THE RELATIONSHIP BETWEEN REALISM IN AIR FORCE EXERCISES AND COMBAT READINESS

THESIS

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THESIS

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Table of Contents

List of Figures

List of Tables

Abstract

Military leaders stress the need for realistic exercises in training military forces. However, few people have addressed how exercise realism impacts unit readiness. The purpose of this research was to determine the relationship between exercise realism and exercise effectiveness. The Delphi method and expert opinion was used to examine several issues involving realism in Air Force exercises. The current level of exercise realism was examined, and the impact of increasing realism in Air Force exercises was explored. Additionally, several factors that affect realism were identified. These factors were analyzed to determine which factors contributed most significantly to exercise effectiveness and unit combat readiness.

The results indicated that realism is related to the effectiveness of an exercise in preparing forces for combat; several factors that affected realism also significantly impacted unit combat readiness. Understanding the relationship between exercise realism and unit readiness will help Air Force planners conduct more effective and efficient exercises.

THE RELATIONSHIP BETWEEN REALISM IN AIR FORCE EXERCISES AND COMBAT READINESS

I. Introduction

General Issue

The mission of the United States Air Force (USAF) is to defend the United States through control and exploitation of air and space power (25:5). This mission statement, delivered recently by USAF Chief of Staff General Merrill A. McPeak, emphasizes the broad and complex responsibilities of the USAF. To meet this global responsibility, Air Force members must be adequately prepared to perform their unit's wartime mission.

Air Force personnel must receive realistic training that prepares them for combat. Air Force Manual (AFM) 1-1, Volume 1, stresses the need for realistic training:

> Training should be as realistic as possible. Aerospace forces must train as they plan to fight. Exercises must replicate to the extent possible the chaos, stress, intensity, tempo, unpredictability, and violence of war. Further, exercises must include "free-play" scenarios that emphasize innovative problem solving, rapidly changing situations, and degraded capabilities. (7:18)

AFM 1-1, Volume 2, continues by stating that frequent and realistic exercises provide one of the most effective forms of training. Further, the more "true-to-life and stressful

exercises are in peacetime, the better prepared the force will be to survive and win in combat" (8:241).

Many people advocate realistic training and understand its importance in preparing forces for combat. Lieutenant General Michael Nelson, Deputy Chief of Staff, Operations and Plans, Headquarters USAF, wrote the following in an essay about the United States' Persian Gulf War with Iraq:

> Our forces were ready for the conflict in January and February 1991 because of the dollars we spent on training, readiness, and parts in the 1980s. We were ready in January because we made a commitment in the eighties to realistic training. (28:119)

Lieutenant General Charles A. Horner, commander of U.S. Air Forces during the Gulf War, also emphasized the important role that exercises played in the success of that war:

> Annual and biannual exercises such as GALLANT KNIGHT, GALLANT EAGLE, BRIGHT STAR, QUICK FORCE, BLUE FLAG, and RED FLAG paved the way to realistic and pragmatic expectations. As the years passed, we honed our ability to conduct air operations and fight in the desert and grew in our understanding of the uniqueness of our area of responsibility. Deployments in the desert gave us an understanding of the effects of heat, sand and dust on our personnel and equipment and allowed us to make adequate preparations to overcome the elements. (18:2)

The U.S. Central Command (CENTCOM) Exercise Division Director during Operation Desert Shield/Storm (ODS), Colonel Jack A. Klimp, wrote that prior to Desert Shield, exercises were conducted at various times with nine of the nations in the area of responsibility (AOR). The benefits of these experiences were manifested during ODS once the forward headquarters element had deployed. Klimp notes that the

exercises created a large contingent of staff officers who were experienced in the rigors of Middle Eastern desert warfare. These officers had travelled extensively throughout the AOR and were familiar with the region's environment, climate, and infrastructure and how each affected operations. They were also experienced in dealing with AOR military forces, some to the point that they had actually fostered relationships with host-nation officials. Perhaps more critically, they were experienced in joint/combined planning and execution (18:12).

General Carl von Clausewitz is another military leader who recognized the need for realistic training. In his book, On War, he writes that "practice and experience teach a commander what is possible and what is not" (4:20). He later writes that the only "lubricant" which reduces war's friction is combat experience. However, although he asserts that exercises are a poor substitute for the real thing, he concedes that the forces that use this training tool will be far better prepared than forces who practice routine, mechanical drills (4:121-2). Clearly, realistic training is important. For military forces, ignoring realism carries the risk of being unprepared for war.

Background and Problem

The importance of combat readiness has been recognized by military thinkers since antiquity. Almost 5,000 years

ago, the Chinese military philosopher Sun Tzu wrote:

> It is a doctrine of war not to assume the enemy will not come, but rather to rely on one's readiness to meet him; not to presume that he will not attack, but rather to make one's self invincible. (31:114)

Exercises have played a crucial role in attaining and building the competence necessary to conduct successful military operations. The militaries of Germany and Japan used war games to prepare for their aggressive assaults that launched World War II (32:206). The impressive victory at Pearl Harbor and the devastating blitzkrieg of Europe are good examples of battlefield success obtained through effective training. Operation OVERLORD, the D-Day Normandy landing that spearheaded the Allied drive to Berlin, was practiced for nearly two years before execution (32:207).

While the importance of realism in exercises is recognized by military leaders, increases in exercise realism carry a corresponding increase in the cost of conducting exercises. AFM 1-1, Volume 2 states that "exercises consume money, time, and other limited resources" (8:241). Exercises are important, but they must be conducted in a manner that maximizes combat readiness while managing costs.

The Office of the Secretary of Defense (OSD) recently proposed reductions in funding for real-world deployments and field training exercises (FTXs). OSD anticipates that an expansion in the use of command post exercises (CPXs),

computer generated war games, and simulations will make up the shortfall. Recent reductions in military budgets have placed greater emphasis on reducing costs, including those associated with training. Reducing the level of realism in exercises will undoubtedly reduce costs; however, these cost reductions may be at the expense of force readiness (16:32; 17:20).

An examination of U.S. military history clearly indicates the tendency of the nation to drastically reduce military expenditures after every major conflict since the American Revolution. History also demonstrates that this invariably reduces the military's subsequent state of combat readiness--sometimes with disastrous consequences (1:22,26,47). Recent events demonstrate that the end of the Cold War may be no exception.

Increasing public pressure to curtail federal spending has focused attention on reducing military budgets. The challenge for today's military establishment is to absorb these reductions while minimizing the negative impact on readiness. To accomplish reductions in exercise spending while maintaining combat readiness, one must understand exercise realism and combat effectiveness and how these two variables interact.

A tradeoff exists between the level of realism in an exercise and the effectiveness of the exercise in preparing forces for combat; however, the extent, or strength, of this

relationship has not been explored. Military experts agree that training exercises should be realistic (7:18; 28:119). The existing research, however, does not address the perceptions of current levels of realism in exercises and how this realism relates to combat readiness. Must all exercises be as realistic as possible to be effective and improve combat readiness? What elements of realism are crucial to the effectiveness of an exercise, and what elements contribute little or nothing? These relationships are the focus of this research.

Problem Statement

The purpose of this research is to determine the relationship between the level of realism in Air Force exercises and exercise effectiveness. This research examines some of the factors that contribute to exercise realism and how these factors explain the effectiveness of exercises in terms of improved combat readiness.

Investigative Questions

Specific questions to research include the following:

1. What are the perceptions of Air Force members concerning the level of realism in exercises?

2. What are Air Force members' perceptions of the amount of realism and its impact on the effectiveness of an exercise?

3. Are there significant differences in the level of realism utilized in exercises among major commands and management levels?

4. What are some factors that contribute to exercise realism?

5. How do these factors relate to exercise effectiveness and combat readiness?

6. What are some advantages associated with increasing realism in exercises?

7. What are some disadvantages associated with increasing realism in exercises?

Scope

The research objective is to learn as much as possible about the perceptions of realism in Air Force training exercises. The scope is intentionally broad and does not focus on a particular type of exercise or element of the exercise system. Additionally, the research includes data from several major commands, career fields, and management levels to gain an overall perspective of Air Force exercise realism.

Definition of Terms

Several terms must be defined to prevent confusion caused by different meanings. These key terms are operationally defined in the manner they are used in this research.

Combat Readiness. The condition of a unit being ready, in terms of the concept or plan of a particular operation, to carry out the operations required by the mission of that unit (14:360). To avoid redundancy this term is used interchangeably with unit readiness and combat effectiveness.

Exercise Effectiveness. The ability of an exercise to improve the combat readiness of military personnel or units.

Military Exercise. Any activity involving the operation of actual military forces in an artificial or simulated hostile environment (11:9).

Readiness. "The state of preparedness of an individual, force, or organization for carrying out an operation, mission, task, or the like" (14:427).

Realism/Reality. The degree to which a scenario or exercise reflects the actual tasks to be accomplished, conditions, and environment that a unit would likely be confronted with in a contingency or combat situation. Reality consists of numerous physical and psychological elements which include factors such as time, task, place, environment, equipment, knowledge, infrastructure, and human stress and emotion.

Scenario. A scripted play of events, usually in the form of an artificial threat or problem which may jeopardize the accomplishment of the unit's mission.

Summary

The purpose of this research is to explore the relationship between exercise realism and exercise effectiveness. The specific investigative questions will be answered in the following chapters. Chapter II is a review of the existing literature relevant to Air Force training exercises, realism, and combat readiness. Chapter III discusses the specific methodology used for data collection, and Chapter IV presents the analysis of the data. Chapter V reports the results of the analysis and offers recommendations as a result of the research.

II. Discussion of the Literature

General

Most military experts agree that training should be realistic. However, little research has been done that explains how realism in an exercise relates to unit combat readiness. First, this chapter examines the two general categories of military exercises and explores some limitations of the exercises that can reduce their effectiveness. Next, this review examines the existing literature on exercise realism and unit combat readiness. The relationship between realism and readiness is explored and obstacles that may reduce exercise realism are presented.

Types of Exercises

An exercise is "any activity involving the operation of actual military forces in a simulated hostile environment" (5:9). The Conduct of the Persian Gulf Conflict, Final Report to Congress clearly states the purpose of exercises:

> Large scale exercises provide an opportunity to synchronize, maneuver, and support forces in realistic, stressful situations. Short of combat, exercises are the best method to determine training and readiness strengths and weaknesses. (18:46)

The Air Force conducts numerous exercises, each with specific training objectives and rules of engagement; however, all military exercises can be grouped into two main

categories: field training exercises (FTXs) and command post exercises (CPXs). In a FTX, forces, equipment, personnel, and aircraft actually move to some location where the exercise scenario is conducted under simulated wartime conditions. FTXs provide realistic training for United States and allied combat forces and help foster greater cooperation (11:6). An additional benefit of the FTX, when conducted in a foreign nation, is that it enables the United States to establish a presence in that nation without the expense of building and maintaining a full-scale operating base (8:33).

Unlike the FTX, CPXs simulate the movement of forces and equipment and emphasize communication and coordination capabilities between various headquarters and subordinate commands. Large scale CPXs are usually driven by computer databases and are much less expensive to conduct than FTXs. CPXs are growing in importance because of their lower cost and the increasing technology available to produce more complex environments (20:25).

Limitations of FTXs

There are several peacetime limitations that reduce the scope and effectiveness of FTXs. These limitations are due to three main constraints: fiscal, political, and environmental. Field exercises provide good hands-on training opportunities, but the exercises are expensive (13:1). The movement of forces and equipment may account

for up to eighty percent of the total exercise budget (27:5). Because projections for the funding of exercises across Air Force major commands are only seventy to eighty percent of the amount requested, alternative sources of training are beginning to play a more significant role in preparing forces for war (18:33; 20:25). These budget constraints prevent exercise planners and commanders from maximizing the amount of realism in exercises.

Political constraints can also effect FTXs and reduce their level of realism. Many exercises require the involvement of host nations to approve exercise durations, provide support facilities, and select operational areas. Although United States and allied forces benefit by interacting and learning about each other's capabilities, current political sensitivities and international events can limit an exercise's scope and realism. For example, diplomatic landing clearances, overflight restrictions, and host nation holidays can limit the ability of exercise planners to test military capabilities (27:6).

Finally, environmental issues such as noise abatement, agricultural damage, and safety regulations can limit the scheduling, location, and realism of exercises. For example, personnel safety is more critical during peacetime maneuvers than during war when missions typically require troops to put their lives at risk (27:4-6).

Limitations of CPXs

Command post exercises simulate the movement of forces and equipment and are less costly than field exercises. However, CPXs have unique limitations that can reduce their realism. These exercises rely on scenario scripts driven by computer databases. The realism achieved during exercise play is dependent on the quality of the database and the capabilities of the exercise control staff (12:8; 16:1).

Major John L. Krueger, a commander and exercise coordinator in the Exercise and Simulations Division at Fort Riley, Kentucky, highlights the importance of the exercise control staff:

> The personnel who staff the simulation center, whether civilian contractor, government service civilians or military, must be technically competent, highly motivated and aggressively proactive to make the system operate to its fullest potential. A knowledge of current weapon systems, tactics and enemy doctrine, combined with a thorough knowledge of what the simulation can replicate, is necessary for at least one member of the staff. (20:25)

Another limitation of the simulation driven exercise is what Krueger described as exercise "gamesmanship" by commanders. These individuals often overemphasize the tactical and strategic play of such systems; areas the simulation is often not designed to realistically portray.

In their effort to "win," commanders often divide their forces in ways that they would never attempt in the field. This attitude often results in placing the main purpose of simulations, to practice reporting procedures and test communication links, in a secondary role (20:20-4).

Another aspect of CPXs that reduces realism is the level of play. CPXs usually revolve around command and control procedures at the Joint Chiefs of Staff (JCS) and Unified Command level. The information flow typically stops at the major commands and omits participation by unit level commanders. In "Limitations of JCS Exercises," Major Gregg Perry states:

> I believe we give up realism by not completing the flow of information to the unit level command and control agencies. However, exercise planning at the high(er) levels of government takes a lot of time, and until many top level decisions are made, there is little meaningful involvement available at the lower levels. Furthermore, real world commitments may keep the same high level players from participating in these exercises, and we lose more realism. (27:9)

Realism

Several authors have addressed exercise realism in their research. Hagel examined the methods used in conducting Air Force CPXs and the difficulties in achieving realism. He found several factors that made realism in CPXs difficult to achieve. Among the factors limiting exercise realism were the following: too little time to conduct the exercise, lack of enthusiasm among exercise players, lack of sufficient funding, improper planning, inadequate feedback, and the failure of senior leadership to play their proper exercise roles. Through interviews of thirty-three people familiar with CPXs, Hagel concluded that "there is not enough logistics realism in the exercise program, but there is some worthwhile training coming from them" (11:3).

In his thesis, Hall addressed the need for increasing realism within B-52G CPXs. While developing a logistics database to increase realism in these CPXs, he determined that:

> Increasing amounts of artificiality have crept into many exercises, especially in the area of logistics. As a result, even though the exercises are considered successful, they may contribute little to the goal of improving combat effectiveness. (12:2-2)

Thus, although many exercises were completed with positive outcomes, their lack of realism may lead to different results in actual combat.

In 1972, Kestler and Boren measured the attitudes of unit managers toward the Air Force Inspection and Readiness Evaluation Program at two now defunct major commands, the Aerospace Defense Command (ADC) and the Strategic Air Command (SAC). Among the attitudinal factors of interest were responses from unit managers concerning the relevancy of exercise scenarios used under the program, the ability of the program to point out deficiencies critical to mission accomplishment, and the overall effectiveness of the inspection program. Kestler and Boren concluded that the overall program was valuable but noted some weakness in the areas of relevancy and criticality, particularly where administrative matters were concerned. These findings suggest a lack of realistic wartime requirements within the scenarios used in the readiness evaluation program (17:53-7).

Krueger noted that while CPX simulations are being increasingly relied upon as training tools, they are commonly misused. Thus, personnel who participate in CPXs often receive minimal benefit from their use. He notes that while simulations are designed primarily to emphasize communications, unrealistic tactical play on the part of participants often reduces the value of this type of training. Poorly qualified staffs within simulation control centers can also limit the quality of the exercise (20:25).

While this literature sampling on realism is relatively small, the emphasis on the importance of realistic training can not be ignored. The factors that constitute realism remain largely unaddressed by the literature. Hagel vaguely suggests elements of realism in his discussion of obstacles that reduce exercise realism. Of these obstacles, the time available to conduct exercises and the attitudes of participants appear to be the most significant. Kestler and Boren suggest a third component of realism, the task element. An effective exercise or evaluation must include a scenario that requires participants to perform tasks that they would be expected to perform in combat (17:30).

Combat Readiness

In his article, "Leadership--Analysis and Comment," Lieutenant Colonel Herbert F. Harback assesses readiness:

> When is the probability the highest, the risk the greatest that armed conflict will start (sic)? It is when the bad guy believes that he can beat the good guy--when, in the mind of the aggressor it is felt that the other person, nation, Army, or soldiers do not look like they are ready. History (sic) tells us that peace comes through strong deterrence. (13:22)

The literature contains many sources which address strategies for determining the effectiveness of an individual soldier or combat unit. The morale of the individual or unit and the degree of training each received are universal themes of these presentations.

In his study of the combat effectiveness of weapon systems, Koman writes that the primary elements in determining a unit's combat effectiveness are: 1) the quality of the commanders, 2) the will-power, morale and discipline of the unit, 3) the type, quality, and number of arms the unit possesses, 4) the physical conditions of the soldiers, and 5) the training level and combat experience of the unit (19:1). Koman believed that these factors fall under two broader categories: those that are strictly quantifiable and those that can best be described as concepts.

In their contract report, "Identification of Observable Factors Related to Success in Combat or Simulated Combat," Edgarton and Graham explored the differences between successful and unsuccessful infantrymen in combat and simulated combat situations. Although developed as a psychological study of the individual behavior traits which

cause a soldier to be either effective or ineffective, this research yields interesting insights (9:2).

Through their literature review, Edgarton and Graham discovered that "buddy" ranking provided more accurate predictors of combat success of individuals than did ratings by the individuals' superiors. Using questionnaire data from veterans of World War II and the Korean War and soldiers undergoing basic and advanced infantry training, the researchers found that those soldiers rated effective by their peers scored highest in the following four areas: positive reactions under fire, leadership qualities, social responses in terms of cooperation, loyalty, and esprit de corp, and intelligence in terms of knowledge, recognition, and tactical ingenuity (9:9-36). If it can be demonstrated that realistic training develops or strengthens these qualities, then realism can be directly linked to combat effectiveness. This relationship between realistic training and the development of these four areas is indirectly supported by Edgarton and Graham. They show that the longer that individuals are observed under fire, or the more experienced they are, the more likely they are to be described as a successful soldier (9:37).

Campbell et al. conducted a comprehensive study that reviewed various definitions of organizational effectiveness. They described the lack of a central "definition and conceptualization of organizational

effectiveness" and undertook an exhaustive literature search to uncover the principle dimensions and variables of organizational effectiveness (2:xii). Their final product was a catalogue of existing methods to measure effectiveness and a discussion of the strengths and weaknesses of each method. The authors determined that there were two general models under which all approaches to measuring organizational effectiveness fall: the goal centered model and the natural systems model (2:5). Because the goal centered model is more applicable to the military organization and philosophy, only it will be defined here. The goal centered model assumes that:

> the organization is in the hands of a rational set of decision makers who have a set of goals in mind they wish to pursue. Further, these goals are few enough in number to be manageable, and can be defined well enough to be understood. (2:6)

The authors then cite the Operational Research Model as being the most important sub-class of goal centered techniques for measuring operational effectiveness. They also present the research of Hayward who argued that the most feasible approach to predict a unit's combat readiness must include the use of existing data on the unit, theory, and, most importantly, expert judgement (2:31). Because the Delphi technique is a methodology of building a consensus of opinion among experts, Hayward's theory tends to support using a Delphi approach in this research on exercise effectiveness and combat readiness.

Summary

This review presents existing literature that explores exercise realism and combat readiness. Although realism is recognized as being important in training military forces for combat, little information is available that describes how the elements of realism contribute to combat readiness. Clearly, this is an area that requires further research. Chapter III describes the methodology used in determining the relationship between exercise realism and combat readiness.

III. Methodology

Introduction

The Delphi technique was chosen as the methodology to determine the relationship between exercise realism and exercise effectiveness. The Delphi is a technique for building a consensus of opinion among experts in a particular area of interest. The procedure involves three attributes that distinguish the method from other group interaction methods: anonymity, iteration with controller feedback, and statistical group response (24:1). With a Delphi sequence, the group members maintain their anonymity, and group interaction occurs through responses to questionnaires. Several iterations or rounds of the questionnaires are sent to the participants, and summaries of previous responses are included as feedback to help build a consensus among panel members. The Delphi procedure presents a statistical response which includes the opinions of the entire group. This chapter describes the evolution of the Delphi technique, some advantages and disadvantages of Delphi, and how the method was applied in this research.

The Evolution of Delphi

The Delphi concept may be viewed as a spinoff of defense research. "Project Delphi" was the name given to an Air Force-sponsored Rand Corporation study that began in the

1950s. The objective of this study was to estimate, from the Soviet strategic planner's point of view, the effect of atomic bombs on the United States industrial systems complex. The objective of the original study was to "obtain the most reliable consensus of opinion of a group of experts by a series of intensive questionnaires interspersed with controlled feedback" (22:10). The justifications for this original study, the inability to collect accurate data and the subjectiveness of the material, are still valid for many Delphi applications today (22:10).

The Delphi technique did not gain recognition outside the defense community until the 1964 Rand paper, "Report on a Long-Range Forecasting Study," by T. J. Gordon and Olaf Helmer. The study explored the methodological aspects of the technique and formed the foundation for a number of individuals to begin experimentation with Delphi in non-defense areas (22:10). Today, the Delphi technique has become a fundamental tool for those in the area of technological forecasting and is used in many technological corporations. The technique is also used in the classical management science and operations research where there is a need to incorporate more subjective information into evaluation models (22:11).

Delphi Procedure

Figure 1 illustrates the Delphi method in detail. As in most methodologies, the first step is to define the

research problem. Then, the experts are selected and questionnaires are prepared that address the investigative questions introduced for the research. The questionnaires are distributed to the participants, and the responses are analyzed to determine if consensus has been reached. Non-consensus items and opinion data are provided as feedback to the participants in successive rounds of the survey. The rounds continue until a consensus is reached. Final results of the research should be provided to the panel members (30:90).

Advantages of Delphi

One of the advantages of using the Delphi process is reduction of negative effects associated with large group decision making. Round table discussions among experts, with the objective of forming a group position, often lead to a compromise between divergent views. These compromises may result from "persuasion by the member with the greatest authority, unwillingness to abandon publicly expressed opinions, and the bandwagon effect of majority opinion" (15:120). In his research on the Delphi process, Preble found that the method overcomes negative effects of group interaction by providing structured format, systematic feedback, and anonymity (29:75). There are also some disadvantages to using the Delphi technique.

Flowchart of the Typical Delphi Process

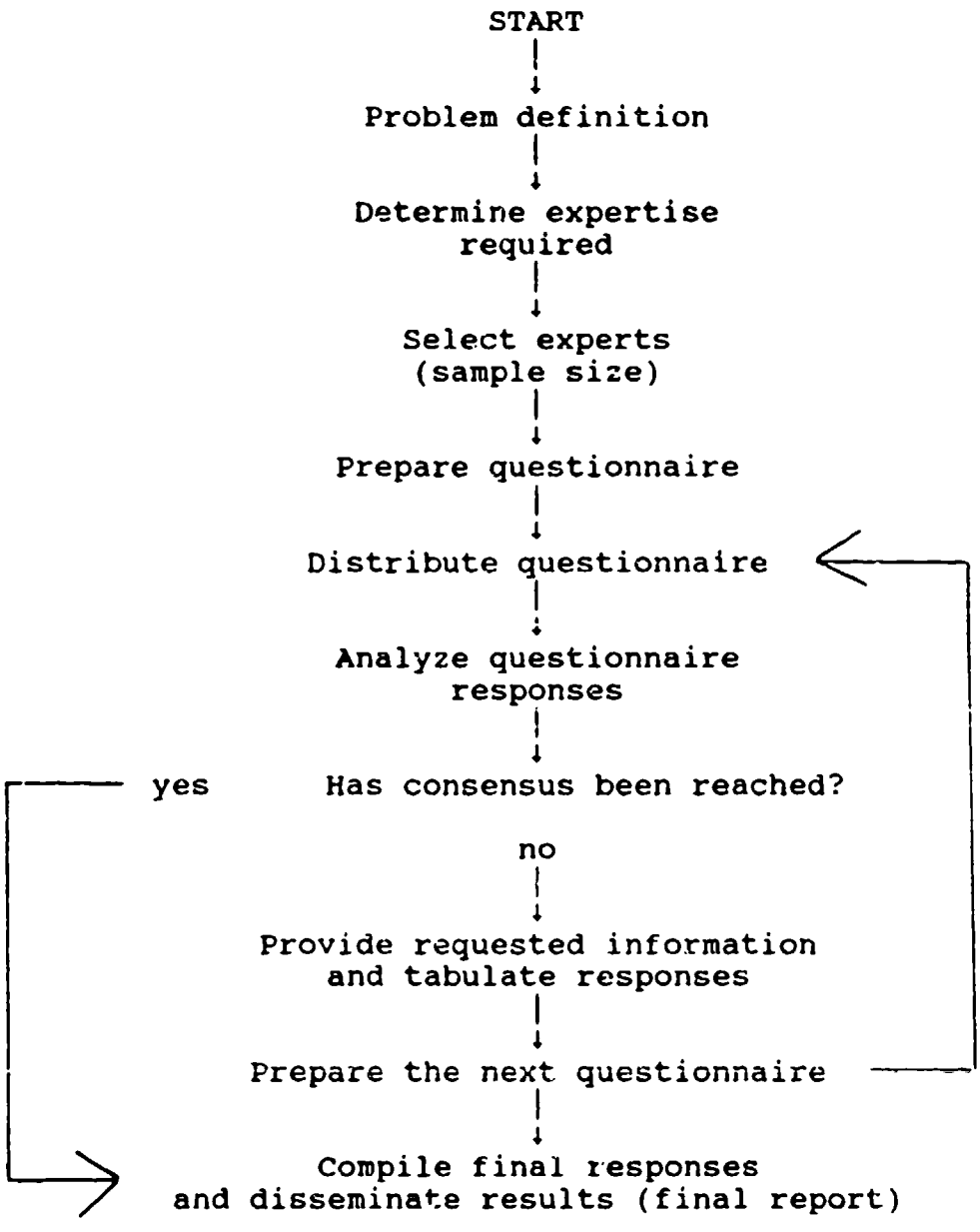

Figure 1. Delphi Process Flowchart (30:80)

Disadvantages of Delphi

One major disadvantage when using the Delphi technique is time. Delphi studies can be extremely time consuming depending on the number of iterations used to develop group consensus and the amount of data that must be collated and distributed to participants in each round. Identifying and contacting the individuals who meet the criteria as an expert in the subject area can also be a time consuming process (19:47).

Justification of the Delphi Method

Anonymity. The Delphi technique eliminates one of the disadvantages of traditional group decision making by allowing participants to change their mind without "publicly admitting it and losing face" (24:20). Some variations of Delphi actually allow participants to interact; however, for this research anonymity was used to eliminate possible influences from status, rank, or job position.

Effectiveness. H. W. Landford cites the effectiveness of the Delphi process:

> The consensus reflects reasoned, self-aware opinions, expressed in the light of the opinions of associated experts. Thus, these predictions should provide sounder basis for long-range decision making than do unarticulated intuitive judgements. (21:22)

Norman C. Dalkey, one of the developers of the Delphi technique, suggests that the Delphi has valuable side products:

> The Delphi procedure is one of the most efficient I know for uncovering the implicit models that lie behind opinions in the "soft" areas. One of the most valuable side-products of a Delphi exercise concerned with strategic bombing was the skeleton of a model which was later fleshed out in detail. (6:9)

Accuracy. Research supports that a group prediction of a panel generally will be superior to those obtained from individual participants. In other words, "two heads are better than one" (26:174). Research on Delphi accuracy by Frederick Parente et al. indicated that "predictions derived from the group were more accurate than those of 95 percent of the individual panelists, but did not exceed in accuracy the best panelists" (26:173).

Reliability. A survey instrument is reliable to the degree that it supplies consistent results (10:185). The Delphi technique is reliable if essentially the same results occur if the forecasting effort is replicated, either by the same director or by another (24:48). Joseph Martino's research on Delphi's reliability concludes:

> ...with a panel of larger than 15, consisting of a cross section of experts in the given field, it is highly unlikely that another equally expert panel will produce a radically different median...forecasts produced by the Delphi procedure are reliable; that is, different panels will tend to produce about the same results. (24:20)

The Delphi technique was used in this research because of the technique's accuracy and reliability. The lack of accurate, quantifiable data concerning exercise realism and the subjective nature of the research area make the Delphi

technique an appropriate methodology for answering the investigative questions discussed in Chapter I.

Delphi Panel Selection

Selecting members of the expert panel is an important step in the Delphi sequence. The panel members must be qualified in the subject area, and the panel must be representative of the research population. Determining who is an expert can be accomplished in several ways, including discrimination through educational credentials or past accomplishments (3:140). For this research, an expert is defined as one who has at least four years experience in an Air Force job involving mobility, exercise plans, or another exercise-related career field. All experts selected for the panel exceeded this criteria, and the panel's average work experience exceeded ten years.

The research objective is to gain a macro view of the relationship between exercise realism and exercise effectiveness. Thus, to be representative of the Air Force, the panel must represent several career fields, management levels, and major commands. With the help of planners at Headquarters USAF, twenty-four individuals were contacted and asked to participate in the research. Figure 2 lists the current or previous job experience of each panel member and their current management level. The experts were chosen from the following major commands: Air Mobility Command

(AMC), Air Combat Command (ACC), and Air Force Special Operations Command (AFSOC). Panel members were also selected from Headquarters USAF. Appendix A contains a list of all questionnaire recipients.

Job Title/Experience	Management Level	Number
Exercise Evaluation Team	Wing	1
Inspector General	HQ USAF/MAJCOM	4
Operations Planner	HQ USAF/MAJCOM/Wing	7
Security Police	HQ USAF/MAJCOM/Wing	3
Services	MAJCOM/Wing	2
Logistics Planner	HQ USAF/MAJCOM/Wing	7
		24

Figure 2. Distribution of Delphi Panel Members

Definition of Consensus

Consensus refers to the general level of agreement within the expert panel and has been defined in previous Delphi studies as having at least two-thirds of the respondents in agreement (5:52; 3:146-147). Therefore, consensus is defined in this study as 66.7 percent or higher agreement. This level is somewhat arbitrary, but it is high enough to be considered a general agreement.

Number of Rounds

There is no clear answer to the number of iterations that should be performed using the Delphi process. The general finding is that "by the end of four rounds, the panel has reached as much agreement as it is ever going to reach" (24:27). Martino continues by stating that two rounds may clarify the issues even if full agreement is not reached by the panel. He also states that a good rule of thumb is three rounds. For this study, consensus among experts was obtained after two rounds; thus, additional iterations were not required.

Questionnaire Construction

The Delphi participants were mailed a series of questionnaires. Three types of questions were used to collect target data. They were either open-ended, based on a Likert scale, or based on a ranking of options. The

open-ended questions were used in the first Delphi round to gain information on levels of realism and the relationship between realism and combat readiness. The open-ended format was useful because prior knowledge of possible responses to some questions was unknown. This format also allowed for capture of more opinion data from the participants.

The second questionnaire was a reiteration of the first questionnaire and used Likert Scale questions to develop panel consensus. The questionnaire was constructed and sent to those experts who responded to the first questionnaire. Summary statistics of responses from the first questionnaire were included as feedback for the experts. This was done in an attempt to achieve a higher level of consensus by exposing respondents to the opinions of other experts. The full text of both questionnaires is contained in Appendix B.

Reliability

The reliability of an instrument is the degree that it supplies consistent results (10:187). For this research, reliability is determined primarily by observing the internal consistency of answers in the survey. Each investigative question was addressed by two distinct questions. If the survey instrument is reliable, an individual expert's response to these two questions should be similar. The reliability can be measured by the correlations between the answers to the two questions.

Validity

Validity is the "extent to which a test measures what we actually wish to measure" (10:180). To improve validity, questionnaires were pretested on five AFIT graduate students who had previous experience as a mobility officer or exercise planner. The students were asked to evaluate the questions in terms of clarity, logic, and readability. Their feedback was used in the design of the questionnaires.

Likert Scale

Questions using a Likert scale were designed to measure a range of opinion on a specific question. Depending on the questions, two variations of the Likert Scale were used. Figure 3 shows these two options (5:47).

Likert Scales used in the Questionnaire

a.	b.	c.	d.	e.
Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
a.	b.	c.	d.	e.
Very Low	Low	Neither High Nor Low	High	Very High

Figure 3. Likert Scales Used in the Questionnaires

The advantage of using the Likert Scale is that the difference in qualitative responses can be quantified (6:220). Mean responses to each question were computed and group consensus was determined by the percent agreement on a Likert scale response. Individual responses of "highly agree" and "agree" were grouped as were "highly disagree" and "disagree". This provided a measure of general agreement or disagreement among the experts and increased the probability of panel consensus.

Some questions required respondents to rank order factors that affect exercise realism. To obtain the overall ranking for a particular response, the frequency of each response and the average ranking for the response among all panel members was calculated. The product of these numbers was multiplied by a weighting factor to obtain the overall ranking for the response. Figure 4 depicts the weighted ranking system. This scale was used because it ensured that the factors ranked higher by panel members were given the greatest weight. Additionally, this system accounts for those responses that received low rankings by panel members yet were listed by several respondents. None [illegible]e experts responded with more than eight factors.

Weighted Ranking System

Average Ranking	Weighted Scale
1st	1.00
2nd	0.875
3rd	0.750
4th	0.625
5th	0.50
6th	0.375
7th	0.250
8th	0.175

Figure 4. Weighted Ranking System

Summary

The Delphi technique is a set of procedures used to gather a consensus of expert opinion. The first part of this chapter described the evolution of the Delphi process, some of the advantages and disadvantages of the technique, and the justification for using Delphi in this research.

The remaining part of the chapter outlined the Delphi panel selection process and the issues involved in constructing and administering the questionnaires. Chapter IV explains how the data from the Delphi surveys were analyzed and used to answer the investigative questions introduced in Chapter I.

IV. Results and Analysis

The purpose of this research was to determine the relationship between exercise realism and exercise effectiveness. The Delphi method was used to determine the current levels of exercise realism, the factors that affect realism, and how these factors impact unit combat readiness. This chapter analyzes the questionnaire data submitted by the Delphi panel experts. Survey results from rounds one and two of the Delphi sequence are analyzed and discussed.

As defined in Chapter III, consensus is achieved with a 66.7 percent or higher agreement on a response. For Likert scale questions, any agreement of 66.7 percent or higher on one side of the agree/disagree axis is considered a consensus. The complete set of survey responses is included in Appendix C.

The First Survey

The first round questionnaire (Appendix B) was sent to 24 experts. The response rate was 83.3% with 20 of 24 panelists participating in the survey. The survey contained several open-ended and Likert scale questions that addressed the investigative questions introduced in Chapter I. Several questions, such as those concerning factors that impact exercise realism, were exploratory in nature. These questions were required so an accurate list of factors could

be established and presented to the panelists in the second round of the Delphi process. Consensus among the experts was not achieved for several first round questions. Analysis of responses from these questions was useful in developing the second survey.

The first survey addressed six general areas: background data on the experts, current levels of exercise realism, exercise realism and combat readiness, factors that affect realism, factors that affect combat readiness, and advantages and disadvantages of increasing exercise realism.

Background Data. The first four questions on the survey were background questions and addressed the expertise of the panel members. Question #2 requested the panelists' number of years of work experience involving military exercises. The results are shown in Table 1. The mean of 3.45 indicates that the average work experience of the experts was between 10 and 12 years. None of the experts had less than six years of experience. Thus, according to the criteria established in Chapter III, all twenty panelists qualified as experts for this Delphi study. The data on operational experience was additional verification of the qualifications of the Delphi participants. Seventeen of the twenty panelists (85%) had participated in at least one operational mission. For the group of experts with

operational experience, the average number of missions they had participated in was 5.8.

Table 1

Delphi Panel Background Data
(Delphi Round One)

1. Years of Work Experience

Response (years)	Frequency	Mean
2-6	0	3.45
6-10	3	
10-12	5	
>12	12	

2. Participation in Operational Missions

Response		Percent participating	Number of missions	
Yes	17	85% (17/20)	Min	1
No	3		Max	25
			Mean	5.8

Levels of Realism. Several questions were designed to determine the current level of realism in Air Force exercises. Question #5 asked panelists to rate the general level of exercise realism. The Likert scale responses are shown in Table 2.

Table 2

Responses to Question #5
(Delphi Round One)

Topic	Frequencies 1	2	3	4	5	Mean	Consensus
Current level of realism	0	6	8	6	0	3.0	No

Legend for Frequencies

1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

Because there was not 66.7% or higher agreement on a response, there was not a consensus among the experts concerning current levels of realism. Most panelists believed that exercises were neither realistic nor unrealistic (40%).

One of the objectives of this research was to determine if a difference in realism existed among major commands and management levels. Questions #6 and #7 were designed to explore these issues. The experts were asked to list the major commands to which they had been assigned and to identify which command, if any, conducted the most realistic exercises.

The summary of responses is shown in Table 3. The experts were grouped according to their major command and management level to highlight particular variances in responses. The "Number in Group" column shows the number of experts in a particular "Group." The "Responses" indicate the number of experts who voted for a major command as conducting the most realistic exercises. Some experts listed more than one major command if they believed the commands conducted more realistic exercises than other commands but were equal to each other. Table 4 indicates the number of responses for each command when grouping the experts by management level.

Table 3

Responses to Question #7 (Delphi Round One)

Group	Number in Group	Responses				
MAJCOM		ACC	AFSOC	AMC	PACAF	USAFE
ACC Wing	3*	2				
ACC MAJCOM	4*	2		1		
AFSOC Wing	1		1			
AFSOC MAJCOM	3		3			
AMC Wing	3		1	1	1	
AMC MAJCOM	3*	1		1		
HQ USAF	3	1			3	1

* indicates one expert in the group did not respond or did not indicate a difference in realism among major commands.

Table 4

Total Responses by Management Level

Management Level	Total Experts	Responses				
		ACC	AFSOC	AMC	PACAF	USAFE
Wing	7	2	2	1	1	
MAJCOM	10	3	3	2		
HQ USAF	3	1			3	1
TOTAL	20	6	5	3	4	1

Of those experts who belonged to a major command, 10 of 17 voted for the command to which they are currently assigned. This phenomena was most pronounced among AFSOC members where 100% (4 of 4) believed AFSOC conducted the most realistic exercises. 57% (4 of 7) of ACC members voted for their major command and only 33% (2 of 6) of members assigned to AMC believed AMC conducted the most realistic exercises. All panelists from HQ USAF believed PACAF conducted the most realistic exercises (3 of 3) although one believed the exercises conducted by USAFE and CENTAF (a Numbered Air Force under ACC) were equally realistic.

There was no apparent difference of opinion among MAJCOM and wing staff experts. In fact, the groupings closely paralleled each other. Two of three ACC wing members believed ACC conducted the most realistic exercises,

and two of four experts from HQ ACC expressed the same belief. Of the AMC wing experts, one of three believed AMC was the most realistic. This same distribution occurred among AMC major command experts.

Applying an arbitrary scaling technique based on the experts' depth (years of exercise experience) and breadth (number of commands served in) of experience is one method to analyze the differences between the ratings of the major commands. This technique was applied to each expert's vote to obtain an average rating for each major command. The explanation of the scaling technique and its application is shown in Appendix D. A summary of the average ratings for each major command is shown in Table 5.

Table 5

Ratings of Exercise Realism Among Major Commands

MAJCOM	AVERAGE RATING
ACC	.848
PACAF	.834
AFSOC	.763
USAFE	.750
AMC	.723

The limitation of this type of ranking is obvious. Because the distribution of factors is arbitrary, the resultant ranks are subjective. Using a different distribution of factors could yield very different results. Nevertheless, it is interesting to note that the major command which received the least amount of support from its own members ranks near the bottom in this design.

The relatively low ranking of AFSOC can be explained because AFSOC expert representation is lowest among the major commands. Further, AFSOC members were characterized by a relatively low breadth of experience factor. This, along with the fact that very few of the other experts had any AFSOC experience, tended to lower the value of the AFSOC ranking.

Exercise Realism and Combat Readiness. The majority of questions on the first survey were designed to determine the factors that affect exercise realism and to analyze how these factors contribute to unit combat readiness. Question #8 addressed whether an exercise must be realistic in order to be effective. In other words, must an exercise be realistic to improve the readiness of combat units? The responses are shown in Table 6.

Table 6

Responses to Question #8
(Delphi Round One)

Topic	Frequencies 1	2	3	4	5	Mean	Consensus
Exercise Effectiveness	0	3	0	6	11	4.25	Yes (85%)

Legend for Frequencies

1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

Consensus was reached on this question. 85.0% of the respondents agreed or strongly agreed that an exercise must be realistic to be effective.

Factors Affecting Realism. Question #9 was an open-ended question that asked the experts to list and rank at least three factors that affect the amount of realism in an exercise. There were a variety of responses to this question and, as expected, no consensus was reached among the panel members. Twenty different factors were listed by the experts. The weighted ranking scale was applied as described in Chapter III to determine an overall ranking for

each factor. Table 7 summarizes the results of the analysis. The factors receiving the highest overall score are listed first. Appendix D (Table 16) illustrates how the score for each factor was computed.

Table 7

Factors Affecting Realism
(Delphi Round One)

1.	Availability of personnel (proper force mix)
2.	Exercise location (weather, terrain, off-base location)
3.	Scenario development (realistic threat)
4.	Funding
5.	Availability of airlift resources
6.	Time
7.	Availability of Base Operating Support (BOS) equipment
8.	Number of simulations/assumptions
9.	Enthusiasm/attitude of participants
10.	Airspace limitations/availability of training areas
11.	Senior leadership involvement/emphasis
12.	Other Wing priorities (day-to-day activities, operational missions)
13.	Exercise size
14.	Environmental factors (noise, local community restrictions)
15.	Safety concerns/restrictions
16.	Difficulties in deploying as a whole unit
17.	Excessive management control preventing free-play exercise
18.	Pre-exercise planning
19.	Reluctance to allow "operations" to fail due to support function shortfalls
20.	Lack of training in re-deployment procedures

Using this ranking system, the five most important factors that impact realism are: availability of personnel, exercise location, scenario development, funding, and availability of airlift resources. The complete list of factors was used in the second round survey so panelists could rate the importance of factors listed by other experts.

Factors Affecting Combat Readiness. Question #10 was similar to the previous question, but it was designed to determine how the factors contributed to an exercise's effectiveness. The experts were asked to use their list of factors submitted in question #8 and to rank the factors that are most important to an exercises's effectiveness. In other words, which factors are necessary to ensure that an exercise improves combat readiness. As in question #9, several different factors were submitted. The weighted ranking system was applied to obtain an overall score for each factor. Appendix D (Table 17) contains the list of factors and computation of scores. Table 8 summarizes the analysis.

Table 8

Factors Most Important to Combat Readiness
(Delphi Round One)

1.	Exercise location (weather, terrain, off-base)
2.	Availability of Personnel(proper force mix, host nation participation)
3.	Number of simulations/assumptions
4.	Funding
5.	Scenario development (proper exercise objective/realistic threat)
6.	Airspace limitations/availability of training areas
7.	Availability of Base Operating Support (BOS) equipment
8.	Availability of airlift resources
9.	Senior leadership involvement/emphasis
10.	Enthusiasm/attitude of participants
11.	Exercise size
12.	Reluctance to allow "operations" to fail due to "support" function shortfalls

The five factors most important in improving combat readiness were location, availability of personnel, number of simulations/assumptions, funding, and scenario development. Four of the five factors were included in the top five factors that affect exercise realism. These factors were used in the second survey in an attempt to develop a consensus opinion among the panelists.

Advantages and Disadvantages of Realistic Exercises. Questions #11 and #12 asked the experts to provide some advantages and disadvantages of increasing realism in exercises. The list of all advantages and disadvantages

submitted by the experts is shown in Figure 5. Most panelists listed only one advantage and disadvantage, and none of the experts listed all of them. Thus, to determine if a consensus can be reached on the advantages and disadvantages of increasing exercise realism, the experts were asked to respond to the complete lists on the second survey.

Advantages:

1. Improved unit readiness (cohesion, confidence, adaptability)
2. Useful in identifying weaknesses in current training and doctrine
3. Effective assessment of equipment capabilities
4. Improved decision making and innovative thinking

Disadvantages:

1. Increased cost (longer exercises and increased use of resources)
2. Increased safety mishaps (equipment and personnel loss)
3. Increased hardships on families
4. Disruption of peacetime missions.

Figure 5. Advantages and Disadvantages of Increasing Exercise Realism

The final question on the first questionnaire was designed to explore the benefits of increasing realism in exercises. The experts were asked if a point exists where increasing realism fails to provide any additional benefits.

Consensus was reached on this question with 70% of the panelists agreeing that there is a point beyond which little can be gained by continuing to increase realism. Comments included responses such as "once an understanding of key elements in the task is achieved, diminishing returns apply." However, 30% of the panelists believed that increases in realism are always beneficial. A representative response of this group is "an exercise that is not as realistic as it could be seems illogical" and "increasing realism in an exercise will make the exercise more like a combat situation and improve combat readiness."

Table 9

Responses to Question #8
(Delphi Round One)

Topic	Frequencies 1	2	Mean	Consensus
Benefits of increased realism	14	6	1.3	Yes (70%)

Legend for Frequencies

1 = Yes
2 = No

The Second Survey

The second round questionnaire (Appendix B) was sent to the 20 experts who responded to round one. The response rate was 70% with 14 of 20 panelists participating in the survey. The lower response rate resulted from early retirements and extended deployments of some of the experts. The survey addressed areas from the first questionnaire where the panelists did not reach consensus. The following areas were addressed: factors affecting realism, factors affecting combat readiness, current levels of realism, and advantages and disadvantages of increasing exercise realism.

Factors Affecting Realism. The first survey asked panelists to list and rank factors that significantly affect exercise realism. This list of 20 different factors submitted by the experts was used in question #4 of the second survey. Using a Likert scale, the experts were asked to indicate the extent to which they agreed that each factor was important to exercise realism. Thus, all the experts responded to the overall list of factors generated from the first survey. Table 18 of Appendix D shows the mean Likert responses for the factors.

To develop a list of factors considered most important in contributing to exercise realism, the results from both Delphi rounds were combined. An arbitrary selection procedure was used. The following criteria were used to select the most significant factors affecting realism:

an overall score of at least 10.0 from analysis of first round data (Table 16) and a mean Likert response of at least 4.0 from second round analysis (Table 18). The results are shown below in Table 10.

Although this selection technique is arbitrary, it considers the rankings submitted by the experts from the first survey and it also considers the consensus among panel members concerning a factor's importance. A larger number of factors could have been selected, but the intent was to focus on the factors that appear to be the most significant. Thus, the selection criteria attempted to group the factors that received high scores from both surveys.

Table 10

Factors Affecting Realism
(Delphi Round Two)

1. Availability of personnel
2. Scenario development
3. Funding
4. Time
5. Availability of airlift
6. Availability of Base Operating Support (BOS) equipment

Factors Affecting Combat Readiness. Question #5 was similar to question #4, but it addressed the 12 factors affecting combat readiness generated from the first survey. The experts used a Likert scale to indicate the extent to

which they agreed that each factor impacts unit combat readiness. The mean Likert responses for each factor are shown in Appendix D (Table 19).

The procedure used to identify significant factors affecting realism was also used for the factors that impact combat readiness. In this case, the criteria used to select factors were an overall score of at least 2.0 (from survey one, Table 17) and a mean Likert response of at least 4.0 (from survey two, Table 19). Table 11 shows the list of factors that meet this criteria. More factors were included in this list than in Table 10 because there was not an obvious separation among overall scores of factors from the round one analysis. Thus, a low overall score (2.0) was used as the cutoff to ensure that important factors were not omitted.

Table 11

Factors Affecting Combat Readiness
(Delphi Round Two)

1. Exercise location
2. Availability of personnel
3. Number of simulations/assumptions
4. Funding
5. Scenario development
6. Airspace limitations/availability of training areas
7. Availability of airlift
8. Senior leadership involvement/emphasis

Current Levels of Realism. A consensus was not reached on round one concerning the current level of exercise realism. The mean Likert response was about 3.0 indicating that the experts believed that exercises were neither realistic nor unrealistic. Thus, this subject was addressed in round two. Question #2 of the second survey asked the experts if the current level of realism in exercises is adequate. As shown in Table 12, over 85% of the panelists disagreed that Air Force exercises contained adequate levels of realism. Thus, although experts did not reach consensus on the current level of exercise realism, most agreed that the current level is not adequate.

Table 12

Responses to Question #2
(Delphi Round Two)

Topic	Frequencies 1	2	3	4	5	Mean	Consensus
Current Level of Realism	2	10	0	2	0	2.14	Yes (85.7%)

Legend for Frequencies

1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

Advantages and Disadvantages of Increasing Realism.

Question #3 asked the experts to respond to the list of advantages and disadvantages developed from the first survey responses. A Likert scale was used to determine the extent that the experts agreed with each list. Tables 13 and 14 summarize the responses. The experts reached consensus concerning both lists, but they were in less agreement with the disadvantages. Some experts wrote comments suggesting that some of the disadvantages apply to field exercises but could be reduced with command post exercises.

Table 13

Responses to Question #3
(Delphi Round Two)

Topic	Frequencies 1	2	3	4	5	Mean	Consensus
Advantages of Increasing Realism	0	0	0	5	9	4.64	Yes (100%)

Legend for Frequencies

1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

Responses to Question #3
(Delphi Round Two)

Topic	Frequencies 1	2	3	4	5	Mean	Consensus
Disadvantages of Increasing Realism	0	4	0	8	2	3.57	Yes (71.4%)

Legend for Frequencies

1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

Summary

This chapter described how the data received from the Delphi panelists were analyzed. Two rounds of surveys were used to gather data that addressed the investigative questions introduced in Chapter I. The first survey explored the factors that impact exercise realism, factors that impact combat readiness, and the differences in exercise realism among major commands and management levels. Data was also collected to examine some advantages and disadvantages of increasing exercise realism.

The second survey was a reiteration of the first round but attempted to build consensus among panel members. The

survey addressed current levels of realism, factors affecting realism, factors impacting combat readiness, and the advantages and disadvantages of increasing realism. Consensus was reached on all questions. Chapter V discusses the results of the analysis in terms of the investigative questions and presents research conclusions and recommendations.

General

This research was designed to explore the relationship between realism in Air Force exercises and exercise effectiveness. Experts from several career fields and management levels provided data that helped explain how exercise realism contributes to unit combat readiness. The following specific issues were analyzed: current levels of exercise realism, factors that impact realism and combat readiness, and the advantages and disadvantages of increasing exercise realism.

The existing literature on realism contains several sources that emphasize the importance of realism in training forces for combat. However, the literature also indicates that little research has been accomplished that specifically addresses the relationship between exercise realism and exercise effectiveness.

The Delphi Method was selected as the methodology to solicit expert opinion and to generate data on exercise realism. The success of a qualitative approach of this type depends on the participation of the subject matter experts. The experts' enthusiasm and persistence were indicative of their interest in discussing issues involving Air Force training exercises.

This chapter presents a discussion of the findings resulting from this research and explores the investigative questions that were introduced in Chapter I. Although the authors have tried to accurately reflect only those views of the expert panel, some conclusions may reflect the authors' bias from their experiences through participation in numerous operational missions, readiness exercises, and deployments. Each of the investigative questions are addressed under the appropriate heading.

Perceptions on Realism

As described in Chapter II, several military leaders have emphasized the need for realism in training combat forces; however, the existing literature on exercise realism fails to demonstrate how realism affects combat readiness and exercise effectiveness. In their research on the performance of infantry soldiers, Edgarton and Graham only indirectly linked training realism to combat effectiveness. For this research on Air Force exercises, the Delphi experts suggest a strong relationship between exercise realism and training effectiveness. The experts reached a high level of consensus on this issue with 85 percent of the panelists agreeing that exercises must be realistic to be effective. However, some panelists disagreed with the concept that effective exercises require complete realism to be effective. The benefits achieved through exercises depend

on the specific training objectives and the experience level of participants. For example, some combat skills can be improved in a very controlled exercise that eliminates the chaos and confusion that occurs in a highly realistic training environment.

While the experts agreed that realism is important in developing exercise effectiveness, they did not reach consensus on the current level of realism in Air Force exercises. Some experts believed that exercise realism was too low, and an equal number believed that exercise realism was too high. The most common response among the experts was that realism is neither too high nor too low. The experts' ambivalence toward this subject suggests that current exercises are not as realistic or effective as they could be.

Although the experts could not agree on the current level of realism, they strongly agreed (85% consensus) that Air Force exercises did not contain adequate levels of realism. Thus, whatever the current level of exercise realism, it is not enough to optimize training. Surprisingly, the experts' responses regarding current levels of realism did not vary according to their career field, management level, or major command. Inadequate funding for exercises is a common theme in both the literature and the experts' responses and may account for the general agreement among panelists that exercise realism

is inadequate. Other factors, though, may certainly contribute to this problem.

While the level of exercise realism is clearly important in creating effective training, the experts agreed that the law of diminishing returns applies. In other words, a point exists at which increasing realism fails to contribute to training effectiveness. In fact, increased realism may actually detract from the overall effectiveness of an exercise. For example, removing simulated casualties from participation in an exercise may simulate realistic conditions, but this practice eliminates any additional training the "casualties" may have gained. Other disadvantages associated with increasing exercise realism, such as the increased risk of mishaps, are addressed later in the chapter.

Levels of Realism Among MAJCOMs

One of this research's investigative questions addressed the differences in realism among Air Force major commands. The data analysis of the first Delphi survey resulted in the following ranking of MAJCOMs (MAJCOM with the most realistic exercises listed first): Air Combat Command (ACC), Pacific Air Forces (PACAF), Air Force Special Operations Command (AFSOC), United States Air Forces in Europe (USAFE), and Air Mobility Command (AMC). The experts from the Air Staff universally selected PACAF as the command

that conducted the most realistic exercises. Many experts suggested that the scope and effectiveness of the USAFE and AMC exercise programs have been reduced because of funding requirements for real world missions. AFSOC's ranking was artificially lowered due to the arbitrary weighting factors used in ranking the MAJCOMs (Appendix D).

The methodology used to rank the MAJCOMs appears valid. However, it is difficult to compare MAJCOMs on the macro-exercise program level, and the resulting information is not particularly useful. As one expert responded, "Comparisons are invalid; it's comparing apples and oranges. Each command focuses on aspects important to its particular mission." Perhaps future research can use this methodology to examine the satisfaction level among the various functional areas of the different MAJCOMs. The information obtained from this type of approach would be specific enough to support detailed recommendations.

The Components of Realism

A primary objective of this research was to identify factors that significantly affect exercise realism. The analysis of the data supplied by the Delphi experts resulted in the following six factors (highest ranked factor listed first): the availability of personnel for exercise participation, scenario development, funding for exercises, time, the availability of airlift, and the availability of

base operating support (BOS) equipment. Each of these factors represents a resource constraint that can limit exercise realism. Surprisingly, location, while mentioned repeatedly by the experts, did not score high enough to appear in the final list. This suggests that the experts place a greater importance on procedural and task-oriented concerns. In other words, the experts believe that how tasks are done is more important than where they are done.

These six factors, or constraints, are not mutually exclusive and interact in affecting exercise realism. These relationships are illustrated in the survey responses. For example, according to various experts' opinions, the removal of constraints on personnel availability allows exercise planners to develop more complete and realistic exercise scenarios. Exercises that follow true Joint Operational Planning and Execution System (JOPES) planning procedures permit a more realistic information and tasking flow and more closely create the "fog of war." Additionally, realistic scenarios allow managers to identify shortfalls in communications systems. Simulated airlift activities prevent training in aircraft loading and result in other simulations that further reduce exercise quality. Aircraft availability also indirectly addresses the ability to move and operate in a location other than the home base. The time available to conduct exercises is certainly related to other constraints. Lack of time may prevent the

realistic use of personnel and equipment resources. For example, personnel and equipment mobility processing is often unrealistically simulated or modified to meet exercise time schedules.

Obviously, proper funding is crucial to the removal or lessening of the previously mentioned constraints; however, funding was not the most important factor affecting realism. This situation indicates that some actions, apart from fiscal constraints, might be taken to facilitate more realistic training. If the current trend in reducing exercise budgets continues, funding will become an increasingly important constraint to increased exercise realism.

The Components of Effectiveness

The analysis described in Chapter IV showed that eight factors significantly impact exercise effectiveness. The factors, in rank order, are a follows: exercise location, availability of personnel, number of simulations and assumptions, funding, scenario development, airspace limitations, availability of airlift, and senior leadership involvement.

Exercise location was ranked as the most significant factor in developing exercises effectiveness. This result may have occurred because deploying and operating from a location other than the home base eliminates many of the

other constraints important to achieving effectiveness. Operating from a deployed training site forces participants to function in an unfamiliar environment. This new environment may require units to adapt to a different terrain, climate, and infrastructure. As one survey respondent put it, "Deployments take away the home court advantage."

Some experts commented that the most effective and realistic exercises involve deployments to an Area of Responsibility (AOR) where operational missions are being conducted. However, other experts suggested that units can gain important benefits by simply moving and operating from any site removed from their home base. The movement to an off-base location reduces the number of simulations and assumptions that are normally made during an exercise. For example, units can not simulate the facilities and equipment required to perform the exercise mission when operating from a deployed location. Off-base exercises have other benefits. Exercise participants will not return to the comfort of home and family at the end of their "contingency" shift. These additional hardships introduced by operating away from home build unit cohesiveness and confidence and prevent participants from developing unrealistic expectations of their combat operations. Additionally, the challenges units face in operating from deployed locations help them identify problems with equipment or procedures.

Obviously, real world commitments and funding constraints limit the number of deployments in which units can participate. When exercising at the home location is the only viable alternative, exercise planners should limit the number of simulations used during an exercise. When possible, facilities, communications, and working and living conditions should replicate those that would be used in a deployed location. Minimizing simulations forces individuals to operate in the unpredictable and unfamiliar environment that is encountered in combat. Of course, all assumptions can not be eliminated during exercises, but commanders should be aware of how their assumptions and simulations can impact exercise effectiveness. As one expert responded, "You can't make assumptions during war."

Finally, senior leadership involvement is important to an exercise's ability to improve readiness. Senior leaders must emphasize the importance of realistic training and ensure that other unit activities do not reduce an exercise's priority or access to resources. Unfortunately, many commanders are evaluated on their unit's performance during operational readiness inspections (ORIs). Thus, unit exercises tend to focus on the areas identified as important by ORI inspection teams. Given the funding constraints imposed on commanders, they will practice and train in preparation for inspections rather than developing and practicing other challenging scenarios. Commanders have

little incentive to provide time and resources for risky, free-wheeling exercises in which the possibility of failure is high.

The turbulence in the world economic and political environment since the end of the Cold War has increased the possibility of military taskings to unexpected locations. To adequately prepare forces to perform these new missions, senior military leaders should encourage commanders to conduct challenging exercises. Several procedures could be used to increase an exercise's ability to improve unit flexibility and adaptability. For example, exercises can be conducted that require units to use unsophisticated communications or to shift to different exercise facilities. One expert suggested that exercises would be more effective if commanders allowed operations to fail due to logistics shortfalls rather than manipulating exercises to ensure "success." Incorporation of these practices into exercises will better prepare the Air Force for the challenges of the future.

Airspace limitations and the availability of suitable flight training areas limit the realism that flyers receive during training. Live fire training, low level flying, and other maneuvers are important elements in developing an aircrew's tactical repertoire. These limitations must be addressed when developing exercise plans.

The time available to conduct an exercise, while important in creating realism, has little impact on an exercise's effectiveness. In fact, the artif cial compression of events can increase exercise effectiveness. This "time crunch" helps develop the stressful environment similar to that experienced in an actual contingency.

Advantages and Disadvantages of Increasing Realism

The Delphi experts agreed that more realistic training exercises result in a more effective fighting force. Realistic exercises have several advantages. Units gain a better understanding of their capabilities and can identify their weaknesses in current training practices and doctrine. Realistic and challenging exercises encourage innovative decision making and help inexperienced personnel develop leadership skills. Most importantly, increasing realism improves unit readiness by creating the environment that will most likely be encountered in war. Units develop confidence and cohesion as they learn to adapt to new situations and to solve unfamiliar problems.

Some disadvantages are also associated with increased exercise realism. Increasing realism often requires spending more money; a difficult proposition in this time of dwindling defense budgets. Increasing realism requires that more time be devoted to exercise planning and demands

more time from senior leadership. Also, if troops are billeted away from families to simulate realistic conditions, personal hardships and morale problems may be experienced. Unit morale and confidence may suffer if units fail to overcome the more difficult obstacles created by realistic exercises. Finally, the likelihood of accidents increases with greater realism.

Building a higher degree of realism into exercises requires the development of accurate scenarios, but this effort is wasted unless the scenarios are updated frequently. Real world operations are unique, and it is impossible to build a single, standard contingency mold that can be used to develop exercises that are effective for all scenarios. It would be a mistake, for instance, to pattern every exercise after the Desert Shield/Storm experience. Lessons learned are important, but that war, like all others that preceded it, has already been fought and will not likely be repeated.

Another danger in increasing realism in exercises is the tendency to suboptimize certain areas at the expense of others. If an exercise realistically focuses on logistics shortfalls at the expense of operations, important lessons can be learned, but a valuable training opportunity for aircrews may be wasted. This, again, supports the argument for varied scenario development.

Conclusion

This research does not address all issues involving realism in Air Force exercises. One of the objectives of this effort is to generate more research and dialogue concerning how the Air Force prepares for combat. Military experts should stress that exercises should not be planned to maximize realism but should be planned and conducted so they are as productive as possible. Realism for the sake of realism is not the goal. Exercises should be designed so they are as effective as possible.

While the factors discussed in this research may be too broad to be readily understood and applied to specific scenarios, they should form the foundation for further research. Perhaps this limited discussion will encourage others to analyze the significant issues involving exercise realism and effectiveness. For example, how important is realism in different types of exercises? Is it possible to measure realism and determine the optimum level for a particular scenario? The analysis of these and other questions can improve our ability to effectively and efficiently prepare for future conflicts.

Appendix A: List of Questionnaire Recipients

HQ USAF/LGXX
WASHINGTON, D.C.

HQ USAF/SPO
WASHINGTON, D.C.

HQ USAF/XOXW
WASHINGTON, D.C.

AFIA/MIL
KIRTLAND AFB, NM

HQ ACC/IGIL
LANGLEY AFB, VA

HQ ACC/DOXE
LANGLEY AFB, VA

HQ ACC/SVXP
LANGLEY AFB, VA

HQ ACC/LGXCM
LANGLEY AFB, VA

20SVS/SVX
SHAW AFB, SC

11SS/LSX
LANGLEY AFB, VA

4FW/CVX
SEYMOUR-JOHNSON AFB, NC

HQ AFSOC/DOX
HURLBURT FIELD, FL

HQ AFSOC/LGR
HURLBURT FIELD, FL

16 OSS/OGSXE
HURLBURT FIELD, FL

16 SOW/LGX
HURLBURT FIELD, FL

HQ AMC/LGXW
SCOTT AFB, IL

HQ AMC/IGXS
SCOTT AFB, IL

62 ALCS/DO
MCCHORD AFB, WA

62 AW/XP
MCCHORD AFB, WA

GCRES/PHOENIX ACE
LITTLE ROCK AFB, AR

Appendix B: The Questionnaires

The First Questionnaire

The following is the text of the first questionnaire:

EXERCISE REALISM QUESTIONNAIRE

DELPHI ROUND 1

Instructions

1. Please fill out the questionnaire in the manner most convenient for you (pen, pencil, typed).

2. Questions are both multiple choice and open-ended. Additional comments are encouraged. These comments may be short and simple, but more thorough answers are encouraged. Please return the completed survey by mail (envelope enclosed) or fax NLT 1 March 1994. The AFIT/LA fax number is DSN 986-7988 or (513) 476-7988. The responses to all questions will be summarized and provided to you with the next round of the survey.

Thanks for your participation!

Definition of Key Terms

A. Exercise. Any activity involving the operation of military forces in an artificial or simulated hostile environment.

B. Realism. The degree to which a scenario or exercise reflects the conditions and environment that a unit would likely encounter in a contingency or combat situation.

C. Combat Readiness. The condition of a unit being prepared to perform their wartime mission.

1. Name _____

2. How many years of experience do you have in duties involving military exercises?

a. 2 years to 6 years
b. 6 to 10 years
c. 10 to 12 years
d. More than 12 years

3. Have you been involved in any operational missions such as JUST CAUSE (Panama), DESERT SHIELD/STORM (Saudia Arabia), or RESTORE HOPE (Somalia)?

a. Yes b. No

4. If you answered "yes" to question 3, how many operational missions have you been involved with?

_____

5. Using the scale below, how would you rate the level of realism in Air Force exercises? Use the additional space below to explain your answer or to provide examples.

a.	b.	c.	d.	e.
VERY LOW	LOW	NEITHER LOW NOR HIGH	HIGH	VERY HIGH

Comments:_____

_____

6. Which major commands have you been assigned to?

_____

7. Of the commands that you have been assigned to, do you think that there is a difference among these major commands as far as the amount of realism in exercises? If so, which commands conduct the most realistic exercises?

Comments:_____

_____

8. An exercise must be realistic tc be effective in improving the combat readiness of the personnel or units participating in the exercise. Explain your answer.

a.	b.	c.	d.	e.
STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE

Comments:_____

_____

9. List at least 3 factors (such as time available for conducting an exercise) that you believe significantly impact the level of realism in an exercise. Rank these factors by importance (with 1 being the most important).

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

10. From the list of factors that you listed in question 9, which factors are most important to an exercise's effectiveness. In other words, which factors are necessary to ensure that an exercise improves combat readiness.

Comments:_____

_____

11. What are some of the advantages of increasing realism in exercises?

Comments:_____

_____

12. What are some of the disadvantages of increasing realism in exercises?

Comments:_____

_____

13. Do you believe that a point exists where increasing an exercise's realism will provide little additional value in terms of improved training or combat readiness?

a. Yes b. No

14. If you answered yes to question 15, can you list specific examples or situations where increasing realism in an exercise has little benefit?

Comments:_____

_____

This completes the round one survey. The responses of all panel members will be summarized and returned to you in the next survey. Thanks for your prompt response!

EXERCISE REALISM QUESTIONNAIRE

DELPHI ROUND 2

Instructions

1. Thanks for your quick response on the first questionnaire. The following questions are a result of our analysis of your responses in round one. The questions in this second, and last, round are similar to the first survey, but fewer open-ended responses are required. When applicable, questions include a summary of panel responses submitted on the first survey.

2. Please return the completed survey by mail or fax NLT 1 May 1994. The AFIT/LA fax number is DSN 986-7988 or (513) 476-7988.

Thanks for your participation!

Definition of Key Terms

A. Exercise. Any activity involving the operation of military forces in an artificial or simulated hostile environment.

B. Realism. The degree to which a scenario or exercise reflects the conditions and environment that a unit would likely encounter in a contingency or combat situation.

C. Combat Readiness. The condition of a unit being prepared to perform their wartime mission.

D. Effective exercise. An exercise that improves the readiness of a unit or individual.

1. Name _____

2. Questions #5 from the first survey asked you to rate the level of realism in Air Force exercises. The responses are summarized as follows:

1st Survey Responses: 30% chose LOW

40% chose NEITHER HIGH NOR LOW

30% chose HIGH

As shown above, there was no consensus on the current level of exercise realism; most responses indicated that the level of realism in exercises is neither high nor low. Do you believe that this amount of realism is adequate for Air Force exercises?

a.	b.	c.	d.	e.
STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE

3. Question #11 and #12 of the first survey asked you to list the advantages and disadvantages of increasing realism in exercises. The following two lists are a summary of responses. Use the scale below the lists to indicate whether you agree with the majority of these advantages and disadvantages.

Advantages of increased realism:

1. Improved unit readiness (cohesion, confidence, adaptability)
2. Identify current weaknesses in training/doctrine
3. Better assessment of equipment capabilities
4. Improved decision-making and innovative thinking

a.	b.	c.	d.	e.
STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE

Disadvantages of increased realism:

1. Increased cost (longer exercises/increased use of resources)

2. Increased safety mishaps (loss of equipment and personnel)

3. Increased hardships on families

4. Disruption of peacetime missions

a.	b.	c.	d.	e.
STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE

4. Question #9 of the first survey asked you to list and rank the factors that significantly impact the level of realism in an exercise. Attachment 1 contains all factors listed by panel members.

Using the scale on attachment 1, please indicate the degree to which you agree that each factor is important to exercise realism.

5. Referring to question #4, our analysis of the rankings for the factors you submitted showed that the following factors received the highest overall ranking: availability of personnel, exercise location, scenario development, funding, and availability of airlift resources.

Use the space provided to reply to the following question for each factor:

If all constraints on the use of this resource were removed, how would exercise realism improve?

1. Availability of personnel

_____

2. Exercise location

---

3. Scenario development

---

4. Funding

---

5. Availability of airlift

---

6. Question #10 of the first survey asked you to rank the factors that are most important to an exercise's effectiveness or ability to improve combat readiness. Attachment 2 is a list of these factors.

Use the scale on attachment 2 to indicate the degree to which you agree that each factor is important to an exercise's effectiveness.

7. Our analysis of the rankings for the factors you submitted concerning the effectiveness of an exercise showed that the following factors received the highest overall ranking: exercise location, availability of personnel, number of assumptions/ simulations, funding, and scenario development.

Use the space provided to reply to question a) for factors 1, 2, 4, and 5. Use question b) for factor 3:

a) How would the elimination of constraints on this resource during an exercise improve unit combat effectiveness?

b) How would the elimination of this constraint improve unit combat readiness?

1. Exercise location

_____

2. Availability of personnel

_____

3. Number of assumptions

_____

4. Funding

_____

5. Scenario Development

_____

This completes the round two survey. The responses of all panel members will be summarized and returned to you (if required). Thanks for your prompt response!

Appendix C: Questionnaire Responses

The responses to the open-ended questions from the first survey are shown below. Several questions from the Delphi questionnaires were based on a Likert scale, and the experts did not provide additional comments.

Question #5. How would rate the level of realism in Air Force exercises?

Comments. "Although I believe we make a sincere attempt to make exercises approximate to actual contingencies, my experience has been that it is simply not possible to insert the decision making opportunities and time pressure found in the real world. With greater use of computer-based training and exercises, this should change."

"Exercises do provide for training and understanding of the process to help in decision making and flexibility needed during a crisis--I do believe operations receive more training realism than does logistics support. The level of realism is constrained by resources and budget."

"Short of actual missiles flying and people dying, our exercises approach a high degree of realism. All the pieces are in place, the biggest constraints are peacetime/local restrictions."

"Exercises are realistic in that they are planned to include and execute weapon systems. However, the opposing forces are usually marginal due to budget limitations."

"It depends on the exercise. Some JCS exercises have been pretty realistic while many local exercises are not."

"A lot depends on which exercise the unit or individual is involved in. Joint Readiness Training exercises are by far the closest to what the real Air Force is involved in. Some exercises center around certain things and, once completed, personnel go back to their motels/billeting."

"Most of my experience has been in Special Operations. The operational missions I've participated in were very much like our exercises."

"Speaking only on the deployment portion of the exercise, the mobility process does a good job of simulating an actual deployment. However, when actual support aircraft are not available for loading it degrades the realism significantly."

"Exercise realism needs refinement and more thought in the initial planning stages."

"Varies with the exercise, area available for the FTX, and host nation willingness to let us operate."

"Most exercises don't follow a plan, and they need to have a fly away. Otherwise, squadrons don't realize how they would operate or if they have the right equipment to operate at a deployed location."

"Although the environment is realistic, many conditions are altered to meet our training objectives. Time phase action is the most altered."

"Realism is exercise dependent. However, rarely will you find an exercise that can put a high level of realism in both paperwork and missions. The packages and effort going into a "perfect" exercise are too large for units (still operationally deployed) to be able to effectively manage."

"Majority of exercise training is designed to be realistic and normally meets requirements. Good planning is the key to having a good exercise. Budget constraints often detract from accomplishing all exercise goals and in a lot of instances do not allow for a proper force list or scenario."

"Combat is extremely difficult to exercise. The unknown variables of live firing of weapons and the use of explosives is safety prohibitive. Support forces are never integrated into the overall air operation--too many support functions are simulated (in the AF) during exercises."

"Realism is the unpredictable input! Exercises tend to be carefully orchestrated to meet a set of objectives for training or evaluation. To prevent embarrassing moments, exercise play is often carefully controlled in the name of safety."

"Funding constraints, resource availability, and smaller force lists result in unrealistic exercises in AMC; however, developing a plan and using computer systems, procedures, and policies on a daily basis does allow "chinks" to be found and corrected resulting in an improved process."

Question #7. Of the commands that you have been assigned to, do you think that there is a difference among these major commands as far as the amount of realism in exercises? If so, which commands conduct the most realistic exercises?

Comments. "Probably PACAF. Exercise planners and evaluators took a truly no-nonsense approach. Senior wing leadership was deeply involved and ensured that small details were not overlooked."

"Exercises within AORs are more realistic and provide more effective training; exercise realism within USAFE, PACAF, and CENTAF is about the same."

"Yes, there is a difference. AFSOC exercises are much more realistic than the AMC exercises I have participated in. The key difference is the level of detailed planning and joint coordination between AFSOC aircrews and their customer."

"Yes. I thought the exercises I dealt with in MAC were the most realistic; PACAF exercises came a close second."

"Not a lot of difference but some. AMC provides training for all AFSCs through the Volant Scorpion/Phoenix Ace program. Most other commands center on security police and other main combat units. All personnel could be on the front lines at any given time. This happened several times in Somalia."

"Yes, AFSOC."

"Yes, ACC."

"Yes, Acc does the best job of realistic training. Other commands do not put forth the wing-wide effort that ACC does."

"The old TAC conducted more realistic exercises because they trained as they were going to fight."

"AFSOC; USAFE is primarily fighter oriented and extremely limited because of European airspace control/congestion. MAC is close behind AFSOC but is usually at the whim of the Army. AFSOC is better at interoperability, works on a smaller scale, and often has a higher level support for conducting its exercises."

"I though communications command had more realistic exercises than ACC because ACC had too many simulations and didn't really test capabilities."

"No, but most of experience has been in ACC."

"Yes, ACC is the most realistic."

"Yes, AFSOC has more realistic exercises; we have larger admin/ops support packages on exercises, which is more realistic of wartime C^2."

"AFSOC planners tend to make their exercises more joint and the level of planning is more detailed than other commands. Special ops forces definitely have a more detailed joint/combined planning effort during all exercises/training."

"PACAF and USAFE. PACAF's JCS exercises have full base play from numbered Air Force on down. USAFE used to have

good exercises but real world deployments have reduced exercises to a minimum."

"Yes, AMC is involved in their wartime mission of moving cargo/passengers. This takes so much time and effort that realistic wartime skills training is often a low priority. Europe had the most realistic exercises because the threat was so close."

Question #8. An exercise must be realistic to be effective in improving the combat readiness of the personnel or units participating in the exercise. Explain your answer.

Comments. "Disagree. Packing up and moving, then setting up for battle is one of the hardest things to do. Personnel readiness is part of daily training but unit readiness is not practiced except in exercises. Even if units never fire a shot, they've still learned something about mobility and logistics."

"Disagree. Some combat skills can be practiced and improved in carefully controlled exercises."

"Strongly agree. When asking people to engage in war, the better prepared they are for the actual situations they will encounter in combat, the greater the chance they will survive and complete the mission."

"Strongly agree. Exercises need to be designed to train as we fight. Theater orientation, tactics, and joint working environments enhance the benefits we receive from an exercise."

"Strongly agree. An exercise must provide the same level of difficulty and confusion that would be experienced by the forces at a real world deployed location."

"Disagree. It depends on the objective of the exercise; it must be defined. Some exercises may have limited training objectives."

"Strongly agree. People must know what to expect when deployed to a bare base scenario; exercises should duplicate those living conditions."

"Agree. If exercises are not realistic, then nobody learns anything other than packing a pallet. People need to have realistic exercises so they know what to expect in war."

"Strongly agree. Train as you intend to fight."

"Strongly agree. One problem of past exercises is their lack of realism--people showing up for deployment with missing gear, etc. A couple of real deployments will teach people to remember these details."

"Agree. It prevents people from feeling as if they are just going through the motions."

"Agree. Realism tests required skills under the proper conditions."

"Strongly agree. Without the stress and pressure, people don't know how they will react in the real thing."

"Strongly agree. Unfortunately, people are frequently hand-picked to deploy but are not the ones who would actually go in war."

"Agree. The scenario must be realistic for personnel to achieve an understanding of the planning and execution process--know the chain of command, the AOR and how units are integrated within the AOR."

"Strongly agree. Air Force people are smart and will see through a charade in a flash. An exercise which does not stress them or make them stretch and become better quickly becomes harassment. The result is reduced readiness."

Question #11. What are some of the advantages of increasing realism in exercises?

Comments. "Realism puts stress on areas that are easily assumed away during an exercise."

"Combat readiness! The unit develops cohesion and confidence when they overcome the unexpected."

"Increased realism provides a better quality of training by exposing troops to what is expected during a real operation."

"It identifies areas where more training may be required or doctrine may need to be changed."

"Limitations will be known before war begins. Allows units to practice self support in all areas."

"If we practice properly then we won't keep making the same mistakes time and time again. With the force shrinking in size, I think realism is needed more than ever."

"Gives units more confidence in carrying out assigned missions."

"Realism improves training in command and control procedures."

"Realism gives assessment of capabilities and may drive hardware procurement."

"Learning objectives can be tied to a practical situation and solution. Red Flag is an excellent example; the payoffs have been tremendous."

"Helps people learn to adapt to new situations and improves readiness."

"Sparks tactical innovation and limits the number of surprises when facing the real thing. Results in higher combat readiness and awareness and identifies shortfalls in training and equipment."

Question #12. What are some of the disadvantages of increasing realism in exercises?

Comments. "Money and more accidents."

"Depletes resources."

"Cost. Units will be forced to deploy more personnel and equipment."

"Takes more time and senior leadership involvement."

"Safety is always a factor and cost becomes a factor at some point."

"More mishaps, injuries, and opportunity for failure."

"Cost, impact on family life and other peacetime missions."

"A great deal of time and energy is required to make a an exercise realistic."

"None. Only positive things can happen when exercises are as realistic as possible."

"Longer down time for avionics equipment; families would experience inconveniences."

"Under current budget constraints, it is becoming extremely hard to have a realistic exercise."

Question #14. Can you list specific examples or situations where increasing realism in an exercise has little benefit?

Comments. "Increasing an exercise force list does not always increase the quality of training. Increasing sortie rate or number of repetitive events at some point becomes redundant."

"One Joint Readiness Training exercise is based on the first ten days of deployment; realistic but not valuable training because it does not cover the full realm of our mission."

"A point exists where increasing realism has little benefit, but it is a variable. Depends on exercise scenario, level of participation, and a host of other factors."

"I feel that conducting an exercise over, say, 4 days is not realistic. If you've done detailed planning and have

a clear understanding of what you want to accomplish, then it will be realistic enough and beneficial."

"Totally swamping the staff with "missions" that are not intended to be executed results in too much paperwork and little beneficial training."

"After loading 14 C-141s, do we really need to load one more?"

"The tendency in all exercises is to exercise for the sake of exercising. Few exercises are actually evaluated and these evaluations, if any, are not used to improve readiness. Only JCS is manned for evaluation and applying lessons learned. Most others are just doing what they did last year."

"As you concentrate on certain skills or train a novice, realism adds distractions and confusion making it harder for a trainee to focus and learn single skills. Complicated, realistic scenarios are for cohesive, well-trained units."

"Safety and cost would be the factors that determine diminishing returns."

"Once a unit understands the key elements in the process such as the planning, execution, integration, and sustainment, diminishing returns apply."

"Permanent kill removal is a good example. To kill a guy and send him home before he ever reaches the target area will make a point he won't forget but the training he has lost by not continuing far outweighs the gain."

Appendix D. Analysis of Delphi Questionnaires

Question #8 of the first survey asked the experts to identify the major command that conducts the most realistic exercises. The following describes the scaling technique used to rate each expert's vote:

1) A factor was established based on the number of times a particular major command was rated "most realistic." The factors were assigned as follows:

Frequency	Factor
1 to 2	0.0
3 to 4	0.5
5 or greater	1.0

This factor was multiplied by .25 to obtain a frequency factor (F).

2) The following factors were assigned based on the years of exercise experience of the expert:

Frequency (years)	Factor
less than 6	0.00
6 to 10	0.50
10 to 12	0.75
greater than 12	1.00

This factor was multiplied to obtain a depth of experience factor (E1).

3) The following factors were assigned to each expert's vote based on the number of major commands that expert had served in:

Number of commands	Factor
less than 2	0.33
3 to 4	0.67
greater than 5	1.00

This factor was multiplied by 0.5 to obtain a breadth of experience factor (E2).

4) The rating for each expert's vote was the sum of the frequency factor, the depth of experience factor, and the breadth of experience factor (Rating = F + E1 + E2).

5) All common major command ratings were averaged to obtain a ranking with 1.0 representing the highest realism score that could be achieved. The calculations of the ratings for each expert's response are shown in Table 15.

Tables 16 and 17 illustrate how the weighted ranking system described in Chapter III was applied to the factors submitted on the first survey. Tables 17 and 18 show the mean Likert responses for the factors supplied to the experts in the second survey.

Table 15

Ratings of Major Commands

LEVEL	F	E1	E2	RATING	MAJCOM
Wing(ACC)	1.0(.25)	0.50(.25)	0.33(.50)	.540	ACC
Wing(ACC)	1.0(.25)	0.75(.25)	1.00(.50)	.938	ACC
Wing(AFSOC)	1.0(.25)	0.50(.25)	0.67(.50)	.710	AFSOC
Wing(AMC)	.5(.25)	1.00(.25)	0.67(.50)	.710	AMC
Wing(AMC)	1.0(.25)	0.75(.25)	1.00(.50)	.938	AFSOC
Wing(AMC)	0.5(.25)	1.00(.25)	0.67(.50)	.710	PACAF
MAJCOM(ACC)	1.0(.25)	0.75(.25)	0.67(.50)	.773	ACC
MAJCOM(ACC)	1.0(.25)	1.00(.25)	0.67(.50)	.835	ACC
MAJCOM(ACC)	0.5(.25)	0.75(.25)	0.67(.50)	.648	AMC
MAJCOM(ACC)				No response	
MAJCOM(AFSOC)	1.0(.25)	1.0(.25)	0.33(.50)	.665	AFSOC
MAJCOM(AFSOC)	1.0(.25)	1.0(.25)	0.33(.50)	.665	AFSOC
MAJCOM(AFSOC)	1.0(.25)	1.0(.25)	0.67(.50)	.835	AFSOC
MAJCOM(AMC)	1.0(.25)	1.00(.25)	1.00(.50)	1.000	ACC
MAJCOM(AMC)	0.5(.25)	0.75(.25)	1.00(.50)	.813	AMC
MAJCOM(AMC				No preference	
HQ USAF	0.5(.25)	1.0(.25)	1.0(.50)	.875	PACAF
HQ USAF	0.5(.25)	1.0(.25)	1.0(.50)	.875	PACAF
HQ USAF	0.5(.25)	1.0(.25)	1.0(.50)	.875	PACAF
*	1.0(.25)	1.0(.25)	1.0(.50)	1.000	ACC
*	0.0(.25)	1.0(.25)	1.0(.50)	.750	USAFE

* indicates that expert voted for more than one command

TABLE 16

ANALYSIS OF FACTORS AFFECTING REALISM

FACTOR	AVG RANK FROM SURVEYS	FREQUENCY	WEIGHTING FACTOR	OVERALL SCORE
1. Availability of personnel (proper force mix, host nation participation)	3.3	10	0.750	24.750
2. Exercise location (weather, terrain, on-base versus off- base)	3.9	10	0.500	19.500
3. Scenario development (proper exercise objective/realistic threat)	2.7	9	0.750	18.225
4. Funding	2.1	3	0.875	14.700
5. Availability of airlift resources	2.8	7	0.750	14.700
6. Time	1.7	8	0.875	11.900
7. Availability of Base Operating Support (BOS) equipment	2.5	6	0.750	11.250
8. Number of simulations/assumptions	3.7	4	0.625	9.250
9. Enthusiasm/attitude of participants	2.8	4	0.750	8.400
10. Airspace limitations/availability of training areas	4.0	4	0.500	8.000
11. Senior leadership involvement/emphasis	4.0	3	0.625	7.500
12. Other Wing priorities (day-to-day activities and operational missions)	2.7	3	0.750	6.075
13 Exercise size	4.0	2	0.625	5.000

TABLE 16 (CONTINUED)

FACTOR	AVG RANK FROM SURVEYS	FREQUENCY	WEIGHTING FACTOR	OVERALL SCORE
14. Environmental factors (noise, local community restrictions)	4.5	2	0.500	4.500
15. Safety concerns/restrictions	1.7	3	0.875	4.463
16. Difficulties in deploying as a whole unit	5.0	1	0.500	2.500
17. Excessive management control preventing free-play exercise	2.0	1	0.875	1.750
18. Pre- exercise planning	1.0	1	1.000	1.000
19. Reluctance to allow "operations" to fail due to support function shortfalls	1.0	1	1.000	1.000
20. Lack of training in re-deployment procedures	1.0	1	1.000	1.000

TABLE 17

ANALYSIS OF FACTORS AFFECTING COMBAT READINESS

FACTOR	AVERAGE RANK FROM SURVEYS	FREQENCY	WEIGHTING FACTOR	OVERALL SCORE
1. Exercise location	5	5	0.50	12.50
2. Availability of personnel	2.25	4	0.88	7.88
3. Number of simulations/assumptions	2.33	3	0.88	6.12
4. Funding	1.5	4	0.88	5.25
5. Scenario development	1	5	1.00	5.00
6. Airspace limitations/availability of training areas	3	2	0.75	4.50
7. Pre-exercise planning	1.5	2	0.88	2.63
8. Availablility of airlift resources	1	2	1.00	2.00
9. Senior leadership involvement/emphasis	1	2	1.00	2.00
10. Enthusiasm/attitude of participants	2	1	0.88	1.75
11. Exercise size	1	1	1.00	1.00
12. Reluctance to allow "operations" to fail due to support function shortcomings	1	1	1.00	1.00

TABLE 18

LIKERT RESPONSES FOR FACTORS AFFECTING REALISM

	FACTOR	MEAN LIKERT RESPONSE
1.	Availability of personnel (proper force mix, host nation participation)	4.46
2.	Exercise location (weather, terrain, on-base versus off- base)	3.92
3.	Scenario development (proper exercise objective/realistic threat)	4.31
4.	Funding	4.46
5.	Availability of airlift resources	4.31
6.	Time	4.23
7.	Availability of Base Operating Support (BOS) equipment	4.18
8.	Number of simulations/assumptions	4.09
9.	Enthusiasm/attitude of participants	4.17
10.	Airspace limitations/availability of training areas	4.08
11.	Senior leadership involvement/emphasis	4.33
12.	Other Wing priorities (day-to-day activities and operational missions)	3.83
13.	Exercise size	3.25

TABLE 18 (CONTINUED)

	FACTOR	MEAN LIKERT RESPONSE
14.	Environmental factors (noise, local community restrictions)	3.62
15.	Safety concerns/restrictions	3.31
16.	Difficulties in deploying as a whole unit	3.67
17.	Excessive management control preventing free-play exercise	3.91
18.	Pre- exercise planning	4.08
19.	Reluctance to allow "operations" to fail due to support function shortfalls	3.67
20.	Lack of training in re-deployment procedures	4.33

TABLE 19

LIKERT RESPONSES FOR FACTORS AFFECTING COMBAT READINESS

FACTOR	MEAN LIKERT RESPONSE
1. Exercise location	4.31
2. Availability of personnel	4.31
3. Number of simulations/assumptions	4.23
4. Funding	4.31
5. Scenario development	4.51
6. Airspace limitations/availability of training areas	4.15
7. Pre-exercise planning	3.84
8. Availablility of airlift resources	4.08
9. Senior leadership involvement/emphasis	4.51
10. Enthusiasm/attitude of participants	4.15
11. Exercise size	3.62
12. Reluctance to allow "operations" to fail due to support function shortcomings	3.92

Bibliography

1. Air Force Logistics Management Center. The Logistics of Waging War. Edited by Lt Col David C. Rutenberg. Washington: U.S. Government Printing Office, 1989.

2. Campbell, John P., et al. The Measurement of Organizational Effectiveness: A Review of Relevant Research and Opinion. Army Research Contract Number DA-49-083 OSA-72. Richardson, Bellows, Henry and Company, Inc., 31 December 1951.

3. Cicarelli, James. "The Future of Economics: A Delphi Study," Technological Forecasting and Social Change, 25: 139-157 (1984).

4. Clausewitz, Carl Von, On War. Edited and translated by Michael Howard and Peter Parst. Princeton NJ: Princeton University Press, 1989.

5. Cummins, Capt Christopher S., USAF. Intra-Theater Mobilization: Guidance and Tools. MS Thesis, AFIT/GLM/LSM/92S-12. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1992 (AD-A259015).

6. Dalkey, Norman C. Delphi. Santa Monica CA: Rand Corporation, October 1967 (AD-660554).

7. Department of the Air Force. Basic Aerospace Doctrine of the United States Air Force. AFM 1-1 (Vol. 1). Washington: HQ USAF, March 1992.

8. Department of the Air Force. "Training the Air Force: The Four Components," Basic Aerospace Doctrine of the United States Air Force. AFM 1-1 (Vol. 2). Washington: HQ USAF, March 1992.

9. Edgarton, Harold A., Ph.D. and Warren R. Granam. The Identification of Observable Factors Related to Success in Combat or Simulated Combat. Navy Research Contract Number N00022-73-C-0023. Personnel Decisions, Inc., Minneapolis MN. July 1974 (AD-786462).

10. Emory, William C. and Donald R. Cooper. Business Research Methods. Homewood IL: Richard D. Irwin, Inc., 1991.

11. Hagel, Maj Stephen J., USAF. Realism in Exercises. MS Thesis, AFIT/GLM/LSM/89S-26. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1989 (AD-A21562).

12. Hall, Capt Russell S., USAF. Improving Logistics Realism in Command Post Exercises Involving B-52G Aircraft Using An Historically Modeled Database. MS Thesis, AFIT/GLM/LSG/89S-30. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1989 (AD-A186962).

13. Harback, Lt Col Herbert F., USA. Leadership--Analysis and Comment. An Oral Interview with Lt Gen Thomas G. Rhame and Article Publication Project. U.S. Army War College, Carlisle Barracks PA. 18 February 1991 (AD-A237338).

14. Heflin, Woodford Agee. The United States Air Force Dictionary. Washington: Air University Press, 1956.

15. Helmer, Olaf. "Analysis of the Future," Technological Forecasting for Industry and Government, edited by James R. Bright. New Jersey: Prentice Hall, Inc., 1968.

16. Keene, Delane S., James W. Lussier, and Robert E. Solick. Identification of Command Post Exercises (CPX) and Field Training Exercises (FIX) Messages. Technical Report 875. U.S. Army Research Institute, Fort Levenworth KA, February 1990 (AD-A220385).

17. Kestler, Maj Joseph D. and Capt Glenn E. Boron. Measurement of the Attitudes of Operational Unit Managers Toward the Air Force Inspection and Readiness Evaluation Program. MS Thesis, AFIT/LSM,SLSR-8-72A. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1989 (AD-A186962).

18. Klimp, Col Jack W., USMC. The Role of Joint and Combined Exercises in Commander-in-Chief, United States Central Command's (USSCINCCENT's Peacetime Strategy and Preparation for War. Naval War College. Newport RI, 18 May 1992 (AD-A253156).

19. Koman, Peter. Kampf und Gefechtswiksamkeit (Combat and Battle Effectiveness). Truppendienst, No. 3. 1971 (AD-901424).

20. Krueger, Maj John L., USA. "Pitfalls in Combat Simulations," Military Review, 72: 20-25 (June 1992).

21. Landford, H.W. Technological Forecasting Methodologies. American Management Association, Inc., 1972.

22. Linstone, Harold A. and Murray Turoff. The Delphi Method: Techniques and Applications. Reading, Massachusetts: Addison-Wesley Publishing Company, 1975.

23. Mann, Capt Thomas R., USAF. Development of a Logistics Support Framework for Defense Mapping Agency (DMA) Automated Systems. MS Thesis, AFIT/GLM/LSM/90s-33. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1990 (AD-A231106).

24. Martino, Joseph P. Technological Forecasting for Decision Making. New York: Elsevier, 1975.

25. McPeak, Gen Merrill A., USAF. "Air Force Sharpens Aim," The Air Force Times, 3 August 1992: 56-59.

26. Parente, Frederick J., and others. "An Examination of Factors Contributing to Delphi Accuracy," Journal of Forecasting, 3: 173-182 (1984).

27. Perry, Maj Gregg T., USAF. "Limitations of JCS Exercises," Airlift, IX: 4-9 (Winter 1987).

28. Pfaltzgraff, Robert L. and Richard H. Schultz. The Future of Air Power in the Aftermath of the Gulf War. Washington: Air University Press, 1992.

29. Preble, John F. "Public Sector Use of the Delphi Technique," Technological Forecasting and Social Change, 23: 75-88 (1983).

30. Riggs, Walter E. "The Delphi Technique: An Experimental Evaluation," Technological Forecasting and Social Change, 23: 89-94 (1983).

31. Tzu, Sun, The Art of War. Translated and with an introduction by Samuel B. Griffith. New York: Oxford University Press, 1971.

32. Van Crevald, Martin. Supplying War, Logistics From Wallenstein to Patton. Cambridge: Cambridge University Press, 1980.

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13. ABSTRACT (Maximum 200 words) Military leaders stress the need for realistic exercises to train military forces. However, few people have addressed how exercise realism impacts unit readiness. The purpose of this research was to determine the relationship between exercise realism and exercise effectiveness. The Delphi Method and expert opinion was used to examine several issues involving realism in Air Force exercises. The current level of exercise realism was examined, and the impact of increasing realism in Air Force exercises was explored. Additionally, several factors that affect realism were identified. These factors were analyzed to determine which factors contributed most significantly to exercise effectiveness and unit combat readiness. The results indicated that realism is related to the effectiveness of an exercise in preparing forces for combat; several factors that affected realism also significantly impacted unit combat readiness. Understanding the relationship between exercise realism and unit readiness will help Air Force planners conduct more effective and efficient exercises.

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