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MARINE CORPS INSTITUTE

STAFF NONCOMMISSIONED OFFICERS CAREER DISTANCE EDUCATION PROGRAM

TACTICAL DECISION MAKING

MARINE BARRACKS
WASHINGTON, DC

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TACTICAL DECISION MAKING (8104)

Course Introduction

Scope

As a staff non-commissioned officer (SNCO), it is necessary for you to master the concepts for making and implementing decisions. To accomplish this goal, the SNCO must understand how decision-making interfaces with other warfighting and command processes like

- Command and Control Systems
- Situational Awareness
- Marine Corps Planning Process
- Mentoring and Training

The content reflects the warfighting and decision-making demands that a SNCO will use to enhance the operational and leadership performance.

References

The following references were used in the writing of this course:

- Designing TDGs and The Staff Ride Handbook. Marine Corps University, Marine Corps Combat and Development Command, Quantico, Virginia. 26 April 1996.
- Designing TDGS/STEX: A Tactical Decision Games Workbook.
- MCDP 1, *Warfighting*.
- MCDP 1-3, *Tactics*.
- MCDP 5, *Planning*.
- MCDP 6, *Command and Control*.
- MCO 1510.89B, *Infantry Training and Readiness Manual*.
- MCO 1500.55, *Military Thinking and Decision Making Exercises*.
- MCWP 1-0, *Marine Corps Operations*.
- MCWP 50-1, *Marine Corps Planning Process*.
- Murray, Col Charles H., USAF, Ed. "Executive Decision Making." U.S. Naval War College, Newport, R.I. 1 Feb 2002.
- Schmitt, John F. "How We Decide." Marine Corps University, Marine Corps Combat and Development Command, Quantico, Virginia. 26 April 1996.

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Estimated Study Time

You will spend about 12 hours and 30 minutes completing this course. This includes the time you will need to study the text, complete the exercises, and take the final examination.

Reserve Retirement Credits

You earn four retirement credits for completing this course. You earn reserve retirement credits at the rate of one credit for each 3 hours of estimated study time.

Note: Reserve retirement credits are not awarded for the MCI study you do during drill period if awarded credits for drill attendance.

Summary

The table below summarizes all-important "gateways" needed to successfully complete this course.

Step	When you	Then you will	For more information
1	Enroll in the program	Receive your program material	Refer to the Program Introduction
2	Complete the self-paced text	Arrange to take the final examination	Refer to the Program Introduction
3	Pass the final examination	Receive a course completion certificate	Refer to the Program Introduction

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CHAPTER 1

DECISION-MAKING PROCESSES

Introduction

Estimated Study Time

30 minutes

Scope

This chapter discusses the concepts and factors related to the fundamental decision-making methods. The content describes the benefits and limitations of the decision-making approaches for leaders.

Chapter Objectives

After completing this chapter, you should be able to

- Identify the definition of decision making.
- Identify the decision-making approaches.
- Identify the characteristics of the analytical decision-making approach and resulting decision.
- Identify the analytical decision-making approach limitations.
- Identify the goal of intuitive decision making.
- Identify the intuitive decision-making approach benefits.

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Decision Making

Introduction

Decision making is an art, which requires the decision maker to combine experience and education to act. This section will introduce the two general approaches to decision making.

Commandant's Guidance on Decision Making

Marine Corps Order 1500.55 discusses the role of military thinking and decision making for leadership development and performance improvement. The use of tactical decision games, PC-based games, and battle studies are just some of the methods addressed to stimulate and develop critical thinking skills to improve the operation performance of Marines and Marine units.

Military Thinking

Military thinking is a hybrid thought process that blends critical thinking skills and warfighting doctrine into a unified and focused solution.

Decision Making

Decision making in a military context is the ability to choose which projections or solutions would be best implemented to accomplish mission success.

The decision-making process can be generalized into two categories:

- Analytical decision-making approach
- Intuitive decision-making approach

SNCO Role in Decision Making

SNCOs play an important role in the decision-making process, because of the vast experience that they have acquired over their careers. While the commander makes the final decision, the SNCO provides interface between the theoretical and the practical solutions. By virtue of the role, the SNCO must understand the decision-making, planning, and assessment processes to effectively lead personnel and processes within units in the Marine Corps.

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Analytical Process

Introduction

The transition to the SNCO corps creates many opportunities and challenges, since it requires a greater role in decision-making processes. Understanding the analytical decision-making process, which is taught in many Marine Corps formal schools, can greatly increase the organizational value of SNCOs.

Analytical Decision Making

Analytical decision making is an approach used to analyze a dilemma and determine the best solution. The problem solver, or team of problem solvers, systematically employ a process that consists of the following actions:

- Carefully taking a problem apart
- Collecting and testing the information required for the problem or task
- Conducting a comparison of the solutions or options
- Selecting an alternative, which should preferably be the best solution.

Analytical Decision-Making Process

The analytical decision-making process uses the general steps listed in the table below. While the table gives the process a checklist approach in order to represent the process, the decision maker must be aware that the decision-making process can never become a set of rigid rules.

Step	Action
1	Define the problem or task, desired objectives, requirements, and criteria.
2	Identify the alternative solutions or options.
3	Evaluate the alternative solutions or options using the established criteria.
4	Assess the strengths, weaknesses, opportunities, and benefits each alternative produces.
5	Assess the risks, uncertainties, and liabilities that could result from each alternative.
6	Compare the alternatives.
7	Identify and select the best alternative within resources available.

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Analytical Challenges

Introduction

The analytical decision-making approach is a quantifiable process that is effective in decision making. However, the approach presents multiple challenges.

Challenges of Analytical Decision Making

The decision maker(s) must compensate for or overcome challenges presented by the analytical approach to effectively employ it. The primary challenges are listed below.

- Requires explicit instructions.
- Requires a detailed analysis.
- Procedure-based process.
- Focus is process oriented that it can become separated from reality.
- Requires multiple options.
- Comparison criteria are subject to change before process is complete.
- Focuses on the optimal solution.
- Limited opportunity for creativity.
- Consumes time.

Limitations of Analytical Decision Making

The analytical approach is limited by some of the factors listed below.

- Time intensive, so it is less effective for time sensitive decisions.
- Requires complete information to produce best results.
- Difficult to apply to high-risk decisions.
- Needs a clearly defined outcome before you can generate alternatives.
- If misapplied the approach will be poorly executed.
- Inflexibility in the approach can produce excessively academic or impractical results.

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Analytical Benefits

Analytical Benefits

The analytical decision-making process benefits the decision maker through the following strengths:

- The experience required to make a decision is lower.
- The decision is determined by sufficiency, which is when it is decided enough information has been gathered.
- Complexity is systematically simplified during analysis.
- The approach focuses on critical thinking skills.

Results

The analytical process produces effective results when it is properly applied. In some cases it is near perfect, but perfection can only be achieved through experienced decision makers who are more experienced. For the new decision maker, the approach has the potential to compensate for inexperience.

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Intuitive Process

Introduction

The formally recognized intuitive or recognitional decision-making approach is simply called the "gut check" in the operating environment.

Intuitive Decision Making

Intuitive decision making is a decision-making process that relies on experience to recognize key elements of a particular problem to arrive at an appropriate decision. The goal is to determine and implement the first solution that could result in success.

Time Criticality and Leadership

In order to make decisions when time is critical, the decision maker places more emphasis on the intuitive decision-making process than the analytical decision-making process. Commanders and leaders more readily use

- Intuition
- Judgment
- Experience

Intuition

Intuition is to know something without apprehension or reasoning. In many cases, intuition is directly related to lesson learned through living.

Judgment

Judgment in intuitive decision making refers to the ability to fit the situation to the first possible solution that is most likely to succeed. Merely acting on the first solution that comes to mind does not require judgment.

Experience

Experience is an aggregate or combination of what an individual has learned from the process of dealing with problems and making decisions in the course of an individual's career or life.

Pattern Matching

Pattern matching occurs when someone sees similar factors in a current situation compared to a previous one. The greater the experience that a decision maker has, the greater intuitive decision-making power of the individual. Pattern matching is often how Marines and leaders solve tactical problems and challenges in the operating environment.

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Intuitive Process, Continued

Capabilities	To enhance a Marine's pattern matching capabilities, add creativity and variety into their training. Varying the conditions and situations in which a Marine must perform creates a greater opportunity for enhanced pattern matching potential.
Relationship of Experience and Skill	As experience grows, so should capabilities and capacities for new skills, competencies, and applications.
Intuitive Applications	The intuitive approach to decision making is applicable to almost every situation. The analytical and intuitive processes are inherently linked that even when the analytical process has gone full cycle, the final option selected could be and is normally biased by intuition rather than influenced by calculation.

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Intuitive Applications

Introduction

The intuitive decision-making approach has limitations and benefits. Effective application of decision-making requires the SNCO to understand and be aware of conditions that could affect the outcomes.

Benefits of Intuitive Decision Making

The intuitive decision-making approach has the following associated benefits.

- Time effective.
- Focuses on the first best solution rather than the optimal solution.
- Can be updated and infused with additional experience constantly.

Limitations of Intuitive Decision Making

The intuitive decision-making approach has several limitations that the decision maker should understand. The intuitive approach could be misapplied when

- Current situations do not match past experience.
- Obsolete experience is applied to current situations.
- Lessons learned become distorted as memories become distant.

The following are limitations of the intuitive decision-making process:

- Mismatched experience
- Obsolescence
- Distortion

Mismatched Experience

Mismatched experience can result from trying to treat every situation in the same manner or procedurally. In essence, lessons learned from one experience are transferred to current situations that are unrelated. Some of the sources of mismatched experiences stem from

- Personal pride in experiences clouds the decision making and problem solving ability.
- Individuals hesitate to acknowledge that a new situation sometimes requires a new decision or solution.
- Individuals perceive unfamiliar solutions or decision resourcing as a loss of power and control.
- Old experiences matched to new situations produces poor or failing results.

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Intuitive Applications, Continued

Mismatch Perspective

Intuitive mismatching could be occurring if the quote below applies to decision-making observations in your operating environment.

"To a man with a hammer, every problem looks like a nail."

Decisions are unique and each decision should be considered separately. Standardizing decisions could mismatch experiences and generate ineffective outcomes.

Obsolescence

Obsolescence occurs when the technical or tactical skills of the decision maker no longer apply to current methods or applications used. A commitment to the professional study of warfighting, combat tactics and techniques to update and expand skills and abilities can minimize the effects of obsolescence in intuitive decision making.

Obsolescence Perspective

Intuitive obsolescence could be occurring if the quote below applies to decision-making observations in your operating environment.

"If it isn't broke, don't fix it."

Properly identifying shortfalls in operations and supporting requirements. Creates an opportunity to infuse new ideas and technology in decision making and the related applications. When problems that requires forward thinking opportunities are ignored, the decision maker may become falling victim to obsolescence by personal design or systematic engineering within the organization.

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Intuitive Applications, Continued

Distortion

Distortion is the deviation between perception and reality. When memories or learning fade, the sequence events leading up to the understanding becomes deviated from what actually occurred.

Limiting Distortion

In order to limit the distortion of memories and lessons learned, leaders and Marines should try to

- Minimize dependence on overconfidence based on experiences. Each situation that Marines face is unique and only parallels previous experiences.
- Focus on the current situations and previous experience three dimensionally. Ask yourself
  - Are the same factors relevant between that past and present?
  - Are the factors that appear to be important relevant?
  - Are there new factors that could minimize the effects of experience?
- Minimize the infusion of predictability into situation-based decisions.
- Understand that estimates and solutions based on probabilities of success generally produce lower than expected results.
- Purge obsolete lessons learned vice modifying them to meet new conditions.
- Minimize the tendency to distort lessons learned to meet the current conditions.

Distortion Perspectives

Intuitive distortion of lessons learned could be occurring if the quote below could apply to your personal decision-making observations.

"This is the way it has always been done."

An open perspective on how decisions are made and the realization that experience can fade with time and understanding the small situational differences will limit the impact of distortion on decision-making processes.

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Decision-Making Comparison

Contrasting the Thinking Processes

Each of the decision-making processes has application in different instances. The analytical process is a much slower process and should be used when time is not critical. The intuitive decision-making process is best applied in environments that are changing in nature. It focuses on a best solution based on the information that the decision maker has at the decision point.

Comparison

The data in the following table attempts to simplify the decision-making processes by illustrating the approach differences.

DECISION-MAKING APPROACH COMPARISON

Comparative Criteria	Analytical Decision Making	Intuitive Decision Making
Applications	Well-defined problem parameters	Ill-defined problem parameters
Variability	General applications	Dynamic applications
Source of Control	Systematic application of process	Situational factors
Thought Processes	Systematic analysis and comparative	Creative and discriminating
Orientation	Process oriented	Goal oriented
Foundations	Clearly defined objectives	Uncertainty
Knowledge Requirements	Complete understanding of problem	Incomplete understanding
Information Requirements	Complete, researched, and derived	Incomplete and assessed
Goals	Predetermined	Situation-based
Desired Outcome	Focuses on single best solution	Focuses on acceptable solution
Theoretical Basis	Classical models and processes	Naturalistic (free) thinking

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Decision Assessment

Introduction

The initial step of decision making is the ability to gather the available information and organize for use. The procedure is referred to as a decision-making assessment. The intuitive and analytical decision-making approaches use assessment to initiate each process. A common acronym, METT-T, provides an organizational parallel for the mental process that occurs during assessment.

Estimating the Situation

Marines use the acronym, METT-T, as the doctrinal standard to conduct this assessment. METT-T represents the following considerations.

- **M**ission
- **E**nemy
- **T**errain and weather
- **T**roops and fire support
- **T**ime available

Incorporating Space and Logistics

METT-TSL is an enlarged version of METT-T to meet the demands of planning and operational requirements for larger or higher level organizations and operations. The capability of METT-TSL to capture high-level requirements in a simplistic format makes it ideal for operational and strategic level applications. METT-TSL represents the following considerations

- **M**ission
- **E**nemy
- **T**errain and weather
- **T**roops and fire support
- **T**ime available
- **S**pace
- **L**ogistics

Decision-Making Application

Estimating the situation or conducting an assessment using METT-TSL supports both approaches to decision making. As the environmental factors change in the intuitive decision-making approach, additional assessments are conducted. Analytical applications use METT-TSL during each step to ensure that the data used to create the options is pertinent and correct.

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Decision-Making Leadership

Introduction

The decision-making approaches are intermeshed, which makes analysis of the process application difficult. The manner in which we make decisions is a hybrid process. The reality is that the best analytical processes and applications in the world are often finalized by an intuitive decision by the final authority. In the operating environment, the Marine at the decision point is often the final authority.

Leadership Challenges

The SNCO faces many new leadership challenges in every role assigned to them. The ability to make decisions for enhanced warfighting performance is an incremental part of the operating environment and self-development. Assimilating and managing information to enhance decision making requires personal, operational, and organizational focus.

The SNCO Decision Maker

The SNCOs must expand their decision-making capabilities in order to meet the leadership and organization demands of the 21st Century. Focusing on action and decisiveness intertwined with judgment and intuition will produce successful solutions that support warfighting.

Development of Decision Makers

The ultimate leadership challenge for SNCOs is to develop decision makers that can lead, direct, and achieve warfighting results in the operating environment. Decision-making competency goals are

- The ability to project and infuse an understanding of the basic decision-making processes and the leadership expanding opportunities created by decision making.
- Link decision making with leadership expanding opportunities.
- Creating an understanding of the relationship between decision making and planning.
- Linking an understanding of the flexibility and organizational value gained by expanding the core competencies through decision making.
- Creating a training and operating environment that focuses on discipline, and tactical free thought governed by warfighting doctrine and effective communications.

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Chapter 1 Exercise

Estimated Study Time

15 minutes

Directions

Complete items 1 through 6 by performing the action required. Check your answers against those listed at the end of this chapter.

Item 1

Decision making in a military context is

a. a process of doing something now to accomplish the mission.
b. directing Marines to accomplish the mission through tactical employment of fire and maneuver.
c. developing a five paragraph order that explains the mission tasks and how those tasks will be accomplished.
d. the ability to choose which projections or solutions would be best implemented to accomplish mission success.

Item 2

What are the two decision-making approaches used by decision makers?

a. tactical and planned
b. intuitive and analytical
c. directed and instantaneous
d. warfighting and predetermined

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Item 3

The analytical decision-making process uses the general steps listed in the table below. The steps are in scrambled order. Select the answer that has the process in proper sequence.

Step	Action
1	Assess the risks, uncertainties, and liabilities that could result from each alternative.
2	Define the problem or task, desired objectives, requirements, and criteria.
3	Compare the alternatives.
4	Identify the alternative solutions or options.
5	Assess the strengths, weaknesses, opportunities, and benefits each alternative produces.
6	Identify and select the best alternative within resources available.
7	Evaluate the alternative solutions or options using the established criteria.

a. 3, 5, 4, 1, 3, 7, 6
b. 7, 2, 1, 5, 6, 4, 3
c. 2, 4, 7, 5, 1, 3, 6
d. 5, 1, 3, 6, 2, 4, 7

Item 4

The goal of intuitive decision making is to

a. select the best solution.
b. determine the commander's intent.
c. implement the first solution that comes to mind.
d. implement the first solution that could result in success.

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Item 5

From the choices below, pick out the limitation of analytical decision-making.

a. Applies to high-risk decisions
b. Requires incomplete information
c. Needs no clearly defined outcome in order to generate outcomes
d. Time intensive

Item 6

Which of the following identifies the benefits of the intuitive approach?

a. Time effective
   Focuses on the first best solution
   Can be updated and infused with experience

b. Reactionary in nature
   Focuses on finding out the probable courses of action
   Requires professional developmental skills

c. Requires mission statements and intent
   Focuses on point of action for decision making
   Follows rigid format and training for experience

d. Leadership focused
   Focuses on complete information for best solution
   Adaptive and flexible in nature and is training intensive

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Answers

The table below provides the answers to the exercise items. If you have any questions, refer to the reference page listed for each item.

Item Number	Answer	Reference
1	d	1-3
2	b	1-3
3	c	1-4
4	d	1-7
5	d	1-5
6	a	1-9

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CHAPTER 2

DECISION MAKING FOR COMMAND AND CONTROL

Introduction

Estimated Study Time

1 hour

Scope

This chapter discusses command and control concepts and how they influence decision making. The command and control approach directly affects how communications and information is processed within the command and how operations are designed and directed. The chapter gives SNCOs a perspective on the systems and processes that interface with command and control, and the importance of decision making within that system.

Chapter Objectives

After completing this chapter, you should be able to

- Identify the forms of command and control.
- Identify the definition of commander's intent.
- Identify the definition of commander's guidance.
- Identify the definition of commander's critical information requirement (CCIR).
- Identify the views of command and control.
- Identify the purpose of low-level initiative.
- Identify the factors that influence mission command and control.

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Introduction, Continued

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Fundamental Elements of Command and Control

Introduction

Decision making is directly related to the command and control process required for effective leadership and management. A SNCO has greater opportunity to make and implement decisions that will be entered into the command and control system.

Command

Command from a doctrinal viewpoint has two fundamental components.

- Decision making
- Leadership

Decision Making

Decision making from a command and control perspective is choosing *if* to decide, then *when* and *what* to decide.

Decision making also includes comprehending the consequences by projecting the outcomes expected from the implementation of decisions.

Leadership

Leadership is taking responsibility for decisions. Supporting aspects of leadership that directly influence decision making includes

- Being loyal to subordinates
- Inspiring and directing Marines toward a purposeful end
- Demonstrating physical and moral courage in the face of adversity

Control

Control is inherent in command because control allows the commander and staff to

- Monitor the status of the command.
- Assess the gap between what has been planned and what has been accomplished.
- Direct action to exploit new opportunities or correct deficiencies.

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Command and Control as a Concept

Introduction

Command and control used as single concept has completely different definitions than the individual terms. Understanding the conceptual applications will improve the SNCOs performance by increasing their ability to support the mission requirements through more effective decision making and operations facilitation.

Simplified Command and Control

MCDP 6, *Command and Control,* defines Command and control as the process in which the commander recognizes what needs to be done and sees to it that appropriate actions are taken.

Operational Command and Control Perspective

MCDP 1-0, *Marine Corps Operations,* takes an operation specific approach in defining command and control. The reference states that command and control is the exercise of authority and direction over assigned and attached forces in the accomplishment of a mission.

Command and Control as a Noun

Command and control used as a conceptual noun describes a system that is compiled of an arrangement of elements that interact to produce effective and harmonious actions. The most common elements in a basic command and control system are

- People
- Information
- Control support structure

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Command and Control as a Concept, Continued

Command and Control as a Verb

Command and control used as a verb expresses a process representing a collection of related activities that are procedural in nature and designed to accomplish a certain task.

The process can vary in complexity and composition to include, but not limited by, the activities listed below.

- Gathering and analyzing information
- Making decisions
- Organizing resources
- Planning
- Communicating instructions and other information
- Coordinating
- Monitoring results
- Supervising execution

Additional Information

Contrasting the definitions is intended to broaden the SNCO perspective and make it easier to understand the intangible aspect of command and control. More detailed information can be found by reading doctrine *www.doctrine.usmc.mil.*

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Forms of Command and Control

Introduction

Command and control can be implemented in mission specific forms. While the forms discussed in this section you are most likely to experience within the execution of your duties.

Forms of Command and Control

Command and control systems are used in many different applications throughout the military. The three most common forms are

- Conscious command decision
- Preconditioned reactions
- Rules-based procedures

Conscious Command Decision

A conscious command decision is made in a calculated or methodical manner, generally based on education, training, and experience combined with a mental process to achieve an objective. An example of a conscious command decision would be deciding on a concept of operations.

Preconditioned Reactions

Preconditioned reaction is a decision that is made in an instinctive way based on advanced practice. The preconditioned reaction requires training and experience to achieve a certain state or objective.

Rules-based Procedures

Rules-based procedures are a methodical approach to accomplish a particular outcome or objective. The objective must be thoroughly analyzed to identify the processes and procedures required to achieve the desired outcome. The procedure used to guide an aircraft on final landing approach is a good example of a rules-based form of command and control.

Hybrid Command and Control Systems

Command and control systems vary with the application and complexity. For example, a guided missile uses a combination of a rules-based and a conscious command decision to form a hybrid command and control system since it requires a computer to deliver the missile.

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Forms of Command and Control, Continued

Use of Hybrid Systems

The requirement for multiple types of command and control is necessary for the development of tactics, operations, and strategies. Each of these processes requires all three general types of command and control to be used at the same time.

The experience gained through preconditioned reaction, or muscle memory, is factored in to the desired output. Certain rules or limitations further limit the possibilities by ruling out alternative options.

Impact of Authority on Command and Control

Command and control uses authority to transform decisions into mechanical processes, and have subordinates execute the decisions. The two types of authority are

- Official authority
- Personal authority

Official Authority

Official authority is a function of rank and position bestowed by organization and by law.

Personal Authority

Personal authority is a function of personal influence derived from factors such as

- Experience
- Reputation
- Skill
- Character
- Personal example

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Intent and Decision Making

Introduction

Command and control systems require a substantial amount of interactivity to be used effectively. Understanding the elements and factors involved in developing and maintaining an effective command and control system is essential to support effective operations.

Influencing Factors on Command and Control

Command and control can be influenced by factors such as

- Commander's intent
- Commander's guidance
- Commander's critical information requirements

Commander's Intent

Commander's intent is a clear, concise articulation of the purpose(s) behind one or more tasks assigned to a subordinate. Intent is the overall purpose for accomplishing the task and focuses on the enduring portion of the mission.

Relationship of Command and Control to Commander's Intent

Commander's intent is designed to allow subordinates to exercise judgment and initiative, when the unforeseen requires the subordinate to depart from the original plan. The subordinate's course of action should remain consistent with the commander's aims. The top-down flow of intent provides consistency and continuity to the actions, and establishes context that is essential for the proper bottom-up exercises of initiative.

Commander's Guidance

Commander's guidance is designed and developed from the preliminary decisions that are required to focus the planners on the commander's conceptual vision of the operation.

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Intent and Decision Making, Continued

Commander's Battlespace Area Evaluation	The commander's battlespace area evaluation (CBAE) is the commander's personal vision based on understanding the mission, battlespace, and the enemy. It is the visualization of what needs to be done and the first impressions of how one will go about doing it.
Commander's Critical Information Requirement	A critical requirement is an essential condition, resource, or means that is needed for a critical capability to be fully functional. Commander's critical information requirements (CCIR) identify information on the friendly activities, enemy activities, and the environment that the commander deems critical to maintaining situational awareness, planning future activities, and assisting in timely and informed decision making.
Relationship to Decision Making	The use of CCIRs and related concepts defined in the preceding blocks provides the basic information to execute plans and orders. It also provides the impetus to make changes based on situational factors.

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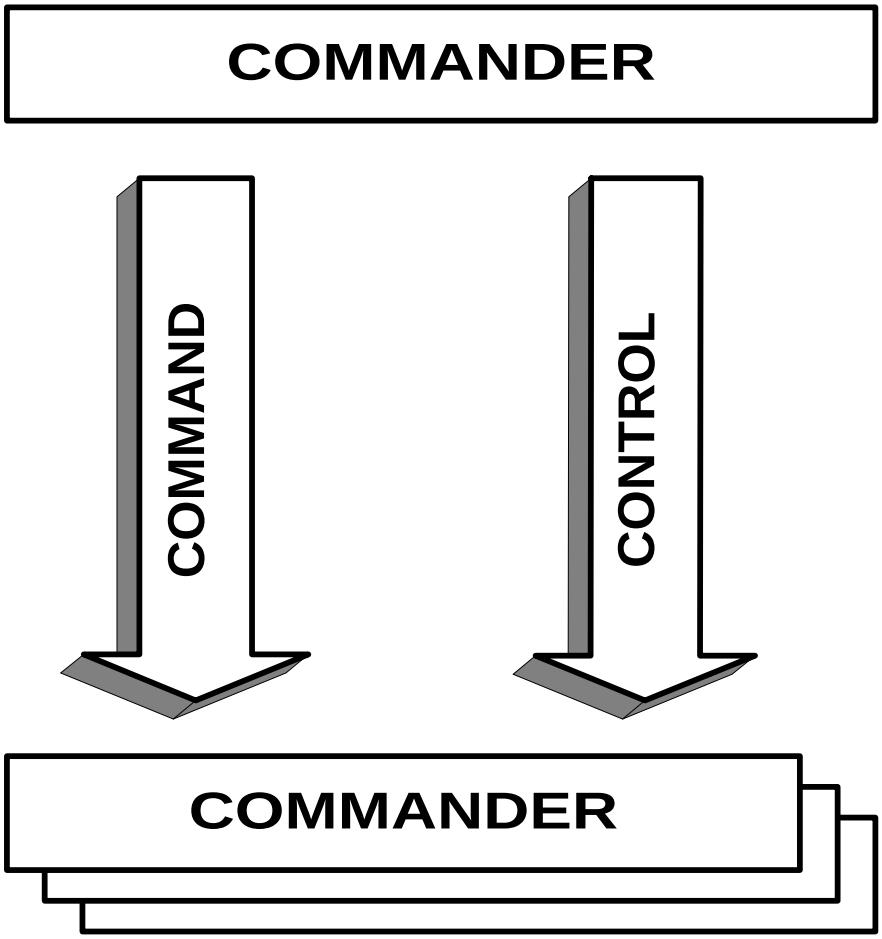
Traditional Command and Control

Traditional View

The traditional view of command and control is a unidirectional one. The "command" and "control" functions operate in a downward flow from higher to lower organizational levels.

Theoretically, commanders impose control on those under their command; commanders are "in control" of subordinates; and subordinates are "under the control" of their commanders.



Traditional View of Command and Control

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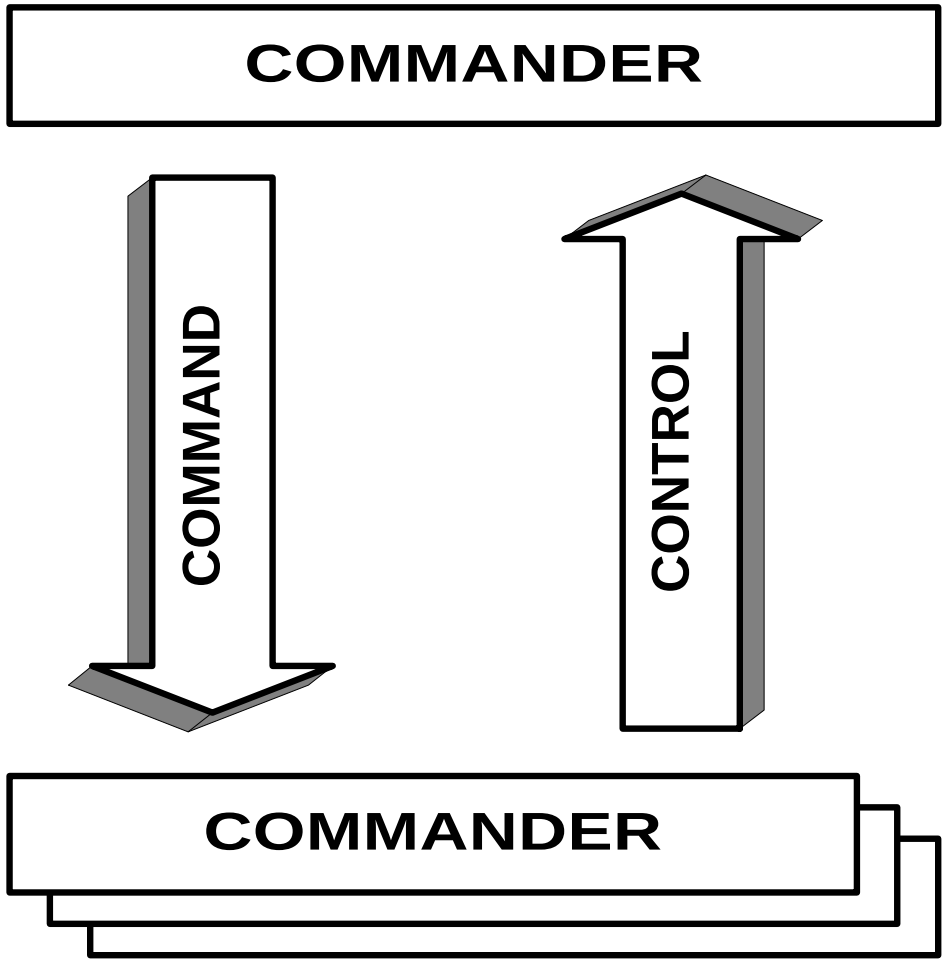
Adaptive Command and Control

Adaptive View

The adaptive view of command and control is dynamic in nature. The commander exercises command as authority and control returns to the commander in the form of feedback. Ideally, the process represents a continuous flow of information between higher and lower organizational levels. Interactive communication systems and leadership are the conduit of success when using the adaptive view.



Adaptive View of Command and Control

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Command and Control Perspectives

Introduction

The command and control views have specific benefits and limitations. The employment method of each is situation specific, since neither form exists independently of the other. The SNCO should understand leadership implications that result from application of command and control views. Most importantly, the SNCOs, NCOs, and Marines should be prepared to provide feedback to the commander in a dynamic situation.

Limitations of Traditional View

The limitations of the traditional view of command and control is limited by

- The leaders impose control on those under their leadership, which conflicts with many of the warfighting concepts.
- The leader's ability to perceive, develop, and process information.
- The operating environment becomes a single dimension.

Benefits of the Traditional View

The traditional view of command and control is beneficial when the leader has complete information and fully understands the situation. Only on rare occasions or limited scenarios does the leader have complete information, so the traditional view has limited applications.

Limitations of the Adaptive View

The adaptive view of command and control requires effective feedback, since feedback controls the subsequent command action. Developing the proper information flows requires organizational cooperation, mission focus, and situational awareness. Many of the limiting factors are directly related to the friction of operating environment, and Marines not capable of assessing the situation and communicating information.

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Command and Control Perspectives, Continued

Benefits of the Adaptive View

The adaptive view of command and control provides the following benefits to Marine leaders.

- The interactive process involves all parts of the system.
- The system works in all directions.
- The system produces a mutually supporting system of “give and take.”
- Complementary command and controlling forces interact to ensure the total force can adapt continuously to changing requirements.
- Inactivity allows leaders to exploit fleeting opportunities, respond to developing problems, modify schemes, or redirect efforts.

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Developing Mission Command and Control

Introduction

While "command and control" is central to most processes and functions within the Marine Corps, the ability to link it to mission specific objectives is another perspective that must be addressed.

Mission Command and Control

Mission command and control is an adaptation of the command and control models to meet the demands of a rapidly changing situation and exploit fleeting opportunities.

Influencing Factors of Mission Command and Control

Mission command and control is enhanced by utilizing the following factors

- Situational awareness
- Low-level initiative
- Commander's intent
- Mutual trust
- Implicit understanding and communication

Low-level Initiative

Commanders use low-level initiative to distribute authority throughout the organization. The distribution of authority creates a responsibility to decide and act within the commander's guidance and intent.

Benefits of Low-Level Initiative

Instituting low-level initiative in organizations can create positive psychological effects. When individuals act on their own initiative, they feel a greater responsibility to produce the desired outcome. The ability to recognize what needs to be done and take the necessary action creates satisfaction.

Implicit Understanding and Communication

Implicit understanding and communication can only be achieved through a common perspective of warfighting. The common prospective can only be developed through repeated practice.

The SNCO has the responsibility to understand, project, and implement the leader's vision and direction at the tactical level to meet the organizations' objectives. The SNCO is responsible for creating an environment that supports the transformation of junior leaders to become war fighters and decision makers.

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Levels of Application

Introduction

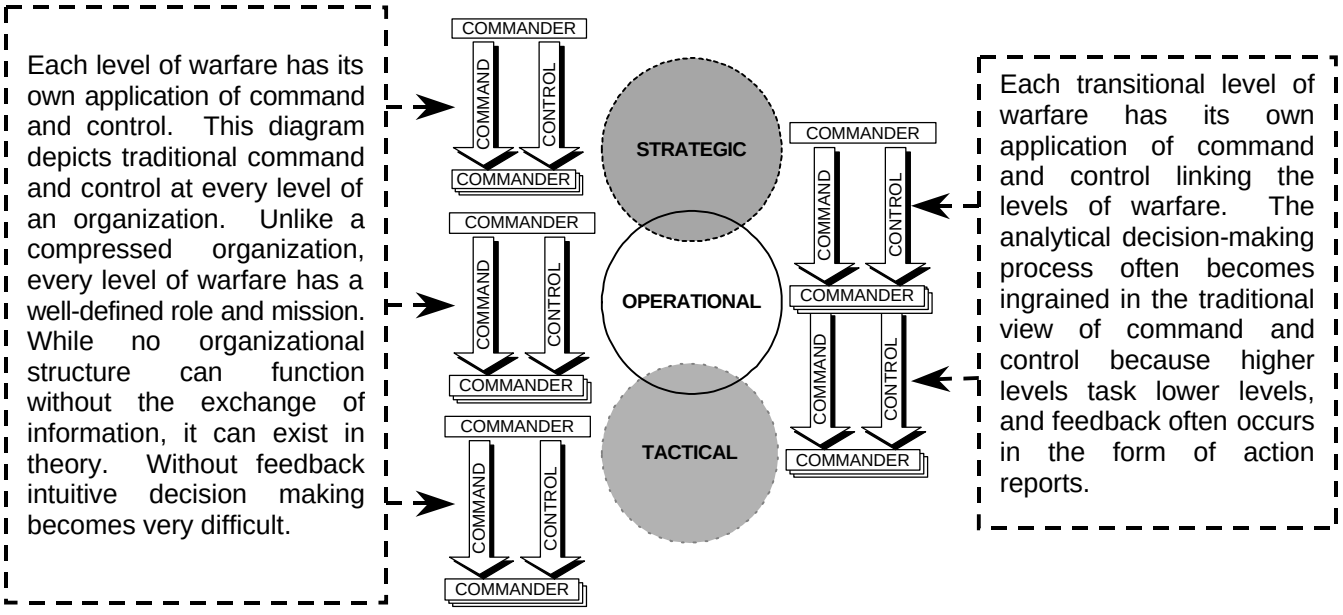
From the perspective of command and control, warfighting and decision making share many of the same qualities. SNCOs should understand that these relationships drive the commanders' approaches to operational design and tactical applications.

Levels of War

MCDP 1, *Warfighting*, states that the levels of war are

- **Strategic** – directly reflects the highest policy and organizational objectives.
- **Operational** – directs and guides a series of actions to achieve the strategic goals.
- **Tactical** – concepts and methods are combined with combat power to accomplish a particular mission and achieve operational results.

TRADITIONAL VIEW OF COMMAND AND CONTROL AS A PURE APPLICATION



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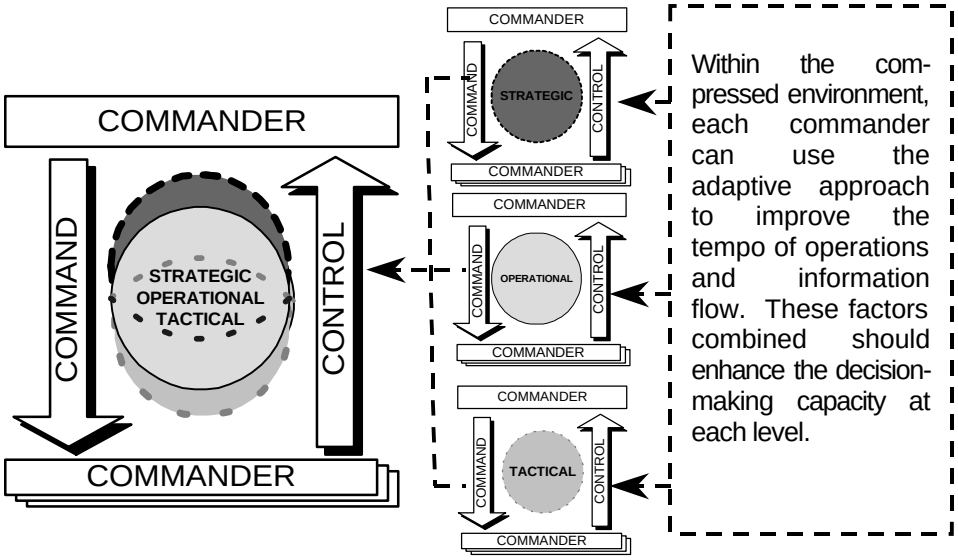
Levels of Application, Continued

Information Exchange in Hierarchical Environments

While the levels of war provide a hierarchy to control military organizations, the decision-making process after orders are issued and mission's execution is initiated requires information exchange to make decisions using either the intuitive or analytical process. The information flow in complex organizations is difficult because of the organizational layers. Each level interprets and reorganizes the information prior to sending it up the next higher level. While this works in many applications, it may not be applicable to every situation.

ADAPTIVE VIEW OF COMMAND AND CONTROL AS A PURE APPLICATION

When the levels of war become compressed, the adaptive view of command and control is more valuable, because its interactive information flow should make decision making and application faster.



Within the compressed environment, each commander can use the adaptive approach to improve the tempo of operations and information flow. These factors combined should enhance the decision-making capacity at each level.

Information Exchange in Compressed Environments

When the levels of war become compressed, the tactical decision maker and strategic planner/decision maker becomes almost the same. The levels of command and control similarly become compressed to the point where the strategic command and control leadership and tactical technician are synonymous. As a result, the decision and execution occur almost simultaneously, so the information flow for command and control becomes absolutely necessary for command and control to remain effective. The commander must adapt to the approach that best fits the mission.

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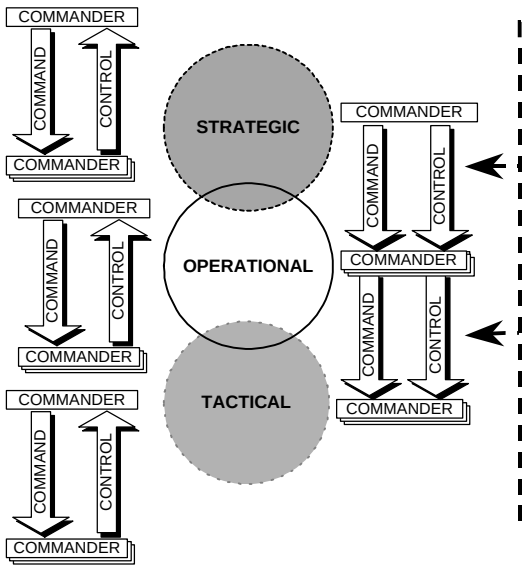
COMMAND AND CONTROL AS A HYBRID APPLICATION

A hybrid form of command and control could be any combination of the traditional and adaptive views used for a situationally or organizationally unique solution. The example is only one of many possibilities that could be used. The unit commanders' personalities and preferences are the driving forces for the direction and application of warfighting. The SNCO serving on a staff or in a direct leadership billet can better lead and support the commander by understanding how the commander conducts operations.



Each transitional level of warfare can reflect its own application of command and control that links the levels of warfare. In this situation, the analytical decision-making process could be used to plan and direct operation in between levels, but at each level the intuitive process may be more valuable especially in extremely fluid environments.

Levels of Decision Making

The levels of decision making reflect the levels of command and control, and organizational structure.

- **Strategic Decisions** – directly reflects the highest policy and organizational objectives.
- **Operational Decisions** – direct and guide how a series of actions are combined to achieve the strategic goals.
- **Tactical Decisions** – process environmental data in combination with situational factors to utilize combat power to accomplish a unique mission or task.

Most SNCOs will participate in tactical decision-making processes, but understanding how the levels of warfare and command and control effect those decisions and their applications is important to execute and support mission tasking.

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Levels of Application, Continued

Interfacing Approaches for Performance

Interfacing the approaches to command and control with the appropriate decision-making processes can affect the tempo of operations and leadership cycles in Marine forces. In simplest terms, the traditional view of command and control and analytical decision-making approach would be a very traditional approach to command and control, but not necessary and optimal combination. Under ideal conditions, the combination could produce effective results if the leadership had complete information and each Marine was highly competent in their specialty and warfighting skills. In most situations this is not the case.

Combining the adaptive view of command and control and intuitive approaches would create a more radical or modern system of operations and communications. The environment would be driven by interactive information flow and the tactical decision making at the decision point. The effectiveness of the individual Marine would impact the outcomes by low-level decision making and initiative. The commander would be dependent on information flows to make effective and timely decisions from the operational perspective while subordinates would continue the information inputs while making low-level decisions guided by intent and the mission.

Decisions and Command and Control Level

Compressed levels of war create low-level, non-linear decision-making capabilities. Multiple low-level decision makers create demands that commanders implement and staff sections facilitate the adaptive view of command and control.

21st Century Challenges

The 21st Century projections of the operating environment provide insight to a fluid and dispersed operating environment. Each operation will require the commander to tailor the command and control methods to meet the demands of the threats and risks of the operation. As the levels of war become more compressed, the need for decision makers at the tactical level becomes proportionately greater. The “strategic corporal” concept was designed to create more decision makers and provide the commander with greater force competencies and warfighting applications to the lowest levels.

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SNCO Impact

Introduction

The expanded role of the SNCO requires decision making in diversified areas and applications. Often these decisions are time related, so understanding how time and the command and control system are interlinked is important to improve the decision-making process.

21st Century Leadership Challenges

The greatest leadership challenge for the SNCO is to develop NCOs capable of leading Marines in the decentralized command environment. In order to accomplish this task, the Marine SNCO must be well-versed in

- Warfighting
- Maneuver warfare
- Command and control
- Decision making
- Planning
- Warfighting tactics and techniques

Linking these doctrinal concepts to the commander's vision provides the SNCO with a basis for training small units leaders and building unit cohesion.

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Chapter 2 Exercise

Estimated Study Time 15 minutes

Directions Complete items 1 through 7 by performing the action required. Check your answers against those listed at the end of this chapter.

Item 1 What is a form of command and control?

a. Guidance and intent
b. Directed and conceptual
c. Strategic and tactical
d. Conscious command decision

Item 2 Commander's intent can be defined as

a. a clear, concise articulation of the purpose(s) behind one or more tasks assigned to a subordinate.
b. the situational overview for the day and how the units will handle the tasking.
c. a mission statement and operations order given to subordinate commanders.
d. the plan of the day that assigns operational missions and related task lists to accomplish the mission(s).

Item 3 Commander's guidance is designed and developed from the

a. mission focus for preliminary estimates of logistics and operational needs.
b. preliminary decisions that are required to focus the planners on the commander's conceptual vision of the operation.
c. adaptive perspective for the visualization of information and operations management from appropriate organizational level.
d. presumptions made by the commander to push the operational planner in the proper tactical mindset without creating tactical information overload.

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Item 4

The identification of information on the friendly activities, enemy activities, and the environment that the commander deems critical to maintain situational awareness, planning future activities, and assisting in timely and informed decision making is best defined as

a. the commander's risk assessment and intent.
b. the commander's critical information requirement.
c. the commander's battlespace assessment evaluation.
d. the commander's combat analysis and intelligence report.

Item 5

The command and control views are

a. analytical and intuitive.
b. directive and nondirective.
c. traditional and adaptive.
d. situational and planned.

Item 6

The purpose of low-level initiative is

a. to distribute authority throughout the organization.
b. to allow commander's to have lance corporals stand independent posts after receiving a mission order.
c. to allow small unit leaders to create operational command and control opportunities.
d. to utilize the adaptive view of command and control and project multiple options and then implement the best one.

Item 7

List the factors that influence mission command and control.

(1) _____
(2) _____
(3) _____
(4) _____
(5) _____

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Answers

The table below provides the answers to the exercise items. If you have any questions, refer to the reference page listed for each item.

Item Number	Answer	Reference
1	d	2-6
2	a	2-8
3	b	2-8
4	c	2-9
5	a	2-10 and 2-11
6	a	2-14
7	• situational awareness • low-level initiative • commander's intent • mutual trust • implicit understanding and communication	2-14

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CHAPTER 3

SITUATIONAL DECISIONS FOR WARFIGHTING

Introduction

Estimated Study Time

1 hour

Scope

This chapter discusses the concepts and factors that improve the intuitive decision-making approach through a greater understanding of situational awareness. The content contains overviews of the psychological, communications, and operational concepts that create and enhance situational awareness.

Chapter Objectives

After completing this chapter, you should be able to

- Identify the definition of situational awareness.
- Identify the definition of group situational awareness.
- Identify the cognitive skills used to describe situational awareness.
- Identify the communications skills that support situational awareness.
- Identify the Marine Corps core competencies.
- Identify the meaning of OODA Loop.

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Introduction, Continued

In This Chapter

This chapter contains the following topics:

Topic	See Page
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Group Situational Awareness	3-4
Cognitive Awareness	3-6
Communications for Awareness	3-8
Performance Cohesion	3-9
The Boyd Cycle	3-12
Situation Intuition	3-14
21st Century Decision Making	3-15
Chapter 3 Exercise	3-16

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Developing Situational Awareness

Introduction

Marines are trained to focus on detail and awareness of their surroundings. The SNCO must refine the skills Marines already have by explaining the role of situational awareness in the decision-making process.

Situational Awareness

Situational awareness is

- Knowing what is occurring
- Understanding what could occur
- Projecting the options that could exist

Goal of situational awareness is to have an understanding of the individuals or groups, and the conditions in which they are operating.

Creating Individual Situational Awareness

Individual situation awareness is the ability to perceive the environmental changes. It can be measured by how quickly the individual can change their behavior to meet the environmental changes.

Activities for Situational Awareness

Activities that improve situational awareness are

- Learning through experience
- Mental and physical simulation
- After action reviews of operational activities
- Professional studies of history or current events

The ability to review analyzed situations creates a knowledge base from which the individual can draw information to create better situational awareness.

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Group Situational Awareness

Definition	Group or unit situational awareness is when members of the group share a common perspective of the operating environment.
Group Situational Awareness	Situational awareness is dependent on the flow of perceived and communicated information. Clarity of environmental perceptions and communications enhances the information transfer. Focus on the communications skills and concepts to enhance situational awareness.
Creating Group Situational Awareness	Activities that can improve group situational awareness. • Develop individual situational awareness within the mission. • Make individuals aware of relevant actions and functions of other team members. • Refine thinking and communications skills. • Develop a "shared situational awareness" mindset between members. • Use "common ground" experiences and understanding to enhance organizational relationships.

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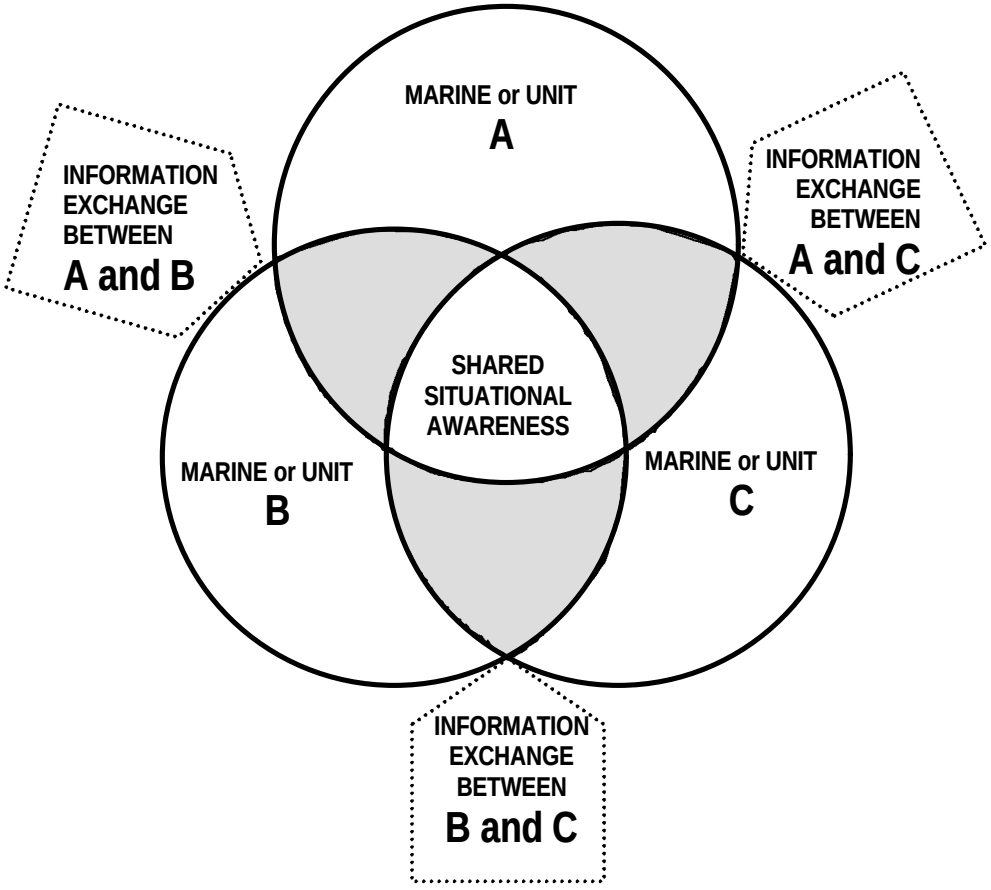
Group Situational Awareness, Continued

CREATING GROUP SITUATIONAL AWARENESS



Information Exchange

Situational awareness is highly dependent on the exchange of information. The information exchange processing takes place between

- The operating environment and individuals
- The internal thinking processes of individuals
- Groups within units
- Organizational layers such between companies and the battalion staff

The skills and types of communications used to enhance situational awareness are discussed in this section.

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Cognitive Awareness

Introduction

The term cognitive means to know. This section addresses the psychological aspects of situational awareness. While the design is not to teach psychology, the SNCO should be familiar with rudiments that compose the ability of a Marine to recognize and perceive factors in the operating environment.

Cognitive Skills

Cognitive skills are mental processes that take place as an individual realizes that their environment is changing. Situational awareness can be broken down into four basic cognitive skills.

- Perception
- Comprehension
- Projection
- Prediction

Perception

Perception is the factual awareness of the current objects, events, states, etc. From an action perspective, perception occurs when you are monitoring, attending, detecting, and identifying processes within a volume of space and time. The simplified definition of perception is acquiring the available facts, which the Marines apply daily and are intimately familiar with the applications.

Comprehension

Comprehension is the understanding of facts. When applied to situational awareness, it relates to the expert knowledge for specific situation or set of situations.

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Cognitive Awareness, Continued

Projection	A projection is envisioning how the situation is likely to develop provided it is not acted upon by any outside force. A projection is the most likely outcome. A Marine's perception and comprehension of the environment projects how this information will affect the mission.
Prediction	Prediction is the evaluation of how outside forces may act upon the situation as to act upon the projections. Predictions are based on perception, comprehension, projections, and how outside factors act upon the possibilities.
Cognitive Skills Application	The application of these skills takes place simultaneously to create the situational awareness rather than the analytical function that requires each step to be conducted sequentially.

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Communications for Awareness

Introduction

The ability to communicate and effectively project information creates conditions that allow situational awareness to become a group or organizational condition. Communications that support situational awareness can be described as

- Vertical
- Horizontal
- Implicit

Vertical Communication

Vertical communication refers to information transmitted up and down the chain of command to "build" a perspective of the battlespace for leaders and commanders.

Horizontal Communication

Horizontal communication refers to the information transmitted within the same organizational level. Communications between members of a platoon, squad, etc., reflect horizontal interpersonal communication skills.

Implicit Communication

Implicit communications are communications that are understood from a common perspective. The Marine Corps warfighting ethos and core competencies provide a "common ground" for implicit communications.

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Performance Cohesion

Common Ground

Developing common ground within the Marine Corps starts from day one when an individual walks into the Maine recruiting office and gets an overview of the Marine Corps. The common ground can also be described as core competencies, which can be further defined by experiences, training, and education. The SNCO should be able to use the common ground opportunities listed below, provided the shared experience that bind Marines together.

- Recruit training
- Core values
- Organizational pillars
- Warfighting philosophy, competencies, tactics, and techniques
- Mission focus
- Personal and organizational performance standards
- Continued education and understanding of doctrine
- Expansion of technical skills to meet doctrinal requirements

A complete list of common ground would be impossible to compile, since Marines spend large quantities of time training, executing, and living together. Understanding when seniors, juniors, and leaders interchange information in a common organizational forum, they all share a part of the Marine Corps continued success.

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Performance Cohesion, Continued

Core Values

Core values are the values that bond the Marine Corps into a total force that can meet any challenge. They provide a universal code of performance and perspective, which increases the perception and understanding of individuals and groups. The Marine Corps core values are

- Honor
- Courage
- Commitment

Core Competencies

Core competencies are areas in which the organization has specialty skills. The Marine Corps' five unique core competencies reflect its role within a naval expeditionary force and define the essence of the Marine Corps' institutional culture. The following is a set of specific core competencies:

- Warfighting culture and dynamic decision making
- Expeditionary forward operations
- Sustainable and interoperable littoral power projection
- Combined arms integration
- Forcible entry from the sea

Organizational Pillars

Organizational pillars are concepts that hold the organization's strategic goals or programs in place. For example, in March 2000, General Jones' testified as to the qualities of the naval 'expeditionary forces' and the Corps 'commitment' to preserving its four pillars of readiness

- Leading Marines
- Maintaining operational readiness
- Contributing to the common defense
- Connecting to society

Pillars are generally universal in nature like core values, but have shorter durations before they have to be updated. Each of the pillars above would pertain to any Marine in any unit doing any duty.

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Performance Cohesion, Continued

Conceptual Awareness	The SNCO needs to constantly research and read to understand the driving forces of the operating environment. Utilizing common ground to create common perception or group situational awareness will allow the SNCO to draw from shared concepts, and recreating them into a working tool to assess current situations.

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The Boyd Cycle

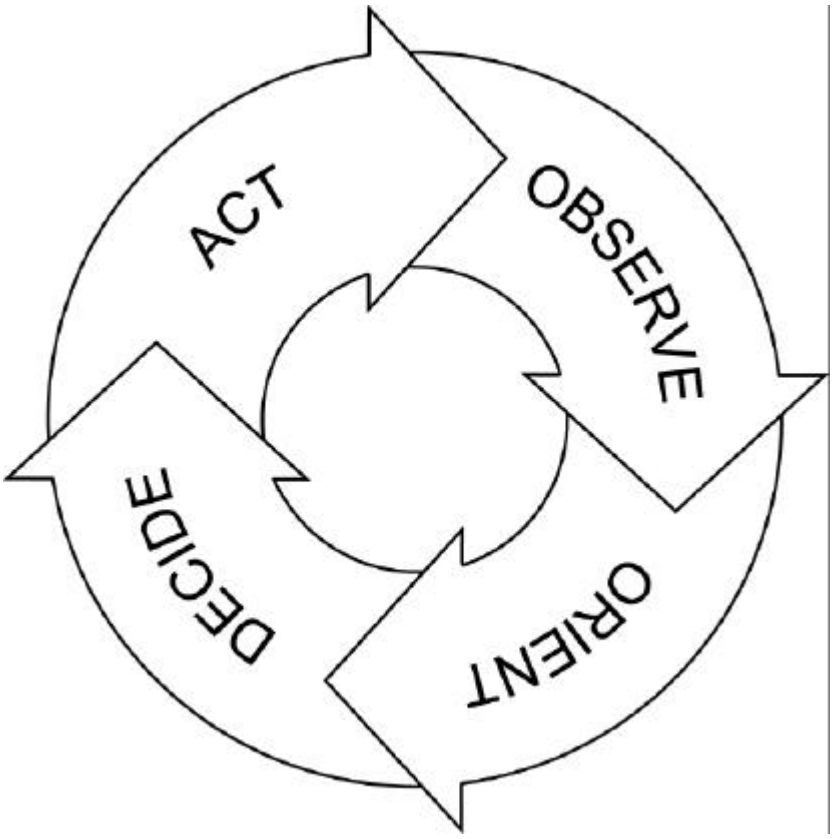
Introduction

The Marine Corps' heritage binds the past and future together via commitment to warfighting excellence in the present. A keystone of Marine Corps training and education is the commitment to develop leaders that can out think the opposition. While many SNCOs have heard the term OODA Loop, most do not know where the acronym came from or that they actually apply it daily.

Colonel John Boyd

Colonel John Boyd, USAF (Retired) served as a distinguished fighter pilot in Korea and Southeast Asia. Boyd's theory and experience was a great contribution to the military. Boyd realized that power and speed were not the quantifying factors to air superiority, but merely a conveyance coupled with the most powerful weapon, the human mind.

THE OBSERVE-ORIENT-DECIDE-ACT (OODA) LOOP



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CHAPTER 4

WARFIGHTING AND PLANNING FOR OPERATIONAL DECISION MAKING

Introduction

Estimated Study Time

1 hour 30 minutes

Scope

"Nothing succeeds in war except in consequence of a well-prepared plan."

—Napoleon Bonaparte

"I engage, and after that I see what to do."

—Napoleon Bonaparte

As quoted from MCDP 5, *Planning*, Napoleon Bonaparte links the importance of decision making to planning. The passage of time has changed little other than methods of applying decision making and the level at which decisions can be made and implemented, at the operational level. This chapter examines how warfighting leads to unique types of decisions SNCOs must make to plan and facilitate processes so that they run smoothly, no matter what. This chapter primarily addresses the relationships between decision making and

- Warfighting concepts
- Information requirements
- Marine Corps Planning Process (MCPP)

Continued on next page

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Introduction, Continued

Chapter Objectives

After completing this chapter, you should be able to

- Identify the definition of military decision making.
- Identify the definition of decentralized command and control.
- Identify the definition of implicit communication.
- Identify the psychological factors that influence decisions.
- Identify the procedures to shape the action.
- Identify the traditional view of maneuver.
- Identify the definition of planning.
- Identify the Marine Corps Planning Process Tenets.
- Identify the value of planning.
- Identify the steps in the Marine Corps Planning Process.
- Identify the information required to conduct mission analysis.
- Identify the definition of decisional advantage.

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Introduction, Continued

In This Chapter

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Warfighting Decision Forces	4-8
Managing Decision Information	4-15
Warfighting Decisions	4-16
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The Deliberate Planning Process	4-21
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Elements of Tactical Decision Making

Introduction

In most situations, the SNCO is the tactical decision maker who turns operational decisions into functional or tactical ones. How do you define decision making, and what special cognitive skills does decision making in military situations require?

Decision Making

MCDP 1, *Warfighting*, defines decision making as a mental process that requires both the situational awareness to recognize the essence of a given problem, and the creative ability to devise a practical solution.

Military Decision Making

Military decision making requires the same kind of situational awareness but calls for a military solution to the problem instead.

Cognitive Skills For Situational Awareness

Situational awareness includes these cognitive skills

- Perception – to be aware of and able to process the situational information.
- Comprehension – to understand the total situation and the factors involved.
- Projection – to understand possible options.
- Prediction – to determine what the opposition might do.

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Elements of Tactical Decision Making, Continued

Critical Thinking

Critical thinking is the ability to combine observations, experiences, and theoretical solutions into one practical solution. Depending on the depth and breadth of the problem, the solution may have to be multilayered, meaning analyzing and subdividing it into multiple smaller problems which can be solved more simply and easily, and by subordinates, either independently, simultaneously, or in linear fashion to achieve the desired output.

Power of Creative Thinking

When you combine cognitive thinking skills together with individual training and experience, and apply them to a specific situation, you will always have a unique and creative solution.

The ability to think individually is an operational multiplier, which prevents the enemy from understanding your perspective and intent. Creative thinking adds to the possibility of a unique solution, which increases your unpredictability, which is a power multiplier.

Summary: The Warfighting Decision Maker SNCO

To lead effectively, along with situational awareness skills, critical and creative thinking, the SNCO must also apply technical and tactical expertise, supported by academic study and experience, to make decisions that turn commander's vision, intent, and guidance into action in spite of any unexpected contingencies and hassles that can arise during combat.

How do the commander's plans, in the context of command and control, affect SNCO warfighting decisions?

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Operational Decision Support

Introduction

Since all actions are the result of decisions (or non-decisions) swift decisions create advantage in the operating environment. Incorporating warfighting into decision making requires a broad mastery of many doctrinal concepts.

- Maneuver
- Operational design
- Commander's Battlespace Area Evaluation (CBAE)
- Commander's guidance
- Battlefield Framework
- Integrated Planning

Maneuver

The view of maneuver is spatial, gaining positional advantage by movement. But the maneuver concept can be applied in other ways too, for example, through enhancing processes, procedures, or applications to generate an operating environment that is more effective than the enemy's, which is always advantageous.

Operational Design

Operational design is the commander's tool for translating the operational requirements of his or her superiors into the tactical guidance needed by his or her subordinate commanders and staff. It includes the purpose of the operation, what the commander wants to accomplish, the desired effects on the enemy, and how he or she envisions achieving a decision.

Commander's Battlespace Area Evaluation

The commander's battlespace area evaluation (CBAE) is the commander's personal vision, his first impressions of how he will go about doing what needs to be done.

Commander's Guidance

Commander's guidance provides the commander's preliminary conceptual vision of the operation.

Battlefield Framework

The battlefield framework consists of the battlespace, force organization, and plans for deep, close and rear tactical operations. The main effort, reserve, and security elements are poised to act on the commander's decisions as operations progress.

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Operational Decision Support, Continued

Integrated Planning	In integrated planning, command and control, maneuver, fires, intelligence, logistics, and force protection are combined and coordinated to share and manage information.
Summary: Application of Operational Decision	To arrive at an operational decision, the commander must consider all the supporting decisions that lead up to it like the constant need to maneuver, the CBAE, commander's guidance and framework for operations. The commander then integrates these elements so that all aspects of the operational plan are coordinated to work as a system.

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Warfighting Decision Forces

Introduction

In warfighting, the Marine making decisions should understand the operational perspective of the Marine Corps and its commanders, and the relationship between doctrine and decision making, which is not normally discussed. This section addresses the interrelationship between warfighting doctrine and its influence on decision making.

Recommended Review

The decision-making processes within units are guided by direction from the commander. Review chapter 2, pp. 2-8 and 2-9 of MCDP 5, *Planning*, to understand how guidance and intent influence decisions and courses of actions.

Philosophy of Command

Philosophy of command is the commander's general outline of principles, processes, and procedures for the command's operations.

Purpose of Philosophy of Command

The purpose of a commander's philosophy is to project tempo and methods designed to best cope with the uncertainty, disorder, and fluidity of combat.

Impact of Philosophy of Command

Infusing philosophy of command throughout the command and its processes creates a situation that supports

- Decentralized command and control
- Implicit communications

Decentralized Command and Control

Decentralized command and control exists when subordinate leaders must make decisions on their own initiative based on the commander's intent. This eliminates the requirement to pass information up the chain of command and then wait for a decision to be passed down.

A competent leader at the point of decision will naturally better understand the true situation than the commander some distance removed. Individual initiative and responsibility are paramount in a decentralized operating environment.

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Warfighting Decision Forces, Continued

Implicit Communication	Implicit communication is based on mutual understanding. When juniors understand the thought process and operational perspectives of their seniors, implicit communication is the highest level of communication since it is the most difficult to achieve.
Objective of Commander's Communication	The commander builds the framework for operations through both verbal and implied mission objectives and tasks. Subordinate leaders must be able to understand and achieve them through effective planning and decision making. The SNCO plays an important role in developing conditions that support such a decentralized operating environment by training NCOs to make effective decisions.
Characteristics of Decentralized Command and Control	The following warfighting characteristics relate the commander's inputs on decision making with the demand of a decentralized command and control. • Nonlinear • Fluid • Result in disorder • Complex • Have a human dimension
Nonlinear Characteristics	Disproportionate outcomes of cause and effect are said to be nonlinear. In simplest terms, nonlinear means that minor actions can have decisive effects on the outcome of a battle.
Nonlinear Results	Low-level NCO decisions can have high-level outputs and should be encouraged and nurtured by SNCOs.

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Warfighting Decision Forces, Continued

Disproportioned Outputs

A staff sergeant and his platoon capture a primary forward refueling position in an area dependent on mechanized operations. By denying the opposing forces their complete refueling capabilities, the enemy now has limited ability to conduct mechanized operations. Since the action was unplanned and produced unplanned results throughout the spectrum of operations, the staff sergeant created a nonlinear impact on the overall operation.

Mission: Eliminate armor threat in a mechanized environment.

LEVEL OF OPERATION	ACTION	RESULT
Strategic (High)	Eliminate mechanized threat.	Lack of fuel reduces armor enemy capability.
Operational (Intermediate)	Conduct anti-armor operations.	Lack of fuel for enemy increases friendly force effectiveness.
Tactical (Low)	Conduct aggressive patrolling and ambush operations against enemy forces.	SSgt captures forward refueling area with a reinforced platoon.

IMPACT

Nonlinear Result of Information Overload

Other nonlinear results could be created by operational decisions that create multiple dilemmas at multiple levels. Decision making also becomes nonlinear when every leadership level makes decisions, which can overwhelm the enemy who lose ability to interpret and take action. Decision making then becomes a form of maneuver warfare; it creates operational advantage by minimizing the opposing force's command structure by limiting decision-making capability through excessive operational inputs and actions.

Fluidity

Fluidity in a situation is created when there is a continuous flow of activity.

Effects of Fluidity

Organizations filled with leaders, Marines that can make decisions at every level, increase the commander's operational fluidity and ability to transition from one form of operational maneuver to another. A SNCO should strive to make the most informed decisions possible to fluidity, benefit the unit, and meet the commander's operational focus.

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Warfighting Decision Forces, Continued

Disorder

Disorder results from the lack of a system. Disorder lies somewhere between the extremes of order and complete chaos, chaos being a state of complete disorder.

As warfighting progresses, the level of disorder in operations can be expected to move toward complete chaos without interactive leadership and decision making. Disorder is natural to war and warfare, since plans go awry, instructions and information become unclear and misinterpreted, communications fail, mistakes occur, and unforeseen events become common.

Optimizing Disorder

Disorder should be minimized in friendly operations and maximized in enemy operations. Since the SNCOs facilitate most operations and tend to stay in units longer than their officer counterparts, they are able to implement efficiency to counteract disorder there. But the ability to target enemy systems to deny access or eliminate capability to create operational disorder for the enemy is a skill mastered by the SNCO.

Complexity

Complexity refers to how intricate and interrelated parts are with the process and elements used to execute war and warfare.

Simplifying Complexity

Understanding friendly systems and how they support warfighting functions can only be learned through experience and academic study, and the SNCO is the binding force between theoretical perspective and real implementation of an operational process. Mastering the warfighting concepts and technical requirements and combining them with the complexity of the operating environment requires analytical skills to pull systems apart into simpler subsystems that can be taught and then interrelated as parts of the whole.

Human Dimension

The human dimension is central to war itself. War is shaped by human nature, which is exemplified by the clash of wills.

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Warfighting Decision Forces, Continued

Psychological Factors Influencing Decisions

Decision making is always affected by other mental factors, but warfighting decision making is affected mostly by these factors:

- Lack of moral courage
- Incomplete information
- Lack of timeliness
- Uncertainty
- Uniqueness

These factors directly interfere with the decision-making processes from a warfighting perspective because it is linked to presence of mind. Understanding the interrelationship of the factors and how they affect the speed, accuracy, and difficulty of the decision-making process directly affects the operational tempo of Marines and their units.

Lack of Moral Courage

Decision making requires leaders to make tough decisions in the face of uncertainty and to accept full responsibility for those decisions. Anything less undermines authority and discipline.

Incomplete Information

Incomplete information makes the decision process difficult, because the warfighting environment is fluid.

Lack of Timeliness

The timeliness of a decision is critical to maximizing initiative and response, which optimizes tempo. The ability to evaluate a situation and act is critical to the execution phase of operations. Time plays a major role in decision making because the ability to act quickly and effectively is part of building advantage and supporting maneuver.

Uncertainty

Uncertainty exists in every environment whether it is a full-fledged battlefield or near hostile environment. Uncertainty makes decision making difficult, because the possible outcomes can jeopardize the lives of your Marines and operational success. Understanding uncertainty and the contributing factors helps the decision maker to improve their decision making.

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Warfighting Decision Forces, Continued

Effects of Human Behavior

The dynamics of the human dimension of warfighting require leadership and management skills to direct and motivate subordinates to achieve operational objectives. Understanding some behaviors typical of the warfighting environment enables the SNCO to predict subordinate behavior in relation to performance expectations based on situational factors related to the operational activity. The ability to line behavior with performance and mission tasking is essential for improving individual and group performance. SNCOs play an essential role in NCO development. The ability to develop critical thinking skills and problem solving ability reinforces many of the human dimension factors mentioned before.

Uniqueness

Since most decisions are situationally unique, avoid standard solutions. Instead, incorporate experience and knowledge to develop a new alternative solution. While pattern matching based on experience is an important part of decision making, each decision should be considered separately. If the quote below applies to your decision making, your observations of the situation or problem may have to be reevaluated.

"To a man with a hammer, every problem looks like a nail."

Standardizing decisions based on mismatched experiences generates ineffective outcomes.

Goal of Decision Making

The goal of decision making is to develop the ability to make decisions on awareness vice habit. Leaders must have the moral courage to make tough decisions in the face of uncertainty and accept full responsibility for their decisions. Moral courage is required to act with incomplete information in dynamic situations that Marines experience in the battlespace. Patience and perseverance are also required to act rationally instead of rashly to decide on a course of action that minimizes risk and optimizes the possibility of success faster than the opposing forces.

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Warfighting Decision Forces, Continued

Creating the Warfighting Decision Maker

The Marine SNCO is the primary link between the tactical application of doctrinal concepts and the tactical decision maker in the operating environment. In order to meet the challenges of the 21st Century operating environment, the SNCO must assume the role of both trainer and mentor transferring the lessons learned from experience in the context of doctrine. By being able to discuss doctrine effectively to support decision making, the SNCO and NCOs they train, will be better decision makers and leaders. Decision making is a mental aspect of maneuver warfare since it increase operational tempo, reduces frictions, and creates on opportunity to optimize performance.

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Managing Decision Information

Introduction	Decision making is dependent upon some form of information, whether it is a collection of situational factors obtained through observation or in depth information derived through meticulous research and analysis. SNCOs serve in billets, which require them to use a variety of information.
Information	Information is facts, data, or instructions in any medium or forum.
Information Requirement	Information requirements (IR) are those items of information regarding the enemy and his or her environment, which need to be collected and processed in order to meet the requirements of a commander.
Priority Intelligence Requirement	Priority intelligence requirements (PIR) are those intelligence requirements for which a commander has anticipated and stated priority in the task planning and decision making.
Commander's Critical Information Requirements	Commander's critical information requirements (CCIR) identify information on friendly activities, enemy activities, and the environment that the commander deems critical to maintaining situational awareness.
Assumption	An assumption is a supposition about the current situation or the future course of events, assumed to be true in the absence of positive proof, which enables the commander to complete an estimate of the situation and make a decision on a course of action.
Relationship to Situational Awareness	Assumptions are used in analytical processes, since time is required to develop well-founded assumptions. Dynamic situations require intuitive decision making where the assumptions and pattern-matching previous experiences occur simultaneously and the decision is made momentarily. An assumption is used to fill gaps that exist within the known information, which allow the decision makers to develop possibilities.

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Warfighting Decisions

Introduction

Warfighting and decision making are arts. The only way to become proficient in either is to be a student of warfare and apply the concepts in the operational and training environments.

Shaping the Action

Shaping the action is the larger scheme of how victory is to be achieved.

Shaping the action can be completed by

- Establishing what is to be accomplished, why, and how
- Identifying the enemy's critical vulnerabilities
- Identifying our vulnerabilities from the enemy's perspective

Shaping creates perspective of the operational environment from a higher operational level. It creates an operational projection of what could possibly be done to achieve a mission objective.

Main Effort

Main effort is the action that is most critical to success at that moment. It is the responsibility assigned to the *unit* to accomplish the key mission. This unit becomes the focal point for the meeting of combat power. The main effort receives the priority of support. This support can come in forms such as logistical, mobility, fire support, and attached personnel to fulfill special mission requirements.

Surfaces

Surfaces are enemy hard spots or enemy strengths.

Gaps

Gaps are soft spots or enemy weaknesses.

Shifting Effort

Situational changes may require a commander to shift the main effort. Redirection provides the opportunity to locate additional gaps or creates additional dilemma for the enemy. *(Economy used in this context means that by initiating action elsewhere creates greater opportunity for success by causing the enemy to divide their operational focus.)*

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Warfighting Decisions, Continued

Traditional View of Maneuver

The traditional view of maneuver refers to a method to gain positional advantage in a space or location, which is normally accomplished by movement.

Dimensions of Maneuver

Every function within the Marine Corps can create maneuver advantage. Any action that reduces operational friction is a means of expanding the dimensions of maneuver.

Goal of Combined Arms

The goal of combined arms is to create dilemma, which is a no win situation for the enemy. Marine war fighters have to be aware of the assets under their control and their capabilities from the fire team to Marine Expeditionary Force (MEF) level.

Methods of Achieving the Combined Arms Concept

Combined arms can be achieved through two different approaches which are

- Tactics and techniques
- Task organization

Tactics and Techniques

Tactics and techniques are generally used at lower operational levels where junior commanders and small unit leaders share the same passion to technical proficiency and tactical application of warfighting concepts and tactics. Sergeants must understand how weapons systems and tactics provide the nucleus of their combat power. The ability to integrate assets to achieve dilemma to support the commander's intent and mission is the goal of combined arms.

Task Organization

Task organization is tailoring a unit's composition to meet specific needs. This is normally done at higher levels of operation.

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Planning Decision Making

Planning

Planning is a preparation process, which involves a number of ongoing, repetitious, and related activities.

Doctrinal Perspective

Planning involves projecting our thoughts forward in time to influence events before they occur rather than merely responding as they occur. This means contemplating and evaluating potential decisions and action in advance.

Functions of Planning

Planning has several key functions that apply at strategic, operational, and tactical levels:

- Direct and coordinate actions
- Develop a shared situational awareness
- Generate expectations about how actions
  - Will evolve
  - Affect the desired outcome
- Support the exercise of initiative
- Shape the thinking of planners

Tenet

A tenet is a principle, belief, or doctrine that is generally held to be true.

Marine Corps Planning Process Tenets

The tenets of the Marine Corps Planning Process are derived from maneuver warfare doctrine and are used to plan and execute military operations.

- Top-down planning
- Single battle concept
- Integrated planning

Top-Down Planning

Top-down planning refers to the commander's involvement and direction of the planning process. The commander's intent and guidance are driving forces behind development. Planning assists the commander in gaining situational awareness and knowledge. The interactive communication process allows the commander's vision to be translated into a concept of operation, which will translate into mission accomplishment.

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Planning Decision Making, Continued

Single Battle Concept	The single battle concept is a warfighting perspective that allows the commander to focus the efforts of the force elements in order to effectively accomplish the mission.
Integrated Planning	Integrated planning is a disciplined approach that is systematic, coordinated, and thorough. Integrated planning requires representatives of the warfighting functions to consider relevant factors, reduce process omissions, and share and manage information.
Value of Planning	The value of planning changes with every situation, with every type of activity, and with every level of an organization. Planning takes on value when done properly, using methods appropriate to the conditions and the activities being planned.
Marine Corps Planning Process	The Marine Corps Planning Process is an established set of procedures that transition a mission statement, commander's intent, and guidance.
Decision Planning	Decision planning is planning that occurs before the decision is made.
Execution Planning	Execution planning is planning that occurs after the decision has been made. It is an approved course of action. Execution planning at one echelon or level becomes the basis for decision planning at subordinate levels as the subordinate develops a course of action to accomplish the mission assigned from above.
Deliberate Planning	Deliberate planning is conducted when sufficient time is available and there is no advantage gained by acting more quickly. Deliberate planning is conducted well in advance of execution and it relies heavily on assumptions that will exist when the plan is implemented.
Rapid Planning	Rapid planning relies on current conditions and is responsive to changing events.

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Planning Decision Making, Continued

Planning Focus

Understanding the planning processes in order to facilitate and accomplish mission tasking should be part of the challenge of transitioning to the SNCO ranks. The deliberate planning process is the most detailed of the planning processes mentioned in the previous section, so it can be used as a general template. While planning templates can create a restricted perception, it should be understood that planning processes could be modified to meet the demands of operational situation. As members of staff or small unit leaders, understanding the planning processes should give SNCOs better mission focus, situational awareness, and understanding of the leadership demands in an operational environment.

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The Deliberate Planning Process

Introduction

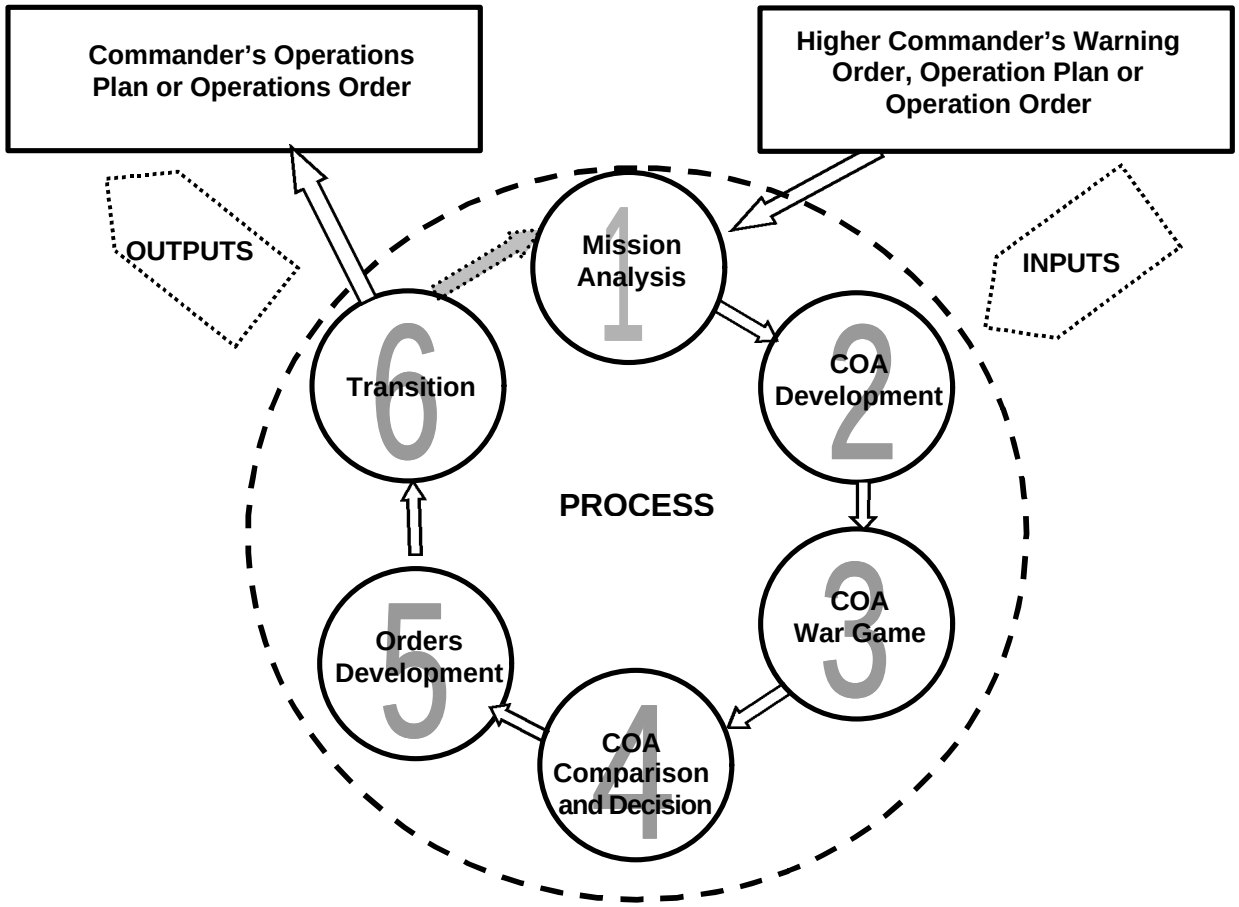
The Marine Corps Planning Process lays out deliberate planning in terms of a six-step process that uses inputs to produce outputs.

Marine Corps Planning Process Steps

The Marine Corps Planning Process steps are

- Mission Analysis
- Course of Action
- Course of Action War Game
- Course of Action Comparison and Decision
- Orders development
- Transition

MARINE CORPS PLANNING PROCESS



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The Deliberate Planning Process, Continued

Mission Analysis

Mission analysis is the process of reviewing and analyzing

- Orders
- Guidance
- Other information used to produce a mission statement

Mission analysis requires that certain information be available such as

- Possible area of operations
- Probable mission
- Available forces
- Area's political, military, and cultural characteristics

Course of Action

A course of action (COA) is a potential solution to an assigned mission.

Requirements for COA Development

When time and other resources are limited, a COA can be developed by considering the two fundamental questions

- What do I want to do?
- How do I want to do it?

Wargaming

The commander approves the COAs for wargaming, and then the friendly COAs are played against the enemy to identify strengths and weaknesses of the COA.

COA Comparison and Decision

The COA Comparison and Decision Process require interactivity between the commander and the staff members. Ideally this process will take place during a collective meeting of leader and staff membership. If the area of operations is dispersed the meeting may have to be held via an electronic format.

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The Deliberate Planning Process, Continued

Commander's Decision Making Responsibility

The commander may select one of the following options for making a decision on the COAs presented.

- Select a COA without modification.
- Modify a COA to overcome disadvantages.
- Develop a new COA by combining favorable elements of multiple COAs.
- Discard all COAs and resume mission analysis or COA development as required.

Post Decision Responsibilities

Once a decision is made, the commander should conduct a review of the COA and the mission statement with subordinate commanders. After ensuring that the COA selected meets all essential tasks, the COA guides the development of the concept of operations.

Order

An order is a written or oral communication that directs actions and focuses a subordinate's tasks and activities towards accomplishing the mission.

Orders Reconciliation

Orders reconciliation is an internal process in which the staff conducts a detailed review of the order.

Orders Crosswalk

The orders crosswalk is a process in which the staff compares the order with orders of higher and adjacent commanders to achieve unity of effort and ensure that commander's intent is met. When discrepancies or gaps are identified the staff must take corrective action.

Order Development

The orders development process is shorter than most of the preceding steps. At this stage the thinking and objectivity is focused. Transitioning from a COA that has already been selected from a list of options and war gamed should be one of the easier, but tedious tasks. Ensuring correctness, evaluating the clarity and simplicity of the plan, and then finalizing the product can be time consuming.

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The Deliberate Planning Process, Continued

Transition

Transition is a continuous process that requires free flow of information between commanders and staffs by all available means.

Benefits of Transition

The transition benefits of the planning process are as follows:

- Enhances the "situational awareness" of operating conditions under which the Marines will execute the order
- Maintains the intent of the concept of operation
- Promotes unity of effort
- Generates tempo

Transition Process

The transition process is designed to ensure that those charged with executing the order fully understand the plan. Transition may be internal or external in the form of briefs or drills. Internally, transition occurs between future plans or future and current operations. The most common locations of internal transition are at the division, group, or wing levels and above. Externally, transition occurs between the commander and his subordinate commanders.

Transition Brief

A transition brief provides an overview of

- Mission
- Commander's intent
- Task organization
- Enemy and friendly situation
- Ensures all actions known and understood.

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Decision Making Planners

Introduction

The importance of understanding the planning process as a staff member is to recognize that it creates a system to organize information, assess the information, and then act upon it.

Analysis and Planning Interface

The planning process provides a systematic framework to work in and actually synchronize with the decision-making processes. The planning process focuses on several COAs similar to the multiple decision projection possibilities that are required for the analytical decision-making approach.

DECISION-MAKING APPROACH COMPARISON

Analytical Decision Making	Planning Process
Define the problem or task	Mission Analysis
Identify alternative solutions	COA Development
Evaluate the alternative solutions	COA War Game
Assess the strengths and weaknesses	COA Comparison and Decision
Assess the risks and uncertainties	
Compare alternatives	Orders Development
Identify and select the best alternative	Transition

Situational Flexibility

Planning and decision making are required to be flexible to meet situational factors and conditions that were unforeseen during the planning phases or analytical planning processes.

Decisional Advantage

Decisional advantage is the ability to make decisions faster than the opposing forces in the essence of maneuver.

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Decision Making Planners, Continued

Planning and Decision-Making Relationship

Planning provides the context for tactical decision making. Planning parallels the analytical decision-making process and provides the operational coherence for combining decision making with warfighting. In dynamic situations, proficiency in warfighting, tactics, and combat techniques support the intuitive decision-making processes and abbreviated analytical processes when time permits. The ability of Marines to adapt lessons learned with information of all types expands their operational conceptualization of the battlespace, which enhances performance.

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Chapter 4 Exercise

Estimated Study Time 30 minutes

Directions Complete items 1 through 17 by performing the action required. Check your answers against those listed at the end of this chapter.

Item 1 Military decision making is a decision-making process that requires

a. processes that are not the same.
b. some aspects of the spectrum of operations and functions.
c. the study of tactics and techniques so that decision makers can make decisions in the operating environment.
d. the same kind of situational but calls for a military solution to the problem instead.

Item 2 Which of the following statements best describes decentralized command and control?

a. Decentralized command and control is a method to control operations using interactive information networks that allow the highest levels of command to interface with the situational control at the tactical level of operations.
b. Decentralized command and control is a battle command process that links higher commanders to lower level units using liaison officers and sections.
c. Decentralized command and control exists when subordinate leaders must make decisions on their own initiative based on the commander's intent.
d. Decentralized command and control is phase of operation that occurs when units are utilizing movement to support maneuver warfare and communications are erratic or non-existent.

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Item 3

Implicit communication is based on

a. between two or more individuals.
b. using non-verbal techniques and technologies.
c. mutual understanding.
d. that individuals leading larger groups use to express ideas and instructions.

Item 4

Moral courage, incomplete information, timeliness, uncertainty, and uniqueness are decisional influences. These influences are described by what term in the text?

a. Environmental factors
b. Psychological factors
c. Operational factors
d. Judgment factors

Item 5

Which answer best describes shaping actions?

a. Conducting a reconnaissance
   Transmitting the commander's critical information requirements
   Conducting METT-T for improved situational awareness
b. Establishing what is to be accomplished, why, and how.
   Identifying the enemy's critical vulnerabilities
   Identifying our vulnerabilities from the enemy's perspective
c. Analyzing the situation to assess critical requirements
   Developing possible courses of action for implementation
   Transitioning the action to warfighting applications
d. Offensive operations
   Defensive planning
   Terrain and operational analysis

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Item 6

The traditional view of maneuver refers to

a. the ability to move in the operating environment.
b. a state of mind that blends decision-making capacity with operational experience.
c. a method to gain positional advantage in a space or location, which is normally accomplished by movement.
d. moving faster than the enemy during warfighting operations.

Item 7

Planning is

a. the methodology that focuses the operation to meet the mission requirements using campaigning and top-site.
b. a preparation process, which involves a number of ongoing, repetitious, and related activities.
c. projecting the mission into the future and designing a plan.
d. combining the commander's intent with the tactical situation and designing a strategy to support the operation.

Item 8

The tenets of the Marine Corps planning process are called

a. offense, defense, combined arms, and maneuver warfare.
b. mission statement, commander's intent, and battlespace evaluation.
c. tactics, strategy, campaigning and combat techniques.
d. top-down planning, single-battle concept, and integrated planning.

Item 9

The changes with every situation, type of activity, and with every level of an organization is known as the _____ of planning.

a. value
b. function
c. dynamics
d. process

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Item 10

From the scrambled list below place the Marine Corps Planning Process steps in the proper order.

Step	Action
6	Course of action comparison and decision
5	Mission analysis
1	Course of action
2	Transition
3	Course of action war game
4	Orders development

a. 1, 3, 6, 2, 5, 4
b. 5, 1, 3, 6, 4, 2
c. 3, 2, 6, 5, 4, 1
d. 4, 5, 2, 1, 3, 6

Item 11

The information that the text cites as required to conduct mission analysis is

a. understanding the mission objectives, operational factors, psychological factors, and enemy capabilities.
b. possible area of operations, probable mission, available forces, area's political, military, and cultural characteristics.
c. commander's intent, guidance, vision, philosophy, and concept of operations.
d. commander's critical information requirement, operational design, battlefield framework, and force structure.

Item 12

Decisional advantage is the

a. ability to make decisions faster than the opposing forces is the essence of maneuver.
b. value assigned to decisions during after action review and analysis to develop lessons learned.
c. organizational capability created by implementing low-level decision-making capability in operational applications.
d. result of appropriate action in the operational environment when dilemma completely shatters the enemy's will to resist.

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Chapter 4 Exercise

Answers

The table below provides the answers to the exercise items. If you have any questions, refer to the reference page listed for each item.

Item Number	Answer	Reference
1	d	4-4
2	c	4-8
3	c	4-9
4	b	4-12
5	b	4-16
6	c	4-17
7	b	4-18
8	d	4-18
9	a	4-19
10	b	4-21
11	b	4-22
12	a	4-25

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CHAPTER 5

DEVELOPING DECISION MAKERS

Introduction

Estimated Study Time

30 minutes

Scope

This chapter discusses the methods and applications available to the SNCO to expand the decision-making capabilities and capacities of their NCOs and Marines by using professional reading for development. Reading like storytelling can create common experiences and enlarge the experiential knowledge base that allows leaders to make better decisions by increasing the total amount "learned" experience.

Chapter Objectives

After completing this chapter, you should be able to

- Identify the Marine Corps order that addresses military thinking and decision making.
- Identify forms of doctrinal publications of Marine Corps doctrine.
- Identify the definition of Marine Corps Lessons Learned System (MCLLS).
- Identify the important facts in a decision-making article.

In This Chapter

This chapter contains the following topics:

Topic	See Page
Introduction	5-1
Reading for Decision Making	5-2
Reading for Warfighting	5-7
Chapter 5 Exercise	5-8

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Reading for Decision Making

Decision Making and Military Thinking

Reading support the development of improved decision making and military thinking skills required of all Marines throughout the Marine Corps. General Krulak, the 31st Commandant further solidified the need for decision making and military thinking skills in White Letter 11-97, which outlined the projections identifying a need for military thinking and decision-making studies. The directive was clarified in MCO 1500.55, *Military Thinking and Decision Making Exercises.*

While the directive provides the superstructure for a decision making and the requirements for a military thinking program, the SNCO has to tailor an organization specific plan of action. Implementing a reading program that focuses on decision making and meets mission specific needs of the unit is up to the discretion of the unit leaders. A proactive SNCO should be capable of mentoring NCOs and Marines alike on reading endeavors and make recommendations.

Types of Publications

The Marine Corps publications are divided into the following types:

- Marine Corps Doctrinal Publications (MCDP)
- Marine Corps Warfighting Publications (MCWP)
- Marine Corps Reference Publications (MCRP)

Doctrinal Reading Support

MCRP 6-11A, *A Book on Books,* provides doctrinal support for developing and structuring a professional reading program. The reference provides general guidelines about the types and locations of materials that could be included in a reading program, which is located at www.doctrine.usmc.mil.

Marine Corps Doctrine

Marine Corps doctrine is designed and developed to provide strategic overview of the methodology, and direction of operations and functions used within the Marine Corps.

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Locating Electronic Reading Resources

The table below contains instructions for locating professional reading resources. This example is set up for using the official Marine Corps website located at *www.usmc.mil*, the general information can be used on other search engines on the Internet.

Step	Action
1	Log on to personal computer using your official login and password.
2	When login is complete, locate the Internet Explorer icon on the desktop or a. Click on Start b. Click on Programs c. Click on Internet Explorer
3	Type in *http://www.usmc.mil* into the address box and click on the "Go" button to the immediate right of the address box.
4	When the web page appears, several options are available. Find a. The button labeled "Publications" on the menu toolbar near the tool bar across the top of the page. b. The "Search" option along the left side menu toolbar of the web page.
5	Clicking on "Publications" makes a drop down menu appear. a. Select the type of publication required, such as "Orders/Directives" and click on it. b. Directives are organized by standard subject identification code or subject. c. Doctrinal publications are organized by type and the options appear on the left menu toolbar.
6	When using the "Search" option a. Type "Reading Program" into the box under "Search." b. Go to the box directly below where ALMAR (All Marine Message) is set as the default. c. Click on "Search."
7	Utilize resource.

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Reading for Decision Making, Continued

Sample Topics

When using a search engine to support a decision-making reading or professional development program, type in subjects like

- Professional development/military thinking
- Military decision making
- Tactical decision games or tactical decision scenarios
- Decision making or decision-making games

SNCO Role in Professional Reading

Marine NCOs face a multitude of challenges and demands as they transition into new billets and accumulate new responsibilities. The experience of the SNCO Corps makes them the ideal leadership trainer for NCOs.

Encouraging professional reading is an effective way to combine training methods for optimal leadership performance.

Marine Corps Directives

Marine Corps directives come in the form of orders, bulletins, and messages. Directives are assessable to all Marines through the official Marine Corps website located at

www.usmc.mil or http://www.usmc.mil/marinelink/ind.nsf/publications

Marine Corps orders are listed by standard subject identification code or subject. *(See 8101 Study Unit 7 for more information on SSIC.)*

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Reading for Decision Making, Continued

Other Resources

Several other sources contain information that can give a Marine sergeant's individualized reading program depth. Some of the sources are

- Periodicals
- On-line periodicals
- On-line references
- Marine Corps lessons learned system
- Marine Corps doctrine and directives

The intent of this section is to make the sergeant aware of the multitude of available sources of professional military education available to the individual. The distance education and resident professional military programs only provides the foundation of military education. The opportunity to expand and develop a broader perspective of the operating environment shows how warfighting is the driving force of all operations.

Periodicals

Periodicals are generally magazines and newspapers that are published on a regular basis. Newspapers and magazines are two examples of periodicals that Marines can read for updated information on national and international events, and issues that affect the operating environment.

On-Line Periodicals

On-line periodicals are periodicals that are available on the Internet. The challenges of the information age require that Marines of all grades have basic computer competencies. Many periodicals have on-line websites that can be accessed.

Marine Corps Lessons Learned System (MCLLS)

The Marine Corps Lessons Learned System (MCLLS) is a database of lessons learned during operational and training evolutions. Currently, the lessons learned database is transitioning into the Combat Development Tracking System. In the interim the database is available via the Marine Corps Doctrine web page located at

www.doctrine.usmc.mil

SNCOs desiring access to the database must request permission and receive a user ID and password to access the database.

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Reading for Decision Making, Continued

SNCO Applications

The SNCO should also do a self-assessment to ensure his or her skill sets required to locate and use materials for professional development has not become obsolete.

The SNCO's experience-based knowledge can fortify his or her professional development pursuits. This knowledge will provide practical solutions and the ability to develop greater leadership skills and problem solving success.

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Reading for Warfighting

Introduction

The professional reading program should increase the amount of information that SNCOs, NCOs, and Marines can apply. The focus is to relate the reading to present and future applications that the SNCO may have to execute.

Developing Perspective

After choosing a professional reading source, the reader should attempt to capture the perspective from which the author is writing. If you are unsure, you may be able to read the summary sometimes located on the back or inside cover of the book. If this is not available, you may have to do some research or seek to answer some the following questions as you read.

- What time frame is the book written?
- What is the author's age and background?
- What was the author's experience and situation when the book was written?
- Is the book a historical account or personal perspective on an issue?
- If the book is a historical account, what did the author attempt to prove or present?
- If the book is a personal perspective, what did the author want to get across to the reader?
- What are the lessons learned that could be derived from the book?
- Do they still apply to today's operating environment? If not or if so, why?

The reader should approach professional reading with an open and inquisitive mind. Determining the value of the book is dependent on the reader's purpose and perspective.

Group Readings and Discussions

Group reading is best facilitated through the use of a professional article(s) that applies to a current issue, training objective, or warfighting technique or application. Articles can be read in a short period of time rather than days and can be accessed on-line or reproduced at minimum expense.

SNCO Reading Applications

SNCOs influence many of the behaviors of their NCOs and Marines. The same influence and communication techniques can be used to create an environment that encourages and supports self-development through professional reading programs.

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Chapter 5 Exercise

Estimated Study Time

1 hour 30 minutes

Directions

The unique nature of training decision makers requires unique approaches to training and education. This chapter exercise consists of two parts. The first section requires you to complete items 1 through 3 by performing the action required. Check your answers against those listed at the end of this chapter.

The second section of this exercise includes several articles on decision making. Each of the articles focuses on a different perspective of decision making. Read the introduction and the article before answering the discussion questions. The intent is to expand the SNCOs knowledge of decision making and critical thinking skills while presenting a discussion forum that may be used to lead guided discussions of print and post articles for their Marines to read individually. You will have three articles to read. Test items 4 through 8 require you to read the article, "How We Decide." Test items 9 through 12 require you to read the article, "Cultivating Intuitive Decisionmaking," and finally test items 13 through 16 require you to read the article, "Strategies of Decision Making."

Item 1

Identify the Marine Corps order that addresses military thinking and decision making.

a. MCO 1500.55, Military Thinking and Decision Making Exercises
b. MCO 1510.85, Military Thinking and Decision Making Exercises
c. MCO 1520.95, Military Thinking and Decision Making Exercises
d. MCO 1525.25, Military Thinking and Decision Making Exercises

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Item 2 The primary forms of Marine Corps doctrine are

a. periods of instruction at Marine Corps Recruit Training, The Basic School, and Marine Combat Training.
b. Marine Corps Common Skills Handbook, Marine Corps Institute courses, and associated publications.
c. Marine Corps Doctrinal Publications, Marine Corps Warfighting Publications, and Marine Corps Reference Publications.
d. professional military education courses, sustainment training at the battalion level and below, and field skills training and evaluation.

Item 3 The Marine Corps Lessons Learned System (MCLLS) can be defined as

a. notes made in the platoon sergeant's notebook during field evolutions that are turned over to the commanding officer at the end of an operation.
b. large quantities of notes compiled into the battalion S-3 shop for planning the next cycle of training.
c. files of after action reports located in the G-3 or G-5 shop that can be used for decision making and planning.
d. database of lessons learned during operational and training evolutions.

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Chapter 5 Exercise, Continued

Directions For Items 4 Through 8

You must read the preview page followed by the article "How We Decide" beginning on page 5-16 before completing this section of the chapter exercise. When you have finished reading the article, answer items 4 through 8 by writing your answers in the space provided. Check your answers against those listed at the end of this chapter beginning on page 5-47.

Item 4

What is the classical decision-making model?

Item 5

What does the author refer to when speaking of military decision making?

Continued on next page

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Chapter 5 Exercise, Continued

Item 6 How does military thinking compare to intuitive decision making?

Item 7 Which model would best support you in your warfighting role?

Item 8 How would you train a Marine NCO to expand their decision-making capabilities and what method works best?

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Chapter 5 Exercise, Continued

Directions for Items 9 through 12

You must read the preview page followed by the article "Cultivating Intuitive Decisionmaking" beginning on page 5-28 before completing this section of the chapter exercise. When you have finished reading the article, answer items 9 through 12 by writing your answers in the space provided. Check your answers against those listed at the end of this chapter beginning on page 5-51.

Item 9

How does the General Krulak compare the two decision-making processes in concise terms? When answering, focus on the terms quantitative and qualitative.

Item 10

What is the benefit of repetitive skills training and how does it relate to decision making?

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Chapter 5 Exercise, Continued

Item 11 How can self-study be implemented to develop decision makers?

Item 12 As a leader, how could I nurture decision making in my Marines?

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Chapter 5 Exercise, Continued

Directions for Items 13 through 16

You must read the preview page followed by the article "Strategies of Decision Making" beginning on page 5-36 before completing this section of the chapter exercise. When you have finished reading the article, answer items 9 through 12 by writing your answers in the space provided. Check your answers against those listed at the end of this chapter beginning on page 5-55.

Item 13

What is the purpose of the article "Strategies of Decision Making" in Required Reading 3?

Item 14

How does proficient decision makers make decisions?

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Item 15 How would you describe the team decision-making process?

Item 16 How can the operational decision-making process be improved?

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Preview to Required Reading 1

Introduction

The article "How We Decide" was written by John Schmitt, who essentially is the father of the paper tactical decision game and many of the decision-making resources used by the Marine Corps and other organizations. Much of the content discussed in the article addresses the intuitive decision-making process.

Reading Objectives and Perspective

The SNCO should read the article "How We Decide" from the perspective of a leadership trainer and war fighter, since that is the chapter focus. In order to develop full appreciation for the article's scope and perspective, the readers should ask questions similar to those below. For training purposes, the student should be prepared to answer the perspective building questions.

- What is the classical decision-making model?
- What does the author refer to when speaking of military decision making?
- How does military thinking compare to intuitive decision making?
- Which model would best support you in your warfighting role?
- How would you train a Marine NCO to expand their decision-making capabilities and what method works best?

Reading Terminology

The following article contains or discusses the following concepts, terms, or issues, which may or may not be familiar to the student. A brief definition or explanation follows the list.

- Fleet Marine Force Manual
- Cognitive psychology
- Recognition-primed decision (RPD) theory
- Fleet Marine Forces
- *Coup d'oeil*

Fleet Marine Force Manual

Fleet Marine Force Manual was the series of publications that is being replaced by the new generations covered in this chapter.

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Preview to Required Reading 1, Continued

Cognitive Psychology

Cognitive psychology is the study of how the mind processes information and how that information changes behavior. This article focuses on decision making and its relationship to problem solving, but cognitive psychology is also related to perception, motor control, attention, memory, and learning.

Recognition-Primed Decision Model

The recognition-primed decision model was developed by Dr. Gary Klein and is also generically referred as recognitional decision making. In essence, the RPD describes the mental process decision makers use to make intuitive decisions. The model is discussed in greater detail in Reading 3 of this chapter.

Fleet Marine Forces

Fleet Marine Forces (FMF) are now referred to as the Marine operational forces.

Coup d'oeil

As used in this article on page 5-26, *coup d'oeil* means skill for pattern recognition that is in turn the basis for intuitive decision making. MCDP 6, *Command and Control* (p. 72), states the definition of *coup d'oeil* as the ability of gifted commanders to intuitively grasp what is happening on the battlefield. The French translation literally means "strike or stroke of the eye." In essence, as a situation evolves, the leader is assessing and deciding on a course of action simultaneously.

Concept Contents

This table is provided to assist the reader in identifying the location of the decision-making concepts in previous chapters that are addressed in the following narrative. After reading the article, it is advised that the student review the concepts to assist in the critical analysis used to answer the review questions.

Decision-Making Concepts Review	See Page
Analytical Decision-Making Process	1-4
Intuitive Decision-Making Process	1-7
Recognition-Primed Decision (RPD) Model – *Figure 1*	5-40

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Required Reading 1

Instructions Read the following article and think about the decision-making processes and how they apply to warfighting.

HOW WE DECIDE

By
Maj John F. Schmitt, USMCR

The Corps' focus on analytical decisionmaking in its schools leaves Marines ill prepared for leading in the real world.

We all know how military decisions are made, right? At least we know how they are supposed to be made. Upon receiving the mission, the commander assembles the battle staff to analyze the mission – analyzing specified and implied tasks, arranging the task sequence, identifying constraints, and making assumptions. Next the commander and staff collectively determine information requirements about the enemy, the terrain, the weather, the local population, and so on. After that comes the staff orientation, a detailed description of the situation made mostly by the intelligence staff but with contributions from other staff sections, to ensure that everybody is "reading off of the same sheet of music." After the orientation the commander issues planning guidance, based upon which the operations staff develops several potential courses of action and presents them to the commander. After the commander approves the courses of action, the various staff sections analyze them and provide estimates of supportability for each. Based on all of the preceding, the commander is now ready to make his estimate of the situation and announce his decision. If the process has worked properly, the decision is reduced to matter of multiple choice – selecting from among the courses of action provided by the staff. From the commander's decision and concept of operations the staff develops detailed plans that, upon the commander's approval, are issued to subordinate units for execution. In theory, the process will occur successively in each unit down the chain of command.

The Classical, Analytical Decisionmaking Model

This is command and staff action done by the book – in this case the book is Fleet Marine Force Manual (FMFM) 3-1 *Command and Staff Action* – and it reflects the classical model of decisionmaking. (Command and staff action is merely a process for making decisions and communicating them to others in the form of orders or plans.) At the lower echelons of command where the commander lacks a full staff he will perform many of these actions himself. At higher levels of the process becomes a more formal interaction between commander and staff. But either way the

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object is the same: to take a methodical and efficient approach to decisionmaking and planning. We are taught that this is the "proper" way to make military decisions and to do any less is to "wing it" and risk an ill-advised choice.

The classical model of decisionmaking holds that decisionmaking is a rational and systematic process of analysis based on the concurrent comparison of multiple options. The idea is to identify all the possible options, analyze all of these options according to the same set of criteria, assign a value to each aspect of each option (either through quantitative means or subjectively), and choose the option with the highest aggregate value. In theory, this highest-value option is the optimal solution. In the research literature, this process is known as multi-attribute utility analysis.

Say, for example, you want to buy a new mid-sized sedan within a certain price range for your family of four. You decide on a set of criteria – sticker price, fuel efficiency, roominess, warranty, safety, manufacturer's reputation, buyer satisfaction – and you prioritize those criteria. Then you simply gather all the pertinent information about mid-sized sedans in your price range and compare. Some of the criteria are easily measured and compared – fuel efficiency, roominess, or dealer's warranty, for example. Some of the criteria – such as carmaker's reputation, safety, or buyer satisfaction – are less quantifiable, but you can still find reliable information on them in *Consumer Reports* or *Car & Driver* magazine. You weight the various criteria according to your established priorities, tally up the results, and as long as you have prioritized honestly, you will have the best choice for your new car. Thus the great appeal of analytical decisionmaking is that, as long as you have accurate information and do the analysis properly, it guarantees that we will reach the best possible decision. In other words, analytical decisionmaking seeks to "optimize."

"The implication of this is clear: the Marine Corps must start to develop intuitive decision-making skills among its leaders."

There are several other important characteristics of the analytical decisionmaking model that are important to understand. First, like most systematic and analytical processes, it is highly time consuming. It takes a while to identify, analyze, and compare all the various options. Using this model, you simply cannot make any decision until you have first analyzed all the options. As a result, no matter how quickly you can through the process, there will always be a certain minimum amount of time that it takes to reach any decision. If timeliness is not a factor, this not a concern; but if tempo is a key consideration, as it is in most military operations, this can be an overwhelming problem – in fact, in some cases it can short circuit the whole process.

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Second, the analytical model requires a high level of certainty and accuracy of information. It assumes that, as with the sedan example above, the pertinent information will be available and reliable. It assumes that if the necessary information is not readily at hand then we will have the time and ability to find it. It is important to recognize that this consideration can significantly impact the previous one because it usually takes time to gather information. But whether it is due to the lack of time or not, if the information is missing or unreliable, the quality of the decision suffers. The analysis and the resulting decision are only as precise as the information on which they are based. We can say with certainty that three plus five equals eight. But how many is a few plus a bunch? Moreover, where considerations are largely quantitative (as with the automobile example above), this process may work fairly well; but when considerations are qualitative, it will not. How do you assign a quantitative (or even subjective) value to the degree of flexibility or the element of surprise in each of your courses of action? It is a highly imprecise effort at best.

Third, reasoning power is essential to analytical decision making, but experience and judgment are not. The analytical model is process based. In theory, if you start with the right information and go through the analytical process properly, you are assured of getting the right answer regardless of you level of experience. As long as he has the requisite reasoning skills, a novice will the same answer as a seasoned military genius. To give an extreme example, a school child, as long as she has mastered the multiplication tables, will multiply six times seven and reach exactly the same answer as an Ivy League mathematics professor. The professor's years of study will offer no more insight into six times seven. In other words, the process is specifically designed to eliminate intangible factors like judgment, intuition, and insight – factors which cannot be calculated.

"So despite its theoretical promise the analytical approach to military decisionmaking is no more certain to achieve optimal results than other methods that do not try to optimize."

We can readily understand the appeal of the analytical model. It depicts decisionmaking as a neat, clean, and orderly process that, properly executed, promises optimization. It is a thoroughly rational and systematic model that is attractive to our scientific society. It is easy to document and justify the analytical decision. (Advice: If cover-your-own butt is a major concern, stick to analytical decisionmaking – you'll always have an excuse.) And given the proper procedural, practically anybody can master it.

The Problem: Reality Intervenes

The problem, as we all know, is that this process rarely works as advertised. Most military decisions are just not amenable to this type of approach. Military decisionmaking is not a neat, clean, and orderly process. Timeliness is a critical factor in most military decisions. Unlike

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selecting a new car, military decisionmaking is not a matter of choosing from among a finite number or of already existing options – military decisionmaking is not a multiple choice. Rather, it is a matter of creating a unique solution out of countless unclear possibilities, based largely on unquantifiable factors. Out own experiences tell us that humans rarely make decisions by multiattribute utility analysis. (In 12 years as an active duty infantry men, I can only recall one time that I actually went to through the process of two options concurrently – and ended up going with my gut instead of my analysis anyway.)

"Decisionmakers in a variety of fields use the analytical approach to decisionmaking less than 10 percent of the time and employ intuitive techniques over 90 percent of the time."

What typically happens is that we lack the time and information necessary to do justice to the analytical process. We end up combining, skipping, or hurrying steps – in general trying to "crunch" the process to fit into the time available – and often feel guilty that we have not done things the right way we think we are supposed to. Since we are taught to believe that rational analysis is the right way to make any decision, if the decision does not work out well, more often than not we conclude that it was because we did not go through the prescribed steps properly. If only we'd done a more thorough analysis.

We need to realize, even if we have the time to do the analysis, the results will rarely be optimal. There are two basic reasons for this. First, there are rarely any absolutely right or wrong answers when it comes to tactics, operations, or strategy – rarely any optimal solutions. In the words of Gen George S. Patton: "There is no approved solution to any tactical situation." And because time is usually a critical factor, "better" is often the ruin of "good enough." To quote Patton again: "A good plan violently executed now is better than a perfect plan next week." Second, while the analytical process may be precise, it will usually be based on considerations that are extremely difficult to quantify and are often no better than subjective hunches – consideration, in other words, which are imprecise. No matter how exact the process, the results will be no more precise than the starting assumptions – or, in the lingo of computer programmers, "garbage in, garbage out." So despite its theoretical promise, the analytical approach to the decisionmaking process to military decisionmaking is no more certain to achieve certain results in practice than other methods that do not try to optimize.

And perhaps most important of all, the undeniable reality is that human beings simply do not make decisions this way. The analytical decisionmaking model has little in common with how the human brain actually works in most circumstances. Fortunately, humans are not nearly the rational animals that we like to think we are. We have the capacity to act rationally, certainly, but it is

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hardly the only way – or in the main way – our brains work. So how do we actually make decisions?

Intuitive Decisionmaking

Starting in the 1970's, cognitive psychology began in earnest to question the classical decisionmaking model and started studying how experienced decisionmakers made decisions in "real life" situations. The phrase "naturalistic decisionmaking" was eventually coined to distinguish between this new approach to decisionmaking theory and the classical approach. While the classical approach studied decisionmaking decisions under controlled conditions in an attempt remove environmental and intangible factors, the new school sought to study decisionmaking under 'naturalistic" conditions. Specifically this meant decision-making characteristics by:

- Uncertain, dynamic environments
- Shifting, ill-defined or competing goals
- Lack of information
- Ongoing action with continuous feedback loops (as opposed to single decision event)
- High-level stress and friction
- Time stress

Not surprisingly, the research revealed that proficient decisionmakers rarely made decisions by concurrent option comparison. Instead, they use their intuition to recognize the essence of a given situation and to tell them what appropriate action to take. In fact, separate studies by Dr. Gary Klein and others conclude that decisionmakers in a variety of fields use the analytical approach to decisionmaking less than 10 percent of the time and employ the intuitive techniques over 90 percent of the time. * Experienced decisionmakers will tend to rely on intuitive decisionmaking to an even greater extent than that, while inexperienced decision-makers are more likely to use the analytical approach (although still not nearly as often as the intuitive method).

Klein developed the recognition-primed decision (RPD) theory, which has become one of the most widely recognized of the intuitive decisionmaking theories (and which has led to the field sometimes also being known generically as "recognitional decisionmaking"). Other in the field

** Klein's most conservative study (based on 1985 observations) estimated that decision makers use intuitive methods 87 percent of the time and analytical methods 13 percent of the time. Klein now recognizes that this study was actually biased toward analysis. More recent studies estimate that the breakdown at more like 95 percent intuitive to 5 percent analytical. G.A. Klein "Recognition-Primed Decisions" in W.B. Rouse (ed.) Advances in Man-Machine System Researcher (Greenwich, CT: JAI Press, 1989); G.L. Kaempf, S. Wolf, M.L. Thordsen & Klein, Decision Making in the Aegis Combat Information Center (Fairborn, OH: Klein Associates, 1992): R. Pascal & S. Henderson, "Evidence of Naturalistic Decision Making in C2" in C. Zsambok & G. Klein (eds.), Naturalistic Decision Making (Hilsdale, NJ: Lawrence Erlbaum Associates, in press); K.L. Mosier, Decision Making on the Air Transportation Flight Deck: Process and Product, unpublished dissertation (Berkley, CA: University of California, 1990).*

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developed other theories known by different by names, but all the theories emphasize intuitive situation assessment as the basis for effective decisionmaking. Klein and colleagues concluded that proficient decisionmakers rely on their intuition to tell them what factors are important in any given situation, what goals are feasible, and what the outcomes of their actions are likely to be – allowing them to generate a workable first solution and eliminating the need to analyze multiple options. Whereas the emphasis in analytical decisionmaking is on the systematic comparison of multiple options, the emphasis is intuitive decisionmaking is on the situation assessment – or, in military terminology situational awareness or coup d'oeil. In other words, based on a firm understanding of the true situation, the decisionmaker knows intuitively what to do without having to compare options. Where analytical decisionmaking strives to "optimize," intuitive decisionmaking seeks to "satifice" – to find the first solution that will work. By its nature, intuitive decisionmaking is much faster than analytical decisionmaking and copes with uncertainty, ambiguity, and dynamic situations more effectively. When it comes to the conduct of military operations, these are two huge advantages.

"We should repeatedly put our commanders in the position of having to make tactical, operational, and strategic decisions . . . we should make extensive use of teactical decision games (TDGs) and other war games."

The intuitive decisionmaker may actually consider more than one option out in series rather than concurrently. For example, he considers option A: if experience tells him A will work, he executes it; if not he moves on to option B. If B will work, execute; if not, consider option C. And so on. This would seem to indicate the quality of the decision depends on the random order in which options are considered. Option C may be the best solution in theory, but it is never even considered because B is good enough. In practice this is not really a problem, however, because in the friction of the battlefield, "optimal" solutions rarely live up to expectation, and good enough is just that – good enough. Moreover, the process does not seem to be random after all. Evidence suggests that proficient decision makers tend to consider an effective option (if not the "best" one) first.

The essential factor in intuitive decision-making is experience. This is an extremely important point. Experience is the thing that allows for the situation assessment that is at the heart of intuitive decisionmaking making. Experience allows us to recognize a situation as typical – that is, within our range of understanding. Although each situation is unique, experience allows us to recognize similarities or patterns and to understand what those patterns typically mean. If we have sufficient experience (and have learned by it) we do not need to reason our way through a situation, but instead simply know how to act appropriately. In general, the greater the experience, the greater the understanding – like the chess

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master who (studies show) can understand the "logic" of up to 100,000 different meaningful board positions. It is this experience factor, which more than any other, facilitates the pattern-recognition skills or coup d'oeil that are the hallmark of brilliant military minds.

Comparing the Two Models

This is not to suggest that intuitive decision-making is always superior to analytical decision making. Each of the models has strengths and weaknesses. One of the keys to effective decisionmaking is appropriate to a given situation.

There are circumstances in which the analytical approach offers advantages. Specifically, analytical decisionmaking offers advantages when:

- Time is not a factor – during prehostility contingency planning, for example.
- Decisionmakers lack the experience needed for sound intuitive judgments.
- The problem poses so much computational complexity that intuitive processes are inadequate – detailed mobilization planning, for example.
- It is necessary to justify a decision to others or to resolve internal disagreements over which course to adopt.
- Choosing from among several clearly defined and documented options – such as in deciding from several equipment prototypes in the procurement process.

So clearly there are circumstances in which analysis helps. Having said that, however, the really important point is that intuitive decisionmaking is far superior to analytical decisionmaking in the vast majority of typically uncertain, fluid, and time-sensitive tactical situations. The implications of this is clear: the Marine Corps must start to develop intuitive decisionmaking skills among its leaders.

It is also important to recognize that, while conceptually opposite, the two models are mutually exclusive in practice. It is possible, for example, to incorporate analytical elements as time permits into what is essentially an intuitive approach. So in any given situation we have to ask ourselves:

- Is analysis appropriate?
- Will intuition work best?
- Or, what combination of the two does the situation require?

How To Teach/Learn Intuitive Decisionmaking

There can be no doubt that we do an excellent job of teaching analytical decision making in our professional schools. Of course, this is only to be expected given the amount of time and effort we dedicate to the subject. But we have to question the wisdom of devoting so much time and effort to teach a method we will use less than 10 percent of the time – and in the process

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reinforcing the mistaken belief that the analytical approach is the "right" way to make decisions. This emphasis on the analytical decisionmaking in the school-house is especially questionable when we consider that by comparison we spend little or no time at all teaching our decision makers the techniques that they will need over 90 percent of the time. Clearly, the time has come for a serious reassessment of how we approach and teach command and staff action – the time to start introducing intuitive decisionmaking in a serious way and to give it priority in our schools.

Some would argue that we have to teach analytical before we can teach intuitive decisionmaking because the analytical procedures constitute the "building blocks" of decisionmaking – as if intuitive decision making is merely analytical decisionmaking done subconsciously and more quickly; as if you cannot do intuitive decisionmaking until you have mastered analytical decision-making. To argue this is to misunderstand the fundamental difference between the two models. Intuitive decisionmaking is not merely analytical decisionmaking internalized. The two types of decision-making are fundamentally different types intellectual qualities. Analytical decision-making is a rational, calculating activity – it is essentially scientific. Intuitive decision-making is an arational (but not irrational), sensing activity – essentially artistic.

Others will argue that if the process is intuitive, then there is no need to teach it because people will do it naturally. But while the process may be intuitive, the experience and judgment on which it is based are not. Those qualities must be acquired, and as we will discuss, there is no other way to acquire them than through repeated practice. Moreover, just because we do something intuitively does not mean that we cannot learn to get at it. The bottom line is that if we want to develop masters in the art of command, we should start teaching Marines intuitive decision making from the beginning. Now, this is not to advocate that we abandon analytical decisionmaking altogether, only that we subordinate it to more important (and more frequently used) decisionmaking skills.

The first thing we have to do is to recognize as an institution that human beings have an intangible capacity for intuition that can outstrip even the most powerful analysis. We have to recognize that even though we cannot fully understand or explain it, this skill can achieve superior results. It is not mystical or merely theoretical. It is real. It is a documented capability of the human mind, and we have to be committed to explaining and developing it.

Being committed to intuitive decision-making, how do we teach it? One thing is clear: we cannot teach it the same way we

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teach analytical decisionmaking. Because it is process based, the way to teach it is to teach the process. This is exactly what we do in our schools. But this approach makes no sense with intuitive decisionmaking precisely because the process is intuitive. In fact, we can even argue that intuitive decisionmaking is a skill that cannot be taught per se (as in provided by the teacher to the student), but rather that intuitive decisionmaking can only be learned (as in gained by the student by his or her own effort). With that in mind, there are two important considerations in learning intuitive decisionmaking. First, like most skills, decisionmaking is a skill that improves with practice. Even when we perform a skill without consciously thinking about how – swinging a tennis racke, solving a crossword puzzle, playing Nitendo Gameboy – we intuitively learn to perform that skill more efficiently simply from repeated practice. Second, as we mentioned earlier, intuitive decisionmaking is an experience-based skill. A broad base of experience is essential to the coup d'oeil or skill for pattern recognition that is in turn the basis for intuitive decisionmaking; the way to improve pattern recognition is to improve the experience base.

In either event, the way to learn intuitive decisionmaking is to practice decision-making repeatedly in an operational context. This is a point not wasted on other disciplines. A few years back the Havard Business School adopted a case study approach to its MBA program. In the first year of the 2 year program, MBA students do not take classes on economics or business management theory per se. Courses consist of business case studies, which the students pick from a management point of view. Each class period is devoted to a different case, and students are expected to be able to discuss that case intelligently as the basis for their course grades. It is only in the second year, after they have a firm grounding numerous historical cases, that students take their courses in business theory – although they also continue with case studies. By the end of the second year, Harvard MBA students studied some 240 business cases. One of the things that makes Harvard MBAs so desirable in the business world is that they have a broad base of practical understanding of business decisionmaking.

We should take the same approach in preparing our decisionmakers. We should repeatedly put our commanders in the position of having to make tactical, operational, and strategic decisions of all different sorts. This means that we should make extensive use of case studies – battle and campaign studies – viewed from the perspective of command decisionmaking. We should make extensive use of tactical decision games (TDGs) and other war games. For example, every day spent in the classroom at any Marine Corps school should begin with an appropriate level half-hour TDG session. (I mention TDGs specifically because they are much easier to do in a short period of time than other

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decision exercises and offer a higher yield in terms of decisionmaking experiences.) It is not enough to do the occasional case study or TDG: these must become a near-daily session in order to amass the requisite experience base. Breadth of experience is more important than detail of experience. From a decisionmaking perspective, 10 different TDGs are more valuable than a single full-scale, computerized war game in the same period of time.

Moreover, each decisionmaking exercise should be a high-risk experience – meaning that the decisionmaker should feel the pressure of being "put on the spot." This is important both to simulate the stress that is a main feature of most military decision-making and to provide a heightened learning incentive. Each decisionmaking experience should involve a discussion/critique led by a more experienced Marine to provide evaluation and draw out the key lessons, for while it is true that a person will learn simply by his or her own experience, the learning curve will be higher with wise guidance. It is also best to play TDGs in a group so we can see how others solved the same tactical problems and can incorporate those lessons to our own experience. The same principle applies outside the schoolhouse – in the Fleet Marine Forces or anywhere else. All Marines should be exercising their decisionmaking skills on a daily basis and adding to their reservoirs of experience.

Summary

Recent developments in the area of decision-making research show that humans rarely make decisions the we have long assumed they do. Effective decisions in the uncertainty, fluidity, and stress of war have more to do with insightful intuition than with systematic analysis. Likewise, creating effective decisionmakers has more to do with developing coup d'oeil than with teaching process. It is time for the Marine Corps to recognize this and take a hard look at how we train our commanders.

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Preview to Required Reading 2

Introduction

The article "Cultivating Intuitive Decisionmaking" was written by General Charles C. Krulak, the 31st Commandant of the Marine Corps. Transforming the operational forces to meet the 21st Century demands was one of the primary focuses of General Krulak. Development of the "strategic corporal" by shifting the warfighting doctrinal understanding and application down to the lowest leadership levels was one of the paradigm shifts envisioned.

Reading Scope and Perspective

The SNCO should read the article "Cultivating Intuitive Decisionmaking" from the perspective of a leadership trainer and war fighter. In order to develop full appreciation for the article's scope and perspective, the readers should ask questions similar to those below. For training purposes, the student should be prepared to answer the perspective building questions.

- How does the General Krulak compare the two decision-making processes in concise terms? When answering focus on the terms quantitative and qualitative.
- What is the benefit of repetitive skills training and how does it relate to decision making?
- How can self-study be implemented to develop decision makers?
- As a leader how could I nurture decision making in my Marines?

Reading Terminology

The following article discusses the following concept, terms, or issues.

- Chaotic
- OODA Loop
- *Coup d'oeil*

Chaotic

Chaotic refers to a very disorganized or confusing situation.

OODA Loop

The Boyd Cycle is formally known in the Marine Corps and other organizations globally as the Observe Orient Decide Act Loop or OODA Loop. The OODA Loop transitions decision-making theory into a simplistic and useful tool to teach and improve decision making.

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Required Reading 2

Instructions Read the following article and think about why and how decision-making processes change the leadership responsibilities of the SNCO?

Cultivating Intuitive Decisionmaking

It is my intent in preparing the force that we account for . . . [the demands of the 21st century] by creating Marines and their leaders who have superb tactical judgment and are capable of rapid decisionmaking under physical and emotional duress . . .

By
Gen Charles C. Krulak

Our world is becoming increasingly chaotic. Operations such as those in Bosnia, Haiti, and Soma1ia – where the unique challenges of military operations other than war have been combined with the disparate challenges of midintensity conflict – are becoming commonplace. The tragic experience of U.S. forces in Mogadishu during Operation RESTORE HOPE illustrates well the volatile nature of these contemporary operations.

The Strategic Corporals . . . and Their Leaders

Marines involved in these amorphous conflicts will be confronted by the entire spectrum of tactical challenges in the span of a few hours and, potentially, within the space of three contiguous city blocks. Thus, we refer to this phenomenon as, the "three block war." Success or failure will rest, increasingly, with the individual Marine on the ground and with his or her ability to make the right decision, at the right time, while under extreme duress. Without direct supervision, young Marines will be required to make rapid, well-reasoned, independent decisions while facing a bewildering array of challenges and threats. These decisions will be subject to the harsh scrutiny of both the media and the court of public opinion. In many cases, the individual Marine will be the most inconspicuous symbol of American foreign policy. His or her actions may not only influence the immediate tactical situation, but have operational and strategic implications as well. If we accept the maxim "battles are won and lost [first] in the mind of the commanders," we can safely assume that the three block war, may very well be won or lost in the minds of our "strategic corporals."

So the natural question become, "How do we develop our strategic corporals' abilities to make sound and timely decisions in the heat of the three block war?" How do we prepare them to deal decisively with the challenges they are destined to confront on the complex, high-stakes, asymmetrical battlefield of the 21st century? Further, the chaotic conditions of the next century promise to increasingly tax the individual decisionmaking skills of both commander

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and staff officers at all levels. The influx of information into our combat operations and fire support coordination centers is growing at a rate faster than our ability to process it. Thus far advances in information technology have increased, not diminished, the burden on our officers to make the hard calls. "Marines must rapidly distinguish between information that is useful in making decisions and that which is not impertinent. Often they must avoid the natural temptation to delay their decision until more information makes the situation clearer or risk losing the initiative. In all likelihood, once military action is underway more information will be simply further cloud the picture. Our leaders must be able to "feel the battlefield tempo, discern patterns among the chaos, and make decisions in seconds much like a Wall Street investment trader, but with life threatening consequences. In short, we must ask ourselves, "From the strategic corporal to the Marine expeditionary force (MEF) commander, how do we ensure: that each and every Marine has the decisionmaking ability needed to execute his or her responsibilities?"

The Essence of Decisionmaking

In answering the question, we must first gain a fundamental understanding of decision making itself. Decisionmaking is the foremost human factor, indeed unique contribution, involved in warfare. In effect, it is the means for implementing the human will. As long as wars result from opposing human wills, they will be emotional and chaotic in nature. Technological or scientific solutions alone will not be adequate to resolve these conflicts; nor will they be able to lift "the fog of war."

"Our leaders must be able to "feel" the battlefield tempo, discern patterns among the chaos, and make decisions in seconds much like a Wall Street investment trader, but with life threatening consequences... how do we ensure that each and every Marine has the decisionmaking ability needed to execute his or her responsibilities?"

Generally, we know that there are two primary models for human decisionmaking – the analytical model and the intuitive, or recognitional model. Military leaders at all levels are familiar the analytical model because it is the one historically used in our formal schools. In this model Marines prepare estimates of the situation that eventually evolve into potential courses of action. Analytical decisionmaking uses a scientific, quantitative approach, and to be effective, it depends on a relatively high level of situational certainty and accuracy. The greater the degree of situational certainty and awareness, the more effective analytical decisionmaking becomes. Unfortunately, the analytical model does not lend itself well to military applications once the enemy is engaged. At that point, military situations most often become very ambiguous, and the leader cannot afford to wait for detailed, quantitative data without risking the initiative. Analytical decision-making offers distinct advantage when the situation allows an indefinite amount of time for analysis, such as during pre-hostility

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contingency planning, but it rapidly diminishes in usefulness "once you cross the line of departure.

While analytical decision making is based on a comparison of quantitative options, recognitional decision making depends on a qualitative assessment of the situation based on the decider's judgment and experience. It does not look for the ideal solution; instead, it seeks the first solution that will work. Research by noted psychologist, Dr. Gary Klein, indicates that most people use the intuitive model of decision making over 90 percent of the time. Ironically, until recently our formal schools focused on the analytical model. This began to change, however, with a growing acceptance of the ideas of the late Col John R. Boyd, USAF (Ret.) Boyd demonstrated that a person in the midst of conflict continuously moves through a recognitional decision pattern that he termed the "Observe – Orient – Decide – Act (OODA) Loop." He pointed out that the leader who moves through this OODA cycle the quickest gains a potentially decisive advantage in the conflict by disrupting his enemy's ability to respond and react. In short, the leader who consistently makes the faster decisions can interfere with his opponent's decisionmaking process and effectively degrade his ability to inflict his will and continue the struggle. Col Boyd's ideas, entirely consistent with the Marine Corps' maneuver warfare philosophy, were incorporated into our doctrine in 1989.

As Co1 Boyd recognized, the chief advantage of intuitive decisionmaking in military operations is its speed. Numerous military historians and sociologists, including such notables as John Keegan and S.L.A. Marshall, have pointed that the normal tendency for inexperienced leaders under extreme conditions is to wait for as much information as possible before making a decision. Of course, the longer the decision is delayed, the more opportunities are missed. Initiative can be forfeited to the enemy. For this reason, Sun Tzu noted that, "Speed is the essence of war," and Patton observed, "A good plan executed now is better than a perfect plan executed next week." History has repeatedly demonstrated that battles have been lost more often by a leader's failure to make a decision than by his making a poor one.

Napoleon believed that the intuitive ability to rapidly assess the situation on the battlefield and make a sound decision was the most important quality a commander could possess. He referred to this intuition as coup d'oeil, or the strike of the eye," and thought that it was a gift of nature. More recently, however, practitioners of the military art have come to believe that while heredity and personality may well have an impact on an individual's intuitive skills, these skills can also be cultivated and developed. Prior to and during World War II, the Japanese called this skill, *ishin denshin*, or the "sixth sense," and they observed that it began to appear after months of intense repetitive training in a cohesive unit. During the same time period, the Germans referred to the capacity to make rapid, intuitive decisions in combat as "character." They attempted to first identify innate intuition during their recruiting processes

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and then cultivate the skill forcing their officers to repeatedly make tactical decisions under stressful situations throughout their professional schooling. While some might point out that both the Germans and Japanese were on the losing end of World War II, we might be wiser to ask how they were able to achieve such great military successes given their relative size and resource limitations. Napoleon may be correct if he meant that intuition cannot be *taught* the traditional sense, but both the Germans and the Japanese were successful in assuming that – through repetition – it could be *learned.*

"If we know that the effectiveness of intuitive decisionmaking is dependent upon experience, we must seek ways to give our Marines that experience. We should recognize decisionmaking as vitally important combat skill and promote its development throughoutout our training curriculum . . ."

How Do We Cultivate Napoleon's Coup p'Oeil;

Character. If we accept that intuitive combat decisionmaking skill will be exceedingly important for all Marines in the: 21st century, we must seek to cultivate that ability. Our first step, however, must be to identify an important *prerequisite* for sound decision making – sound character. As often as not, the really tough issues confronting Marines in the three block war will be ethical/moral quandaries, and they must have the wherewithal to handle them appropriately. We cannot anticipate and train Marines for each situation they may face. All Marines must, therefore, possess a moral consistency to serve as compass. Making the right ethical decisions must be a thing of habit. This why we created the Transformation Process where we recruit bold, capable, and intelligent young man and women of character and recast them in the white hot crucible of recruit training. We immerse them the highest ideals of American society – the time honored values of our Corps – honor, courage, and commitment. We place these values on them in a framework of high institutional standards to which they are held strictly accountable. We further foster the acceptance of these values through the unit cohesion and sustainment phases. The common thread throughout Transformation is an emphasis on the growth of integrity, courage, initiative, decisiveness, mental agility, and personal accountability – the basic skills needed to make timely, accurate, and ethical decisions in the heat of combat.

Repetitive Skills Training. If we know that the effectiveness of intuitive decisionmaking is dependent upon experience, we must seek ways to give our Marines that experience. We should recognize decisionmaking as a vitally important combat skill and promote its development throughout our training curriculum, but in our formal schools' curriculums and our local unit training programs. We must face the paradox that our least experienced leaders, those with the least skill in decisionmaking, will face the most demanding decisions on the battlefield. Just as we expect a Marine to employ his weapon under combat duress we must likewise demand that he employ his mind.

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Required Reading 2, Continued

Marines need to be comfortable with using their intuition under highly stressful circumstances. In short, we must make intuitive decisionmaking an instinct, and this can only be accomplished through repetition. Training programs and curriculums should routinely make our Marines decide a course of action under cold, wet, noisy conditions while they are tired and hungry and as an instructor continually asks them "what are you going to do now Marine?"

Unit commanders must scrutinize their training programs to ensure that operational exercises are geared to challenge the intuitive decisionmaking processes of subordinates leaders at every level in their command. Training must account for the role of uncertainty in decisionmaking. We should literally bombard them with information and get them used to making decisions under varied circumstances without complete information and with contradicting or false information. Similarly, we must continually review and revise our formal schools' curriculums – from the Schools of Infantry to the Marine Air Ground Task Force Staff Training Program and up to and including the Marine Corps War College to dramatically increase the number of times we force each Marine to make decisions.

"The results of experimentation with the CDR indicate that we are on the right course. Squad leaders who routinely exercise in the CDR gain confidence in their intuitive abilities and make sound decisions more rapidly."

Our Warfighting Lab has led the way in developing practical tools to support this type of instruction with the computer assisted training simulation known as the Combat Decision Range (CDR). The CDR puts the squad leader square in the middle of the three block war and requires him to make decisions across the spectrum of conflict, from humanitarian relief to midintensity firefight, with the media watching. During a single 30 to 45 minute CDR training scenario, a Marine squad leader must make 15 to 30 urgent, life or death decisions while land navigating and communicating both up and down the chain of command. The results of experimentation with the CDR indicate that we are on the right course. Squad leaders who routinely exercise in the CDR gain confidence in their intuitive abilities and make sound decisions more rapidly.

Initiatives similar to the CDR should be pursued in all of our professional schools and in our operational units. At each level, from young, aspiring noncommissioned officers to our MEF commanders, our training should be geared to putting the Marine in the appropriate stressful environment for his or her grade, forcing them to make timely decisions. Initially, it is important that the correctness of the decision not be an issue. The "right" decision is any decision as long as it is timely. After all, in combat situations there are rarely any right

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or wrong answers, As the conditioning proceeds, appropriate post exercise critiques and debriefs will begin to identify in the participant's mind the credibility of various decisions (or "solutions") in relative terms. Through this process, they will begin to develop an intellectual framework for making time-critical decisions in their billet.

Self-Study. A personal commitment must be made by each Marine to focus on developing his or her own decisionmaking abilities. This means self-study; but simply reading history is not enough. We need to read it with an eye toward examining the relevant decisionmaking processes that took place during the particular event. Why did the commander make this decision? What information did he have when he made it? What information did he not have? Was it timely? What subsequent decisions did he make and why? What were the results? Personal study of history and the military art in this manner promotes an ability to recognize patterns and later, to exploit them. While it is no substitute for personal experience, the dedicated study of conflict and warfare complements tactical decision games, simulations, and exercises in establishing a mental framework for making time-sensitive decisions.

Command Climate. While most realistic training in the world may never be able to replicate the stresses associated with making decisions in combat, we must pursue means of conditioning a willingness among our Marines to make those decisions. We should literally inculcate a "culture" of intuitive decisionmaking throughout our Corps. To do so requires that commanders at all levels create within their units an atmosphere that encourages, not inhibits, their subordinates to make decisions. Subordinates must be assured that their leaders will back them up when they make a poor tactical decision. Debriefs and critiques must challenge the subordinate's rationale, but not threaten his or her pride or dignity. This, of course, is not possible in a command where micromanagement or a "zero-defect" mentality is prevalent.

Continuing to March

The Marine Corps Combat Development Command will dedicate itself to identifying developing and cultivating appropriate intuitive combat decision-making skills at all levels. Our Warfighting Lab will continue to take the lead with initiatives such as the Traders Game with the New York Mercantile Exchange, concepts and ideas exchanges with the New York City Fire Department, and the Dynamic Decisionmaking Wargame involving traders, firefighters, police officers, air traffic controllers, and other professionals. The Lab should eventually expend their experimentation efforts in this area beyond the training realm. They should seek to answer such questions as: Can certain personality types develop intuitive skills more readily than others? Is there a means for testing this? Do different billets, assignments, and military occupational specialties require different types of intuition? Should our manpower processes –

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recruiting, promotion, billet assignment, command selection, etc. – consider these factors? Answering questions such as these will help us field leaders at all levels with the decisionmaking skills they will need to fight and win the three block war.

Summary

Our warfighting philosophy, both now and with the growth of operational maneuver from the sea, is one of maneuver. Maneuver doctrine to be successful, demands high tempo in order to retain the initiative. Without leaders who can make timely decisions under extreme duress, this doctrine simply cannot succeed. These leaders cannot rely on the traditional, analytical approach to decision making. Advances in the information technology will never clear Clausewitz's "fog of war" to a point where the analytical model is timely enough to guarantee victory. Marine Corps leaders, therefore, need to develop confidence in their own intuition – an intuition rooted firmly in solid character. We must actively seek out means for cultivating intuitive decisionmaking skills among our leaders at all levels from the strategic corporal to the MEF commander. Since these intuitive skills result from experience, we must include repetitive decisionmaking skills in all of our formal schools curriculums and in the (training programs of our operational units. Finally, our commanders must foster a climate within their units that is supportive of intuitive skill development. Doing these things will cultivate coup d'oeil and guarantee our success on the 21st century battlefield.

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Preview to Required Reading 3

Introduction

The article "Strategies of Decision Making" was written by Dr. Gary Klein. Dr. Klein developed the Recognition-Primed Decision model and multiple other decision-making resources used by the Marine Corps and other organizations.

Reading Scope and Perspective

The SNCO should read the article "Strategies of Decision Making" from the perspective of a leadership trainer and war fighter. In order to develop full appreciation for the article's scope and perspective, the readers should ask questions similar to those below. For training purposes, the student should be prepared to answer the perspective building questions.

- What is the purpose of the article?
- How do proficient decision makers make decisions?
- How would you describe the team decision-making process?
- How can the operational decision-making process be improved?

Reading Terminology

The following article discusses the following concept, terms, or issues.

- Multi-attribute utility analysis
- Decision analysis
- Operational decision making

Multi-Attribute Utility Analysis

Multi-attribute utility analysis is the technical term that describes the process of comparing systematically generated options by assessing a value to them and choosing the best value. The analytical decision-making process utilizes this process to support decision making.

Decision Analysis

Decision analysis refers to the process of evaluating an option as a move in a chess game. The decision maker looks at a branching tree of responses and counter-responses and estimates the probability and utility of possible future state in order to calculate the maximum and minimum outcomes.

Operational Decision Making

Operational decision making refers to the process of making decisions that are applicable in the operating environment.

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Required Reading 3

Instructions Read the following article and think about the decision-making processes and how the intuitive processes can be enhanced by the SNCO.

Strategies of Decision Making

This article posits that military decision makers have come to rely *too heavily on analytical decision-making processes, contributing to a reduction in the effectiveness of training and decision support systems. The author examines the strengths and weaknesses of competing decision-making processes and offers a "recognitional model" for use in most combat or field situations. His recommendations have impact on training and decision-aid development*.

By
Gary A. Klein

It is time to admit that the theories and ideals of decision making we have held over the past 25 years are inadequate and misleading, having produced unused decision aids, ineffective decision training programs and inappropriate doctrine. The Department of Defense (DOD) often follows the lead of behavioral scientists, so it is important to alert DOD policy makers to new developments in models of decision making.[1]

The culprit is an ideal of analytical decision making which asserts that we must always generate options systematically, identify criteria for evaluating these options, assign weights to the evaluation criteria, rate each option on each criterion and tabulate the scores to find the best option. We call this a model of concurrent option comparison, the idea being that the decision maker deliberates about several options concurrently. The technical term is multiattribute utility analysis.

Another analytical ideal is decision analysis, a technique for evaluating an option as in a chess game. The decision maker looks at a branching tree of responses and counter-responses and estimates the probability and utility of each possible future state in order to calculate maximum and minimum outcomes. Both of these methods, multiattribute utility analysis and decision analysis have been used to build decision training programs and automated decision, aids.

These strategies sound good, but in practice they are often disappointing. They do not work under time pressure because they take too long. Even when there is enough time, they require much work and lack flexibility for handling rapidly changing field conditions.

Imagine this situation (which we actually observed): An Army brigade planning staff engages in a 5-hour command and control

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exercise. One requirement is to delay the enemy advance in a specific sector. The operations and training officer (S3) pinpoints a location that seems ideal for planting mines. It is a choke point in a wooded area where the road can be destroyed. A plan develops to crater the road, mine the sides off the road and direct the artillery on the enemy as he either halts or slows his advance to work around the obstacles. During the planning session, there are objections that it is impossible to have forward observers call in the artillery, and that without artillery support to take advantage of the enemy slowdown, the mines would do no good. Someone suggests using FASCAM (family of scatterable mines), but another person notes that FASCAM will not work in trees, only in open areas. Only after this thorough consideration and subsequent rejection of his initial choice, does the S3 consider an open area also favorable for an artillery attack and select it as the point of the action.

Suppose the planners had tried to list each and every available option, every possible site all over the map, and then evaluate the strengths and weaknesses of each? There was simply not enough time in the session to do this for each possible decision. We counted 27 decisions made during the 5 hours, an average of one every 12 minutes. Even this is misleading, since it does not take into account time taken by interruptions and communications. We estimate that about 20 of the decisions took less than 1 minute, five took less than 5 minutes and perhaps only two were examined for more than 5 minutes. Obviously, there is not enough time for each decision, using analytical concurrent option comparisons. And if we try to approach only a few choices in this way, which ones? It is even more complicated to screen decisions for deliberation. Analytical strategies just will not work in this type of setting.

I am not saying that people should never deliberate about several options. Clearly, there are times to use such analytical strategies. We have watched DOD design engineers wrestle with problems such as how to apply a new technology to an existing task. Here it did make sense to carefully list all the options for input devices and displays and to systematically analyze strengths and weaknesses to get down to a small number of configurations for testing.

The point for this article is that there are different ways to make decisions, analytical ways and recognitional ways, and that we must understand the strengths and limits of both in order to improve military decision making. Too many people say that the ideal is for soldiers to think more systematically, to lay out all their options and to become, in effect, miniature operations researchers. This attitude is even built into military doctrine. For example, US Army Field Manual 101-5, *Staff Organization and Operations,* advises decision makers to go through the steps of multi-attribute utility analysis.[3] Such advice may often be unworkable and sometimes may be dangerous. To understand why, we must get a clear idea of what skilled decision makers do.

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For the past four years, my colleagues and I have been studying experienced decision makers, faced with real tasks that often have life and death consequences. We have studied tank platoon leaders, battle commanders engaged in operational planning at Fort Leavenworth, Fort Riley, Fort Hood, Fort Stewart and the National Training Center at Fort Irwin. (Prior to that, we observed Air Force and Army battle commanders at BLUE FLAG.) We studied urban fireground commanders and wildland fireground commanders (with over 20 years of experience) as they conducted actual operations. We also studied computer programmers, paramedics, maintenance officers and design engineers. Many of the decisions we examined were made under extreme time pressure. In some domains more than 85 percent of the decisions were made in less than 1 minute.

We found that concurrent option comparison hardly ever occurred. That is, experienced decision makers rarely thought about two or more options and tried to figure out which was better. In this article, I will describe the recognitional decision strategies we did find, differentiate between the situations that call for analytical or recognitional strategies and examine some of the implications for military decision making.

Recognitional Decision Making

When we told one commander that we were studying decision making, he replied that he never made any decisions! What he meant was that he never constructed two or more options and then struggled to choose the best one. After interviewing him, we learned that he did handle decisions all the time. After studying over 150 experienced decision makers and 450 decisions, we concluded that his approach to decision making is typical of people with years of experience and we have derived a model of this typical strategy.

Basically, proficient decision makers are able to use their experience to recognize a situation as familiar, which gives them a sense of what goals are feasible, what cues are important, what to expect next and what actions are typical in that situation. The ability to recognize the typical action means that experienced decision makers do not have to do any concurrent deliberation about options. They do not, however, just blindly carry out the actions. They first consider whether there are any potential problems and only if everything seems reasonable, do they go ahead.

A recognitional approach can save time and effort for more important concerns. An experienced brigade commander looked at a map and selected a site for an engagement area (a place to set up artillery and air attacks on an enemy advance). Other sites were then proposed that he had not even bothered to consider, although they seemed plausible to his less-experienced subordinate. He was able to explain why each alternative was defective and seemed surprised that anyone would even think about them. In other words, his skill enabled him to generate only plausible options so that he did not have to bother with computing advantages and disadvantages. He

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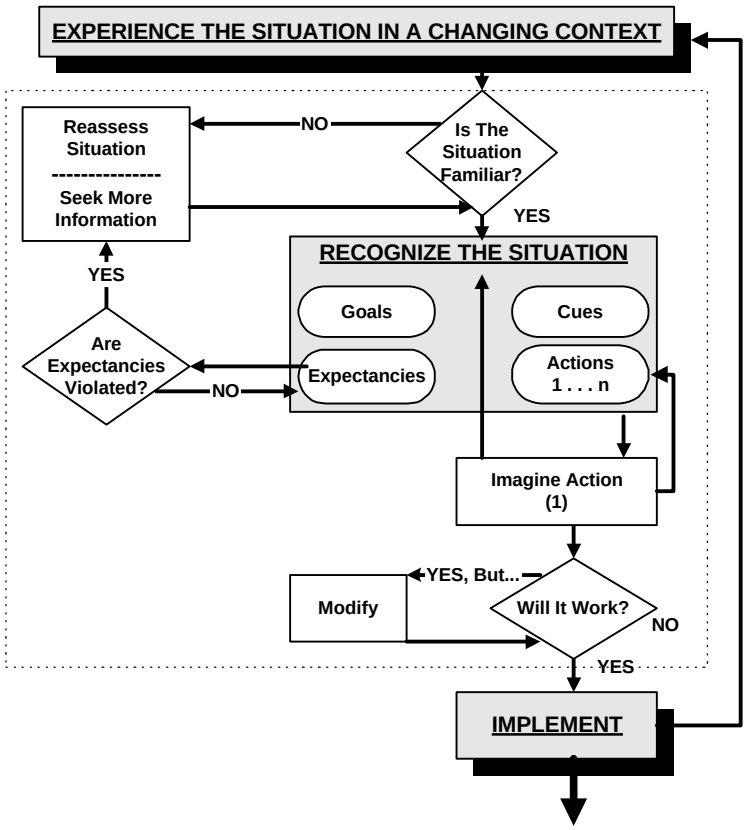
Figure 1



RECOGNITION-PRIMED DECISION (RPD) MODEL

Figure 2

FACTOR	EFFECT ON USING ANALYTICAL DECISIONS
Experience Level	Decrease
Time Pressure	Decrease
Dynamic Events	Decrease
Abstract Data	Increase
Justification	Increase
Conflict Resolution	Increase
Optimization	Increase
Computational Complexity	Increase

FACTORS AFFECTING THE USE OF RECOGNITIONAL AND ANALYTICAL DECISIONS

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could use all of his experience to judge what was needed for the situation. He could generate a workable first option, so there was no reason for him to generate many more options and then have to perform a painstaking evaluation of them.

We call this a "recognition-primed decision (RPD)." The officer used experience to recognize the key aspects of the situation, enabling a rapid reaction. Once a decision maker identifies the typical action, there is usually a step of imagining what will happen if the action is carried out in this situation. If any pit-talks are imagined, then the decision maker will try to modify the action. If that does not work, the officer jettisons it and thinks about the next most typical action.

Notice that the experienced decision makers are not searching for the best option. They only want to find one that works, a strategy called "satisficing." We have found many cases where decision makers examined several options, one after the other, without ever comparing one to another. Because there is no deliberated option comparison, experienced decision makers may feel that they are relying on something mysterious called "intuition" and they may be mildly defensive about it if they are questioned carefully. One implication of our work is that this is not a mysterious process. It is a recognitional, pattern-matching process that flows from experience. It should not be discounted just because all aspects of it are not open to conscious scrutiny.

Figure 1 shows a schematic drawing of the RPD model. It shows that if the events contradict expectancies, the experienced decision maker may reexamine the way the situation is being understood. The basic thrust of the model is that decision makers handle decision points, where there are several options, by recognizing what the situation calls for rather than by calculating the strengths and weaknesses of the different options. The concept of recognitional decision making has been developing only in the last few years.

We have found that even with nonroutine incidents, experienced decision makers handle approximately 50 to 80 percent of decisions using recognitional strategies without any effort to contrast two or more options. If we include all decision points, routine plus nonroutine, the proportion of RPDs goes much higher, more than 90 percent. For novices, however, the rate of RPDs can dip to 40 percent. We have also found that when there is deliberation, experienced decision makers deliberate more than novices about the nature of the situation, whereas novices deliberate more than experts about which response to select. In other words, it is more typical of people with lower levels of experience to focus on careful thinking about the best option.

What about team decision making? Since many decisions are made within a network of coordinating organizations and by several people at each node in the network, we have also examined distributed decision making.

Teams and networks demand more justification and conflict resolution, so we expect to find more examples of concurrent

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option comparison; that is, contrasting two or more options. However, in our studies, this has not occurred. Earlier I described a 5-hour command and control planning session in which we tabulated 27 decisions.[4] Only one of these showed any evidence of concurrent option comparison. My earlier example of the operations planning officer choosing a site to disrupt the enemy advance illustrates recognitional decision making by a team. Similarly, our other studies of team decision making found the team behaving much like individuals—generating a plausible option, evaluating it by imagining what could go wrong, trying to "satisfice," trying to improve the option to overcome its limitations and sometimes rejecting or tabling an option to move on in a more promising direction.

How is the RPD Model Different from Analytical Decision Making?

The RPD model describes how choices can be made without comparing options: by perceiving a situation as typical; perceiving the typical action in that type of situation; and evaluating potential barriers to carrying out the action. This recognitional approach contrasts to analytical decision making in several ways:

- The RPD model concentrates on "satisficing," whereas models of decision analysis and concurrent option comparison have emphasized optimizing (trying to find the best option).

- The RPD model asserts that experienced decision makers generate a good option as the first one they consider. However, concurrent option comparison assumes that generating options is a semirandom process, with some coarse screening to ensure that only relevant options are considered.

- The RPD model focuses on situation assessment. In contrast, concurrent option evaluation models have placed more of the emphasis on selecting among options than on recognizing situations.

- Another difference is the evaluation of options. The RPD model assumes that decision makers evaluate typical actions by imagining how they will be carried out in that situation. Such an evaluation lets the decision maker improve the option and also reject it, if necessary. Analytical models present strong methods for evaluating sets of options. These models make it inconvenient for the user to improve options since that would force the evaluation to begin again.

- The RPD model assumes that decision makers will usually have an option available regardless of how tight the time constraints arc. Experienced decision makers usually start with a typical option. If time permits, this option will be evaluated; if defective, it will be replaced by the next most typical option. In contrast, analytical models provide no guidance until after options are generated, evaluation criteria and weights established, ratings accomplished and tabulations completed. If a reaction is needed before this process is finished, the decision maker is out of luck.

By contrasting recognitional and analytical decision making, we can see the

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strengths of each. Recognitional decision making is more important when experienced personnel are working under time pressure on concrete, contextually dependent tasks in changing environments and have a "satisficing" criterion of selecting the first option that looks like it will work. It comes into play when the unit is an individual or a cohesive team that does not reach deadlocks over conflicts. Recognitional decisions can ensure that the decision maker is poised to act. Its disadvantages are that it is hard to articulate the basis of a decision and it is difficult to reconcile conflicts. Furthermore, it cannot ensure "optimal" courses of action and this is especially important for anticipating the opponent's strategies in preparation for the worst case. Also, it is risky to let inexperienced personnel "shoot from the hip."

Concurrent option comparison has the opposite strengths and weaknesses. It is more helpful for novices who lack an experience base and for seasoned decision makers confronting novel conditions. It is apt to be used when there is ample time for the decision. It comes into play when the data are abstract, preventing decision makers from using concrete experiences. It makes it easy to break down new tasks and complex tasks that recognition cannot handle. It is especially important when there is a need to justify the decision to others, since justification usually requires us to list reasons and indicate their importance. Analytical decision making is more helpful when there is a conflict to be resolved, especially when the conflict involves people with different concerns. It is usually a better strategy to use when one needs an optimal solution. And finally, analytical decision making is needed when the problem involves so much computational complexity that recognitional processes are inadequate. However, its cost is more time and effort, and more of a disconnect with the experience of the decision maker. Figure 2 presents the conditions that increase a decision maker's tendency to use analytical strategies rather than rely on recognitional decision making.

I am not claiming that there is a right way or a wrong way to make decisions. Different conditions call for different strategies. My goal is not to reject analytical decision making, but to make clear what its strengths and weaknesses are so that it can be applied more fruitfully.

For too long we have emphasized one strategy—the analytical one. That is the one required by doctrine. That is the one we have been teaching. That is the one we have been building decision aids to promote.

Problems with Analytical Decision Making

We create problems of *credibility* when we present doctrine about one right way to make decisions—the analytical strategy—and thereby force officers and soldiers to ignore doctrine in making the vast majority of time-pressured operational decisions during training exercises. It does not take them long to realize that doctrine is

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irrelevant in this area and to wonder whether it can be trusted in other areas.

We can create problems in *efficiency* when we teach analytical decision techniques to military personnel who will have little or no opportunity to use them. Worse yet, we create problems in *effectiveness* for personnel who try to apply these techniques and fail.

We create problems of *competence* when we build decision aids and decision support systems that assume analytical decision strategies. These systems are likely to reduce inputs to the form of abstract alphanumeric data and to restrict the operator's job to that of assessing probabilities, entering subjective utilities, providing context-free ratings and so forth. This misses the skilled operator's ability to size up situations, to notice incongruities and to think up ways to improve options. In other words, these decision aids can interfere with and frustrate the performance of skilled operators. It is no wonder that field officers reject decision aids requiring them to use lengthy analytical processes when the time available is not adequate.

Human error is often explained in terms of decision bias.[5] The concept of decision bias is that people are predisposed to make poor decisions because of several inherent tendencies, such as inaccurate use of base rates, over reliance on those data that are more readily available or appear more representative, low ability to take sample size into account and difficulty in deducing logical conclusions. This argument is often made by scientists who want to convince us that human decision makers (other than themselves) cannot be trusted, and we therefore need these scientists to develop decision aids to keep the rest of us from making grievous errors.

However, the decision bias argument has been recently attacked as unjustified and self-serving.[6] The evidence that humans are inherently biased decision makers comes from experiments run under artificial laboratory conditions. Furthermore, judgment biases appear to have a very small impact outside laboratory conditions. It is easy to use the benefit of hindsight to label each accident an example of decision bias that can best be controlled by more rigorous analytical procedures. For example, expert testimony was given by some psychologists about the *Vincennes* episode. With the benefit of hindsight, it was clear that something had gone wrong and there was an assumption that human error was to blame. One piece of testimony suggested that the crew was guilty of expectancy bias. They were expecting an F-14 attack and focused on cues that fit that expectation. However, if the error had been in the other direction, an F-14 attack that was missed, then the blame would have been placed on base-rate bias, failure to take base rates and prior expectancies into account. My impression is that with hindsight, every error can be explained as a bias, but this may not be telling us much. I am more in agreement with the testimony showing how the *Vincennes* control room failed to provide the

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crew with the cues and information that would have enabled them to take advantage of their expertise. They were prevented from using recognitional decision strategies.

My own impression is that experienced decision makers do an excellent job of coping with time pressure and dynamic conditions. Rather than trying to change the way they think, we should be finding ways to help them. We should be developing techniques for broadening their experience base through training, so they can gain situation assessment more quickly and accurately.

If we can give up our old single-theory analytical perspectives and appreciate the fact that there are a variety of decision strategies, we can improve operational decision making in a number of ways.

One opportunity is to improve strategies for effective team decision making. Staff exercises are too often a charade, where subordinates present options to a commander who then picks the best one. Usually, however, the subordinates know which option they prefer. They present, as other options, ones that had been rejected to round out the field. This procedure can be inefficient because it divorces the situation assessment activities from the response selection step and it gives the subordinates the more demanding job of assessing the situation. It asks die commander to make a choice rather than working with the team to modify and improve options. There may be times when it is more effective to have the commander work with the staff to examine die situation and then turn over to them the job of preparing implementation plans. If alternative viewpoints and criticisms are wanted, they should come during the assessment and initial planning, so as to strengthen the option to be implemented.

A second opportunity is to understand how commanders can present their strategic intent so that subordinates are able to improvise effectively. It is dangerous to have subordinates ignoring direction and carrying out their own plans, but it is also dangerous to have subordinates carrying out plans that no longer make sense. Improvisation arises when there is recognition that the situation has functionally changed. We need to understand how commanders can communicate their situation assessment so that their subordinates can recognize and exploit changed conditions.

A third opportunity is to revise training procedures. Certain specialties need training and analytical decision strategies. But generally, training can be more productive by focusing on situation assessment. Along with teaching principles and rules, we should present actual cases to develop sharper discriminations and improve ability to anticipate the pitfalls of various options. The goal of analytical decision training is to teach procedures that are so abstract and powerful that they will apply to a wide variety of cases. If this had been successful, it would have been quite efficient. However, we have learned that such rules do not exist.

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Instead, we need to enhance expertise by presenting trainees with a wide variety of situations and outcomes, and letting them improve their recognitional abilities. At the team level, we can be using after-action reviews to present feedback about the *process* of the decision making and not just on the *content* of the options that should have been selected.

A fourth opportunity is to improve decision support systems. We must insist that the designers of these systems have appropriate respect for the expertise of proficient operators and ensure that their systems and interfaces do not compromise this expertise.[7] We must find ways to present operators with displays that will make situation assessment easier and more accurate. We also want displays that will make it easier for operators to assess options in order to discover potential problems. In other words, we want to build decision support systems that enhance recognitional as well as analytical decision strategies.

This article appeared in the Military Review in October 1989 is used with permission from the author, Dr. Gary Klein.

Gary A. Klein is the president of Klein Associates Inc., a research and development company that performs work in applied cognitive psychology. Previously, he was a research psychologist with the Air Force Human Resources Laboratory.

1. For a fuller view, *see G.* A. Klein (in press). "Recognition-Primed Decisions," *Advances in Man-Machine Systems Research,* ed. W. Rouse, (Greenwich. CT: JAI Press). 5.
2. For the purposes of this article, the term "analytical decision making" will be used to refer to these two methods, and particularly to concurrent option comparison.
3. US Department of the Army Field Manual 101-5, Staff *Organization and Operations* (Washington. DC: US Government Printing Office, May 1984). 5-9 to 5.10.
4. M. Thorflsen, J. Galushka, S. Young. G. A. Klein and C. P. Brezovic, *Distributed Decision Making in a Command and Control Planning Environment* (KATR-663(C)-87-08F) (Yellow Springs, OH: Klein Associates Inc., 1967). Prepared under contract MDA903-B6-C-0170 for the US Army Research Institute. Alexandria, VA.
5. D. Kahneman and A. T versify. "Intuitive Predictions; Biases and Corrective Procedures, "*TIMS Studies in Management* Science, 12. 1979, 313-27.
6. L. L Lopes. The *Rhetoric of Irrationality,* paper presented at Colloquium in Mass Communication, Madison. Wl, November 1966 (currently under revision). J. J. J. Christensen-Szalanski, "Improving the Practical Utility of Judgment Research," *New Directions in Research on Decision Making,* ed. B. Brehmer, H. Jungerman. P. Lourons and G. Sevon (North Holland: Elsevier, 1986).
7. I have made some suggestions in an earlier paper, see G. A. Klein, "Automated Aids for the Proficient Decision Maker," *IEEE Proceedings.*

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Chapter 5 Exercise Solutions

Answers

The table below provides the answers to the exercise items. If you have any questions, refer to the reference page listed for each item.

Item Number	Answer	Reference
1	a	5-2
2	c	5-2
3	d	5-5
4	See item content.	5-19
5	See item content.	5-20/21
6	See item content.	5-21/22
7	See item content.	5-17/26
8	See item content.	5-26
9	See item content.	5-31
10	See item content.	5-32
11	See item content.	5-34
12	See item content.	5-34
13	See item content.	5-38
14	See item content.	5-39
15	See item content.	5-41/42
16	See item content.	5-45/46

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Item 4

The answer is located on page 5-19 is quoted below.

What is the classical decision-making model?

"*The classical model of decisionmaking holds that decision making is a rational and systematic process of analysis based on the concurrent comparison of multiple observations. The idea is to identify all the possible options, analyze all of the options according to the same set of criteria, assign a value to each aspect of each option (either through quantitative means or subjectively), and choose the option with the highest aggregate value. In this theory, this highest-value option is the optimal solution.*"

The classical decision-making model reflects the steps utilized in the analytical decision-making process. The student should be able to draw parallel from previous lessons and the article content.

Item 5

The answer is located on pages 5-20/21 is quoted below.

What does the author refer to when he speaks of military decision making?

"*Military decisionmaking is not a neat, clean, and orderly process. Timeliness is a critical factor in most military decisions. Unlike selecting a new car, military decisionmaking is not a matter of choosing from among a finite number or of already existing options – military decisionmaking is not a multiple choice. Rather, it is a matter of creating a unique solution out of countless unclear possibilities, based largely on unquantifiable factors.*"

Major Schmitt relates decision-making application to the mission demands and how it deviates from the analytical decision-making processes taught at most formal schools.

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Item 6

The answer is located on pages 5-21/22 is quoted below.

How does military decision making compare to intuitive decision making?

"*…we lack the time and information necessary to do justice to the analytical process. We end up combining, skipping, or hurrying steps – in general trying to "crunch" the process to fit into the time available and intangible factors, the new school sought to study decisionmaking under 'naturalistic" conditions. Specifically this meant decisionmaking characteristics by:*

- *Uncertain, dynamic environments*
- *Shifting, ill-defined or competing goals*
- *Lack of information*
- *Ongoing action with continuous feedback loops (as opposed to single decision event)*
- *High-level stress and friction*
- *Time stress*

Not surprisingly, the research revealed that proficient decision makers rarely made decisions by concurrent option comparison. Instead, they use their intuition to recognize the essence of a given situation and to tell them what appropriate action to take."

Military thinking lends itself to intuitive decision making because military thinking is based on dynamic environments and how leaders must integrate skills and competencies to meet the challenges of the operating environment. The two methods are actually one in the same.

Item 7

The answer is located on pages 5-17/26 is quoted below.

The answer is strictly subjectively based on the students' perception of how decision making affects their specific mission and the operating environment after reading the article.

Which model would best support you in your warfighting role?

Ideally, almost every process should be supported by the intuitive decision-making process with the exception of planning related roles and applications.

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Item 8

The answer is located on page 5-26 is quoted below.

How would you train a Marine NCO to expand their decision-making capabilities and what method works best?

"*With that in mind, there are two important considerations in learning intuitive decisionmaking. First, like most skills, decisionmaking is a skill that improves with practice. Even when we perform a skill without consciously thinking about how – swinging a tennis racket, solving a crossword puzzle, playing Nintendo Gameboy – we intuitively learn to perform that skill more efficiently simply from repeated practice. Second, as we mentioned earlier, intuitive decisionmaking is an experience-based skill. A broad base of experience is essential to the coup d'oeil or skill for pattern recognition that is in turn the basis for intuitive decisionmaking; the way to improve pattern recognition is to improve the experience base. In either event, the way to learn intuitive decisionmaking is to practice decisionmaking repeatedly in an operational context.*"

Implementing decision making into the training schedule is a manner that the SNCO can create an environment in which the NCOs or Marines can practice decision making. This can come in the form of a tactical decision game, tactical decision simulation, or any other method that requires the individual to make a decision.

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Item 9

The answer is located on page 5-31 is quoted below.

How does the General Krulak compare the two decision-making processes in concise terms? When answering focus on the terms quantitative and qualitative.

"*While analytical decision making is based on a comparison of quantitative options, recognitional decisionmaking depends on a qualitative assessment of the situation based on the decider's judgment and experience. It does not look for the ideal solution; instead, it seeks the first solution that will work.*"

The analytical decision-making processes focuses on identifying all possible solutions and then identifying the best option. The more options generated the better the chances of identifying the optimal solution. Theoretically, the greater quantity of solutions the better quality the solution.

The intuitive or recognitional decision-making process focuses on identifying the first solution that will meet the situational requirements. The quality of the solution is based on the experience and judgment of the individual making the solution. A quality decision made intuitively identifying a large quantity of possibilities and comparatively determining the best solution. The first solution implemented changes the situation almost immediately and will initiate a subsequent series of actions are responses that the decision maker will be able to control better.

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Item 10

The answer is located on page 5-32 is quoted below.

What is the benefit of repetitive skills training and how does it relate to decision making?

"Repetitive Skills Training. If we know that the effectiveness of intuitive decisionmaking is dependent upon experience, we must seek ways to give our Marines that experience. We should recognize decisionmaking as a vitally important combat skill and promote its development throughout our training curriculum, but in our formal schools' curriculums and our local unit training programs. We must face the paradox that our least experienced leaders, those with the least skill in decisionmaking, will face the most demanding decisions on the battlefield. Just as we expect a Marine to employ his weapon under combat duress we must likewise demand that he employ his mind."

Many SNCOs are familiar with the term "muscle memory" from training evolutions that occur during marksmanship training and other areas. While "muscle memory" is somewhat comparable to the cognitive processes used in intuitive decision making, muscle memory focuses on mechanical processes that result in a standardized output rather than a mental process that produces a situationally unique output. Repetitive skills training for decision making requires a similar technique. The more decisions that the leader is required to make and evaluate afterwards creates a stronger "memory muscle." "Memory muscle" is composed of lessons learned from previous decisions and the related experiences. The application comes in the form of pattern matching, which is how the decision maker relates similar portions of a dilemma to develop a new and unique solution.

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Item 11

The answer is located on page 5-34 and is quoted below. Additional thought is required in order to devise a method to initiate and create a positive decision-making environment.

How can self-study be implemented to develop decision makers?

"*Self-Study. A personal commitment must be made by each Marine to focus on developing his or her own decisionmaking abilities. This means self-study; but simply reading history is not enough. We need to read it with an eye toward examining the relevant decisionmaking processes that took place during the particular event. Why did the commander make this decision? What information did he have when he made it? What information did he not have? Was it timely? What subsequent decisions did he make and why? What were the results? Personal study of history and the military art in this manner promotes an ability to recognize patterns and later, to exploit them. While it is no substitute for personal experience, the dedicated study of conflict and warfare complements tactical decision games, simulations, and exercises in establishing a mental framework for making time-sensitive decisions.*"

Self-study can be prompted by many different approaches. As a SNCO, you have the opportunity to "prime the pump." By utilizing group discussion on topics relating to professional development, the SNCO can expand the horizons of the NCOs, which will more than likely cause a trickle down effect in the Marines. General Krulak focuses on capturing the author's or leader's perspective in order to develop a more in depth understanding of why decision were or were not made. Understanding the decision-making processes and how they relate to command and control and the planning process gives the SNCO a greater understanding of decision making and how it applies today's operating environment.

Creating decision-making opportunities to supplement self-study reinforces lessons learned and ability of younger more inexperienced Marines.

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Item 12

The answer is located on page 5-34 is quoted below. Additional thought is required in order to devise a method to initiate and create a positive decision making environment.

As a leader how could I nurture decision making in my Marines?

"*To do so requires that commanders at all levels create within their units an atmosphere that encourages, not inhibits, their subordinates to make decisions. Subordinates must be assured that their leaders will back them up when they make a poor tactical decision. Debriefs and critiques must challenge the subordinate's rationale, but not threaten his or her pride or dignity. This, of course, is not possible in a command where micromanagement or a "zero-defect" mentality is prevalent.*"

The quote not only applies to commanders, but more so it applies to SNCOs to a greater degree. Creating NCOs that can manage time, assets, and processes while simultaneously leading Marines is the leadership focus of SNCOs in many aspects. Creating an environment where NCOs feel the positive friction of challenge and a sense of accomplishment when afforded the opportunity to make decisions and lead Marines only enhances the opportunity to greater self-study and professional development. Eliminating the "zero-defect" can be a keystone in developing this ideal environment that nurtures decision making.

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Item 13

The answer is located on page 5-38 is quoted below.

What is the purpose of the article in Required Reading – Strategies of Decision Making in Chapter 5 Exercise Solutions?

"*The point for this article is that there are different ways to make decisions, analytical ways and recognitional ways, and that we must understand the strengths and limits of both in order to improve military decision making. Too many people say that the ideal is for soldiers to think more systematically, to lay out all their options and to become, in effect, miniature operations researchers. This attitude is even built into military doctrine. For example, US Army Field Manual 101-5, Staff Organization and Operations, advises decision makers to go through the steps of multi-attribute utility analysis.*[3] *Such advice may often be unworkable and sometimes may be dangerous. To understand why, we must get a clear idea of what skilled decision makers do.*"

Identifying any similar answer would satisfy the question. For the reader, Dr. Klein's article should expand the individual's view of decision making and its value to a SNCO as a tactical decision maker and process facilitator.

Item 14

The answer is located on page 5-39 is quoted below.

How does proficient decision makers make decisions?

"*Basically, proficient decision makers are able to use their experience to recognize a situation as familiar, which gives them a sense of what goals are feasible, what cues are important, what to expect next and what actions are typical in that situation. The ability to recognize the typical action means that experienced decision makers do not have to do any concurrent deliberation about options. They do not, however, just blindly carry out the actions. They first consider whether there are any potential problems and only if everything seems reasonable, do they go ahead.*"

The answer should reflect that the intuitive or recognitional decision-making process is the most widely used decision-making process.

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Item 15

The answer is located on pages 5-41/42 is quoted below.

How would you describe the team decision-making process?

"*What about team decision making? Since many decisions are made within a network of coordinating organizations and by several people at each node in the network, we have also examined distributed decision making.*

Teams and networks demand more justification and conflict resolution, so we expect to find more examples of concurrent option comparison; that is, contrasting two or more options. However, in our studies, this has not occurred. Earlier I described a 5-hour command and control planning session in which we tabulated 27 decisions.[4] *Only one of these showed any evidence of concurrent option comparison. My earlier example of the operations planning officer choosing a site to disrupt the enemy advance illustrates recognitional decision making by a team. Similarly, our other studies of team decision making found the team behaving much like individuals — generating a plausible option, evaluating it by imagining what could go wrong, trying to "satisfice," trying to improve the option to overcome its limitations and sometimes rejecting or tabling an option to move on in a more promising direction.*"

Team decision-making results when several people attempt to "satisfice" to come to an optimal solution to overcome each decisions limitations.

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Item 16

The answer is located on pages 5-45/46 is quoted below.

How can the operational decision-making process be improved?

"*… we can improve operational decision making in a number of ways.*

One opportunity is to improve strategies for effective team decision making. Staff exercises are too often a charade, where subordinates present options to a commander who then picks the best one. Usually, however, the subordinates know which option they prefer. They present, as other options, ones that had been rejected to round out the field…

A second opportunity is to understand how commanders can present their strategic intent so that subordinates are able to improvise effectively. It is dangerous to have subordinates ignoring direction and carrying out their own plans, but it is also dangerous to have subordinates carrying out plans that no longer make sense. Improvisation arises when there is recognition that the situation has functionally changed. We need to understand how commanders can communicate their situation assessment so that their subordinates can recognize and exploit changed conditions…

A third opportunity is to revise training procedures. Certain specialties need training and analytical decision strategies. But generally, training can be more productive by focusing on situation assessment…

A fourth opportunity is to improve decision support systems. We must insist that the designers of these systems have appropriate respect for the expertise of proficient operators and ensure that their systems and interfaces do not compromise this expertise.[7] *We must find ways to present operators with displays that will make situation assessment easier and more accurate…*"

Any answer that includes the four suggestions above would be acceptable.

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CHAPTER 6

DECISION-MAKING APPLICATIONS

Introduction

Estimated Study Time

1 hour

Scope

This chapter discusses the development and use of tactical decision games to improve decision making and military thinking. Upon completion of the chapter the SNCO should be able to facilitate and evaluate a tactical decision game (TDG) while expanding the decision-making capabilities and capacities of their NCOs and Marines.

Chapter Objectives

After completing this chapter, you should be able to

- Identify the definition of a tactical decision game.
- Identify the purpose of a TDG.
- Identify the benefits of alternative training.
- Identify TDG enhancements.
- Identify methods to play a TDG.

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Introduction, Continued

In This Chapter

This chapter contains the following topics:

Topic	See Page
Introduction	6-1
Define Tactical Decision Games	6-3
Advantages of Tactical Decision Games	6-4
Limiting Factors of Tactical Decision Games	6-6
Tactical Decision Game Design	6-7
Tactical Decision Game Facilitation	6-12
Chapter 6 Exercise	6-20

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Define Tactical Decision Games

Tactical Decision Game

The tactical decision games (TDGs) are situational-based scenarios where individuals are required to exercise mental agility to meet the demands of the situational stimuli while implementing a problem solving solution. The TDG can range from paper media to a situation given orally to Marines by a seminar leader or facilitator.

Purpose of The Tactical Decision Game

The purpose of the tactical decision game is to gain breadth in experience and skills in decision making to meet a specific set of circumstances.

Benefits of Alternate Training Applications

While neither of these applications are true substitutes for experience, it can provide Marines and Marine leaders with supplemental information that can be converted to experience when a situation presents itself. Tactical decision games can benefit Marines by

- Improving pattern recognition skills
- Exercising the decision-making process
- Improving and practicing communication skills
- Increasing leadership potential

Sand Table Exercise

A sand table exercise (STEX) is a three-dimensional tactical exercise game that employs a three-dimensional terrain model with various props to represent assets or liabilities. Assets are items that can be utilized to develop a solution or optimize performance in some manner. Sand tables or similar training support items benefit the Marines by creating “top site,” which is the ability to see how the pieces of the problem fit together.

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Advantages of Tactical Decision Games

Introduction

Every training application has benefits and limitations, which is understandable since training can only simulate the operating environment, and the mettle required to function under combat conditions. The TDG has benefits and limitations.

Benefits of the Tactical Decision Game

While all TDGs enhance a Marine's ability to think critically in conjunction with some level of situational awareness and analysis, the generalized benefits of conducting seminar TDGs are listed below:

- Interactive training
- Hot seat thinking
- Experiential learning
- Command experience
- Positive training atmosphere

Interactive Training

The seminar approach to TDGs creates an interactive learning process, which can be highly effective. The SNCO can project training focus and integrate experience into the TDG while providing immediate feedback to the Marines on their solutions.

Hot Seat Thinking

Hot seat thinking is when a Marine is put "on the spot" and has to make decisions, and then deal with the outcomes just as they would in a real situation. Marines pride themselves in near flawless performance in any application they are assigned. The ability to perform in front of peers can generate the motivation and initiative to develop greater proficiency or diversified skills. In order to create this positive learning environment, the SNCO must use judgment to create a challenging level of stress during TDGs, and a mentoring approach to the after action reviews. The combination of leadership finesse and mentorship will build a more cohesive leadership team within the unit, since "hot seat" thinking leads to proactive leaders.

Experiential Learning

Marines of every rank often learn through the experiences of others. The learning can come in the form of after action reports, sea stories, or actual observation of an event.

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Advantages of Tactical Decision Games, Continued

Command Experience	Tactical decisions must be expressed in the form of combat orders. The Marines must understand and be able to give "frag" orders based on a given scenario and subsequent changes as the TDG progresses. This builds confidence and presence.
Positive Training Atmosphere	TDGs can be designed as a rewarding way for Marines and leaders to expand skills, while creating a positive environment where training and the associated learning are actually fun and practical. The ability to create new skill sets affects leaders much like qualifying on the rifle effects the Marine attending the recruit training depots. The TDG provides a great team building and mentorship forum that builds tactical and technical proficiency through decision making.

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Limiting Factors of Tactical Decision Games

Introductions

Understanding the limitations of training techniques allows the trainer to link the training objectives with the appropriate technique.

Limitations of the Tactical Decision Game

The limitations of the TDG are

- One Move TDGs.
- Difficulty simulating operating environment.
- Works best at the initial attack, extended attack, or company level.
- Difficult to apply to special operations.

One Move TDGs

Some TDGs represent a single "snapshot in time" that requires players to make only one move. These TDGs do not capture the on-going interactive nature of tactics or decision making.

Difficulty Simulating Operating Environment

While it is important to develop mental agility and critical thinking skills, the decision execution is the primary difficulty and often becomes the limiting factor of TDGs. While the TDG can enhance critical and creative thinking skills, it is almost impossible to simulate the friction and uncertainty of the operating environment.

Design Difficulties

While a TDG has viable applications at every level, it is most effective at the company level because of the enhanced number of variables and limited perspective of the scenario. When TDGs are used at higher or lower levels, they are more difficult to design. At higher levels, the decision-making cycle takes longer and the scenario must generally describe a situation developed over time. At lower levels, a terrain model might better serve the TDG or detailed micro-terrain details.

Limited Special Operations Applications

Operations that require intricate planning and large quantities of detailed technical information, generally becomes too difficult to design applicable TDGs.

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Tactical Decision Game Design

Introduction

Designing a tactical decision game to enhance training and decision making can be a challenge. The SNCOs utilizing TDGs need to incorporate critical thinking and decision-making skills in order to improve the performance of their Marines and themselves. This section focuses on how to design a TDG that is innovative and useful.

Design Characteristics

The TDG is only as successful as the design. After developing or during development of a TDG, the facilitator or seminar leader should try to incorporate as many of the following elements as possible or required for game play.

Interest

A TDG should generate interest. In order to do this, the designer has to focus on quality and the application reality. A mission that reflects the possibilities of the operating environment will build interest. Gaining interest is the first step in developing an infectious desire to learn and excel.

Challenge

Developing a TDG with the appropriate level of challenge requires the SNCO facilitator to know the skills and abilities of the Marines that are going to be involved in the TDG. Pushing the limit on a player's tactical and technical ability is fine as long as it does not minimize interest and learning opportunity.

Detail

The level of detail for each TDG will be different. The facilitator must present enough information allowing the player to act. The right level of detail keeps the TDG from getting bored or overwhelmed. Ideally, creating a situation that amply shrouds the dilemma in the "fog of war" without overwhelming or boring the participants creates the max benefit for the players and facilitator.

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Tactical Decision Game Design, Continued

Granularity	Granularity refers to the level of information that is proportionate to the level of the game. Squad level games should set squad or platoon level objectives, have appropriate level maps, and details. Granularity can be achieved by using the Systems Approach to Training, which is covered in a subsequent section of this chapter.
Multiple Interpretation and Solution	The TDG should present a dilemma that is open to scrutiny and freethinking, which will generate multiple reasonable solutions. When leading a seminar with multiple players, the multiple options create opportunity for discussion and interactivity.
Avoid a Solution Approach	TDGs should be designed by presenting a problem or dilemma, not a solution reverse engineered into a problem. Contrived situations with a "canned solution" limits interest and the decision-making opportunity.
Role-Playing	Role-playing refers to the perspective that the TDG is designed to view the dilemma. For example, a squad leader may have to capture the perspective as the company commander, which could significantly change the play of the problem. Role-playing expands the perspective of the battlespace and the requirements for mission accomplishment or solution.
Limit Information	Limiting the information on the TDG scenario requires the player to critically analyze the information that is provided, and then apply it as creatively as possible for the maximum solution with minimum time requirements.
Limit Time	Limiting time in TDGs requires the players to focus on intuitive decision-making process while economizing the information flow to critical information requirements only. Decision making under mental duress hones the player's ability to make decisions in real situations where the operating environment may be hostile.
Create a Dilemma	The dilemma should start out as a basic problem. The problem should be appropriate for the level of experience and skills of the individuals participating in the TDG.

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Tactical Decision Game Design, Continued

After Action Review	After action reviews, allow the seminar leader to draw out lessons learned from the TDG play. Reviewing the chosen course of action or reasoning behind the decision-making process can be beneficial for all parties. Building the experiences and reinforcing lesson learned is an essential part of the decision-making process.
Simplicity	Design simplicity often has greater effect than complex TDGs. Simplicity requires intuitive thinking and focuses on basic or universal concepts. Universal concepts can be altered slightly for unique situations quickly and effectively.
Infusing Fog and Friction	The TDG should infuse fog and friction to create a situation that has no one clear solution. The ability to cause friction gives the simple TDG magnified value though discussion and decision-making potential.
Design Sources	Designing original TDGs from scratch can be a great challenge. After defining the objective of the TDG, the facilitator may be able to draw a workable scenario from another source. Some of the possible sources are listed below and should be considered by SNCOs developing TDGs.
History	A historical battle can provide a useful basis for a TDG. The seminar leader can update the scenario by using modern weapons and the organizational structures. The scale of the battle can be adjusted, as necessary, to meet the TDG objectives. When the seminar leaders brief the historical situation and outcomes pre- or post-TDG, they should be careful to not present the historical solution as the "right" solution. The focus is on developing decision-making capacity and capabilities.
Personal Experience	Personal experience can be converted into TDG, but the seminar leaders should focus on the decisions generated rather than the actual outcome. If the Marines involved all share common core competencies, this particular approach is particularly effective.

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Tactical Decision Game Design, Continued

Specific Dilemma

TDGs can be designed to meet a specific dilemma that could present itself in a variety of situational scenarios. If the dilemma stays the same, the pattern matching potential is increased. Productive creativity is encouraged, but some of the situational factor that could be modified to make effective use of this approach are

- Mission
- Enemy
- Size
- Disposition and activities of enemy
- Disposition of friendly forces
- Terrain and weather

Random Engagement

Random engagement focuses on a specific piece of terrain with relief, vegetation, and other features. The seminar leader then makes the enemy and friendly forces appear in different location and multiple directions, as the scenario requires. The situational factors should be filled as appropriate for the skills and abilities of the Marines participating in the TDG.

Methods

In general terms, the TDG can be designed in one of two methods. These methods are

- "Here's the mission" or situational-based
- "Now what?" or a reaction to the solution

Situational-Based

The situational-based TDG focuses on a particular situation that is given to the player in a mission order format.

Solution Reaction

A solution reaction TDG focuses on taking the initial situation and moving one situation forward in time. The situation should be considered in three-dimensional terms, so that the seminar leader can select the best option to feed to the players.

TDG Enhancements

Tactical decision games can be modified to achieve different training objectives, and develop a larger experienced base. The SNCO can implement any number of the following suggestions to increase the decision-making opportunity, and minimize the amount of time required to play the TDG.

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Tactical Decision Game Design, Continued

Reverse Scenario

When reversing the scenario, players have to rethink the dilemma from the opposing perspective. A player has to create an analysis of how an opposing force would execute an operation on the same piece of terrain that was either being defended or assaulted. This is an excellent method to war game a scenario to identify strengths, weaknesses, opportunities, and risks that fortified or weakened the previous scenario.

Modify Terrain Perspective

The TDG can change drastically by simply modifying terrain perspective. When using a map, terrain model, or sand table, and rotating the perspective 90 degrees can totally change the way decisions have to be made and implemented. During the after action review, which is conducted by a seminar leader or TDG facilitator, focus should be placed on how the TDG dynamics and decision-making rational changed by rotating the terrain.

Variable Modification

Modifying scenarios slightly can change the problem analyses, decision processes, and solutions significantly. For example, the SNCO could change the TDG scenario in the one or more of the following ways:

- Daylight to nighttime operations
- Foot mobile forces to mechanized or heliborne forces
- Changing climatic or terrain factors, such as desert operations to woodland operations
- Modifying the size of the enemy forces

In order to be successful using variable modification, the SNCO must be intimately familiar with the capabilities and capabilities of the Marines. Challenging the mental processes and procedures is the goal, but care must be taken not to overwhelm the Marine to the point that they no longer wish to participate.

Special Operations

Special operations TDGs are difficult to design, since they require large quantities of detailed or highly technical information.

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Tactical Decision Game Facilitation

Tactical Decision Game Forums

When the SNCO is determining the method of playing the TDG, the number of Marines to be trained and the training objectives are the determinants. The three basic methods to play a TDG are

- Solitaire
- Seminar
- Force-on-Force (dynamic, multi-resource)

Solitaire

The solitaire method requires the player to solve the problem in a fashion similar to solving a crossword puzzle or brainteaser. The paper TDG is the ideal application for the solitaire game in that the individual reads the problem, produces a solution, compares a response with the one provided, and then reflects on the rationale that is used to determine the solution.

Seminar

The seminar forum involves a designated facilitator and a group of players. The facilitator presents the information and guides the solution produced by the players. Ideally, the number of players should be limited to 12 or less.

Force-on-Force

The Force-on-Force or the dynamic, multi-resource method is a more advanced version that evolves along a timeline. Players may represent opposing or adjoining forces and must respond to changing situations.

When playing from opposing perspectives, the teams simultaneously solve the TDG from opposing viewpoints. The controller or facilitator compares the two solutions and generates a new scenario based on how the two scenarios match up. The controller uses judgment to assess outcomes or casualties of the solutions. In this case, the facilitator must control the evolution of the TDG with the purpose of generating new tactical challenges.

The new challenges must be “on the spot” or intuitive decisions vice the collaborative thinking and planning used for the initial scenario. After four or five engagements, the opposing side will have completed an engagement.

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Tactical Decision Game Facilitation, Continued

Limiting Force-on-Force Play

The controller or facilitator should limit the size of the teams when using the force-on-force forum to four to six Marines. Larger or smaller sized teams limits the amount of interactivity, increases the amount of time to play the TDG, expands the decision-making capacity of the players, and is harder to direct and control the objectivity of the game.

Effective TDG Leadership

The SNCO should try to incorporate as many of the following guidelines when conducting a TDG.

- Infuse enthusiasm
- Craft tactical proficiency and interactive perspective into the TDG
- Demonstrate mental agility and adaptability
- Stimulate and maintain player interest
- Integrate mentorship into the TDG
- Manage players and game.

Enthusiasm

The ability to realistically paint the scenario and place the participant into the play is crucial. Enthusiasm is contagious and absolutely necessary to effectively build the scenario.

Proficiency and Respect

If the TDG controller knows the skills and abilities of the participants, the TDG can be used to challenge the Marines without overwhelming them. It is absolutely crucial that the seminar leader not to over design the TDG beyond the scope of their capabilities. A SNCO should conduct a self-analysis of their own skills and abilities, and keep the TDG to where it generates positive results, not professional embarrassment.

Mental Agility and Adaptability

The seminar leader should demonstrate the ability to react to unanticipated solutions and responses. Incorporating critical and creative thinking requires the SNCO to adapt to the response and redirect the play as required. Becoming mentally mired in as the facilitator could limit the decision making and experiential learning potential.

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Tactical Decision Game Facilitation, Continued

Stimulate Player Interest

Stimulating interest starts with design and development, but finesse in execution is even more important. Do not beat concepts or observations into the ground. Keep the play and discussion rolling at a light and brisk pace. Leave room for mental maneuver.

Mentorship

Ideally, the seminar leader will be a senior approaching the TDG from the position of a mentor. Positive communication and approach increases the effectiveness of the TDG. The seminar can target areas such as

- Teaching or illustrating warfighting or tactical concepts
- Teaching warfighting or operational techniques
- Relate the importance and development of implicit communication

Players Critique

Critiques are essential to recap the play of the TDG and create lessons learned. The game facilitator will have to make notes during the game to analyze and capture the thought processes used to make decisions during the TDG. Critiques can identify training objectives that can be implemented in future TDGs, training cycles, and field applications. The SNCO has direct input on the training schedules or may do the actual planning, so the results from TDGs can be used to create similar situations for future TDGs or field training operations.

Conduct Discussions

Conduct discussions during or after a TDG enhances the lessons learned since it requires the players or observers to think critically. Discussion is the oral application of decision making, since it requires the players assess the information and then provide feedback to the TDG facilitator and other players. Critiques, discussions, and after action reviews are all similar, but can be directive, interactive, and informational respectively depending on the personality and approach of the facilitator and the training objectives that support the design of the TDG.

Manage The TDG

The seminar leader should attempt to set a tone of open candor when the group participating in the TDG is made up of varying grades and experience levels.

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Tactical Decision Game Facilitation, Continued

Facilitator Responsibilities

The individual facilitating the TDG should be able to incorporate the following concepts to create the desired benefits from the TDG.

- Prepare for the exercise
- Present the scenario
- Choose player(s) to present solutions
- Enforce the "time limit" rule
- Enforce the "decisions as instructions" rule
- Question the thought process
- Lessons learned

Prepare for the Exercise

The facilitator must have a thorough knowledge of the scenario being presented, and be prepared to address a variety of possible decisions made by the players. The experience and expertise of the SNCO corps makes them excellent TDG facilitators, but it also requires them to think "tactically."

Thinking tactically is not necessarily thinking in terms of combat, but more so in conceptual perspective of warfighting. Creating an atmosphere that forces the "game play" to utilize the OODA process intuitively, can be challenging with novice players. Designing scenarios that unroll quickly for more advanced players, requires the controller to combine warfighting, tactics, techniques, and occupational specifics to speed up the decision-making process faster and more effectively.

Presenting the Scenario

The facilitator needs to present the scenario to the group. This can be done with an explanation supplemented with an orientation of a map or sand table, as applicable. The controller should also be prepared to answer any questions that the players may have about the situation. Answering questions does not mean that the controller should eliminate all uncertainty.

Choose Players to Present Solutions

Choosing players to present solutions is generally better than asking for volunteers. The player should not feel as though they can escape the challenge by simply not volunteering. Creating a TDG environment that makes the players feel as if they have as much chance as anyone else is important since it adds to the stress of the TDG. The controller should not tolerate players that actively try to avoid presenting a solution.

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Tactical Decision Game Facilitation, Continued

Enforce the "Time Limit" Rule

When the facilitator holds the players to a set time limit, it forces them to act quickly. Time compression creates stress, which is normally part of the decision-making process especially under operational conditions.

Enforce "Decisions as Instructions" Rule

The facilitator should require the players to issue their decisions as combat orders utilizing the appropriate format. The player should be prepared to discuss the decision made later in the game. The facilitator should ensure that the TDG forum is focused on "Decide now, discuss later."

Question the Thought Process

The TDG facilitator should question the thought process by inquiring as to the rational used to make the decision present. Useful questions include

- What was your reasoning for that action?
- What was your overall estimate of the situation?
- What would you have done if...?
- What were your assumptions?
- What was the biggest concern about your plan?

Lessons Learned

Summarizing the lessons learned and the conclusion that the TDG produced is essential to create greater decision-making ability.

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Tactical Decision Game Facilitation, Continued

Brief Instructions

The facilitator should provide the players with a briefing and clear instructions for action. The briefing and instructions should convey the following essential information:

- **Overview of the situation** is to include elements or anticipated changes in the situation that could significantly influence the actions of the unit.
- **Mission and commander's intent** is what the task is, why it needs to be done, and what the intended end result of the action is.
- **Coordinating instructions** that state what each unit is to do and when.
- **Communication methods** are used between individuals and between adjoining forces.
- **Identification of known hazards** and planned controls of those hazards.

Facilitation Techniques

The following facilitation techniques should be incorporated in TDGs.

- The art of asking questions
- Teaching to objective
- Briefing clear instructions

Art of Asking Questions

The art of asking questions allow the facilitator to shape the dilemma that the player is expected to respond to. It requires the facilitator to incorporate two basic techniques

- Active listening
- Questioning

Active Listening

Active listening is important in that it prompts the facilitator to ask questions, how to ask and answer questions, and how to defer questions or bounce them off the rest of the group.

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Tactical Decision Game Facilitation, Continued

Questioning

The TDG facilitator must probe the player's thought process to get the player to explain their rationale.

Questioning Techniques

When using questions to prompt thought in the player, the facilitator should avoid leading questions. Examples and suggested alternatives are provided below.

- Example: "Wouldn't this have been a more effective course of action?"
  Alternate: *"Did you consider any other alternatives?"*

- Example: "Do you really think that will work?"
  Alternate: *"On a scale of 1 to 10, what do you think is your probability of success?"*

- Example: "So by using air support, you really think that you can still use direct attack on this flank?"
  Alternate: *"What would you do if the air delivered munitions missed the target?"*

- Example: "Don't you think that hill is too steep for a dozer?"
  Alternate: *"What information did you use in choosing a dozer for this assignment? Is there anything else you should consider before using a dozer?*

Objective Focus

The facilitator's primary responsibility is to ensure that the exercise and discussion does not stray away from the purpose of the training. Additionally, the facilitator should refrain from lecturing and allow the participants to teach each other.

In order to meet these two requirements, the facilitator should have provoking questions prepared to stimulate activity and limit discussion. The following guidelines can assist the facilitator.

- Guide the discussion.
- Focus on the objectives in a logical sequence.
- Avoid detailed examination of events not directly related to major training objectives.

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Tactical Decision Game Facilitation, Continued

Teaching to The Objective	TDGs are set up with specific learning objectives in mind, and it is the facilitator's responsibility to ensure that the exercise and discussions do not stray away from the training purpose.
Refocusing on The Objective	The objective of the TDG is decision making. A TDG is not an academic test, but rather an exercise in thinking and application of information, and experience to improve the decision-making process. The questions selected to prompt activity should help the player clarify that information inputs are consciously and subconsciously important to them. Additionally, the player should be able to rationalize how the information was used in the decision-making process.

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Chapter 6 Exercise

Estimated Study Time

15 minutes

Directions

Complete items 1 through 5 by performing the action required. Check your answers against those listed at the end of this chapter.

Item 1

A tactical decision game can be defined as

a. immediate action when conducting field training so that everyone understands the situation and then reviewing in the after action.
b. playing force on force without really understanding why the situation exists, but making a decision that could solve the problem.
c. a situational-based scenario where an individual is required to exercise problem solving to meet the demands of the specific situation.
d. the utilization of combined arms staff trainer (CAST) techniques with paper or scenarios to save time, involve more players and solve tactical problems.

Item 2

The purpose of a TDG is to

a. utilize time that would normally be lost during the transition of training events and build leadership.
b. apply lessons learned from historical battles so that they can be reenacted as the situation is pattern matched.
c. give Marines expertise in areas that they may have to serve in and create an infantry mindset as a core competency.
d. gain breadth in experience and skills in decision making to meet a specific set of circumstances.

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Item 3 Which is a benefit of alternative training?

a. Cost-effective
b. Exercise the decision-making process
c. Encourages immediate action
d. Various props that represents assets or liabilities

Item 4 The TDG can be enhanced by

a. reversing the scenario, modifying the terrain perspective, continuing the play, and modifying the variables.
b. using larger maps, including more detailed situations, increasing the number of players, and increasing mission focus.
c. using terrain models, building a sand table, reading doctrine, and including combined arms applications.
d. reading professional articles, focusing on military occupational specialty training, and scheduling time to conduct training.

Item 5 Methods of playing the TDG are

a. blue and red teams, high intensity, and military operations other than war.
b. solitaire, seminar, and force-on-force.
c. single person, fire team, and squad level application.
d. fire and maneuver, fire support planning, and squad rush walk-throughs.

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Answers

The table below provides the answers to the exercise items. If you have any questions, refer to the reference page listed for each item.

Item Number	Answer	Reference
1	c	6-3
2	d	6-3
3	b	6-3
4	a	6-10/11
5	b	6-12

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APPENDIX A

Primary Resources

Development Resources

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Primary Resources, Continued

Development Resources, continued

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TACTICAL DECISION MAKING

REVIEW LESSON EXAMINATION

Review Lesson

Introduction

The purpose of the review lesson examination is to prepare you for the final examination. It is recommended that you try to complete your review lesson examination without referring to the text, but for those items (questions) you are unsure of, restudy the text. When you finish your review lesson examination and are satisfied with your responses, check your responses against the answers provided at the end of the review lesson examination.

Directions

Select the answer that BEST completes the statement or that best answers the item. Each question will be in the form of multiple choice, so circle your response.

Item 1

The ability to choose which projections or solutions would be best implemented to accomplish mission success is

a. perspective development.
b. decision making.
c. planning.
d. command and control.

Item 2

The _____ decision-making approach is a decision-making process that relies on experience to recognize key elements of a particular problem to arrive at an appropriate decision, while the _____ decision-making approach consists of the following actions: carefully taking a problem apart; collecting and testing the information required for the problem or task; conducting a comparison of the solutions or options; and selecting an alternative, which should preferably be the best solution.

a. intuitive … analytical
b. directed … conceptual
c. warfighting … planning
d. tactical … administrative

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Item 3

The analytical decision-making process uses the general steps listed in the table below. The steps are in scrambled order. Select the answer that has the process in proper sequence.

Step	Action
1	Assess the risks, uncertainties, and liabilities that could result from each alternative.
2	Define the problem or task, desired objectives, requirements, and criteria.
3	Compare the alternatives.
4	Identify the alternative solutions or options.
5	Assess the strengths, weaknesses, opportunities, and benefits of each alternative produces.
6	Identify and select the best alternative within resources available.
7	Evaluate the alternative solutions or options using the established criteria.

a. 3, 5, 4, 1, 3, 7, 6
b. 2, 4, 7, 5, 1, 3, 6
c. 7, 2, 1, 5, 6, 4, 3
d. 5, 1, 3, 6, 2, 4, 7

Item 4

The analytical decision-making process has which of the following limitations?

a. Focuses on the first best solution
b. Time intensive
c. High risk applications
d. Needs a clearly defined outcome

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Item 5

The implementing of the first solution that could result in success is the goal of _____ decision making.

a. analytical
b. command
c. intuitive
d. control

Item 6

Time effectiveness, first best solution focus, and the ability to be updated and infused with experience would reflect the benefits of

a. command and control system.
b. the planning process.
c. intuitive decision making.
d. analytical decision making.

Item 7

Which is a form of command and control?

a. Guidance and intent
b. Directed and conceptual
c. Strategic and tactical
d. Conscious command decision

Item 8

A clear, concise articulation of the purpose(s) behind one or more tasks assigned to a subordinate is best defined as commander's

a. guidance.
b. vision.
c. intent.
d. battlespace analysis.

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Item 9

Preliminary decision required to focus the planners on the commander's conceptual vision of the operation could be best described as commander's

a. guidance.
b. vision.
c. intent.
d. battlespace analysis.

Item 10

The commander's critical information requirements is best defined as the identification of

a. critical risks that operational forces could experience as they engage enemy activities and an analysis of the environment to support planning through situational awareness for decision making.
b. critical communications assets used to support operations that will help the commander build a warfighting perspective of the tactical situation through awareness and decision making.
c. information on the friendly activities, enemy activities, and the environment that the commander deems critical to maintaining situational awareness, planning future activities, and assisting in timely and informed decision making.
d. the critical informational analysis used to determine the situation currently and the future actives to make sound decisions for planning and communications.

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Item 11

The traditional view of command and control can be described as a situation when _____, while the adaptive view of command and control can be described as

a. higher headquarters directs subordinate headquarters on mission execution down the platoon commander level … platoon commanders direct the actualization of operations within the demands of the five paragraph order.
b. command and control functions operate in a downward flow from higher to lower organizational levels … a command and control process represented by a continuous flow of information between higher and lower organizational levels.
c. a command and control process represented by an interactive flow of situation reports and requests for fire support … a command and control system that puts the operational and fire support plans into an integrated data communications systems that changes with the situation.
d. the command and control element directs and influences in the operating environment with a linear flow of information … a command and control system that has become irregular due to the interactive nature of inputs and outputs.

Item 12

Low-level initiative is defined as a method to

a. distribute authority to decide and act throughout the organization rather than localizing it in one spot.
b. create an opportunity for the strategic corporal to execute command and control and provide information management.
c. implement the bottom up planning process in order to allow higher headquarters to integrate plans into a working campaign plan.
d. allow platoon commanders and officers in charge to create command and control at their operational levels.

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Item 13 What are the factors that influence mission command and control?

a. Situational Awareness, low-level initiative, commander's intent, mutual trust, and implicit understanding and communication.
b. Commander's guidance, standard operating procedures, warfighting applications for operations, explicit understanding and communication, and operational planning process.
c. Mutual understanding, commander's vision, operational analysis, leadership styles, and unit mission.
d. Rank of commander, level of staff, actions required, level and impact of the decision-making process, and technology and data support.

Item 14 In the operating or administrative environment, knowing what is occurring, understanding what could occur, and projecting the options that could exist can be defining in general terms as

a. situational awareness.
b. analytical decision making.
c. command and control.
d. operational analysis.

Item 15 When a condition exists that demonstrates that all members share a common perspective of the conditional operating environment, the condition could be called which of the following terms?

a. Implicit communications
b. Recognitional skills
c. Warfighting perspective
d. Group situational awareness

Item 16 Situational awareness requires leaders and Marines to develop which of the following cognitive skills?

a. Knowing, recognizing, understanding, and initiating
b. Perceiving, comprehending, projecting, and predicting
c. Postulating, communicating, coordinating, and facilitating
d. Understanding, conceiving, perceiving, and recognizing

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Item 17

Vertical, horizontal, and implicit are types of _____ that can be used to develop and enhance

a. planning…command and control.
b. planning…situational awareness.
c. communication…situational awareness.
d. communication…command and control.

Item 18

The decision-making processes in the Marine Corps are influenced by our core competencies, which are

a. Warfighting culture and dynamic decision making
Expeditionary forward operations
Sustainable and interoperable littoral power projection
Combined arms integration
Forcible entry from the sea
b. Fire and maneuver
Planning tenets expeditionary operations
Military operations other than war
Utilization of the rapid planning process
Military thinking and warfighting
c. Warfighting and military operations other warfare
Decision making and military thinking
Integrated aviation and ground organizations
Operational and planning interfaces with mission essential tasks
Force projection through interservice transportation planning
d. Expeditionary culture and operations
Military thinking and decision making
Forcible entry from the sea
Fire and maneuver with MAGTF support
Command and control to sustain littoral operations

Item 19

The cycle of orienting, observing, deciding, and then acting is known as the

a. Boyd Loop.
b. Decision Loop.
c. OOBA Loop.
d. OODA Loop.

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Item 20

Military decision making is

a. a decision-making process that relies on experience to recognize key elements of particular problem to arrive at an appropriate decision.
b. a decision-making process that requires situational awareness to recognize the essence of a given problem and the creative ability to devise a practical solution.
c. a decision-making process that analyzes a dilemma and determines the best solution.
d. a decision-making process that commanders use to integrate warfighting, tactics, and combat techniques into an integrated operational solutions that can be used in the combat or training environment.

Item 21

What is decentralized command and control?

a. A condition that exists when subordinate leaders must make decisions on their own initiative based on the commander's intent.
b. The operational state that exists when subordinate leaders have received their orders and commander's guidance.
c. The method of implementing mission orders into the operating environment that requires subordinates to act as directed during changing situations.
d. The ability to send and receive situation reports so that the next operational phase can be planned without delay.

Item 22

Implicit communication is

a. communication that individuals leading larger groups use to express ideas and instructions. These communications are generally delivered to large gatherings of individuals, so minimum distortion takes place.
b. communication which smaller groups express their ideas.
c. the highest level of communication since it is the most difficult to achieve.
d. Communication that focuses on individual transmitting information to express their ideas.

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Item 23

What are the factors that affect decision-making?

a. Moral courage, incomplete information, timeliness, uncertainty, and uniqueness
b. Fear, fog of war, risk, time, tempo, and maneuver
c. Information management, critical information requirements, communications, and focus
d. Planning, warfighting, operational design, and tactics

Item 24

Which of the choices provided would best describe the procedures listed below?

- Establishing what is to be accomplished, why, and how.
- Identifying the enemy's critical vulnerabilities
- Identifying our vulnerabilities from the enemy's perspective
-

a. Developing operational design
b. Shaping the action
c. Initiating planning
d. Warfighting decision making

Item 25

The traditional view of maneuver is a method to gain

a. positional advantage in a space or location, which is normally accomplished by movement.
b. the enemy advantage position.
c. the ability to move faster than the enemy during warfighting operations.
d. a state of mind that blends decision-making capacity with operational experience.

Item 26

What preparation process involves a number of ongoing, repetitious, and interdependent activities?

a. Planning
b. Course of action
c. Analyzing the mission
d. Drafting ideas into SMEAC format

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Item 27

Top-down planning, single battle concept, and integrated planning are the guiding principles for the Marine Corps

a. Expeditionary Operations.
b. MAGTF Planning.
c. Planning Process Tenets.
d. Warfighting Plan.

Item 28

The changes with every situation, type of activity, and with every level of an organization is known as the value of

a. dynamics.
b. function.
c. planning.
d. process.

Item 29

From the scrambled list below place the Marine Corps Planning Process steps in the proper order.

Step	Action
6	Course of action comparison and decision
5	Mission analysis
1	Course of action
2	Transition
3	Course of action war game
4	Orders development

a. 1, 3, 6, 2, 5, 4
b. 3, 2, 6, 5, 4, 1
c. 4, 5, 2, 1, 3, 6
d. 5, 1, 3, 6, 4, 2

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Item 30 What information is recommended to conduct mission analysis?

a. Understanding the mission objectives, operational factors, psychological factors, and enemy capabilities
b. Commander's intent, guidance, vision, philosophy, and concept of operations
c. Commander's critical information requirement, operational design, battlefield framework, and force structure
d. Possible area of operations, probable mission, available forces, area's political, military, and cultural characteristics

Item 31 What is decisional advantage?

a. The value assigned to decisions during after action review and analysis to develop lessons learned.
b. The result of appropriate action in the operational environment when dilemma completely shatters the enemy's will to resist.
c. The organizational capability created by implementing low-level decision-making capability in operational applications.
d. The ability to make decisions faster than the opposing forces and it is the essence of maneuver.

Item 32 Military Thinking and Decision Making Exercises is published in the

a. MCO 1040.55.
b. MCO 5500.35.
c. MCO 1500.55.
d. MCO 8000.55.

Item 33 Marine Corps Doctrinal Publications, Marine Corps Warfighting Publications, and Marine Corps Reference Publications can be generally classified as

a. books for professional reading.
b. guidelines for commanders to develop operational plans.
c. Marine Corps doctrine.
d. primary reading for The Basic School.

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Item 34 The Marine Corps Lessons Learned System (MCLLS) can be defined as

a. notes made in the platoon sergeant's notebook during field evolutions that are turned over to the commanding officer at the end of an operation.
b. large quantities of notes compiled into the battalion S-3 shop for planning the next cycle of training.
c. database of lessons learned during operational and training evolutions.
d. files of after action reports located in the G-3 or G-5 shop that can be used for decision making and planning.

Items 35 to 38 These items relate to a professional reading article that will be introduced and read. Additional instructions will be given as you read the article.

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Introduction

Dr. Thomas C. Adams, a political-military strategist with more than 30 years of experience, wrote the article "Future Warfare and the Decline of Human Decision Making". The articles included in earlier chapters described how to develop, employ, and project greater decision making. Dr. Adams approaches future warfare from a different perspective. He projects a view of warfare that indicates the greater the influences and increased dependence on technology should theoretically reduce the human factor and role in the decision making aspect of warfare. A contrasting perspective for the SNCO would be to determine if technology would reduce the need for the "strategic corporal" and the possibilities and realities of automating warfare.

Reading Scope and Perspective

The SNCO should read the article "Future Warfare and the Decline of Human Decision Making" from the perspective of a leader and warfighter. In order to develop full appreciation for the article's scope, the reader should approach future warfare from the strategic level. The examples of technology lend themselves to a compressed warfighting environment. (*See page 2-9*) Automating warfare would theoretically allow national policy to be executed in machinery. As you read the article, think about how would that change the role and demand for decision makers at every level of operations. Some warfighting definitions have been included to refresh the reader on some of the more important concepts related to the article. Be prepared to answer the specific article questions below.

- What is the purpose of integrating technology into the military forces according to Joint Chiefs of Staff and why would it be important to the Marine Corps?
- Does observation and information gathering capabilities guarantee success or is there a better application for these resources?
- What approach are military leaders taking in applying the OODA Loop to benefit friendly forces and put the enemy at a disadvantage?
- How do human beings deal with information overload and what effect could it have on operations?

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Review Lesson, Continued

Reading Terminology

The following article discusses the following concept, terms, or issues.

- Tempo
- Speed
- War
- OODA Loop
- Information Overload
- Directed Energy Weapon
- Smart Ship
- Net War
- TRADOC
- DARPA
- Fly-By-Wire

War

War is defined as a violet clash of interests between or among organized groups characterized by the use of military force. More importantly the additional information provided that cites the human dimension of war is the essence of war. The definition focuses on the fact that two hostile, independent, and irreconcilable wills, each trying to impose itself on the other. As you read the article, focus on the emphasis that war is endemic of mankind and it is a psychological and sociological condition more so than a condition or reason. The challenge presented by the article would anticipate the transfer from a human behavior to a mechanical behavior controlled by high-level decision making.

Tempo

Tempo is speed over time. Tempo reflects the organization's ability to consistently operate quickly. Operationally tempo is the quantifier of success between two opposing and equal forces.

Speed

Speed as defined by MCDP 1, *Warfighting,* is rapidity of action. It applies to both time and space.

OODA Loop

OODA Loop is the Observe – Orient – Decide – Act process used to make situational estimates and implement decisions. *Review Chapter 3 for additional information.*

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Review Lesson, Continued

Information Overload	Information overload occurs when there is an inability to discriminate or prioritize the pertinence and importance of the information.
Directed Energy Weapon	A directed enemy weapons (DEW) are based on the emission of electromagnetic energy at different frequencies in focused beams. These weapons are designed to increase the speed of delivery and effects thus increasing the tempo of operations. Increased tempo can greatly reduce the human decision-making capabilities.
Smart Ship	Smart ships would be ships that have been refitted with new control, automation, damage control, and information technologies that would allow the ship to operate more effectively with reduced numbers of personnel.
Net War	Net war is the electronic conflict within and among computer systems attacking the full spectrum of opposing military and civilian information systems. This includes computer-controlled networks such as communications, logistics, and transportation assets.
TRADOC	TRADOC is the acronym for the U.S. Army's Training and Doctrine Command.
DARPA	DARPA stands for the Defense Advanced Research Projects Agency.
Fly-By-Wire	Fly-by-wire is a term used to describe a situation where unmanned aircraft are controlled by humans located safely away from the battle scene.

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Instructions Read the article and be prepared to answer the review questions.

Future Warfare and the Decline of Human Decisionmaking

By
THOMAS K. ADAMS
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To date, most warfare has taken place within what Robert J. Bunker terms "human space," meaning the traditional four-dimensional battlespace that is discernible to the human senses.[1] In essence, war has always consisted of human beings running, dodging, and hurling things at each other, lately with the help of machinery. Even such revolutionary developments as gunpowder only enhanced our ability to throw things at enemies we could see and hear.

The first crude examples of autonomous weapons were probably the early experiments by the U.S. Navy and Sperry Gyroscope Company on unpiloted aircraft during the last years of the First World War. Then came the advent of electronics, especially radar, and warfare began to leave the realm of human senses. Ships and planes could fire on enemies that were no more than ghostly green images on a cathode ray tube. Later came military robots such as cruise missiles that were able to autonomously execute missions formerly requiring manned systems. Advanced radar engagement systems enabled pilots to locate, identify, and destroy enemy aircraft without ever seeing them. Some robotic systems became even more independent, such as the Navy's Phalanx close-in air defense weapon, which is "capable of autonomously performing its own search, detect, evaluation, track, engage, and kill assessment functions."[2] Thanks to advanced sensors and information processing, target recognition and identification methods are being developed to permit truly autonomous guided munitions. This includes munitions capable of autonomously engaging fixed and mobile ground targets, as well as targets in air and space. [3] Warfare has begun to leave "human space."

A long step in this direction was taken in mid-2000 when the U.S. Senate Armed Services Committee added $246.3 million to its version of the 2001 defense authorization bill to speed development of unmanned combat systems. The committee set two ambitious goals--within ten years, one third of all deep-strike aircraft would be unmanned; and within 15 years, one third of ground combat vehicles would operate without human beings on board. [4] At about the same time, the Defense Advanced Research Projects Agency (DARPA) and the U.S. Army selected initial contractors for the Army's planned Objective Force.

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The concept calls for "a network-centric, distributed force that will include a manned command and control element/personnel carrier, a robotic direct-fire system, a robotic non-line of sight system, an all-weather robotic sensor system, coupled with other layered sensors. "[5] According to Lieutenant Colonel John Blitch, program manager for DARPA's Tactical Mobile Robotics Program, "We have spent a lot of time and energy analyzing employment concepts for portable robotic platforms over the last few years and are convinced of their revolutionary impact on dismounted warfare. "[6] These initiatives and others are rapidly taking us to a place where we may not want to go, but probably are unable to avoid.

Once this progression of ever more capable machines began, the U.S. armed forces, and those of other advanced countries, started down a road that will probably remove warfare almost entirely from human hands. Several trends are contributing to this unsettling development, but the most important one is the rise of computer-driven information systems coupled with the proliferation of mobile autonomo and semi-autonomous systems (i.e. "robots"). The devices created by this coupling greatly increase the speed at which things happen, especially weapon effects and information processing. A much less noticed trend, the development of very cheap and very small military systems, will also help to move warfare even further out of "human space." In combination, these advances have a synergistic effect. More and more aspects of warfighting are not only leaving the realm of human senses, but also crossing outside the limits of human reaction times. The effect of these trends is already being enhanced by the emergence of directed energy weapons (DEWs) with their capacity for engagement at the speed of light.

In short, the military systems (including weapons) now on the horizon will be too fast, too small, too numerous, and will create an environment too complex for humans to direct. Furthermore, the proliferation of information-based systems will produce a data overload that will make it difficult or impossible for humans to directly intervene in decisionmaking. This is not a consideration for the remote science-fiction future. Weapons and other military systems already under development will function at increasingly higher levels of complexity and responsibility--and increasingly without meaningful human intervention.

According to the U.S. Army Infantry School, "We intend to transform the Army, all components, into a standard design with Internetted C4ISR. "[7] And, it is well known that various "digital army" initiatives such as the Land Warrior system and the Force XXI Battle Command Brigade and Below are under way. [8] Likewise, a number of unmanned and semi-autonomous systems are already in wide use, and autonomous systems are in prototype or development. [9] The first operational light-speed weapon, the U.S. Air Force's Yal-1a Attack Laser (also known as ABL or Airborne Laser), is slated for operational readiness by 2003. Others,

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such as high-power microwave and particle-beam devices, are under development.[10] At Sandia National Laboratories, tiny MEMS (Micro-Electro-Mechanical Systems) already exist in prototype form.[11]

None of this is accidental. For one thing, it is national policy, articulated by former President Bill Clinton as a critical part of the national security strategy.[12] Second, it has been pursued tenaciously by the military despite expense, setbacks, and criticism. Knowledge is seen as the key to "battlefield dominance," and speed is seen as the key to exploiting that knowledge. We have made these two qualities--knowledge (information) and speed--the keystones of planning for the future Army and the other services as well. Army After Next (AAN) forces are expected to need both "linear speed" (speed across the ground) and "angular speed" (the ability to out-think and anticipate) in order to survive and win on future battlefields.[13] Like the chiefs of the other services, General Eric Shinseki, the Army Chief of Staff, has clearly stated that he endorses this concept. [14] It is believed that these qualities--information dominance, combined with speed and agility--will lead to military dominance at all levels of warfare: strategic, operational, and tactical.[15]

Military discussions of advanced warfighting (as opposed to scientific or technical ones) occasionally include the reassurance that there will always be an immediate, direct, and intimate connection between human beings and warfighting. According to the Joint Chiefs of Staff, "The purpose of technology is to equip the man. We must not fall prey to the mistaken notion technology can reduce warfare to simply manning the equipment. "[16] As a white paper from the U.S. Army's Training and Doctrine Command (TRADOC) put it, "Autonomous unmanned systems will be fully adaptive to unforeseen changes while remaining completely predictable in mission performance."[17]

We are faced with the prospect of equipment that not only does not require soldiers to operate it, but may be defeated if humans do attempt to exert control in any direct way. It is easy to see a steadily decreasing role for humans in direct combat as the 21st century progresses.

Information Systems

The fundamental development underlying the loss of human control is that of automated information systems. Furthermore, the impressive current capabilities of such systems may only hint at their future capacity. Quoting again from the TRADOC white paper:

> *Advances in computer architecture and machine intelligence will have reached the point where intelligent agents can analyze the environment and current battle situation, search likely target areas, detect and analyze targets, assist in attack decisions, select and dispense munitions, and report results.*

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These unmanned systems will augment manned platforms in every facet of operations on the ground, sea, air, and space, including information dominance and manipulation.[18]

The difference between a machine that can do all these things and "assist in attack decisions" and one that makes its own "attack decisions" is a matter of programming. This is a description of machines that can function autonomously to conduct warfare at the tactical level. If anything, this description is probably a gross understatement.

Current computers have not even begun to approach their theoretical limits, and those limits continue to recede. In 1998, scientists at the Los Alamos National Laboratory in New Mexico announced that they had been able to consistently manipulate subatomic particles, thus opening to the way for computation and communication systems orders of magnitude smaller and faster than the ones now in existence.[19] In 1999 researchers at UCLA and Hewlett-Packard succeeded in constructing microscopic integrated circuits using single molecules as building blocks. James Heath, the UCLA professor leading the project, suggested that a molecular computer with the processing power of 100 conventional personal computers would be about the size of a grain of salt. The implications are almost unimaginable--cheap, ubiquitous super-computing, and unlimited memory capacity in devices so small that they are on the scale of insects.[20]

This is not to suggest that there will ever be an overriding decision to exclude humans from decisionmaking. Instead, we will continue to pretend to be in complete control while leading ourselves gradually and incrementally toward systems whose logic demands that human control become more abstract with less and less direct participation.

Mastering the OODA Loop

The entry point for automated systems to join the military decisionmaking process is described in abstract form by the so-called "OODA" Loop: observe, orient, decide, and act.[21] For purposes of this discussion, the loop can be seen as beginning with "observation," and indeed there will be a great deal of observation connected with future military organizations.

An enormous amount of attention (and money) has been invested in observation in the form of new surveillance and reconnaissance technology. Development of these capabilities has become increasingly vital with the Army Chief of Staff's 1999 announcement that he plans to field units whose very survival is largely dependent on information collection and advanced information systems.[22] This meshes nicely with the TRADOC view of the future: "The use of multiple, inexpensive unmanned platforms with modular sensor and information-gathering devices provide for an almost unlimited ability to analyze the battlespace. These sensor platforms will be land-based (both mobile and stationary),

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airborne, and space-based."[23] As explained by Major General John Thomas, commander of the U.S. Army Intelligence Center at Ft. Huachuca, Arizona, this kind of information saturation is essential. The Army's new lightly armored "medium brigades" will have intelligence and sensor assets equivalent to those of a full division. These new brigades are expected to survive by using these assets to avoid the enemy, using superior knowledge, terrain, and agility to remain out of enemy fields of fire. According to General Thomas, "Probably the largest and most exciting area is in robotics so that many of these sensors can be automatically emplaced and maybe even autonomously emplaced."[24]

But victory does not always go the commander with the best observation. It goes to the one that can best process observation into data, data into information, information into orders, and then orders into action. The process is continuous--the results of action are observed, starting the process all over again. The individual functions involved have been enshrined in military jargon as the OODA Loop mentioned above.[25] The notion of mastering this process, "getting inside the enemy's decision loop" (i.e. execute the OODA process more quickly than the enemy) is at the heart of the digital Army and the information warfare concept.

By 2025, speed-of-light engagement will be a common feature of military conflict. Future architectures envision a new array of ground- and space-based sensors, uninhabited combat aerial vehicles (UCAV), and missile defense technologies that will take advantage of directed energy weapons. Air, sea, land, and space forces will be both faster and more agile. Adversaries will take advantage of these characteristics to operate faster than a defender can observe the activity, orient himself, decide how to respond, and act on that decision. The attacker thus places himself "inside" the defender's OODA Loop, destroying an adversary's ability to conduct an active defense.[26]

To master the OODA Loop in this demanding environment, military leaders are pushing hard for the technology to obtain and process more information more rapidly. This push attempts to achieve the core capability of information dominance, "the ability to collect, same."[27] From the perspective of an Army organized around automated information systems, the struggle to get inside the enemy decision loop is one of processing power, the ability to move through the loop ever more rapidly.

When improved sensors are coupled with extensive communications links and advanced data-processing, the result is an ever-increasing flow of detailed information. Unfortunately, the explosion of available information inevitably results in information overload and flawed decisionmaking. Human beings commonly deal with this by ignoring much of the inflow, thus negating the purpose of the information systems in the first place. Recent exercises reveal an alarming number of unread messages

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because of information overload. As the quantity of data rises, the difficulty of preparing and interpreting it for decisionmaking grows. Furthermore, more information, flowing more efficiently, can easily give the commander conflicting perspectives of the battlespace. Soon it becomes obvious that the slowest element in the process is the human decisionmaker. By reducing the human role, the entire system is enhanced.

Automated systems, using some form of artificial intelligence, may be the solution to this difficulty. As an Air Force document asserts: "Unmanned systems will capitalize on artificial intelligence technology gains to be able to assess operational and tactical situations and determine an appropriate course of action. The key to the success of command and control is information. Some of these systems will not only collect data but also have the ability to analyze data and provide recommendations to the commander."[28] Operationally, the difference between "providing" a recommendation and "acting" on a recommendation is merely a software tweak.

Automated systems can certainly reduce the pressure of information saturation and eliminate conflicts, but at a price. Essentially, they do so by creating a series of information "filters" that establish priorities and eliminate marginal data, reconcile the remaining information conflicts, and present a consensus picture of the situation. All of this is invisible to the ultimate consumer, out of his or her control and very likely not well understood. This means that the commander is receiving a picture of the battlefield that is designed to emphasize certain things while de-emphasizing others. Still other factors are omitted entirely.

Autonomy

STAR 21, an Army study of 21st-century needs, concluded that unmanned systems will become prevalent on the land battlefield.[29] The rise of unmanned ground systems is the most important step toward autonomous systems for land warfare, a rise that is already in full progress. As envisioned by the Army Training and Doctrine Command:

> *Unmanned systems will operate throughout the depth, width, and breadth of the battlespace, providing both the real-time intelligence necessary for the commander to locate and identify key targets, as well as the means to destroy them. . . . [A]utonomous convoys loaded with the necessary supplies to replenish expenditures can be dispatched from ports or airheads to central logistics bases. From there, the unmanned systems can transport the supplies further forward. . . .*
>
> *Future battles will have unmanned systems as forward sensor/observers detecting and identifying high-value targets and calling for fires.[30]*

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Unmanned systems have been around for a long time in the form of multimillion-dollar cruise missiles and the like. After all, the long-range cruise missile is nothing more than an unmanned bomber, an autonomous aerial vehicle or, simply put, a robot.[31] But now such systems are cheaper, smaller, and more capable than seemed possible even a few years ago. In 1998, for example, an autonomous aircraft no bigger than a large model airplane and weighing just 29 pounds flew across the Atlantic Ocean, successfully arriving at a predetermined destination.[32] The U.S. Department of Defense has an extensive military robotics program, and by 2005 DOD is expected to spend $72 million on unmanned ground vehicles alone.[33] Unmanned systems have supported the Bosnia mission in the areas of reconnaissance (with Unmanned Aerial Vehicles) and mine-clearing using Standardized Robotic System kits on manned platforms.[34] The DARPA Unmanned Ground Vehicle Demo 11 program has fielded four HMMWVs reconfigured as unmanned scout vehicles.[35]

The difference between a truly autonomous system and one that is merely unmanned is another question of processing power. As mentioned earlier, the coming micro-miniaturization of computer systems will eventually make it possible to pack computing power greater than a year 2001 mainframe system into a device that is barely visible.[36] The immediate prospect is for cheap computers small enough to be used in almost any device, followed at some point in the more distant future by ubiquitous supercomputing and unlimited memory capacity in devices that are literally microscopic. These developments are important for their own sake, but also in the present context because they set the stage for autonomy.

As the TRADOC white paper put it, “Unmanned systems may have the ability to learn. The concept of collective leadership and subordination will then permit systems working under human supervision to assist the warfighter in the accomplishment of his mission.”[37] As this quote suggests, TRADOC publications in particular are careful to specify that human decisionmaking will be involved at some level in the operation of these systems. However, there is no a priori reason why this should be so. Inevitably, some adversary will decide that eliminating humans from the military decision cycle at the tactical level will confer a significant advantage, forcing others to follow suit.

The logic leading to fully autonomous systems seems inescapable. Clearly, the armed forces will want a “person in the loop” no matter how capable the automated system may become. However, if this person has a meaningful role in the operation of the system (for example, a tank, fighting ship, or warplane), then he or she will obviously be the most critical (and probably the most vulnerable) component of the system as well as the most difficult to replace. The obvious course for an adversary attacking the tank, ship, or plane is to concentrate on attacking

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The obvious response to this threat is that favored by the Air Force for some applications, "fly-by-wire." This means simply that a human located safely away from the battle scene remotely pilots the aircraft by radio control. In principle, there is no reason this solution could not be applied to ground vehicles and ships, or at least to surface vessels (submarines present a different problem). Unfortunately this solution has its own vulnerabilities--the enemy's priority then becomes to attack the remote control links electromagnetically by jamming or physically by attacking the transmitter.[38] This becomes all the more troublesome when cross-continental control is required. Having extended links gives the enemy a logical place to attack that is hard to defend. Systems will need at least some measure of local autonomy in order to survive. Fully autonomous systems avoid all these difficulties while allowing a less vulnerable, higher performance system.

But even if full autonomy is rejected, the presence of humans making critical decisions still does not avoid the issue. Given that such persons have a real, rather than merely symbolic, role in the command and control of the fighting system, consideration must be given to the possibility that they will be injured or killed and cannot carry out their duties. It seems unreasonable that the highly trained crew and their multimillion-dollar ship or aircraft would simply be written off as a casualty. It is far more sensible to design the system so as to continue to operate the plane or vessel and, if necessary, continue the fight. This is nothing more than autonomy arrived at by a slightly different route.

The trend toward reliance on automation and artificial intelligence can be seen in the Navy's Smart Ship Program, which is spending millions of dollars to replace personnel with technology. By 2005, this program is expected to reduce the number of sailors on the Navy's 27 CG 47 *Ticonderoga*-class cruisers by replacing them with new control, automation, damage control, and information technologies. Shortly afterward, 57 of the DDG 51 *Arleigh Burke*-class destroyers will be likewise refitted. According to Navy plans, the crew of the new DD-21 "land attack" destroyers could number as few as 95. Current destroyers and cruisers carry more than 300 sailors on board.[39] These improvements aren't cheap. Refitting the 27 *Ticonderoga*-class cruisers alone will cost $124 million. But according to a Navy assessment, lower manpower costs, less maintenance, and fewer support costs will save nearly $3 million a year per ship.[40] Another example is the "arsenal ship" proposal in which a stealthy, unmanned vessel would loiter off an enemy shore and fire guns or missiles at the command of air or ground forces located elsewhere.[41]

In sum, this approach results in the development of systems that take the operator "out of the loop," shifting the role of the human operator from that of an active controller to that of a supervisor who serves in a fail-safe capacity in the event of system malfunction. Unfortunately, the role of

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Speed

Directed Energy Weapons (DEWs), including laser, microwave, and charged particle or neutral particle beam devices, are a major emerging military technology that enormously increases the speed with which weapon effects occur. All are based on the emission of electromagnetic energy at different frequencies, usually in focused beams. They can be vastly more accurate than conventional weapons because they follow line-of-sight rather than ballistic trajectories, thus eliminating all the problems of ballistics.[43] Researchers and engineers are now developing a wide range of these devices.[44] The first operational laser weapon, the U.S. Air Force's Yal-1a Attack Laser, will be followed by Army and Navy systems. One of these, the Army's Tactical High Energy Laser Demonstrator, scored a first on 28 August 2000 by using a deployable laser system to successfully track and destroy a salvo of two Katyusha artillery rockets in flight. Other applications are being examined through the Army's "virtual test bed" for vehicle-mounted directed energy weapons.[45]

One advantage of such weapons is that missing the target is less important, since the system will be able to cycle quickly and fire off another speed-of-light burst, this time having corrected its aim. With DEWs, active countermeasures (dodging, throwing chaff, deploying decoys, returning fire) become enormously more difficult and in many cases impossible. It is hard to see many roles for humans in this kind of lightning duel. Human perceptions and motor coordination skills are simply not capable of intervening usefully. Defense then relies on instantaneous, automated responses and passive measures, of which the best are probably speed and size. Small, agile, very fast-moving targets, other things being equal, are harder to detect and much harder to hit.[46] This will place a premium on micro-systems, to be discussed later. The same qualities that make such systems harder to target and strike also make them much more difficult to control in anything approaching human "real-time."[47]

As indicated by the Army's tactical laser systems, DEWs are not limited to strategic weapon systems.[48] A variety of threats--short-range rockets and artillery, UAVs, cruise missiles, pop-up helicopters--can appear quickly and without warning. When a threat is not detected until late or its unmasked time is short, there is no second chance. Countering these threats requires a weapon that is fast, accurate, and close-in. On 22 April 1999, Boeing completed proof-of-concept testing of a new tactical high-energy chemical laser. As described by Boeing, this technology "permits . . . highly mobile, self-contained laser weapons with significant lethality at engagement ranges up to 10 km for ground-to-air defensive systems, and over 20 km for air-to-ground or air-to-air systems." The company's plans include "complete weapon systems in roll-on, roll-off installations for rotorcraft (V-22, CH-47), aircraft (AC-130), and ground vehicles." Boeing says that such a system could be ready in about two years.[49] With

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Perhaps the extreme example of warfare outside "human space" is that of "netwar"--electronic conflict within and among computer systems attacking the full spectrum of opposing military and civilian information systems (including computer-controlled networks such as communications, logistics, and transportation). By its nature, the speed of such conflict is limited only by the speed of the electronic circuits in which it occurs. This is another example of conflict that will quickly escalate out of human control due to its complexity and rapidity. Netwar attacks may be too pervasive and rapid for human intervention, adapting instantly to responses. Both attack and defense will be completely automated, because humans are far too slow to participate.[51]

Smaller and Smaller

Small systems are highly desirable for military purposes, especially in a force-projection Army. Smaller systems require less space, thus fewer airframes to transport, and they use less fuel in operation. They are more difficult for the enemy to detect and, once detected, harder to hit. The viability of such "small, smart, systems" was demonstrated on 11 January 1999, when Lockheed Martin began DOD-sponsored flight tests on an aircraft with a wingspan of six inches--about the size of an outstretched hand. The aircraft, which weighs only three ounces, is one of the smallest man-made flying objects.[52]

It is (once again) the presence of micro-electronics that makes the difference between the Lockheed Martin device and an ordinary model airplane. Miniaturized electronic circuits have revolutionized military electronics. Similarly, the miniaturization of mechanical systems is expected to launch another revolution. Military commanders will have very small, very smart machines to more effectively collect target and damage assessment information with reduced risk to personnel and decreased probability of discovery. Swarms (hundreds or thousands) of miniature autonomous vehicles will be capable of performing tasks that are difficult or impossible today, such as locating and disabling land mines, detecting chemical, biological, or nuclear weapons, and verifying treaties.

During the 1990s, Sandia National Laboratories produced an early example of a microsystem, the Miniature Autonomous Robotic Vehicle (MARV). MARV is one cubic inch in size and is made primarily from commercial parts using ordinary machining techniques. Despite its small size, it contains all its needed power, sensors, computers, and controls. MARV is severely limited in its operation, but it is leading to even smaller autonomous vehicles with greatly enhanced mobility, more intelligence, on-board navigation and communication, as well as the ability to act cooperatively with other robots.[53] Sandia is also developing technologies to rapidly machine, fixture, and assemble Small Smart

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Machine devices, including automated assembly of parts down to 100 microns in size.[54]

At the Massachusetts Institute of Technology (MIT), researchers have devised much tinier robots, similar to ants, which exhibit certain limited aspects of intelligence and differentiated specialization, such as avoiding shadows and staying away from each other. They are cheap and easy to reprogram. According to researchers, "Thirty-five years from now, analogous small, lethal, sensing, emitting, flying, crawling, exploding, and thinking objects may make the battlefield highly lethal."[55]

Very small systems have several advantages. As noted earlier, it is easier to quickly transport huge numbers of them, both sensors and fighting systems. They also can be moved at speeds, accelerations, decelerations, and in intricate maneuvers that human beings could never withstand. It is conceivable to move enormous numbers of these devices at ballistic missile speeds, having them in action half a world away in minutes. In such circumstances, operating according to preset instructions may not provide the necessary flexibility in operation, and remote control is probably impractical. Once again, this leads us back to autonomy.

The nature of small systems is such that they are more difficult to hit with conventional projectile weapons due to their small size and large numbers. This applies even to some DEWs, such as lasers. The logical countermeasure for very small, smart systems deployed in large numbers is probably an energy weapon with an area effect such as an electromagnetic pulse (EMP) device. Once again this is likely to lead to the play and counterplay of extremely rapid autonomous systems functioning far too quickly for human intervention.

Solutions

If the problem is how to maintain meaningful human control of autonomous warfighting systems, no good solution presents itself. One answer, of course, is to simply accept a slower information-processing rate as the price of keeping humans in the military decision business. The problem is that some adversary will inevitably decide that the way to defeat the human-centric systems is to attack it with systems that are not so limited.

A longer-range solution is to integrate humans and machines in a far more intimate fashion. Once form of this concept is that of the Air Force's Information Integration Center (IIC). In this scheme, all-source information collectors would transmit raw data to an IIC. Archival databases linked to the center would be used for historical analyses to fill information gaps. The IIC, housed in an integrated and interconnected constellation of "smart" satellites, will analyze, correlate, fuse, and "deconflict" all relayed data. The refined data would be relayed to human users through implanted

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microscopic chips, providing users with computer-generated mental visualizations. This would allow the user to place himself or herself into the selected battlespace.[56] It would avoid the need for clumsy interfaces by making humans a part of the information system in a way very similar to that in which the computers are connected. But, like "fly-by-wire" systems, it does depend on broadcast information at radio frequencies, raising the serious possibility of jamming or other forms of interference.

In the further future, the arrival of very advanced, microscopic information systems may allow extremely sophisticated data processing capacities to be made an integral part of the human brain. However, assuming this proves to be possible, such a step may raise objections from those who object on moral and ethical grounds to blurring the distinction between humans and machines. It also does not address the relative fragility of human beings in combat situations.

Conclusions

The evolution and adaptation of the systems and processes described here are not as simple nor as straightforward as it might seem. The effective use of such technologies will require rapid, effective, and close interaction between many different systems. It will involve sophisticated command and control links as well as a variety of technical means, including reconnaissance sensors, communication links, computers, display systems, and weapon platforms. This kind of new and subtle interaction will require radical changes in the architecture and integration of these interconnected and widespread intelligence absorbing, processing, and application systems. Right now, the architectures for this kind of "system of systems" are barely in the developmental stages. The actual achievement of solutions for the integration of such large, complex systems will be a long process involving extensive experimentation. At least another decade, probably two, will be required.

This leaves us in something like the position of monarchies witnessing the democratic revolution at the beginning of the 19th century. Something profound and far-reaching is going on all around us, even within our own societies. But the advisers, courtiers, and generals that surround the throne are at a loss to determine what it means, much less what to do about it.

Humans may retain symbolic authority, but automated systems move too fast and the factors involved are too complex for real human comprehension. When computers are designed and programmed by other computers, the situation will be even further from anything humans can reasonably expect to understand, much less intervene in successfully. At the same time, loud denials can be expected from some quarters, angrily claiming that humans are as much, if not more, in charge than ever. In a sense this will be true--the new systems will enable people to accomplish far more in war and peace than was even conceivable before their development, or, rather, is even

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conceivable now. But the simple fact remains, the farther we extend our reach outside "human space," the more we require the assistance of machines.

Future generations may come to regard tactical warfare as properly the business of machines and not appropriate for people at all. Humans may retain control at the highest levels, making strategic decisions about where and when to strike and, most important, the overall objectives of a conflict. But even these will increasingly be informed by automated information systems. Direct human participation in warfare is likely to be rare. Instead, the human role will take other forms--strategic direction perhaps, or at the very extreme, perhaps no more than the policy decision whether to enter hostilities or not. Nevertheless, wars are a human phenomenon, arising from human needs for human purposes. This makes intimate human participation at some level critical, or the entire exercise becomes pointless.

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Reviewed 20 November 2001. Please send comments or corrections to Parameters@awc.carlisle.army.mil.

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NOTES

The author wishes to express his gratitude to Lieutenant Colonel John Blitch, Program Manager for DARPA's Tactical Mobile Robotics Program, for agreeing to review this material. However, his review does not imply endorsement. The observations and opinions expressed, as well as any errors or omissions, remain the sole responsibility of the author.

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45. "Tactical High Energy Laser (THEL)," news release BW0064, TRW Inc., Redondo Beach, Calif., 9 November 2000, Internet, http://www.trw.com/thel/, accessed 12 December 2000. The U.S. Army is also considering a Directed Energy Warfare Vehicle (DEW-V) concept. The DEW-V is a "virtual test bed" to determine the operational effectiveness of vehicle-mounted directed energy weapons for battle scenarios in 2015 and beyond. See Hillaby.
46. John T. Tatum, "A New Threat to Aircraft Survivability: Radio Frequency Directed Energy Weapons," *Aircraft Survivability*, Fall 1995, p. 11.
47. Although no one expects these devices to completely replace conventional weapons, they have at least three advantages over conventional systems in addition to those already cited. First, some DEWs, especially the radio frequency type, have a higher probability of hit than projectiles. The spreading beam can irradiate the entire target, making accurate pointing and tracking much simpler. Second, the "ammunition" supply for these weapons is large compared to a typical store of conventional projectiles and missiles. This is especially true of aircraft, where weight is a critical consideration. Finally, DEWs are potentially much cheaper to support than conventional explosives. The traditional ammunition loading, fusing, and storage facility could be replaced by the "fuel" required to source the DEW. Additionally, some forms of DEWs, such as lasers and radio frequency weapons, can be used to produce nonlethal effects. See Tatum, p. 11.
48. The U.S. Army and TRW Corporation have been using the High Energy Laser System Test Facility (HELSTF) for a joint tactical program with Israel called "Nautilus." The joint effort is evaluating lasers for use against short-range rockets, including the kind used with great effect against Israeli troops in South Lebanon and Russian forces in Chechnya. On 9 February 1996, lasers at HELSTF shot down their first armed and operational short-range rocket at White Sands Missile Range, N.M. In 1997, HELSTF conducted a successful live-fire test including the detection, tracking, and destruction of a short-range missile. The demonstration paved the way for further development in the form of the planned Tactical High-Energy Laser (THEL) system, a mobile ground-based air defense system for the U.S. Army Space and Missile Defense Command. "Nautilus Fact Sheet," U.S. Army Space and Missile Defense Command, Huntsville, Ala., 1996. "Tactical High Energy Laser (THEL)" information sheet, TRW Corporation, Cleveland, Ohio. The same material may be found on the Internet at http://www.trw.co.il/seg/sats/THEL.html, accessed 29 June 2000.
49. "Boeing Completes Testing of Tactical High Energy Laser," Defense Systems Daily, Internet, http://defence-data.com/archive/page4222.htm, accessed 26 June 2000.
50. Ibid.
51. For a full discussion of netwar, see Stefan Eisen, Jr., "Netwar, It's Not Just for Hackers Anymore," document number ADA297897, Defense Technical Information Center, Ft. Belvoir, Va., 22 June 1995.
52. "Micro Air Vehicles," *UK Defence Forum*, March 1999, Internet, http://www.ukdf.org.uk/ts6.html, accessed 13 March 2000.
53. Sandia National Laboratories, Intelligent Systems and Robotics Center, Miniature Autonomous Robotic Vehicle (MARV) webpage, http://www.sandia.gov/isrc/Capabilities/Prototyping/Small_Smart_Machines/MARV/marv.html, accessed 2 March 2000.
54. Ibid.
55. Institute for National Strategic Studies (INSS), *Project 2025* (Norfolk, Va.: National Defense University, 6 May 1992), p. 36.
56. 2025 Concept, No. 900702, "Implanted Tactical Information Display," 2025 Concepts Database (Maxwell AFB, Ala.: Air War College, 1996).

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Item 35

According to the Joint Chiefs of Staff, "The purpose of technology is to _____." Why would it be important to the Marine Corps?

a. update the warfighting systems to support better operational readiness... The Marine Corps primary benefit would be that an increase in technology would force increases in the quality of enlistees to meet the new demands.
b. equip the man. We must not fall prey to the mistaken notion technology can reduce warfare to simply manning the equipment
c. provide a strategic conglomeration of independent systems capable of replacing the ground combat element… This would be important to the Marine Corps because the expeditionary structure could be revamped.
d. upgrade the communications and information systems so that the Department of Defense has interoperability for strategic success… This would benefit the Marine Corps because the information exchange would create better planning and decision-making processes.

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Item 36

According to the article, does observation and information gathering capabilities usually guarantee success or is there a better application for these resources?

a. No, observation and information gathering capabilities allow junior leaders to start an upward information push to the decision makers. The senior leaders will process the information and then tell the junior how to best employ the assets to guarantee success. Managed operational action is the goal of leadership and warfighting.
b. Yes, the ability of a leader to process and organize information has better command and control, which is paramount for superior performance, since the leader can issue the best orders. BAMCIS combined with information to process into operational data yields the best operational performance.
c. Yes, the ability of a leader is to gather and organize information so that the planning process can be implemented. Dilemma identification and complete analysis guarantees success for the warfighter, since the best solution always yields the best results. The planning process utilizes information to its maximum potential.
d. No, the leader that can best process observation data into information, information into orders, and then orders into action will be more successful. The process is continuous – results of action are observed, starting the process all over again. The individual functions are enshrined in military jargon as the OODA process. Utilizing the OODA allows leaders to simultaneously observe and act as the operating environment changes.

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Item 37 According to the author, how can military leaders apply the OODA Loop?

a. Military leaders must master the OODA Loop in the demanding operational environment by utilizing technology to obtain and process information more rapidly than the enemy. This is known as information dominance and it is a core capability that increases speed and tempo. Increased tempo allows friendly forces to "get inside" the enemy's OODA, because the friendly "processing power" creates a situation where they can no longer process information and make decisions effectively.
b. Leaders in the military apply the OODA Loop to pass information through the chain of command, which allows decisions to be made after strict consideration and application. This benefits friendly forces, because every action is completely evaluated before implementation. This puts the enemy at a disadvantage, since a well-planned operation results in operational success.
c. The OODA Loop benefits military leaders, because it provides a format to organize and transmit information. The simplification of information allows it to be transmitted quickly over improved communication assets and to be "shot gunned" or widely dispersed to decision makers quickly. This creates a situation where staff members can quickly respond to commander's queries, which allow decisions to be made faster. This put most opposing forces at a disadvantage, because their technology is often outdated or inferior, which prevents them from making effective decisions.
d. The leadership of the military can apply the OODA to project and develop plans so that decision-making processes are simplified and developed in synchronization with national goals and objectives. Standardized processes make development easier and more focused, which improved efficiency and reduces output costs. The OODA Loop makes objectivity a situational function.

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Item 38

According to the author, how do human beings deal with information overload and what effect could it have on operations?

a. Information overload is a rarity in military forces since there is always a staff to process the information. The network of communicators and decision makers allows the information to be screened and processed completely at every level. In almost every operation there is a complete understanding of the operational situation from the command level to the Marine rifleman. Improved technologies for communications have removed many of the informational "bottlenecks" that existed in the past.
b. The improvements in technology create massive influxes of information, which can result in information overload. This can be remedied by ensuring the that number of communications and staff members at every level is appropriate for the amount of information they are required to handle. Appropriate staffing at every level ensure that all information has be interpreted and inputted into the decision making process.
c. Unfortunately, the explosion of available information inevitably results in information overload and flawed decision making. Human beings commonly deal with this by ignoring much of the inflow, thus negating the purpose of the information systems in the first place. Recent exercises reveal an alarming number of unread messages because of information overload. As the quantity of data rises, the difficulty of preparing and interpreting it for decision making grows. Furthermore, more information, flowing more efficiently, can easily give the commander conflicting perspectives of the battlespace.
d. Usually information overload is a minimal problem, because leaders and decision makers are well trained. Effective training allows all information to be processed to eliminate conflicted perspectives of the operating environment.

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Review Lesson Solutions

Review Lesson Solutions

The table below lists the answers to the review lesson examination items. If you have questions about these items, refer to the reference page.

Item	Answer	Reference
1	b	1-3
2	a	1-4 and 1-7
3	b	1-4
4	b	1-5
5	c	1-7
6	c	1-9
7	c	2-6
8	d	2-8
9	b	2-8
10	c	2-9
11	a	2-10/11
12	a	2-14
13	a	2-14
14	a	3-3
15	d	3-4
16	b	3-6
17	c	3-8
18	a	3-10
19	d	3-13
20	b	4-4
21	a	4-8
22	c	4-9
23	a	4-12
24	b	4-16
25	a	4-17
26	a	4-18
27	c	4-18
28	c	4-19
29	a	4-21
30	d	4-22
31	d	4-25

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Review Exercise, Continued

32	c	5-2
33	c	5-2
34	c	5-5
35	b	R-18
36	d	R-20
37	a	R-20
38	c	R-20
39	c	6-3
40	c	6-3
41	b	6-8/9
42	c	6-11
43	b	6-12