrence, dialogue, exchanges, and other inducements to cooperate. Excess optimism concerning the utility of force can easily invite an unwarranted increase the level of violence if not checked by a valid analysis of operational risks.

This means that in a new environment, commanders must deal with risk initially when they have the advantage of radically altering the environment for the adversary. As routine operations settle in they must continue to exert initiative to reduce vulnera-

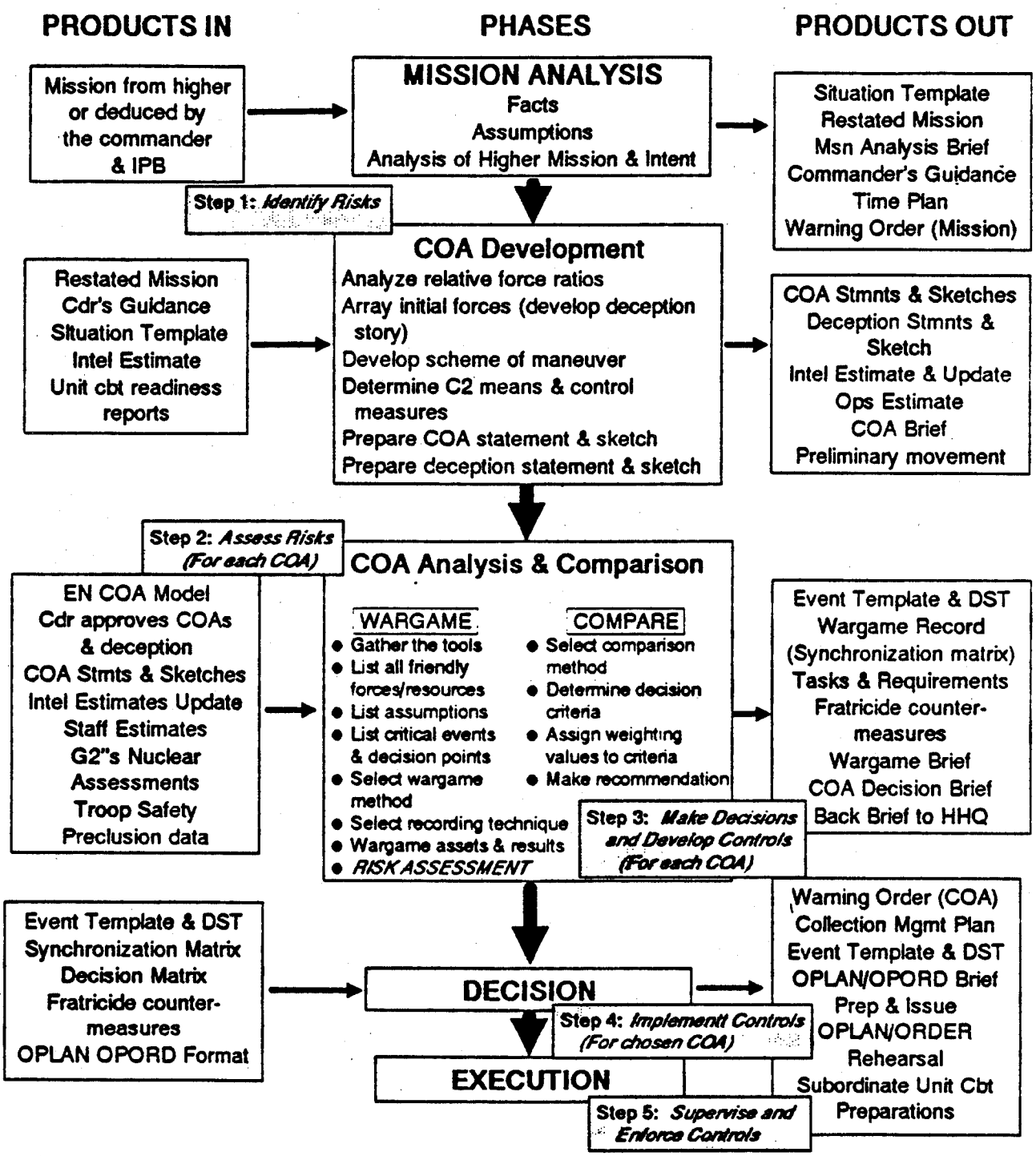
bility and sustain enemy uncertainty (preferably without the enemy perceiving it). Finally, the commander must anticipate environmental changes and address new risks according to some established framework. Given the likelihood of rotational unit involvement in OOTW, an appropriately structured framework that organizes and communicates intuition-based analysis may also substantially enhance tactical versatility between units.

Whether the commander's contribution is called intuition, art, or insight, structured risk analysis is no substitute. LTG (Ret) John Cushman captures the essence of the commander's ideal perspective:

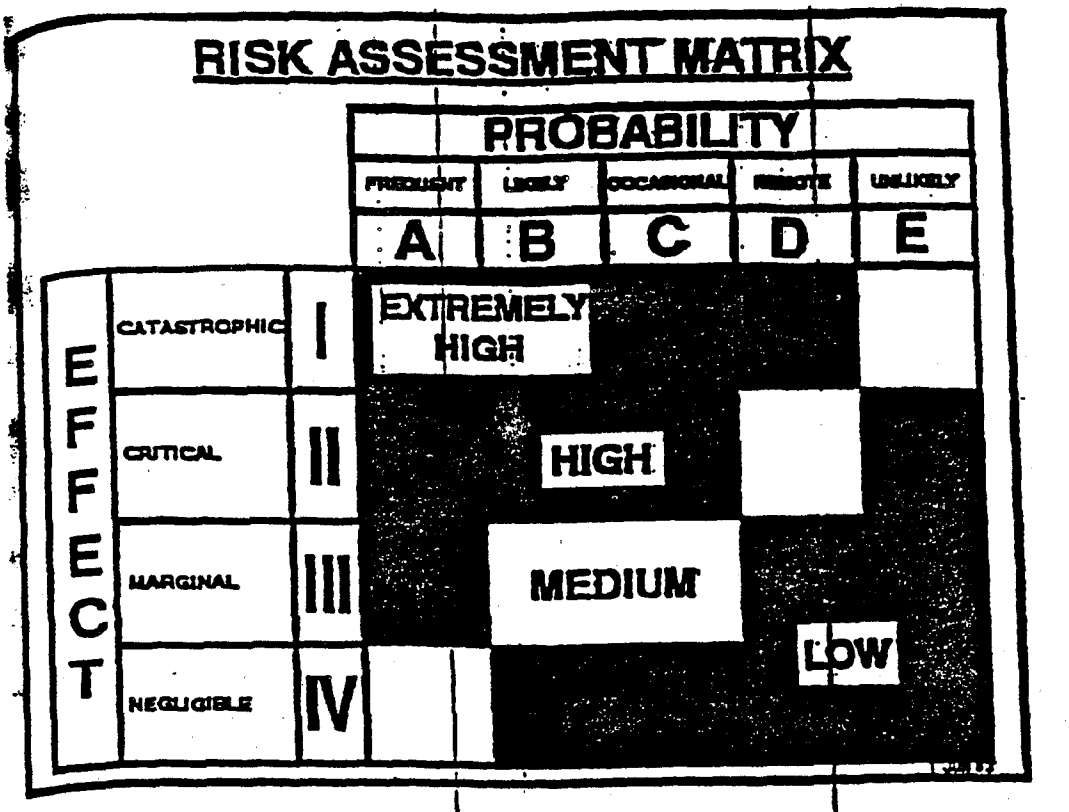
> While a structured process, using a staff, can assist in decision making, it cannot replace the commander's personal insight. Intellect alone does not guarantee insight, nor does experience. Insight comes from an absence of mindset, from willing openness to a variety of stimuli, from intellectual curiosity, from observation and reflection, from continuous evaluation and testing, from conversations and discussions, from review of assumptions, from listening to views of outsiders, and from avoiding perfect certitude.[105]

Appendix A: Risk Assessment in the Deliberate Decision Making Process

Adapted from FM 101-5 (DRAFT), August 93, B-23.



Appendix B: Example Risk Assessment Matrix--Mission Independent



RISK MANAGEMENT PROCESS

1. IDENTIFY HAZARDS - Identify hazards or factors that may adversely affect mission accomplishment.
2. ASSESS HAZARDS - Determine extent of hazard detriment to mission.
3. MAKE RISK DECISION - Reduce risk to that which is mission essential.
4. IMPLEMENT CONTROLS - Establish measures necessary to control risks.
5. SUPERVISE - Ensure control measures are followed.

DECISION FOR RESIDUAL RISK

EXTREMELY HIGH - MACOM Commander
HIGH - Corps/Division/Installation Commander
MEDIUM & LOW - Delegated to appropriate level

SOME FACTORS TO CONSIDER IN RISK MANAGEMENT

Level of activity
Inherent dangers of equipment used
Operational conditions
Personnel/organization proficiency
Weather
Condition of personnel
Adequacy of site
Accident frequency
Hazardous materials used
Environmental concerns
Complexity of movement
Supervision
Complexity of mission
Level of planning
Availability of protective equipment
Adequacy of directions given

From FM 101-5 (DRAFT), August 93, F-62a.

Appendix C: Example Risk Assessment Matrix--Unit Specific

Side A

Planning

CIRCLE ONE	Risk Value		SCORE _____
Guidance	Preparatory Time		
	Optimum	Adequate	Minimal
FRAGO	3	4	5
OPORD	2	3	4
OPLAN/LOI	1	2	3

Mission Control

CIRCLE ONE	Risk Value		SCORE _____
Task Organization	Trainig Event		
	Support Nontactical/ Garrison	Day Tactical	Night Tactical
OPCON	3	4	5
Attached	2	3	4
Assigned	1	2	3

Crew Endurance

CIRCLE ONE	Risk Value		SCORE _____
Evironmental Preparation	Crew Preparation		
	Optimum	Adequate	Minimal
Tactical	3	4	5
Training	2	3	4
Garrison	1	2	3

Crew Selection

CIRCLE ONE	Risk Value		SCORE _____
Task	Experience Level		
	Highly Qualified	RL 1	RL 3
Complex	3	4	5
Routine	2	3	4
Simple	1	2	3

Side A, Subtotal_____

From FM 101-5 (DRAFT), August 93, F-61and F-62.

FM 101-5
Side B

Weather

CIRCLE ONE	Risk Value		SCORE _____
Wind	Ceiling/Visibility		
	>1000/3	<1000/3	Minimums
>30 kt	3	4	5
16-30 kt	2	3	5
0-15 kt	1	2	5

Terrain

CIRCLE ONE	Risk Value		SCORE _____
Type of Terrain	Modes of Flight		
	Low Level	Contour	NOE
Mountain	3	4	5
Desert/Jungle	2	3	4
Hills, Flat/Rolling	1	2	3

Equipment

CIRCLE ONE	Risk Value		SCORE _____
Equipment Age	Aircraft Status		
	FMC	PMC	Mission Equipped
Old	4	5	5
Average	2	4	4
New	1	2	2

Subtotal Side A ____ *Subtotal Side B* ____ **Total** ____

0 to 12 Low Risk	13 to 23 Caution	24 to 35 High Risk (note)

OPERATIONAL RISK ANALYSIS METT(E)-T(P) 09-Jan-94

FACTORS	LOW RISK	MODERATE RISK	HIGH RISK	REMARKS/ASSESSMENT
MISSION (Relative Difficulty)	Lesser	Low Mod High <---1---2---3---4---5---6--->	Greater	
Assigned tasks, achieve Cdr's Intent?	Simple, clear	<---|---|---|---|---|---|--->	Difficult, complex	
Soldiers & ldrs done this task before?	Yes, recently	<---|---|---|---|---|---|--->	No, never	
Know critical attachments?	Yes, all	<---|---|---|---|---|---|--->	No, none	
Plan adequate & synchronized?	Full rehearsals	<---|---|---|---|---|---|--->	Minimum coordination	
Control measures adequate?	Redundant, clear	<---|---|---|---|---|---|--->	Minimum, vague	
_		<---|---|---|---|---|---|--->		
_		<---|---|---|---|---|---|--->		
ENEMY (Strengths & Weaknesses)	En Disadvantage	Low Mod High <---1---2---3---4---5---6--->	En Advantage	
Know enemy strength, options, & COG?	Detailed intell	<---|---|---|---|---|---|--->	Vague, incomplete intell	
Terrain & weather benefits enemy?	Not at all	<---|---|---|---|---|---|--->	Decisively	
Solders or equipment superior?	No instances	<---|---|---|---|---|---|--->	Several factors	
Discernible uniforms & equipment?	Identifiable	<---|---|---|---|---|---|--->	Very Difficult	
Ability to react, reinforce, or fix us?	Limited	<---|---|---|---|---|---|--->	Immediate	
_		<---|---|---|---|---|---|--->		
_		<---|---|---|---|---|---|--->		
TERRAIN & WEATHER (Day/Night/Mission Impact)	Favorable	Low Mod High <---1---2---3---4---5---6--->	Adverse	
Operational impact of OCOKA factors?	Favorable	<---|---|---|---|---|---|--->	Adverse	
Navigation difficulty?	Negligible	<---|---|---|---|---|---|--->	Extreme	
Impact of obscuration or lmtd visibility?	Positive	<---|---|---|---|---|---|--->	Negative	
Impact of weather on soldiers & equip?	Favorable	<---|---|---|---|---|---|--->	Adverse	
_		<---|---|---|---|---|---|--->		
_		<---|---|---|---|---|---|--->		
TROOPS (Phys & Psych Readiness)	Adequate	Low Mod High <---1---2---3---4---5---6--->	Inadequate	
Adequate means to fix, maneuver, & mass?	Extensive	<---|---|---|---|---|---|--->	Minimal	
Subunits trained in collective tasks?	Fully trained	<---|---|---|---|---|---|--->	Untrained	
Soldier & Ldr Endurance?	Exceed req'ts	<---|---|---|---|---|---|--->	Inadequate	
Attachments proficient & experienced?	Fully trained	<---|---|---|---|---|---|--->	Untrained	
Mission preparedness?	Full rehearsals	<---|---|---|---|---|---|--->	Unbrieted	
_		<---|---|---|---|---|---|--->		
_		<---|---|---|---|---|---|--->		

EQUIPMENT (Task Related Equip)	Available	Low Mod High <---1----2---3---4---5---6--->	Unavailable	
Commo capability redundant, robust?	Reliable	<---|---|---|---|---|---|--->	Unreliable	
Weapons effects & limitations?	No impact	<---|---|---|---|---|---|--->	Major impact	
Can we sustain our effort?	Likely	<---|---|---|---|---|---|--->	Unlikely	
Mission-critical equip (Nav,NODs,etc)?	Available, reliable	<---|---|---|---|---|---|--->	Unavail, unreliable	
--		<---|---|---|---|---|---|--->		
--		<---|---|---|---|---|---|--->		
TIME (Opn Duration/Intensity)	Favorable	Low Mod High <---1---2---3---4---5---6--->	Unfavorable	
Planning & preparation time?	Extensive	<---|---|---|---|---|---|--->	Inadequate	
Impact of continuous opns?	Adequate rest	<---|---|---|---|---|---|--->	Inadequate rest	
Time for thorough recon?	Extensive	<---|---|---|---|---|---|--->	Inadequate	
Can we move/react faster than enemy?	Yes, always	<---|---|---|---|---|---|--->	No, rarely	
--		<---|---|---|---|---|---|--->		
--		<---|---|---|---|---|---|--->		
PROTECTION (Conserving Cbt Power)	Favorable	Low Mod High <---1---2---3---4---5---6--->	Unfavorable	
OPSEC/Deception--Deny En Intell	Reliable	<---|---|---|---|---|---|--->	Unreliable	
Preventive Health/Maintenance	No impact	<---|---|---|---|---|---|--->	Major impact	
Soldier skill in Cbt ID, ROE, & SOP?	Extensive	<---|---|---|---|---|---|--->	Minimal	
Engagement vs ID ranges?	ID likely	<---|---|---|---|---|---|--->	ID unlikely	
Impact of battlefield hazards?	Unlikely	<---|---|---|---|---|---|--->	Extensive	
Civ casualties/Collateral Damage	Unlikely	<---|---|---|---|---|---|--->	Excessive	
--		<---|---|---|---|---|---|--->		

--Analyze the six METT-T categories with respect to your current mission.
--Make your best subjective assessment of each using the factors provided plus mission specific factors.
--Using either the numeric or qualitative scale weight all assessments based upon their relative impact for this mission.
--Determine need for higher HQ review based upon the cumlative projected risk.
--See reverse for possible prevention measures to address risk by METT-T category
--Always consider extraordinary measures to minimize fratricide risk.

RISK LEVEL GUIDELIN
<10 LOW
11-20 MODERATE
>20 HIGH

ENDNOTES

1. United States, War Department, Field Service Regulations FM 100-5 Operations, (Washington: GPO, 22 May 1941), 24-25.

2. Concept from Clausewitz' *Nachricht* or notes appended to his On War manuscript, found in Richard Simpkin, Race to the Swift, (London: Brassey's, 1986), 10 and 13.

3. The most recent edition of the Army's capstone doctrinal manual, FM 100-5, introduces two important new concepts that will dramatically effect future conflicts. These are the general category of peacetime, non-combat operations, *Operations Other than War (OOTW)* and the fifth tenet of AirLand Operations, *Versatility.* United States, Department of the Army, FM 100-5 Operations, (Washington: GPO, 1993), 2-0 and 2-9.

4. The current draft of Field Manual 101-5 and Student Text 100-9 used at the Command and General Staff College both stress this point. United States, Department of the Army, FM 101-5 Command and Control for Commanders and Staff (DRAFT), (Washington: GPO, 1993). United States, Department of the Army, US Army Command and General Staff College, ST 100-9 The Tactical Decisionmaking Process, w/Change 1, (Ft. Leavenworth: USACGSC, July 1993).

5. There has been a lot of recent interest in risk assessment generally related to safety and force protection issues (such as vehicle/aircraft/weather/fratricide). Examples include policies implemented in the 3rd Infantry Division training regulation, V Corps and DESERT STORM risk assessment cards, aviation preflight requirements, and fratricide reduction methodology published by the Center for Army Lessons Learned, the Armor School, and the Infantry School.

6. Originally inspired from discussion of using quantitative analysis to identify and improve processes that, although adequate, limit organizational potential or offer competitors an area to exploit, Richard E. Trueman, Quantitative Methods for Decision Making in Business, (Chicago: Dryden Press, 1981), 8.

7. H. W. Lewis, Technological Risk, (New York: W. W. Norton and Company, 1990), 103.

8. Carl von Clausewitz called this the center of gravity the "hub of all power and movement" in On War, edited and translated by Michael Howard and Peter Paret, (Princeton, NJ: Princeton University Press, 1976), 595.

9. In war and a single engagement, Clausewitz states the enemy is not defeated until his will to continue the contest is broken, 90. Clausewitz described victory in terms of the enemy's material

defeat, moral defeat, and finally his open admission of defeat, 233-4. The more decisive the physical defeat, the more likely the outcome will be accepted by the vanquished. "When we speak of destroying the enemy's forces we must emphasize that nothing obliges us to limit this idea to physical forces: the moral element must also be considered," 97. Concept of commander's will animating his center of gravity from James J. Schneider, Theoretical Paper No. 3: The Theory of the Operational Art, (Ft. Leavenworth: USACGSC, March 1988), 27.

10. Clausewitz discusses the friction of war and its two greatest causes, danger and physical exertion in Book I, 113-116,119-121.

11. Battlefield information arriving in disjointed fragments makes the commander "more, not less uncertain." Clausewitz, 102.

12. Clausewitz discusses these common challenges of real-time intelligence and calls the "difficulty of accurate recognition" a serious source of friction in war and "one of the great chasms between planning and execution," 117-118.

13. "No general can accustom an army to war," and "Peacetime maneuvers are a feeble substitute for the real thing" (Discipline in execution) Exertion must be practiced as it is inevitable in war--the goal is for troops to understand it when it happens in war and not think it is based on failings. Clausewitz, 122.

14. Clausewitz, 122.

15. Simpkin, 28.

16. James Schneider states "There is more friction inherent in the indirect approach since friction generally varies with maneuver distance. There is also a greater need to rely on surprise . . . A greater strain is placed on logistics . . . [and] an even greater burden is placed upon command and control, Theoretical Paper #3, 41. Clausewitz similarly exposes the risk of the indirect approach, saying "A complex operation may be more effective than a simple one against a passive enemy, but this depends on available time and the enemy's ability to upset our plan by rapid action." Clausewitz, 228-9.

17. This derives from Clausewitz' central proposition that war is "a paradoxical trinity" of violence and hatred stemming from the people, chance and probability for the commander to contend with, and subordination to the policy of the state, 89.

18. Lewis, Technological Risk, 50.

19. Subjective probability is "a measure of the degree of belief that a particular event will occur." from Trueman, Quantitative Methods, 23.

20. A conditional probability is that "of the occurrence of event A, given that event B has occurred." Trueman considers this a natural way to express many probabilities in the world of real decision making, 24-25.

21. Quade, E. S, Analysis for Public Decisions, 2d Ed, (New York: North-Holland, 1982), 158.

22. This example of "compounding guesswork" is derived from a similar example concerning a sequence of ten events in which ten "best guesses," each with a probability of .6 leads to a very low predictive value--.6 percent. Thus, there would be a 99.4 percent chance that the expected outcome *would not* occur! Taken from Quade, Public Decisions, 158-9.

23. "In short, absolute, so-called mathematical, factors never find a firm basis in military calculations. From the very start there is an interplay of possibilities, probabilities, good luck and bad that weaves its way throughout the length and breadth of the tapestry. In the whole range of human activities, war most closely resembles a game of cards." Clausewitz, 86.

24. Peter Paret in "The Genesis of *On War*," introductory essay to Clausewitz, On War, 18.

25. Quade unfortunately coins this term to reflect the adversarial nature of this uncertainty and not the commonly held meaning of the strategic level of war, Public Decisions, 156.

26. Clausewitz, 92.

27. OCOKA refers to the military aspects of terrain--Observation/fields of fire;Cover/concealment;Obstacles;Key terrain;Avenues of approach. United States, Department of the Army, FM 34-130 Intelligence Preparation of the Battlefield, (Washington, DC: GPO, 1989), 4-8 and 4-9.

28. Martin Van Creveld, Command in War, (Cambridge, MA: Harvard University Press, 1988), 142.

29. Erwin Rommel, The Rommel Papers, Edited by B. H. Liddell Hart, (New York: Harcourt, Brace and Co., 1953), 519.

30. Clausewitz reinforces this imperative to take the initiative and make the enemy fight on enforced terms: "If a commander seeks to avoid the decisive battle, but his opponent forces it, the opponent will have an overall inherent advantage of achieving the object of his plans and resources." Clausewitz, 98.

31. Clausewitz, 75.

32. Paret, "Genesis," in Clausewitz, 4.

33. Clausewitz, 86.

34. Clausewitz, 86.

35. Clausewitz, 137.

36. Department of the Army, FM 22-103 Leadership and Command at Senior Levels, Washington: GPO, 1987, 59.

37. Weigley, Russel F., The American Way of War, (Bloomington: Indiana University Press, 1973), 79.

38. FM 22-103, 30.

39. A. H. Jomini addressed this preparedness for unrestrained pursuit of the fleeting opportunity when he wrote: "[others] want war too methodical, too measured; I would make it brisk, bold, impetuous, perhaps sometimes even audacious" in The Art of War, in The Roots of Strategy, Book 2, (Harrisburg, PA: Stackpole Books, 1987), 478.

40. Van Creveld, 10.

41. Rommel, 519.

42. Norman Dixon describes these mechanisms in his summary of ineffective traits in On the Psychology of Military Incompetence, (New York: Basic Books, Inc, 1976), 166-7. Similar to Dixon's conceits, Tolstoy said intelligent men cannot deal effectively with something that confounds their deep seated, cherished knowledge, James Gleick, Chaos: Making a New Science, (New York: Viking, 1987), Side 1.

43. United States Marine Corps, FMFM 1 Warfighting (Washington: GPO, March 1989): 7, calls the stress created by chance and uncertainty "psychological friction." Dixon discussed fear of personal failure, 39-40.

44. Dixon, 244.

45. Dixon, 165.

46. Clausewitz deals with this problem at length in his chapter on military genius (Chapter 3, Book 1). Acknowledging it is hard to distinguish between the determination that comes with strength of character and the obstinacy born of egotism, he implies that the former relies on preparation. Faith in principles and the analysis done before the battle will allow the commander to be stable and consistent in the face of "the *vividness* of transient impressions," 108.

47. These primary impacts of cognitive limitations stem from an interview with MAJ Chris Berwanger, an operations research analyst who currently supervises a contracted development effort to provide automated support to military risk analysis. MAJ Berwanger is the delivery order manager for Battle Command Battle Lab project titled: "Risk Analysis Support to the Tactical Planning Process." Interview by author was on 18 August 1993.

48. From Quade's discussion of the costs of making decisions with adjustments made for the military environment, Public Decisions, 128-9.

49. E. S. Quade, Analysis for Military Decisions, (Chicago: Rand McNally, 1964), 107.

50. Quade, Public Decisions, 349-50.

51. "The danger. . . is that the greater the success we seek, the greater will be the damage if we fail." Clausewitz, 97.

52. Alan Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War," International Security, Vol 17, No. 3, (Winter 1992): 59-90, 88.

53. The Marine Corps capstone doctrinal and theoretical manual, FMFM 1, links conventional, low-risk tactics to attrition warfare in contrasting it with maneuver warfare: "Potential success by maneuver-unlike attrition-is often disproportionate to the effort made. But for exactly the same reasons, maneuver incompetently applied carries with it a greater chance for catastrophic failure, while attrition is inherently less risky," 29.

54. Gleick, Chaos, Side 1.

55. Alan Beyerchen makes a convincing argument that Chaos Theory and other nonlinear techniques used to model weather and economic systems, not only apply to war, but are completely consistent with Clausewitz' analysis, 59-90.

56. Beyerchen concludes that we can only approximate complex conditions, and, in effect, "nothing ever happens twice." Thus, repeatability in science is only approximate and subject to occasionally wide deviations, 64.

57. Gleick, Chaos, Side 1.

58. FM 100-5, 2-5.

59. ST 100-9, w/C1 designed to be consistent with current draft 101-5, 6-1.

60. ST 100-9, w/C1, 1-3 and FM 100-5, 2-14 to 2-15.

61. Draft versions of FM 101-5, Command and Control for Commanders and Staff, and FM 34-130, Intelligence Preparation of the Battlefield, include several conceptual changes that impact the risk taking component of decision making. These include *positive and procedural* (P^2) controls in execution, risk assessment as a major element of the decision making process, commander's critical information requirements, rules of engagement (ROE) as a centerpiece of operations other than war, and moving the decision support template and matrix from the IPB process to the command estimate. United States, Department of the Army, FM 101-5 Command and Control for Commanders and Staff (DRAFT), (Washington: GPO, July 1993) and United States, Department of the Army, FM 34-130, Intelligence Preparation of the Battlefield (DRAFT), (Washington: GPO, July 1993).

62. FM 100-5, 2-9.

63. FM 100-5, 13-0

64. FM 100-5 generally discusses *versatility,* 2-9 and *OOTW* in terms of training requirements, 13-8 while FM 25-101 Battle Focused Training, (Washington: GPO, 1989), 1-3, discusses the training principles.

65. FM 100-5, 1986, 15 and FM 101-5 (DRAFT), O-5, the 1993 FM 100-5 does not specifically address this issue.

66. FM 100-5, 6-7.

67. FM 100-5, 6-6 and FM 101-5, 5-2.

68. FM 100-5, Glossary-5.

69. FM 101-5 (DRAFT), 1-4 & 1-9.

70. ST 100-9, w/C1, 2-9.

71. FM 101-5 (DRAFT), 1-4 and 1-8. The commander visualizes through his creativity and intuition the sequence of events leading to the endstate.

72. FM 101-5 (DRAFT), 1-13.

73. FM 101-5 (DRAFT), based on facts and conclusions drawn from IPB, C-31.

74. This is inconsistent with the two kinds of risk mentioned on page O-5 and in ST 100-9, w/C1. FM 101-5 (DRAFT), D-5.

75. The 1986 FM 100-5 and elsewhere in the new draft of FM 101-5 only these two primary risks are highlighted.

76. FM 101-5 (DRAFT), D-5.

77. ST 100-9, w/C1, 2-8.

78. FM 101-5 (DRAFT), C-3.

79. FM 101-5 (DRAFT), C-16.

80. FM 101-5 (DRAFT), E-1.

81. The use of suitability, acceptability, and feasibility as doctrinal terms in analysis is new in this version of 101-5. Whether or not the terms survive the drafting process, the risks they represent will require analysis. FM 101-5 (DRAFT), E1 and ST 100-9, w/C1, 7-4 & 5.

82. FM 101-5 (DRAFT), E1, E3 and E9. Manageable is "two or three COAs as a minimum--more if time and resources permit. . . " against as many enemy COAs as possible. In practice, this rarely exceeds three COAs developed and wargamed against one enemy COA.

83. FM 101-5 (DRAFT), F38.

84. FM 101-5 (DRAFT), F7.

85. FM 101-5 (DRAFT), F31; FM 100-9, App C.

86. FM 101-5 (DRAFT), 1-5.

87. From the introduction of the new doctrinal terms *positive and procedural* (P^2) controls in FM 101-5 (DRAFT), 1-19 & 20.

88. Huba de Wass de Czege, Big Red One Training Center Handbook, (Ft Riley, KS: 1st Infantry Division (Mechanized), 1993), 2-1.

89. FM 34-130 (DRAFT) and memorandum of distribution.

90. FM 101-5 (DRAFT), 1-8.

91. FM 101-5, 6-6.

92. FM 101-5 (DRAFT), 4-47.

93. FM 101-5 (DRAFT), 4-48.

94. FM 22-103, 33 & 87.

95. FM 22-103, 10.

96. FM 22-103, 10.

97. FM 22-103, 34.

98. This approach derives from analysis matrix developed by John Langston and EER Systems in "Risk Analysis," Knowledge Engineering Project Working Paper, (Leavenworth KS: EER Systems, 1993),.

99. David Chandler, The Campaigns of Napoleon, (New York: MacMillan, 1966), 149.

100. FM 100-5, 2-10 and 11.

101. J.F.C. Fuller, The Army In My Time (London: Rich & Cowan, 1935), 73 cited in A.J. Bacevich, "New Rules: Modern War and Military Professionalism," Parameters, (December 1990): 12.

102. Lewis, Technological Risk, 3.

103. FM 100-5, Chapter 13, *Operations Other Than War*, 13-0.

104. "All history teaches that no enemy is so insignificant as to be despised and neglected by any power, however formidable." Jomini, 440. "When we speak of destroying the enemy's forces we must emphasize that nothing obliges us to limit this idea to physical forces: the moral element must also be considered." Clausewitz, 228.

105. Cushman, John, Thoughts for Joint Commanders, Annapolis, MD: John Cushman, August, 1993, 8.

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