Training Field Grade Officers to Exploit the Maneuver Control System

A Monograph
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Abstract

TRAINING FIELD GRADE OFFICERS TO EXPLOIT THE MANEUVER CONTROL SYSTEM by COL Richard G. Leyden, U.S. Army, 45 pages.

As the U.S. Army transforms itself for future information age operations, it will rely heavily on the Army Battlefield Command Systems (ABCS) to provide digital Command and Control (C2) support to commanders throughout the theater of operations. ABCS is designed to provide the vertical and horizontal data flow required to achieve rapid decision-making and execution speeds needed to gain and retain informational dominance throughout future operations. As described in this monograph, the Maneuver Control System (MCS) provides this vertical and horizontal integration as a member of the Army Tactical Command and Control System (ATCCS), the middle layer of systems in the ABCS architecture. ABCS has the capability to provide the C2 support required by future commanders. At issue is whether the U.S. Army will train its leaders to exploit the provided technology, specifically the MCS.

This monograph defines "exploitation of technology" (i.e., understanding its capabilities, recognizing its opportunities, and acting to multiply the affects of those capabilities); and provides reasons why it is necessary to train Army leaders to exploit technology, not just to use technology. ABCS use clearly improves C2 efficiency. ABCS exploitation combines and optimizes the strengths of decision-makers and systems to achieve even better and faster use of the technology. The focus of this monograph is, therefore, on the decision-maker/ MCS interface, the point where exploitation of technology must occur in order to retain the technological initiative.

Determining how a decision-maker can exploit his C2 technology requires an understanding of what information a decision-maker needs to make a decision, and how a decision-maker makes that decision. Recognition-Primed Decision (RPD) techniques and the Military Decision-Making Process (MDMP) are included in that discussion because experienced military decision-makers use both RPD skills and the MDMP to make decisions. Exploitation of technology depends on capitalizing on the advantages offered by both RPD and MDMP. Identifying the key leader's roles and requirements in the decision-making process generated the listed training topics needed to train key leaders to exploit technology.

A comparison of required training to currently available training, whether taught institutionally or during New Equipment Training (NET), results in the finding that Army training insufficiently prepares decision-makers to deliberately exploit technology. In addition to learning how to get information from their systems, decision-makers must learn how to get the right information from their systems. The School of Advanced Military Studies (SAMS) and the School for Command Preparation (SCP) should take steps immediately to enhance technology exploitation training provided to their field grade officer students.

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CHAPTER ONE

INTRODUCTION

> The "Revolution in Military Affairs" - is about far more than technology; it is also about utilizing the highest levels of information - knowledge and wisdom - and about the importance of will power and idealism in all worthy endeavors.[1]

In March 1997, the Army used its most modern set of automated Command and Control (C2) systems during a two-week brigade level Advanced Warfighting Experiment (AWE) at Fort Irwin, California. Data and products processed on systems associated with a particular Battlefield Functional Area (BFA), were accessible to systems associated with another BFA.[2] For the first time during a major field exercise, all five "stovepipe"[3] C2 systems demonstrated digital interoperability. The level of interoperability seen at the March 1997 AWE, however, failed to meet the goal of cross-system integration required for the future force. Subsequent integration efforts featured the Maneuver Control System (MCS) as a keystone system, linking all five BFA systems together. Army C2 systems have continued to improved since 1997, and now possess even greater potential to support the future force. The current force must "exploit" this technology to build on successes already achieved. Exploitation of technology is similar to exploitation on the battlefield. Exploitation occurs when a commander achieves success, recognizes a capability or opportunity, and acts to multiply the affects of that success. As FM 100-5 warns, "failure to exploit aggressively . . . may provide the enemy sufficient time to regain the initiative."[4] Clearly, the Army must exploit technology, not just use technology, to retain the

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[1] John Arquilla and David F. Ronfeldt, " New Epoch - And Spectrum of Conflict," in In Athena's Camp: Preparing for Conflict in the Information Age, ed. John Arquilla and David F. Ronfeldt, with a forward by Alvin and Heidi Toffler (Santa Monica, CA: RAND Corp, 1997), 10.

[2] Elizabeth A. Stanley, Evolutionary Technology in the Current Revolution in Military Affairs: The Army Tactical Command and Control System (Monograph, Strategic Studies Institute, US Army War College, 25 March 1998), 45.

[3] "Stovepipe" systems vertically connect subordinates and superiors. Military stovepipe systems only support a single Battlefield Functional Area (BFA), providing connectivity between multiple levels of command. A military stovepipe system provides no "horizontal" connectivity across BFAs within the same level of command.

[4] Department of the Army, FM 100-5 (Washington, D.C.: United States Government Printing Office, 1993), 7-9.

technological initiative needed to transform the force. Unfortunately, current Army training is insufficient to prepare decision-makers to deliberately exploit technology.

Decision-makers, not equipment operators, are the people who exploit technology. Operators use technology to enhance the unit's C2 capabilities. Decision-makers (i.e., commanders and supervisors) recognize what those enhanced capabilities are, and integrate those capabilities into unit procedures to exploit the technology. While an under-trained leader may exploit technology, the trained leader exploits technology deliberately. Consequently, leaders must understand system capabilities, the requirements of the military decision-making process (i.e., unit procedures), and the function served by the decision-maker within the unit. Training is required to gain understanding in those three areas. Comparing required training to what is currently available demonstrates that officers moving into positions that can influence technological exploitation receive insufficient training.

The U.S. Army Command and General Staff College (CGSC) is expanding its use of MCS integrated training. At issue, is whether these selected students will learn to use the technology, or exploit it? The field grade officers graduating from the School for Command Preparation (SCP) and the School of Advanced Military Subjects (SAMS) will move into positions that can exploit technology and affect the decision-making process at their next units. This group of CGSC student officers, for reasons explained in the next section, represent the training needs of all officers in MCS leadership positions. The question then becomes, is training available to teach field grade commanders and planners how to exploit technology. Analysis of existing training packages reveals that they are insufficient to prepare field grade commanders and planners to exploit MCS capabilities.

Applicability

Several reasons make it important to compare the content of available MCS training packages against the needs of the CGSC student. First, the composite CGSC student population[5] reflects their counterpart population throughout the Army. If significantly new MCS related programs of instruction are required for CGSC, they also will be needed Army-wide. Second, if available courses are adaptable, CGSC may reduce its course preparation load by modifying existing training materials. Third, the CGSC student will benefit from receiving the same MCS instruction as that included in the Total Support Package delivered as part of a system fielding. Finally, the "needs" of the CGSC student must be evaluated in terms related to exploiting the capabilities of the technology, not just operating the systems.

Officers require training to "exploit" technology, not just operate the equipment. With the advent of desk top/desk side sized systems, analysts and decision-makers gained tools that enhanced their ability to plan and execute assigned tasks in garrison and on the modern battlefield. Electronic connectivity with similar systems used by other analysts and decision-makers accelerated the decision-making process and reduced execution time. Despite frequent technological enhancements, gaining efficiencies essentially depends on equipment configuration, programming, tasking, and use. Trained to exploit technology, a CGSC graduate will be prepared to identify ways to improve unit performance through use of technologically advanced systems. If trained only as a user of technology, the officer will only learn the skills needed to stay afloat in the technological sea. Today's officer needs to ride the crest of the technological wave.

[5] The CGSC student population includes students attending the Combined Arms and Services Staff School (CAS3), the Command and General Staff Officer Course (CGSOC), the School of Advanced Military Studies (SAMS), and the School for Command Preparation (SCP).

Personnel trained to exploit technology can achieve predicted personnel efficiencies promised by employing digital technology. Officers trained only as operators, or only on what products are available from digital C2 systems, will tend to use technology merely to replace "old" methods. The paper map becomes an electronic map updated by the same crew that updated the paper map. An officer may eventually learn how to employ personnel best when trained as a user, but will need new training every time that the power of the system is improved. Retraining will be frequently required if technology continues to improve at a rapid pace. Once trained, officers need to teach themselves and to recognize how best to use improved systems. They must learn to exploit technology.

Methodology

Exploitation of technology depends on how the commander employs technology, and how the staff uses it. This paper focuses on field grade commanders and planners. This is so because all Army Battlefield Command Systems (ABCS) are designed to support the commander. The MCS system is critical to integrating C2 systems across the Battlefield Functional Areas (BFAs) at brigade, division, and corps levels. Thus, analysis must begin with a discussion of the Army Battlefield Command Systems and a review of available training. That review forms the objective foundation upon which to compare training requirements to determine whether appropriate training is available for the field grade commander and planner.

Defining the training needed to exploit technology is a subjective effort because of the variety of cognitive skills and operator knowledge that must work in concert to optimize procedures. Technologically advanced C2 systems improve the quality of decisions, and reduce the time between problem recognition and execution. Using the systems instead of manual methods and procedures shortens the decision-making cycle. Transmitting digital information clearly is faster than voice transmission or paper reports. That is one simple example of technology's use. Exploiting technology requires someone to recognize how to use the equipment to its best

advantage. Determining how to do that begins with determining what a decision-maker needs to make a decision.

Once the ABC System and existing training programs are understood, it is possible to explore the process of defining the training required to enable field grade officers to exploit C2 technology. Numerous completed studies and sources, not involving military decision-makers, provide a base from which to develop a general model of how a decision-maker acts. The resulting model includes a description of what is, and what is not, important for a decision-maker to see to produce a decision. The critical portions of this model are the methods used to solve problems and make decisions. Recognizing how decision-makers make decisions generates a concise set of actions that can expedite the decision-making process.

Are decision-making models derived from examining decisions in civilian managerial settings useful for determining military training requirements for C2 technology exploitation? The answer is yes, but the civilian model does need adjustment to guide development of a military decision-making model. Validation of the civilian decision-making model followed an examination of similarities, and possible discrepancies, between non-military and military vocabularies, requirements, and situations. A key leader, who recognizes the pending loss of situational awareness, can compensate in several ways. Compensating techniques, if recognized, help identify information needed by the leader. One obvious compensating technique is to revert to "analog" systems (e.g., a paper map). Additional sources of information identified general military decision-maker methodologies that build on the civilian model to generate a decision-making model used in all analysis that followed.

The derived military model was used to define required training. The proposed training teaches concepts and actions that facilitate exploitation of technologically advanced C2 systems. The training requirements fall into three categories: a general subjects and concepts course, a specific commander's course, and a separate planner's course. The planner's course is designed to teach the student not only how to use the systems, but also how to exploit system capabilities.

Analysis of available training, and required training, generated the conclusion that training packages are unavailable for CGSC to use to prepare field grade commanders and planners to exploit MCS capabilities. This conclusion led directly to several recommendations. Namely, the School of Advanced Military Studies (SAMS) and the School for Command Preparation (SCP) must adjust their MCS and decision-making programs of instruction to enable future commanders and field grade planners to exploit digital C2 technology. Additional recommendations identify offices within the U.S. Army Training and Doctrine Command (TRADOC), and the Program Executive Office for Command, Control, and Communication Systems (PEO C3S), that can support the SAMS and SCP enhancement effort.

CHAPTER TWO

BACKGROUND

The primary sources of existing training are the organizations responsible for institutional training and for development and fielding standard Army digital C2 systems. TRADOC is responsible for institutional training. PEO C3S is responsible for development and fielding of the systems.[6] The study examined the training currently provided by CGSC, the TRADOC System Managers (TSMs) associated with the ABCS, and the organizations providing training to the digitized division (4ID) and the Interim Brigade Combat Team (IBCT). Users, from operators to recipients of products, receive training on appropriate ABCS components. Reasons to limit the review of available training to MCS training for field grade commanders and planners follow.

Field Grade Commanders and Planners.

"Command has two vital components – decision-making and leadership."[7] The commander is the "accountable" decision-maker in his unit; therefore, the quality of support provided by fielded C2 systems affects the commander most. Perhaps the most critical decision he makes is how he will use supporting C2 systems to make decisions. By establishing and enforcing ABCS utilization requirements within his unit, he creates the environment needed to exploit system capabilities. At a minimum, the commander is aware of the operator training conducted within his unit. He is; therefore, in the best position to ensure that operator training supports his needs. To understand what his needs are, he must recognize what information he expects to receive during the decision-making process. The quality of the training that the commander has received, on how to use his C2 systems, is critical for his unit to exploit fully systems capabilities.

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[6] LTC Michael Ammel, TPIO-ABCS Training Division, interviewed by author, hand-written notes, Fort Leavenworth, 16 Feb 01 and LTC Steven Davis, Chief, Combat Cmd D (and ABCS/MCS training POC within CGSOC), Center for Army Tactics, CGSC, interviewed by author, hand-written notes, Fort Leavenworth, 20 Feb 01.

[7] FM 100-5, 2-14.

The commander, as the senior leader in his unit, sets the example for how to use the systems. The leader also provides purpose, direction, and motivation to subordinates.[8] An untrained commander may be able to provide purpose (e.g., by saying things like "we must exploit our system's capability to succeed"), but that effort is greatly reduced without knowledge based direction. By what he does, the commander demonstrates what he relies on to make decisions. Operators will become less motivated to exploit their systems if their commander does not effectively use the products produced by those systems. This may occur if the commander does not possess a basic understanding of how to exploit his C2 systems. Commanders trained on exploiting C2 systems, however, can realize the full potential of those systems during post-fielding operations.

Commanders are not the only leaders within an organization. Staff officers also provide leadership within their organizations. The commander influences how subordinates train and operate, and so too do staff officers. Staff officers hold primary responsibility for how their sections operate, and how their systems are used. In some instances, staff officers may even be systems operators. For these reasons, staff officers must fully understand systems capabilities and how best to support their commanders. Because many company grade officers lack the experience necessary to make use of decision-making methods associated with ABCS, it is only necessary to investigate the training field grade officers require to exploit digital C2 systems. The proposed "staff" training population was further limited to students at the School of Advanced Military Studies (SAMS) because that is the first course of instruction within CGSC that provides the same MCS related training to all field grade officers. The SAMS student is an ideal officer to train to exploit technology since the field grade planner directly influences command-wide ABCS potential exploitation. By incorporating its use into the planning effort, further exploitation can occur during execution.

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[8] Department of the Army, FM 22-100 (Washington, D.C.: United States Government Printing Office, 1990), 1.

Commanders determine whether subordinates merely use technology or exploit technology. ABCS operators and first level users of the technology usually receive training only on the system related to their Military Occupational Specialty (MOS). Thus trained, they tend to focus only "on their lane." Their immediate supervisors similarly focus on their duty requirements. The commander, and to a lesser extent field grade staff officers, routinely see across staff functional areas. The commander's role is critical to technological exploitation because he sets the goals, establishes priorities, and maintains focus on his goal. To paraphrase Peter Drucker[9], staffs focus on doing things right, commanders focus on doing the right things. If the right thing to do is to exploit the synergistic capabilities of an integrated system of systems, then the commander must learn how to direct that effort. To direct that effort effectively, he must not only know how to use his assigned equipment, but also know how his equipment fits into the Army's digital C2 architecture.

U.S. Army Digital C2 Systems

The title "Army Battlefield Command Systems" (ABCS) was adopted in September 1993.[10], and includes inter-linked C2 systems supporting all levels of command from army to platoon. The Army Global Command and Control System (AGCCS) is used at army and corps level, and interfaces with the "Joint" Global Command and Control System (GCCS) and the Army Tactical Command and Control System (ATCCS). Corps, division, brigade, and battalion levels of command use ATCCS. ATCCS is actually a family of systems as described below. The Force XXI Battle Command Brigade and Below (FBCB2) system is used at levels of command between brigade and platoon. ATCCS is the focus of this monograph because it supports the majority of field grade commanders and planners.

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[9] Peter F. Drucker, The Effective Executive (New York: Harper and Row 1966), 1.

[10] "Chapter 5: Battle Command," "US Army Combined Arms Command Annual Command History: 1 January 1992 - 31 December 1993," p 7; available from http://call.army.mil/products/cachist/leav9293/chap5.htm; Internet; accessed 5/2/01.

ATCCS has been the name for the Army's battlefield C2 family since 1986.[11] Tracing its lineage to C2 systems first developed in the 1960s, ATCCS was a direct outgrowth of "Sigma Star" efforts to integrate several C2 systems across separate BFAs. Current C2 systems under the ATCCS umbrella are the Advanced Field Artillery Tactical Data System (AFATDS), the All Source Analysis System (ASAS), the Combat Service Support Control System (CSSCS), the Air and Missile Defense Work Station (AMDWS), and the Maneuver Control System (MCS). Each system effectively improves functionality within its BFA. The five systems have also achieved some level of integration with each of the other systems.

To reduce the complexity of the full integration challenge, the ABCS community selected MCS as the keystone system to tie all members of the ATCCS family together. For that reason, the most likely place to exploit the power of the ATCCS will be through MCS. CGSC is fielding MCS in the client-server configuration (i.e., MCS server with multiple MCS Light systems operating as clients) to support training on this critical ATCCS node. The MCS client-server arrangement should fully support any student "technology exploitation" training deemed required. The necessary training equipment is available, is the training itself also available?

Available ABCS Training

As expected, the digitized division (4ID) and the Interim Brigade Combat Team (IBCT) receive state-of-the-art training. CECOM, through the Program Executive Office for Command, Control, and Communications Systems (PEOC3S), ensures that complete training is available, and supports the systems fielded. To support the fielding and training effort, a Central Technical Support Facility (CTSF) provides space and resources to the numerous offices and organizations contributing to that effort. New Equipment Training (NET) adheres to guidance provided by the responsible TRADOC offices. The TRADOC Program Integration Office – ABCS (TPIO-ABCS) generates and coordinates requirements across the ABCS spectrum, while the TRADOC

[11] Stanley, 28.

System Managers (TSMs) provide the System Training Plans (STRAPs) for their respective systems. TSM-MCS, in particular, issued its STRAP on 7 October 1996. Significant support is provided by University XXI, "a collaboration between the University of Texas and Texas A&M in support of digitization issues for the Army."[12]

CTSF sponsored training includes both individual tasks and collective tasks. In all cases, training is oriented on objective tasks that can be readily evaluated (e.g., display page x, transmit report y). CTSF MCS training fulfills New Equipment Training (NET) requirements. The training provided will ultimately support institutional training.[13] TRADOC's Warrior-T office located at the CTSF has documented the individual training tasks described above, and completed a task crosswalk between individual and collective tasks. Warrior-T has not developed a commander's task list.[14] Training materials developed and used at the CTSF are available from the Warrior-T office or from the Army Training Support Center (ATSC).

CGSC currently provides training featuring relatively heavy ABCS use in the Command and General Staff Officer Course (CGSOC) and the Combined Arms and Services Staff School (CAS3). CGSOC conducts four electives in which students directly interact with ABCS equipment. A334 (MCS) and A335 (ASAS) extensively cover what the systems can provide, and how to get it from the systems in support of a non-digitized unit. A308 (Digital Division) and A311 (IBCT) cover the specific systems in less detail, but conduct training within the framework of a digital Tactical Operations Center (TOC). All electives feature embedded training techniques, but remain focused on operator tasks when working with the digital C2 systems. Students gain digital C2 "literacy," versus proficiency."[15] CAS3 features MCS use as part of

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[12] A. White, "Digital Battle Staff Training Deficiencies and Mission Essential Task List Mapping," May 2000, p 4; available from http://www.university-xxi.org/docs/Ro222.pdf; Internet; accessed 8 Feb 01.

[13] TRADOC System Manager-Maneuver Control System, "Maneuver Control System (MCS) System Training Plan (STRAP)," 7 Oct 96, p 7; available from http://www.atsc.army.mil/warmod/strap/strap.htm; Internet; accessed 13 May 01.

[14] Response proved during Warrior-T "Digital Command" officer professional development presentation at Fort Leavenworth, 21 Feb 01.

[15] LTC Steven Davis, interviewed by author, hand-written notes, Fort Leavenworth, 20 Feb 01.

MDMP training. Emphasis is on MDMP, not MCS. Both institutional instruction and ABCS NET programs provide field grade officers with a comprehensive level of user understanding on the systems featured in the respective courses. To determine whether knowing how to use the equipment equals knowing how to use the equipment to support decision-making requires an understanding of how decision-makers and units make decisions.

CHAPTER THREE

DECISION-MAKERS AND THE DECISION-MAKING PROCESS

The civilian equivalent of the military commander is the executive. Whether a junior or senior executive, that person is responsible for managing subordinates, leading group efforts, and making decisions that affect the entire organization. Many researchers have invested considerable time and effort to examine the executive and his role within his organization. Researchers have looked at all variables involved in making a decision from multiple aspects. The results of those studies warrant review because the volume of findings and results related to executive decision-makers and decision-making dwarfs the volume of findings and reports limited to military decision-makers and decision-making. The task, therefore, was to examine the available decision-making literature and derive therefrom a military decision-making model appropriate for understanding the requirements created by the introduction of digital battlefield systems.

Peter Drucker, in his book The Effective Executive, identifies five "habits" characteristic of the effective executive. First, the effective executive maximizes his time available by identifying what does not need to be considered at all, and by identifying what can be considered by a junior member. Essentially, he refrains from being a problem solver, limiting himself to key decisions. Despite giving tasks to subordinates, he ensures that their time is also not wasted. Next, the effective executive continuously provides an outward focus toward accomplishing organizational goals. Third, the effective executive builds on strengths, not weaknesses, to mobilize strength toward the best effort. Fourth, the effective executive establishes the correct priorities, and concentrates those activities in his organization where superior performance will produce outstanding results. Finally, the effective executive makes effective decisions because he knows that a few right decisions are preferable to a large number of decisions that include bad ones.[16]

[16] Drucker, The Effective Executive, 23-24, 113

The decision-maker needs information to make his decision. The manner in which the information is recognized and processed, however, varies from one executive to the next. Many individuals prefer to receive the "bottom line up front" followed by supporting details. Other individuals give more importance to the details that come last. Some individuals prefer verbal reports to written reports, but may prefer statistical representations to graphical depictions. In nearly all instances, the effective executive "edits" the problem facing him into a relatively small number of factors that need to be considered, and breaks complex problems into component parts through "decomposition."[17] Editing and decomposition provide a framework for the decision-maker to evaluate the information provided to him. Decision-makers, therefore, require information in a format that supports their thinking styles.

The effective decision-maker recognizes exactly what information he needs, and in what format, to make a decision. Paul Nutt supports the theory that the decision-maker's personality can predict how information is processed.[18] Using personality terms defined by Carl Jung[19], Nutt constructed table to map the sixteen possible personality type combinations onto specific "decision style characteristics."[20] Characteristics contained in the table include how to support the decision-making process, and key decision-making traits associated with each personality type. A condensed version of this table is at Appendix A. Nutt recommends that executives use the relatively familiar "Myers-Briggs" personality test, published in 1980,[21] to determine their personality type, and use that information to define how to present information to them.

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[17] James G. March and Chip Heath, A Primer on Decision-Making: How Decisions Happen (New York: The Free Press, Macmillan, Inc, 1994), 12.

[18] Paul C. Nutt, Making Tough Decisions. Tactics for Improving Managerial Decision Making (San Francisco: Jossey-Bass Publishers, 1989), 108.

[19] Carl G. Jung, Psychological Types (London: Routledge & Kegan Paul, 1923), quoted in Paul C. Nutt, Making Tough Decisions. Tactics for Improving Managerial Decision Making (San Francisco: Jossey-Bass Publishers, 1989), 108.

[20] Nutt, Making Tough Decisions. Tactics for Improving Managerial Decision Making, Table 7-2, pg134-137.

[21] I[sabel] B[riggs] Myers and P[eter] P. Myers, Gifts Differing (Palo Alto: Consulting Psychology Press, 1980), quoted in Paul C. Nutt, Making Tough Decisions. Tactics for Improving Managerial Decision Making (San Francisco: Jossey-Bass Publishers, 1989), 108.

Regardless of how an executive prefers to get his information, he only needs to process the information relevant to the decision at hand.

The presentation of unnecessary information to a decision-maker impedes his ability to make decisions. Delivering unnecessary information and needed information to the decision-maker in the same format is counterproductive. Critical items have the same value as fluff items. Non-critical items bury important information. In general, this occurs because of too much detail. This problem usually grows. Questions about the unimportant data frequently generate a request for more details. More information is not always the answer because added information may inhibit the executive's ability to see all of the relevant material, to see the "big picture."

The "big picture" is a combination of factors relating to the decision at hand, and the goals that the executive is trying to achieve.[22] Subordinates may focus on a portion of a problem assigned to them by a superior. When subordinates report their piece of the solution, decision-makers not only put the pieces back together, but also maintain perspective between potentially conflicting inputs. The adage that "it's hard to remember that your job was to drain the swamp when you're surrounded by alligators" may represent the environment in which a complex decision is made, but the effective executive always remains focused on the true goals. The effective executive retains overall situational awareness, and ensures that the decision made actually accomplishes what has to be done regardless of the methodology used to reach the decision.

Methods of Problem Solving

Decision-makers use three basic methods to analyze problems and reach decisions. Two "optimizing" methods are discussed, "comparison of courses of action" and "recognition-primed decision" making. The decision-maker uses an "optimizing" method when trying to make the best possible decision. The third method discussed is "singular evaluation." The singular

evaluation method is a "satisficing"[23] method. Satisficing is selecting the first option that works. Researchers have also discovered that successful decision-makers routinely use visualization techniques to solve problems regardless of which decision-making method is used.

A decision-maker will generally make the best decision by using the "comparison of courses of action" decision-making method. This method requires the decision-maker to identify the problem, identify options, establish evaluation criteria, prioritize the evaluation criteria by mathematically weighting each criterion, evaluate each option against the criteria, and pick the highest valued choice.[24] One decision-maker's "best" decision may be different from a second decision-makers "best" decision. Varied options, criteria, and criteria weighting will produce varying decisions. The comparison of courses of action method requires the most time to complete of any method observed; however, fewer follow-up decisions are required to address unforeseen problems. The comparison of courses of action method is the best optimizing technique.

The Recognition-Primed Decision (RPD) method is another optimizing technique. Using RPD, a decision-maker analyzes a situation, matches it to a known problem that the decision-maker has seen before, possibly adapts the known solution, and acts. When asked, the decision-maker frequently replies that he "just knew what to do. "[25] An experienced decision-maker is required to employ the RPD method. Inexperienced decision-makers will also use this method;

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[22] Drucker, The Effective Executive, 23, 130. Drucker emphasizes that the executive provides an outward focus toward goals and on what the decision has to accomplish.

[23] Herbert A. Simon, Models of Man: Social and Rational (New York: Wiley, 1957), quoted in Gary Klein, Sources of Power. How People Make Decisions (Cambridge, Mass: MIT Press, paperback edition, 1999), 19-20. Simon coined the term "satisficing" by combining the terms satisfy and sufficing. The term satisficing is used within the Decision-Making research community to describe non-optimization methods.

[24] Peer O. Soelberg, "Unprogrammed Decision Making," Industrial Management Review 8 (1967): 19-29, quoted in Gary Klein, Sources of Power. How People Make Decisions (Cambridge, Mass: MIT Press, paperback edition, 1999), 10-11. Soelberg provides the steps used in the "Comparison of Courses of Action" method. They are representative of the steps listed by various authors.

[25] Gary Klein, Sources of Power: How People Make Decisions (Cambridge, Mass: MIT, 1998; paperback edition, 1999), 17. In this example, Klein analyzed the decisions made by fire fighting commanders. He determined that the Commanders "just knew what to do because their experience let them see a situation, even a non-routine one, as an example of a prototype, so they knew the typical course of action right away."

however, their store of previously solved problems may not completely match their current problem. The RPD method is the best method to use to solve problems requiring nearly immediate decisions. RPD relies heavily on experience and is, in fact, the most frequently used optimizing method.

The singular evaluation method is a satisficing decision-making method. The decision-maker uses this method to make quick decisions whenever he is unable to map a current problem onto a previously experienced problem. The term "singular" does not mean that the decision-maker only considers one course of action; it means that he only considers one course of action at a time. Evaluation criteria are limited to determining that the plan is suitable (i.e., appropriate for the task to be performed), feasible (i.e., can be accomplished), and acceptable (i.e., produces the desired result at an appropriate cost).[26] The decision-maker adopts the first plan considered that fulfills all three criteria listed above. A high probability of success, not necessarily a high quality result, is the goal of the singular evaluation method.[27] The singular evaluation method is the most frequently used decision-making method to resolve critical decisions under time pressure[28]

Decision-makers employ visualization skills when using any of the three decision-making models. Course of action comparison, RPD, and singular evaluation all require the decision-maker to predict the consequence of their decision. The decision-maker mentally understands the problem by picturing it in his mind, then creates a mental picture of the future.[29] Visualization is essential to the RPD process, which by definition depends on recognition. "Recognition" only occurs when a person's mind develops a cognitive understanding of the problem under consideration. Visualization may be vivid (e.g., a firefighter remembering a previous fire), or more subtle. An example of subtle recognition occurs when tasked to remember the letters in this

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[26] U.S. Naval War College, Sound Military Decision (Newport, RI: U.S. Naval War College, 1942), 32.

[27] March, A Primer on Decision-Making: How Decisions Happen, 22.

[28] Soelberg, "Unprogrammed Decision Making," 19-29. Soelberg set up his experiment to prove that individuals normally compare two options. Observed results indicated that a subject considers only one option at a time.

sentence. The mind easily remembers the letters by recognizing the words that they form.[30] Visualization improves all decision-making methods, but is most beneficial when used early in the decision-making process.

Leading the Decision-Making Process

The decision-maker is responsible for the decision-making effort within his organization. Deciding how to make a decision is perhaps the most important decision he will make throughout the process. To facilitate the decision-making process, he must effectively communicate with his subordinates. He must also do more than direct his subordinates to solve a problem; he must ensure that the solution fits into long-term organizational goals. Making a decision is a very small part of the decision-maker's job. In practice, the decision-maker spends the majority of his time framing problems and directing the efforts to resolve problems.

Executives who routinely make the best decisions do so because they maintain the best levels of communication with their subordinates. Successful decision-makers not only provide information and direction to their subordinates; they also define how the subordinates should provide updates to the decision-maker. Examples of provided information includes clear goals, definitions of a problem's scope, and directed focus on what is important.[31] Updates may be required systematically, on a daily basis, or only when the subordinate has completed his tasks; and may require an emphasis on supporting logic or possible ramifications.[32] Decision-makers

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[29] Sound Military Decision, 30.

[30] Peter H. Lindsay and Donald A. Norman, Human Information Processing: An Introduction to Psychology, 2d ed. (New York: Academic Press, 1977), 564.

[31] Klein, Sources of Power: How People Make Decisions, 225. The seven types of information that are required to help subordinates understand what to do are the purpose of the task (higher level goals), the objective of the task (an image of the desired outcome), the sequence of steps in the plan, the rational for the plan, the key decisions that need to be made, the anti-goals (unwanted outcomes), and the constraints and other considerations.

[32] Drucker, The Effective Executive, 94-95.

make the best decisions when subordinates cater to the perception skills of the decision-maker.[33] The decision-maker bears the responsibility for ensuring that subordinates know and understand what he needs to make a decision.

The purpose of any action requiring an executive's decision must support organizational goals. The executive must routinely reinforce these goals, or risk receiving unsatisfactory proposed solutions for his consideration, and wasting time. Subordinates also need anti-goals (i.e., unwanted outcomes) to facilitate problem resolution. To make the best decision in the shortest time requires the decision-maker to define "what is right"[34] at the start of the process. The optimum definition of what is right will state the purpose, and rational behind the requirement to decide something. Subordinates armed with goals and rational will develop proposals for the decision-maker that support higher level goals.

The effective executive defines the scope of the problem for his subordinates by stating the task's objective, along with a clear understanding of what the desired outcome looks like. Known issues and underlying realities related to the problem provide the starting point for subordinates to use.[35] If the executive has broken the problem into a series of smaller problems, then he should outline the anticipated sequence of steps needed to complete the action. Constraints and other considerations known to the decision-maker accompany the problem statement. Depending on their personalities, decision-makers may remain closely involved with every step taken by their subordinates as they prepare their proposals for decision. If the executive prefers this type of hands-on approach, he must not allow himself to fixate on only resolution of the problem.

The effective executive does not become so involved in the work of his subordinates to cause him to lose sight of the efforts true focus. To get the product he needs, the executive must

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[33] Ben J. Heirs and Gordon O. Pehrson, The Mind of the Organization: On the Relevance of the Decision-Thinking Process of the Human Mind to the Thinking-Processes of Organizations (New York: Harper & Row, 1977), 84.

[34] Drucker, The Effective Executive, 134.

[35] Ibid., 114.

provide directed focus on what is important. He enforces a "first things first"[36] attitude to ensure that the important tasks receive proper precedence. His focus includes an emphasis on previously stated goals in order to keep subordinates from developing problem solutions that are not suitable for the organization. The effective executive also applies this focus to his own actions to ensure that essential decisions are made first. The decision-maker, by focusing on the right things, makes effective decisions.

[36] Ibid., 100.

CHAPTER FOUR

MILITARY DECISION-MAKERS AND THE MILITARY DECISION-MAKING PROCESS

Unique Military Decision-Making Considerations

Some argue that the civilian decision-making model does not apply when trying to solve military problems. Three points possibly support that argument. First, different things are at stake. Second, factors facing the military commander do not equate to those found in civilian situations. Third, the civilian community lacks the well-defined hierarchical command and staff structure found in the military community. [37] Detailed comparison of the two communities; however, reveals that the decision-makers, and the methods they use, are virtually identical. The military does have a decision-making advantage not found in the general civilian community. That advantage is due to the amount of training dedicated to supporting the decision-making process, not due to an in-place hierarchical command and staff structure. The presence of small differences between the military and civilian decision-making environments does not reduce the suitability of using civilian-based observations and findings to develop military training requirements.

Making decisions about the life and death of a business enterprise does not compare to making decisions about an actual person's life or death on the battlefield. On a wider scale, battlefield failure caused by a bad decision can adversely affect other units. Both of these examples illustrate why the military tries to make critical decisions in a deliberate manner, using expert knowledge whenever possible.[38] In case after case, the decision-making process used by

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[37] William A. Reitzel, Background to Decision Making (Monograph, U.S. Naval War College, 1958), 31-59. Prof. Reitzel presents a general discussion of why military decision-making is different from non-military decision-making. He includes concepts such as complexity, an enemy, and command responsibility.

[38] Ibid., 35.

the military decision-maker is the same one used by a non-military decision-maker. The stakes may be different when comparing decisions in the military environment to decisions in the civilian environment, but the dilemma faced by the decision-maker and the methods available to solve the problem are the same.

Mission complexity and the presence of a thinking enemy are two significant factors not routinely associated with decisions in the civilian environment. A military unit deals with complexity through staff specialization. An executive must break his problem into manageable pieces in order to assign task responsibility to a subordinate. While the civilian organization may not have the "staff" structure to automatically process subtasks, the process is the same once the problem is broken down into component problems. The military staff structure does have a civilian equivalent in large corporations. The second factor, a thinking enemy, compares favorably to the civilian term for a thinking opponent with opposite goals, a "business competitor." Factors that appear to be unique to the military decision-maker usually correlate to factors considered by the civilian counterpart, and actually serve to reinforce the suitability of the civilian based decision-making model.

Civilian to Military Conversions

There are minor differences between the terminology used in the civilian decision-making environment and that used in the military decision-making environment. Replacing civilian terminology with military terminology does not undermine the validity of any concepts developed in the previous chapter. Military terminology is used exclusively in the next chapter to develop the required training that is needed to enable field grade commanders and planners to exploit C2 technology. The following examples of "civilian" to "military" translations highlight the type of minor differences that exist:

Competitor => Enemy
Decomposition => Assignment of subtasks
Executive => Decision-maker/Commander
Marketplace => Battlefield
Organization => Unit
Subordinates => Subordinates/Staffs

All three civilian decision-making methods appear within the military. The civilian "comparison of courses of action" method follows the same steps used in the deliberate Military Decision-Making Process (MDMP). The civilian method covers the entire MDMP, not just the step within the MDMP that shares the same name (i.e. "comparison of courses of action (COA))." The Recognition Primed Decision method serves as a model for the U.S. Marine Corps' Intuitive Decision-Making course.[39] The third method (i.e., the singular evaluation method that seeks a suitable, feasible and acceptable option), while not taught as a separate method in the Army, forms the heart of MDMP COA development training. Visualization of the problem, and the solution, is an important tool in the military methods. The ability to visualize the situation remains an important military decision–making tool during future military operations.[40]

Institutional Training

The Military Decision-Making Process is taught to Army officers at all levels of professional military training. The subject receives high emphasis in CAS3, CGSOC, and throughout SAMS. The MDMP is the primary decision-making method taught because it routinely allows the decision-maker to select a near optimum solution to any problem. Key steps within the MDMP that relate to civilian methods are COA development, wargaming, and comparison. Developed COAs adhere to satisficing requirements required by the singular evaluation method, while wargaming allows even inexperienced officers to visualize problems and each COA's end state. The MDMP, like its civilian counterpart, is, in fact, especially useful for the inexperienced.[41] The downside of routinely using the MDMP is that it can generate pre-formatted responses to new

[39] Klein, Sources of Power: How People Make Decisions, 44. "Lieutenant General Paul Van Riper has guided organizations such as the Marine Corps Combat Development Command at Quantico, Virginia, to support intuitive decision-making. The Marines are beginning to use rapid pattern-matching exercises developed by Major John Schmitt (U.S. Marine Corps Reserves) and other officers. In both places, the emphasis on pattern matching seemed more helpful than lessons on formal analysis of alternate options." The closest parallel in the Army is the "Leadership Reaction Course." Few officers go through the LRC after their Officer Basic Course.

[40] Michael D. Jones, "CCIR: A Tool for Information Dominance," Military Review 81:2 (March-April 2001): 25-26.

problems. Staffs substitute experience with the process for experience with the problem. Process experience generates automatic responses that can cause the MDMP to lose its pliability, adaptability, and originality.[42] Automatic responses speed the decision-making process, but are a feature of the Recognition-Primed Decision method, not the MDMP. [43]

Field observation demonstrates that an officer actually makes more use of the RPD method as he progresses through his career. Tank platoon leaders at Fort Knox use the RPD method to make decisions less than fifty percent of the time, while a brigade Tactical Operations Center (TOC) at Fort Hood recently resolved over ninety-six percent of their problems using RPD.[44] Junior officers receive RPD related training through hands-on exercises such as the "Leadership Reaction Course." Ironically, as an officer expands his experience base, and is better able to exploit the RPD process, he receives fewer opportunities to understand and hone his RPD skills through directed training. A significant potential exception within the institutional training community, under development by the School for Command Preparation, is the "Think Like A Commander" (TLAC) cognitive battle drill. Featuring "adaptive thinking methodology designed to develop critical creative thinking skills,"[45] TLAC focuses on building the commander's experience base using a series of problems requiring rapid decisions in a mentored learning environment. The TLAC course does not train a commander to integrate his experienced-based rapid decision-making capabilities with an inexperienced staff's MDMP methodology.

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[41] Klein, Sources of Power: How People Make Decisions, 103.

[42] Reitzel, Background to Decision Making, 72.

[43] Ibid., 95. Decision makers tend to use RPD when they are under greater time pressure, have a higher experience level, are under dynamic conditions, and have ill-defined goals. They use rational choice when they have a need to justify, an internal conflict to resolve, need an optimized solution, and faced with greater computational complexity.

[44] Klein, Sources of Power: How People Make Decisions, 97-98. The finding that RPD was used to make 96+% of all decisions surprised Klein's associates because of the emphasis placed on methodical comparison techniques during MDMP training.

[45] School for Command Preparation, "Think Like a Commander," 3 April 2001; available from http://www-cgsc.army.mil/scp/tlac.asp; Internet; accessed 2 May 01.

On a larger scale, the Staff – Digital Leaders Reaction Course (S-DLRC), validated during eight command post exercises, has the potential to exercise both RPD and MDMP decision-making skills. TRADOC's Training Initiatives Office recently proposed the creation of a fixed-site S-DLRC for the 4th ID.[46] S-DLRC features an "adaptive thinking training methodology" that allows commanders and staffs to examine decisions made, and not made, in a digital environment. Repeated S-DLRC iterations will enhance the capabilities of the commander and staff; however, the course presently is oriented on making decisions and then analyzing those decisions, not on how to make decisions using RPD techniques. Trainers can use S-LDRC exercises to reinforce the commander's need to visualize various aspects of his problem and to maintain situational awareness.

Decision-Makers and Situational Awareness

Visualization of a problem, from problem recognition through solution, is an essential component of effective decision making. For reasons explained earlier, the decision-maker's critical responsibility throughout the decision-making process is to maintaining situational awareness, and a view of the "big picture." The decision-maker, due to his level of experience, will recognize when a sense of the big picture is being lost before his subordinates do.[47] Inherently understanding the need to retain a solid grasp of the big picture, he will act to retain situational awareness. The less experienced subordinate probably will not recognize the decision-maker's compensating measure as an attempt to retain situational awareness. Recognizing various compensating measures for what they are, a commander's attempt to retain situational awareness will trigger subordinates to provide truly needed information to the decision-maker. In a digital environment, compensating measures include returning to analog systems (e.g., the paper

[46] Training Initiatives Office, "Concept Proposal Brief," 2 Feb 01; available from http://www.university-xxi.org/docs/briefings/dd2n19.pdf; Internet; accessed 8 Feb 01.
[47] Klein, Sources of Power: How People Make Decisions, 158.

map), broadening informational focus, narrowing informational focus, and making administrative changes.

A digital decision-maker will turn away from his digital C2 system, and use a paper map for two reasons. He either "just likes to use a map" or he is losing situational awareness. Training is required to overcome both cases. A commander, who has used a paper map to make decisions in the past, will continue to use the paper map until he readily receives the same information from his equipment. Communication between the commander and his staff is as important as it is in the civilian community. If the commander does not know the capabilities of the system well enough to request specific information, displays, or reports, then his subordinates must anticipate his needs. "Going to the map" is a better option than allowing the commander to lose situational awareness. This option is only available if there is an available, properly posted map. If a map is required, someone has to maintain it. To exploit the full potential of digital C2 systems, commanders and staffs must work to eliminate the need to use non-digitally linked tools. The commander must make decisions based solely on information provided by digital C2 systems in order to achieve maximum personnel and digital processing efficiencies.

A commander losing his situational awareness may request information that is more detailed. The request for more information assumes that detail will provide greater understanding of the situation. The loss of situational awareness is due, however, to an inability to integrate already presented information into the commander's overall image of the problem. As observed in the brigade AWE, "a surplus of data does not equal knowledge."[48] Key leaders must remain focused on essential information when making a decision. Unneeded information only masks the critical information from view. Commanders do need to train subordinates to check details during the decision-making process, but they do not necessarily need to see all of those details when trying to make their decision. Commanders make essential decisions; subordinates make subordinate

[48] Stanley, Evolutionary Technology in the Current Revolution in Military Affairs: The Army Tactical Command and Control System, 46.

decisions. Before asking for new information, the commander should ask himself whether the information he is about to request will make a difference in his decision, or if it only needs visibility during execution.

Greater detail is useful to detect and recognize developing problems. Because a commander spends the majority of his time monitoring his unit's actions and supervising subordinates, his normal mode of operation includes a routine evaluation of a wide range of detailed information. The commander decides what to decide immediately after problem identification. He also determines what information he needs to make his decision. The commander may be uncomfortable using less information to make an important decision than he considers for day to day oversight, but he should only consider relevant information to make decisions effectively. Commanders who can differentiate between making a decision, and monitoring their units, can differentiate between what they do, and do not, need to see to make a decision.

A third way to compensate for a loss of situational awareness is to focus on a portion of the problem that falls within the commander's "comfort area." A comfort area can be any facet of the problem that is within the decision-maker's experience base (e.g., an armor officer commanding a task force would focus on armor related indicators). Although the decision-maker may already thoroughly understand that portion of the problem, he requests extra detail in the hope that his solid grasp of the problem within the comfort area can expand to cover the entire problem. He may regain situational awareness by focusing on a portion of the problem. The solution, however, will be potentially weighted toward satisfying "comfort area" requirements due to the presence of the additional (unneeded) factors that are now considered in that area.

The final compensating technique is to adjust the way the decision-maker sees the information. Efforts to change the format of the products in order to support the decision-maker's informational processing preferences will help him retain situational awareness. Each decision-maker requires tailored information because each decision-maker processes information

differently.[49] Adjusting the font, or changing the background color, near the decision phase of the decision-making process is not a good indicator of success. Commanders need to establish their informational requirements at the beginning of the effort.

Ultimately, in the digital environment, using paper maps and changing digital informational format enroute to a decision degrades the decision-making process. Both actions increase manpower demands and slow the flow of data within the command. Degradation of the process may be a better option than making a decision without situational awareness; but the ABCS family is supposed to enhance capabilities, not degrade them. Digital C2 systems can only be exploited when units effectively employ the systems to support their needs. Commanders and their staffs are responsible for using their equipment properly. That will happen when commanders and staffs know what the commanders really need to make the critical decisions. Commanders and their senior subordinates can learn how to exploit the technology provided for their use.

[49] For example, when receiving logistics information, a commander may want to see classes of supply reported as "red-amber-green," while some want to see each class as a percent of basic load, while still others might request a trend chart that shows both past and projected information.

CHAPTER FIVE

REQUIRED TRAINING

> The discriminator among competitors is not who possesses the technology but who uses it best. Leading a technology-rich organization requires systemic understanding and not simply functional efficiency. It also requires that the organizational leader and the technological specialist know enough about each other to communicate and cooperate in accomplishing the mission.[50]

General Topics

Training designed to teach field grade commanders and planners to exploit digital C2 systems must include both technical and tactical subjects. Technical topics include subjects such as components of the system, equipment requirements (e.g., physical space), operator manning and training requirements, connectivity requirements, standard network configurations, strengths of the system, and products that can be produced by the ABCS family. The product of this technical training should be an officer able to supervise and deploy a system and its operators. In general, technical subjects deal with how to operate and use ABCS equipment. Tactical training follows technical training, and teaches the student how to employ the systems. This training produces an officer prepared to exploit the system's full capability. Tactical training related to exploiting technology must include system weaknesses, using systems to support decision making, and using systems to support unit execution.

The greatest weakness of the ABCS family of systems is that it only does what someone tells it to do. A new operator armed with 40 hours of training,[51] can extract data, prepare products, and answer questions, but cannot read the decision-maker's mind to know what the decision-maker really needs. The power of MCS is its ability to relate and tie information together. MCS can overwhelm the decision-maker with information. Commanders and staffs must identify to the operator exactly what they need to see, or they potentially limit the role of the entire ABCS

[50] Linda C. Jantzen, "Taking Charge of Technology," Military Review 81:2 (March-April 2001): 66.
[51] MCS STRAP, 7.

family to that of word processor, presentation aid, and data shuffler. To avoid the potential flood of unneeded information, ABCS users need to be taught the type of information to request, and the type of information not to request during the decision-making process.

The second weakness is that MCS training, performed independently, only hones operator skills. An individual builds confidence in his ability to select the correct menu item in order to display a particular product in this manner. Individual training will not build unit confidence in its ability to support the commander's decision-making requirements. Collective training is required to develop confidence that the commander can maintain situational awareness solely through the MCS. Officers must learn how to plan and conduct this training so that all involved in the decision-making process can explore system capabilities, refine procedures, and build unit confidence. The relationship between the commander's needs and the products produced by an operator must be clear or else system training can only be considered a "miscellaneous scrap bag"[52] of events

To get the most from MCS, system training must include how to support the decision-making process with MCS. MDMP training teaches the student how to conduct planning, but provides limited information on how to support that planning effort. Learning what type of information is required, how to present the information that is required, and how to maintain situational awareness will prepare the student to get what he needs from MCS. MCS is a powerful tool if used effectively; it can also be a powerful hindrance to success if allowed to generate data without guidance. The student must understand the fact that the power of MCS is multiplied when employed correctly (i.e., combined with an experienced decision-maker's knowledge).

MCS users must learn that different levels within the decision-making process use different types and amounts of information, and that not all information is important. An important lesson is that different information is required to make a decision than is used for routine unit command

[52] Dewey, How We Think: A Restatement of the Relation of Reflective Thinking to the Educational Process (Lexington [Boston], Mass: D.C. Heath and Co., 1933), 185.

and control. MCS can generate too much information during the decision-making process. Uncertainty dominates the military decision environment. More information will not eliminate uncertainty. Subordinates must learn to act on information at their level, and resist the temptation to report all that they considered to the commander. Information provided to the commander is limited to critical details and information needed by him to maintain situational awareness. Situational knowledge, explicit detail on everything happening in his area of operations, is not the same thing as situational awareness. Commanders and staffs that understanding their informational requirements are enabled to effectively task MCS for that information.

Commanders and staffs next need to learn the critical nature of how and when they view information. Where information appears in a presentation affects how it is processed. Information presented first receives more weight.[53] If certain critical information is more important than other information, present it first. Likewise, present the most probable action or situation first. Paul Revere, expecting a British land advance, listed his expected option first (i.e., "One if by land and two if by sea"),[54] thus setting the first "American" example for all involved in the decision-making process to follow.

Frequency and vividness of presentation also affect how much weight a decision-maker gives to a particular piece of data.[55] If a single critical piece of information appears several times in slightly different form, it gains the weight of several pieces of information. If this information must appear multiple times, it should at least be grouped together to attempt to avoid false weighting of its importance. Similarly, a commander will give more weight to information that he "sees" vividly in his mind. A commander briefed that an avenue of approach includes marshland that a vehicle could be stuck in, can visualize a stuck vehicle from experience. The

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[53] Lindsay, Human Information Processing: An Introduction to Psychology, 541, 634. "Just how the impressions are formed and compared determines the resulting decision and the same person can arrive at different decisions simply by comparing the same things in different order." "...information received first seems to be weighted most highly...information received last tends to be best remembered (temporarily)."

[54] March, A Primer on Decision-Making: How Decisions Happen, 25-26. March uses the term "optimal coding" to describe placing items in sequence according to importance.

mental image of a stuck vehicle gives greater weight to that information than less vivid information.[56]

In many cases, vividness helps the commander to visualize the big picture. Anything that helps the decision-maker retain full situational awareness is good. The decision-maker needs to learn; however, that visualized information may gain more importance than it may deserve. Staffs also share the burden of applying visualization techniques equitably across critical decision factors. More important critical factors should not be presented to the commander in a format that is difficult for him to process, while forwarding less important information in a format that he does prefer. If the senior staff officers do not know what type of format the commander prefers, they may be able to use the chart discussed in Chapter Three, provided in Appendix A. Ideally, all information going to the commander is in a format suited to him.

Once the decision-making process is underway, the commander is responsible for more than just receiving information and making the decision. All officers involved in the decision-making effort need to learn the commander's various responsibilities related to the decision-making effort. The commander is a decision-maker, a source of experience, a supervisor, and a trainer. He adds to the process the unique value of his experience which combined with the information provided, generates a decision that is reached faster, and solves the problem better, than it could have been done without his assistance

Problem resolution begins and ends with the decision-maker. He makes the initial decision of who will resolve the problem by taking it on himself (with or without major staff assistance), assigning it to a subordinate commander, or assigning it to a subordinate staff element. If it is "his" problem, he continues the decision-making process by providing guidance to his

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[55] Nutt, Making Tough Decisions. Tactics for Improving Managerial Decision Making, 59-69.

[56] Using the same commander, an example of less vivid information would be if he were also told that the avenue of approach is the only one that provides "cover and concealment" for dismounted infantry." The term "cover and concealment," if processed only as a conceptual term, will not be vividly remembered.

subordinates.[57] Commanders also decide how they will monitor the progress of their subordinates in accordance with their decision-making style.[58] --One thing they should not do is hover over the MCS display. To paraphrase Karl Albrecht: "The experience of looking at MCS continuously relates to decision making the same way that chewing gum relates to talking. Part of the same apparatus is involved, but there is no output."[59]

Commanders add value to the decision-making process by recognizing situations that may not be apparent to less experienced subordinates. Initial problem framework and guidance provided to subordinates is possible because of the commander's ability to recognize the current problem as similar to an earlier one.[60] During the decision phase of the process, the commander applies his visualization and pattern recognition skills to the objective information presented to him to determine what "right" is and make the best possible decision. His ability to make an RPD based decision to verify, reject, or modify the numerically based COA comparison recommended by the staff is the final value added quality provided by the commander. All involved with the decision-making process must learn that the commander's ability to do this depends on his ability to visualize the problem, and the solution. Techniques used to retain situational awareness should be used to present the proposed solutions in a recognizable manner.

The commander supports and influences the decision-making process within his unit in two other ways. Training affects the process before the process begins and commanding the unit affects the process when it is underway. Through training, he establishes his unit's baseline decision-making capabilities. He may not conduct the training, but since it involves him personally, he must establish training criteria, standards, and priority. Commanders and senior

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[57] Klein, Sources of Power: How People Make Decisions, 225. The seven types of information that are required to help subordinates understand what to do are the purpose of the task (higher level goals), the objective of the task (an image of the desired outcome), the sequence of steps in the plan, the rational for the plan, the key decisions that need to be made, the anti-goals (unwanted outcomes), and the constraints and other considerations.

[58] Feedback may be required step by step, on a daily basis, or only when the subordinate has completed his tasks; and may require an emphasis on supporting logic or possible ramifications.

[59] Karl Albrecht, Brain Power: Learn to Improve Your Thinking Skills (Englewood Cliffs, NJ: Prentice Hall, 1980), 5.

staff officers need to learn how to conduct training that will enable their units to exploit digital C2 systems. As a commander, he must let his staff work the problem while he continues to execute his non-decision-making command duties. A commander collects a wealth of information that is hard to quantify by talking with, and seeing, subordinate commanders and soldiers in his unit.[61] Intangible information personally collected by a commander directly supports his ability to retain situational awareness.

Specific Training for Commanders

A commander's course must begin with "technical" training. He probably will not need to know exactly what buttons to push to get specific products or displays, but he must develop an understanding of what is available to support his decision-making effort. As a leader, he needs to "speak" ABCS and MCS intelligently with subordinates. Commanders need a credible base of knowledge to effectively counsel and direct subordinates on system employment and training. A commander who can only differentiate between MCS and ASAS two out of three times is capable of using the technology to support his decision-making process. He is not capable of exploiting that technology to shorten his decision-making cycle.

Commanders, within their unit at least, decide what to decide. Technology today allows a commander at every level to know greater statistical detail about subordinate units than was known at the lower level ten years ago. Even 1960's technology provided enough timely information to tempt high level decision-makers to make decisions in Vietnam better left to lower levels of command.[62] As even more information becomes available, renewed emphasis is required to let subordinate commanders make their own decisions. Commanders must realize that

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[60] Klein, Sources of Power: How People Make Decisions, 89.
[61] Martin L. Van Creveld, Command In War (Cambridge, Mass: Harvard University Press, 1985), 262.
[62] John Arquilla and David F. Ronfeldt, "Cyberwar is Coming!," in In Athena's Camp: Preparing for Conflict in the Information Age, 38.

just as they know more about their subordinate commands, subordinate commanders know more about higher and adjacent units. Technology has increased the flow of information in both directions. Armed with intent, commanders can make decisions at lower levels in the chain of command.[63] To exploit this fact, commanders throughout the chain of command must make decisions at the appropriate level.

Institutional training must teach commanders not only how to exploit their systems, but also how to subsequently train their units to exploit the systems. The MCS STRAP states that "(MCS) is not a fighting system that requires separate collective training." Collective training is received "during STAFFEXs, CPXs, or FTXs."[64] Training focus during these exercises is on objectively measured skills and on how to use the systems. Commanders need to learn how to develop subjectively measured skills (e.g., how to support their own RPD and visualization efforts) that will enable their unit to do more than just use their systems to replace analog methods.

Understanding what information to request, to support his effort to make a decision, is essential for effective decision-making. The commander's course of instruction must focus on teaching commanders to only request needed information. They must understand that additional information may hide the important information, and may degrade their ability to maintain situational awareness. Orderly thought processes result from an orderly presentation of information to consider. [65] The commander must recognize his preferred order to process information, and habitually use it. By learning to ask for only needed information, he will get the detail he needs without losing his grasp of the big picture.

The commander can identify what type of information to ask for by answering one of two questions. First, will the additional information resolve a decision point that he needs to address?

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[63] Norman Davis, " An Information-Based Revolution in Military Affairs," in In Athena's Camp: Preparing for Conflict in the Information Age, ed. John Arquilla and David Ronfeldt, with a forward by Alvin and Heidi Toffler (Santa Monica, CA: RAND Corp, 1997), 89.

[64] MCS STRAP, 5.

[65] Dewey, How We Think: A Restatement of the Relation of Reflective Thinking to the Educational Process, 247.

Second, will the additional information make it harder or easier to decide? If he does not need the information, he must then decide whether someone else must address the information. If the information is not relevant to the decision, but is relevant to execution, then it joins the larger pool of indicators monitored during daily operations. At the completion of digital C2 decision-making training, commanders must understand that the purpose of getting information is to decrease the length of the decision making cycle, not to increase it.

Specific Training for Field Grade Planners

MCS exploitation training for field grade planners is also composed of technical and tactical subjects. Technical training includes everything presented in the commander's course plus additional user level work. The field grade planner's knowledge of MCS operation must be greater than the commander's knowledge because he tasks MCS operators directly for information, and may actually need to operate the equipment. The planner uses these skills to request specific products and displays needed to fulfill the commander's MCS requirements. The training requirement for field grade planners does not include system manager skills; however, training should be sufficient to make them system experts.

The primary skill included under the system expert title is that they will know how each staff section connects into the unit's ABCS constellation, and how MCS can receive each section's information. This connectivity understanding should also include higher and lower levels of commands. As C2 systems experts, planners will have the knowledge required to establish demanding usage requirements that will enable true exploitation of the C2 systems considered. At a minimum, planners will learn enough about the systems to avoid developing plans requiring digital C2 connectivity and information flow when neither is available. Training field grade planners to this level of system understanding will greatly enhance their ability to coordinate MCS support for their commander.

Field grade planners need to understand how commanders make decisions, and what information they need. Planners are a critical link between the highly experienced commander and the less experienced staff and operators. Therefore, the planner's course should include the same topics covered by commanders. At their level, field grade planners also leverage their personal experience base, and visualization skills, to make decisions on subordinate problems tasked to them. Knowledge gained from the commander's course subjects, and the general topics, will help the field grade planners better understand the commander's informational needs and help them make their own RPD based decisions.

Planners trained to anticipate the information needs of the commander must actively guard against generating unneeded information. They must not obscure the commander's view of the big picture by generating unneeded data and products. If the commander requests seemingly unneeded information, they must provide it in a form that supports retention of situational awareness. The planner must learn that it is his responsibility for ensuring that the commander retains solid situational awareness. Planner's training must also teach the officer to anticipate the needs of other staff officers and subordinate commanders, fulfill those requirements, and not overwhelm those recipients with unneeded information. Institutional planner's training will produce an officer who not only makes the commander more productive, but also makes the staff more efficient.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Field grade commanders and staff planners need to learn how to exploit the capabilities of the digital systems that support their decision-making efforts. Available training focuses on how to use the equipment. Senior leader instruction currently covers supervisor skills that are related to objectively measured collective tasks centered on generating products and fulfilling coordination requirements. Commander training is limited in scope, and is essentially an executive overview of the systems. Hands-on experience, in the form of training exercises that allow the commander to use numerous system products, supplements the executive overview. Collectively, available training builds a solid "how to use" base of knowledge that effectively teaches users and supervisors how to properly operate their systems. This solid foundation supports user technical proficiency, and sets the conditions that will enable system exploitation. Additional training for senior leaders is required to make full system exploitation a probable occurrence, not just a possible occurrence.

Field grade commanders and staff officers must fully appreciate the commander's role in the MCS assisted decision-making process. Commanders are not mere beneficiaries of modern technology; they are the difference between use and exploitation of that technology. When used correctly, technology effectively replaces analog methods to reduce decision-making time and improve execution. The commander provides the guidance and discipline required to employ "his" systems correctly, to gain linear improvement. The power of technology is multiplied, however, whenever the commander can maintain situational awareness, apply his experience, and add Recognition-Primed Decision (RPD) skills to facilitate problem resolution. Staffs must support the commander's ability to see the big picture, and determine what is "right," by

generating only needed informational products for his consideration. True exploitation of technology occurs when commanders, staffs, and technology work together to yield exponential gains.

MCS training for commanders and field grade planners must expand to include six new, or modified, subject areas. No course of instruction can guarantee that its graduates will exploit digital C2 technology. Training will increase the likelihood of achieving exploitation without spending time on trial and error learning at the unit level. Commanders and field grade officers must learn more than just how to get information from MCS, they should also learn why they need that information. To learn why, they need to learn what type of information the commander should get, how he processes that information, how he retains situational awareness, how he visualizes a problem, and how his RPD skills enhance the MDMP. Finally, they must learn how to train to fulfill requirements outlined in the preceding five topics, is needed since available collective training events are tailored to support Army-wide, objectively evaluated tasks, not fulfillment of each individual commander's unique needs.

The only training system currently developed which appears to be well suited to support training in the six additional topic areas is the Staff-Digital Leaders Reaction Course. The S-DLRC provides a methodology that has potential to train these subjects. The training material itself is unavailable. S-DLRC's main deficiency is its non-availability. Once established, it requires relatively low overhead to maintain, but the Fort Hood facility will not be available in the near-term. It is not a mobile trainer.

Recommendations

Although superior training is available that teaches operators and supervisors how to use MCS, exploitation of technology training is missing. Steps must be taken within the School of Advanced Military Studies (SAMS) and the School for Command Preparation (SCP) to improve the value of MCS training provided to designated commanders and field grade planners. Both

schools should use previously developed Command and General Staff College materials to provide their students with an executive overview of the entire ABCS family, and MCS operator details.

SAMS should reinforce the ABCS executive overview, and initial MCS training, by using MCS in its pre-existing exercise schedule. SAMS also should incorporate training identified in Chapter 5 into pre-existing SAMS course material by updating learning objectives within existing lesson plans. Enhanced training value, on these subjects, may result by conducting a mini-exercise with SAMS and SCP students. This possibility requires additional study. SAMS and SCP should coordinate to consider the suitability of a one-day S-DLRC type course that highlights the commander's role, the staff's role, and the role of information in the decision-making process.

SCP does not need to adjust the first week of its Pre-Command Course program of instruction. Course authors may want to develop a lesson that highlights the value that the commander brings to ABCS, but this is not a requirement. Officers attending the Tactical Commander's Decision Course,[66] however, should receive instruction that highlights their important roles and responsibilities related to digital C2 system exploitation. At a minimum, these select officers should receive TLAC training in conjunction with a review of decision-making information requirements as detailed in Chapters 3 and 4. The purpose of this expanded TLAC session is to unite RPD and MDMP methodologies to exploit MCS operations. A combined SAMS and SCP one-day S-DLRC type course should reinforce concepts outlined in this monograph.

Two important TRADOC offices that can directly contribute to this training effort are the Training Initiatives Office (TIO), Transformation Directorate, DCST, TRADOC, and the Battle Command Battle Lab (BCBL). TIO should provide SAMS with any available information concerning initiatives similar to S-DLRC that may be usable in the school environment. BCBL

should contribute available insights developed while preparing the "Art of Digital Battle Command" related material.

Several other TRADOC offices can assist SAMS and SCP better prepare field grade officers to exploit ABCS potential. The TRADOC Program Integration Office-ABCS (TPIO-ABCS) should monitor the development and inclusion of field grade officer training into ABCS NET training. The Army Training Support Center (ATSC), with its growing training support capability, should identify new ways to provide commanders and field grade planners with instruction on the training topics identified in Chapter Five.

Other offices with great potential to support SAMS' and SCP's commander-centric training include the Program Executive Officer for Command, Control, and Communication Systems (PEO C3S), WARRIOR-T, and University XXI. PEO C3S should continue to coordinate with, and provide support to, TRADOC by overseeing the development of training for commanders and field grade staff officers. WARRIOR-T should capture expertise resident within the Central Technical Support Facility, related to the type of topics listed above, for the Army Training Support Center.

[66] TCDC students are the most likely Pre-Command Course students to use MCS in their units.

APPENDIX 1

Personality Type to Decision-Making Process Correlation

The following table, an edited version of Paul Nutt's comprehensive correlation,[67] identifies the primary type of information considered by each personality type. The sixteen personality types represent all possible combinations of the standard personality factors as identified by Carl Jung.[68] The decision-maker's dominant and secondary personality types determine the type of information that completes the "Key Consideration" column.

Personality Type	Dominant Factor	Key Considerations
ESTJ	"Thinking"	Factually described realities
ENTJ	"Thinking"	Consequences of possibilities
ISTP	"Thinking"	Data that give order and meaning
INTP	"Thinking"	Unique and ingenious options
ESFJ	"Feeling"	Tangible views of key people
ENFJ	"Feeling"	Ways to harmonize
ISFP	"Feeling"	People's values
INFP	"Feeling"	What's right
ESTP	"Sensates"	Practical action
ESFP	"Sensates"	Tact
ISTJ	"Sensates"	Facts that contain inferences
ISFJ	"Sensates"	Personal experience
ENTP	"Intuitives"	New ideas
ENFP	"Intuitives"	Making converts
INTJ	"Intuitives"	New arrangements
INFJ	"Intuitives"	Eliciting cooperation toward goal

[67] Nutt, Making Tough Decisions. Tactics for Improving Managerial Decision Making, Table 7-2, pg134-137.

[68] Carl G. Jung, Psychological Types (London: Routledge & Kegan Paul, 1923), quoted in Paul C. Nutt, Making Tough Decisions. Tactics for Improving Managerial Decision Making (San Francisco: Jossey-Bass Publishers, 1989), 108.

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