ANALYSIS OF THE JPLAN EXERCISE AS AN EXPERIENTIAL LEARNING TOOL

THESIS

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Presented to the Faculty of the Graduate School of Logistics and
Acquisition Management of the Air Force Institute of Technology
Air Education and Training Command
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

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September 1994

Acknowledgments

First and foremost, we would like to express our deepest appreciation to our thesis advisors, Lieutenant Colonel Phillip E. Miller and Major James R. Weeks. We would specifically like to thank Lieutenant Colonel Miller for the guidance and insight he provided throughout this thesis effort. It was at his direction that we made the transition from process to product (not a moment too soon, either). We are greatly indebted to Major Weeks for his flexibility, motivation, and expertise. Without their assistance, we could not have completed this study.

We would also like to express our gratitude to countless others for their assistance, but this is not possible. However, a few of these individuals include: Major Lawrence Grubbs at Headquarters USAF, for his help in identifying a current view of Air Force policies and plans, Major Mark Roth for providing the computer expertise requisite for this study, and Mr. Albert Rogers for his participation in this endeavor from beginning to end.

Furthermore, we would both like to express our appreciation to our families. They have persevered a grueling 15 month program of instruction along with us. They have sacrificed inordinate amounts of "family time" so that we could complete this study within the time allotted. For this, we are truly grateful.

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Abstract

The purpose of this study is to develop an effective educational tool for the Combat Logistics course offered at the Air Force Institute of Technology. The current tool being used, the JPLAN Exercise, was identified as outdated in several areas.

The research focused upon four investigative questions: (1) what makes an effective educational tool?, (2) should the existing exercise be revised or replaced?, (3) which logistics principles are essential for incorporation into the educational tool?, and (4) is the updated tool significantly different from the original?

To answer these questions, we conducted an extensive literature review that focused on two areas. The first area was concerned with accepted educational methods. The second area was concerned with logistics lessons learned from major US conflicts since World War I, as well as current military logistics issues.

This information was used to develop a revised JPLAN Exercise. This revised exercise was given to students along with the original exercise. We surveyed the students about differences in value, currency, and realism between the two exercises, as well as their perceived self-efficacy following exposure to each. Recommendations were to begin using the revised JPLAN Exercise in future course offerings, as well as to perform further research.

ANALYSIS OF THE JPLAN EXERCISE AS AN EXPERIENTIAL LEARNING TOOL

I. Introduction

General Issue

The American people of recent decades have witnessed sweeping changes in the world in which they live. The changes have encompassed virtually every facet of life to include social, political, and economic matters. Two factors in particular, the increasing number of advances in modern technology in the last few decades, as well as the sudden shift from bipolarity to multipolarity in the global arena, will impact the way in which Americans conduct their various future activities (Foster, 1993:20-21).

The first of these factors, advances in modern technology, has resulted in a world that tends toward globalization:

> Dramatic advances in transportation and telecommunications technologies have made the world a much smaller place than it was even a few decades ago. Seemingly insignificant events in the remotest corners of the earth have almost instantaneous reverberations at many removes from their point of occurrence. (Foster, 1993:21)

This is primarily due to the "virtually unimpeded flow of people, information, finances, materials, services, and environmental and health effects across national borders" (Foster, 1993:21).

The second factor, the resulting political imbalance, has placed the United States in unfamiliar territory. In the words of former US Secretary of Defense,

Richard Cheney, the collapse of the Soviet Union has "removed the possibility of a massive invasion of Western Europe and ended a major source of support for anti-democratic regimes and insurgencies around the world. In short, the threat that defined the Cold War era is gone" (Cheney, 1992:8). Again, all this has occurred in light of the information explosion and the differing global balance of power.

Business and Governmental Responses to the Changing Environment. These changes have forced both businesses and governments to alter their strategies for future survival. According to one business author, "we have passed from the era of huge regional factories with large labor forces and tight community ties. With advances in communications and transportation, we have entered the era of the 'borderless marketplace' " (Evans, 1993:10). The recent passage of the North American Free Trade Agreement in the US Congress underscores these sentiments.

The United States government has responded to the changes in technology, as well as the change in perceived threat that have emerged from this dynamic environment by altering its outlook on defense strategy. The Cold War defense strategy was based on assumptions related to a large scale invasion of Western Europe involving "hundreds of divisions from the Soviet Union and other Warsaw Pact nations" (Cheney, 1992:9). The current national security strategy reflects these global changes. According to Mr. Cheney, "Our focus is now on regional contingencies, as opposed to global war. Our force structure, like those of our allies, will be based on mobility and flexibility, not static defense, with an active component that is about 25 percent smaller than our peak force in the 1980s" (Cheney, 1992:9). A perfect example of the implementation of this new strategy occurred in September 1991, when President George Bush announced the removal of both tactical nuclear weapons from our ships and ground-launched tactical

nuclear warheads from overseas, as well as the removal of Air Force bombers from alert status (Cheney, 1992:9). The result, according to General Ronald R. Fogleman of Air Mobility Command, is that "the US is far more dependent than we've ever been on getting forces out of CONUS" (Canan, 1993:34).

US Defense Forces of the Future. This new strategy is currently one which relies heavily upon the use of fewer people, with fewer resources. A few of the major resources under attack include the defense budget, weapons systems, and installations. Specifically, former Chairman of the Joint Chiefs of Staff, General Colin L. Powell, remarked on this subject saying "We have stopped weapons programs, closed bases, and released thousands of great young Americans who had volunteered to serve their country. When the mid-90s arrive, we will have cut over one million people from the Armed Forces" (Powell, 1992:17).

US Air Force of the Future. The reduction of resources that has resulted from the new national security strategy impacts every organization in the Department of Defense, however, the authors are concerned primarily with those changes that have affected the organization in which they operate: the United States Air Force.

According to an article in Air Force Magazine, the Air Force has undergone six straight years of cuts in areas such as overall budget, number of aircraft, active-duty troop strength , installations, and new weapons procurement. Specifically, the Air Force budget has dropped forty percent, or $50 billion, from the peak budgets of the Reagan Administration. The number of aircraft has fallen by 2,036, or 28 percent of the total force since 1987. This includes one-third of the active-duty fighter force, forty percent of the bomber fleet, and one-fourth of the intercontinental ballistic missile (ICBM) force. Active-duty personnel figures show a reduction of 162,000 servicemen and women, or one out of four airman

over the same period. In the area of military installations, the Air Force of the future will have eighteen fewer CONUS bases and will have closed twenty-two overseas installations. In doing so, the Air Force will bring 57,000 personnel back to the Continental United States (CONUS). Finally, Air Force procurement funding for new weapons systems has fallen sixty percent (Dudney, 1993:22-23).

The Air Force's Global Reach. Amid the chaos surrounding reduced resources, the Air Force began a reorganization to adapt to the changes at home and abroad. According to Air Force Chief of Staff, General Merrill A. McPeak, "flexibility is important--increasingly important as the pace of change quickens, as the variety of tasks we undertake widens, and as resources available to us are reduced" (McPeak, 1993:45). As a part of the reorganization, the Air Force combined the assets of the former Military Airlift Command (MAC) and the tanker aircraft of the former Strategic Air Command (SAC) to create what is now Air Mobility Command (AMC). The significance of this consolidation is the relationship it has with the strategic direction of US defense forces. The Commander of Air Mobility Command, General Ronald R. Fogleman, claims that AMC is "the cornerstone of [U.S.] national military strategy", a strategy tied to "the rapid movement of forces from wherever they are to wherever they are needed . . . in response to regional crises" (Canan, 1993:34).

Under these conditions, the proper execution of military logistics can be the deciding factor in any operation the US chooses to undertake. In an effort to ensure the provision of proper military logistics to meet the Air Force's needs, education and training are necessary for the members of the Air Force's support personnel. In response to this necessity for proper instruction, the Air Force has developed a series of courses on the subject of logistics. Combat Logistics is one of these courses.

Current Mobility Education and Training. Combat Logistics, designated LOG 299, is a two-week course offered by the Air Force Institute of Technology, School of Systems and Logistics (USAF Formal Schools Catalogue, 1993). The course, which is completed by approximately 250 individuals from various Air Force Specialty Codes annually, is the only course of its kind offered in the Air Force (Weeks, 1993a).

This course combines lecture and discussion, emphasizing the mobility aspects of logistics, and culminates in a scenario-driven exercise known as the Joint Operation Planning Exercise, or JPLAN (Weeks, 1993b).

The objective of the JPLAN, as it is called, is to simulate the Joint Operations Planning and Execution System (JOPES) and therefore provide an opportunity for the students of the course to apply the principles acquired in the classroom. The JPLAN is designed to test and enhance the participant's skills in "management, decision-making, and interpersonal relationships" (Joint Operation Planning Exercise:1).

According to the course director, the JPLAN Exercise was developed around 1985 and is no longer current in three specific areas. First, the theoretical and operational foundation of the exercise is based on principles of logistical warfare from the Vietnam era. Secondly, the data contained in the computerized force selection aspect of the exercise does not include current war fighting packages called Unit Type Codes, for use in the development of realistic Time Phased Force and Deployment Data (TPFDD). Finally, the computer program currently being used is a 1987 version of a software package called Ingress™. This software is no longer capable of competing with current database packages in terms of speed, power, or user friendliness (Weeks, 1993a).

Specific Problem

The specific problem this research will address is summarized in the following research question: Is the current JPLAN Exercise valuable as an educational tool for use in the Logistics 299 course?

Research Objectives

The objectives of this particular study were to assess the current JPLAN Exercise to determine the need for improvements to it, to develop an updated educational tool for use in Logistics 299, and to measure student perceptions of the difference in relation to the original exercise.

Investigative Questions

The following investigative questions were formulated to meet the research objectives, as well as to answer sufficiently the research question proposed in the problem statement:

1) What makes an effective educational tool?

2) Should an updated educational tool be developed or should the existing exercise be revised?

3) Given that Logistics 299 is constrained by various factors, including time and funding, what logistics principles are essential for incorporation into the educational tool and which can be left out?

4) Is the updated tool significantly different from the original?

Scope/Limitations

The findings of this particular study are limited to individuals participating in the Logistics 299 course provided by the Air Force Institute of Technology, School of Systems and Logistics. The resulting educational tool was designed for

use with the particular time and budget constraints of the Logistics 299 course in mind. The method used may not be as valuable for courses of differing subject matter or courses under different constraints.

Organization of this Research Document

The remainder of this document consists of four chapters. Chapter II will provide a review of the literature to date concerning the appropriateness of various educational techniques and the latest information concerning current Air Force issues, organization, weapons systems, and logistics policies and doctrine. Chapter III will describe the methodology used to answer each of the investigative questions previously outlined. Chapter IV will summarize the research findings and analysis. Finally, Chapter V will provide conclusions and recommendations.

II. Literature Review

Purpose

The purpose of this chapter is to provide a review of relevant literature concerning the appropriateness of various instructional techniques, as well as the latest information concerning current Air Force issues, weapons systems, and logistics policies and doctrine. The resulting summary of information will provide a basis by which answers can be obtained to the investigative questions formulated in Chapter I.

Organization

The following review of literature will incorporate information from two distinct subjects relevant to the research objectives. The first portion will address the literature concerning the use of various instructional techniques in education and training. First, taxonomies of current instructional techniques from several different authors will be presented. These will be followed by brief descriptions of each of the techniques. These descriptions will include the advantages and disadvantages of that particular technique. The review of literature concerned with educational techniques will conclude with an overall assessment of the literature's usefulness. This will be followed by a review of the history of the logistics of waging warfare, to include the lessons learned from each of the major US conflicts since World War I. In order to maintain the proper focus on how these changes relate to the JPLAN Exercise, changes to transportation and mobilization principles in particular will be explored. The review will conclude with a summary of current Air Force issues, policies, and doctrine which are likely to affect the way in which war is waged in the post-Cold War global arena.

Instructional Techniques in Education

The following portion of the literature review will identify the major classifications of instructional techniques prevalent in education. These techniques are listed in Table 1. Specific attention will be given to those techniques listed in Table 2.

Taxonomies of Educational Techniques. Determining that which constitutes an effective educational tool, as well as whether or not the current JPLAN Exercise should be updated or revised, requires a useful taxonomy of educational techniques as a starting point.

The following taxonomies of instructional methods included in Table 2, along with their individual strengths and weaknesses, provides the necessary information to make an educated decision regarding our first two investigative questions.

The difficulty of locating such an exhaustive list of educational techniques was lessened by the fact that the authors of literature on the subject were relatively consistent in their classifications, as well as the labels they attached to the various techniques. Three authors in particular offered texts which included what they believed to be complete taxonomies of instructional techniques. These are included in Table 1.

Brief Descriptions of Instructional Methods. Fortunately, there is considerable overlap in the taxonomies of the various authors. This congruence allows for a useful listing of educational techniques that is broad, however not overly burdensome. The brevity of this list is also advantageous in that it allows for the brief description of each method without excessive prose.

Lecture. "A lecture has been defined as a process by which facts are transmitted from the notebook of the instructor to the notebook of the student

Table 1. Taxonomies of Instructional Methods

Staton	Davies	Novak
1) Lecture	1) Lecture -problem centered -point of view -body of knowledge	1) Lecturing
2) Demonstration-Performance	2) Demonstration	2) Discussion Groups
3) Group Discussion -directed -conference -seminar	3) Discussion -experiential small group -debates and seminars -case studies -role playing	3) Lab or Studio work
4) Role-Playing	4) Independent Study Method -projects and programmed instruction -slide-tape presentation -Personalized System of Instruction (PSI)	4) Tutorial Instruction
	5) Lesson Method	5) Individualized Instruction -modular courses -audio-tutorial -computer assisted instruction
		6) Mastery Learning

(Davies, 1981; Novak, 1979; Staton, 1960)

Table 2. Consolidated Taxonomy of Instructional Methods

1) Lecture
- -problem centered
- -point of view
- -body of knowledge

2) Demonstration-Performance

3) Discussion
- -directed
- -conference
- -seminar
- -experiential small group
- -debate
- -case studies
  - --critical incident
  - --next stage
  - --live case study

4) Role-Playing and Games

5) Individualized Instruction/Independent Study Method
- -modular courses/personalized system of instruction (PSI)/mastery learning
- -audio-tutorial/slide-tape presentation
- -computer assisted instruction

Adapted from Davies, 1981; Novak, 1979; Staton, 1960

without passing through the mind of either" (Staton, 1960:65). Although this definition is fairly humorous, according to Mr. Staton, it is often likely to be true. Lecturing has been described as both a speech, and a presentation (Davies, 1981:38). The process involves, in most cases, reading a script word for word or the use of an outline, notes, or other prompts (Davies, 1981:38). In addition, Mr. Davies' taxonomy lists three types of lectures, depending on the focus of the lesson. The first type is the problem-centered lecture which typically begins with the instructor presenting a problem to the class. The lecture then proceeds with the presentation of alternative solutions along with their strengths and weaknesses, concluding with the appropriate solution. The second type of lecture begins as the instructor presents a particular point of view, followed by associated data, and concluded with a plan of action. The last type of lecture is called the body of knowledge lecture. This is the most common type of lecture. It consists of several logically organized points presented in succession, leading up to a conclusion (Davies, 1981:38-39).

Advantages of Lecture. Many advantages of the lecture method have been offered in the literature examined, however there are four distinct advantages that subsume all of them. The single-most significant advantage of the lecture method, which was noted by all three authors, was the fact that a lecture covers large amounts of material in a short amount of time (Davies, 1981:39). Mr. Staton stated it this way: "It is a means whereby an instructor can spend hours gathering bits of needed information from here, there, and yonder, and then present in a few minutes' time the information he spent hours gathering , saving each of the trainees hours of hunting down the information for himself" (Staton, 1960:67). The second advantage of the lecture method is that it is suitable for any number of students, given that the instructor is able to be seen

and heard, and that the lecture hall is not a poor facility (Davies, 1981:39; Novak, 1979:175; Staton, 1960:67). The third and fourth advantages combined, include the use of lectures for both beginning and advanced students (if they are motivated), and the control the lecturer maintains over the content and process involved (Davies, 1981:39).

Disadvantages of Lecture. A review of the relevant literature revealed that there were four primary disadvantages to the use of lecture as a method of instruction. The first disadvantage to the lecture method is that it is one-way communication without any feedback mechanism to determine whether or not learning is taking place (Davies, 1981:39; Staton, 1960:66). In this situation, students are not participants in the learning experience, they are just receiving the instructor's notes verbally and transferring them to paper "without passing through the mind" (Staton, 1960: 65). The next disadvantage of the lecture method is that its success is determined largely by the abilities and activities of the lecturer. If the lecturer is not properly prepared, or is a lousy speaker, the lecture suffers (Davies, 1981:39; Staton, 1960:67). Prior planning and a pre-lecture syllabus handed out by the lecturer can provide a wealth of understanding and can aid in student comprehension of the material. This is because these activities provide the relevant cognitive structure to learn ahead of time (Novak, 1979:173). The third disadvantage of lecturing is that it does not lend itself well to instruction aimed at developing student skills in physical activities (Davies, 1981:39; Staton, 1960:67). The lecture method would not be a good choice if the objective of the course is to learn how to change the oil in a car. The fourth disadvantage of the lecture method relates to its flexibility in presenting material to students with differing levels of cognitive understanding from the start.

According to Novak, in these situations:

> the lecture will be too fast for some students to internalize the information meaningfully and too slow (hence boring and wasteful) for students with the best framework of relevant concepts. The result is a double penalty for the students with poor entry cognitive structure -they must take copious notes, thus draining their attention into writing rather than learning, and later accomplish in private study what they could not do in the group setting. (Novak, 1979:173)

Demonstration-Performance Method. The second method of instruction in the taxonomy presented is the demonstration, or demonstration-performance. It is nearly identical to the lecture method, with one exception. The demonstration method involves showing as well as telling, adding the visual sense to the oral already monopolized by the lecture (Davies, 1981:40). According to Mr. Staton, it is in all likelihood the first method of instruction used by man. He asserts that this is evident if you can visualize the cave man adding wood to a fire and his son learned by imitation (Staton, 1960:83). Student participation in this method is encouraged. The performance portion of the demonstration-performance method entails the students practicing the activity demonstrated by the instructor, while the instructor provides supervision and corrective feedback (Davies, 1981:40). A very salient example of this method in use today is the First Aid/ CPR course taught by the Red Cross. The instructor demonstrates the proper way to perform these activities and then supervises the students to ensure that they are learning to properly execute the required procedures and activities.

Advantages of the Demonstration-Performance Method. The demonstration-performance method has three distinct advantages. The first of these advantages is that it is an arresting and attention getting form of instruction (Davies, 1981:41). The second advantage of this method of instruction is that it

bridges the gap between the principles taught in the classroom and real-world situations (Davies, 1981:41; Novak, 1979:177)). It is best suited to teaching manual skills and routine processes (Novak, 1979:177; Staton, 1960:83). The third advantage of demonstration-performance is that it is considered to be flexible and easily altered to meet the needs of the students. It can be repeated several times until the skill or routine process is mastered (Davies, 1981:41). A fourth advantage offered by Mr. Davies, not described in detail, is that demonstration-performance is challenging and thought-provoking. (Davies, 1981:41).

Disadvantages of the Demonstration-Performance Method. Five disadvantages of the demonstration-performance method are found in the available literature. The first of these is the extra preparation and organization necessary to ensure a good demonstration. A poorly executed or a poorly planned demonstration can result in failure to meet the objectives set (Davies, 1981:41). The next disadvantage of this method is that if anyone of the students cannot see or hear the demonstrator, the learning opportunity is lost (Davies, 1981:41). Similar to the previous disadvantage, this method is limited as to the number of students or trainees that can be taught at one time to ensure everyone can see and hear the demonstrator (Davies, 1981:41) The advent of closed circuit television was offered as a means to eliminate this disadvantage, however, this possible solution does not account for the expert supervision required once the students begin to practice their newly acquired skills. The fourth disadvantage of the demonstration-performance method is that it involves considerable time for preparation at a considerable expense (Davies, 1981:41). Finally, a fifth disadvantage to demonstration methods is that they often require that students already be skilled in the use of some of the equipment used. This may take away from the learning of the objective skills and may not allow for concept

clarification, when necessary (Novak, 1979:177). This is particularly true in sessions dedicated to the acquisition of concepts in the hard sciences.

Discussion Method. The third instructional method common to the taxonomies presented is the discussion method. This method has also been called group discussions or discussion groups (Davies, 1981:41; Novak, 1979:176; Staton, 1960:98). This method is the most complex technique presented thus far. Although discussion may be a concept common to all, and usually requires little explanation, it is difficult to isolate as a fixed method of instruction. Discussion as a pedagogy has many different meanings. The taxonomies presented earlier are a prime example of this. The different types of discussion techniques considered include directed discussions, conferences, seminars, experiential small group discussions, debates, case studies, role playing, and games (Davies, 1981:42-45; Staton, 1960:98). In the most general terms, Mr. Davies suggests that "the discussion method is student oriented. It is participative rather than autocratic. Discussion is an informal strategy, with a great deal of involvement and interaction" (Davies, 1981:41). The purpose of discussion is problem-solving or decision-making (Davies, 1981:41).

Directed Discussion. The first type of discussion is the directed discussion. This method involves the instructor guiding the students thoughts and discussion to known answers. The purpose is to allow the students to arrive at the answers. The students are more likely to utilize information if they feel it is their own (Staton, 1960:113-116).

Conference. The next type of discussion technique is called a conference. The instructor in a conference has certain specific points that must be covered, however, the overall material covered will not be as structured or guided as in a directed discussion. The purpose of a conference discussion is

primarily to provide the students an opportunity to utilize their own imagination, knowledge, and judgment (Staton, 1960:116-117).

Seminar. The third type of discussion is the seminar, sometimes called a group tutorial (Davies, 1981:43). This method goes one step further. The instructor presents a problem which does not have a single correct answer. The purpose of this type of discussion is to facilitate thinking within the group as a whole to arrive at possible solutions to the problem presented (Staton, 1960:118). According to Mr. Davies, "Seminars are particularly useful for developing critical thought" (Davies, 1981:43).

Experiential Small Group. The next category of discussions is the experiential small group. This type of discussion method is primarily concerned with the exploration of issues. Some common examples of experiential learning include sensitivity training and encounter groups (Davies, 1981:42).

Debate. The fifth discussion method is the debate. This is the most formal of the discussion techniques, in that it follows a rigid set of rules (Davies, 1981:43). The purpose of this technique is to allow students to present logical arguments on a particular subject which will then be countered by the logical arguments of a group embracing the opposing viewpoint.

Case Study. Another variation of the discussion technique that has gained wide acceptance among business school curricula in recent years is the case study method or CSM (Markulis, 1985:168). The case study method is intended to allow students to critically analyze a problem. Unlike the previously mentioned discussion techniques that promote critical thinking to solve a problem, the material presented in the case study is in the form of a real or simulated problem (Davies, 1981:44).

There are four types of cases as well. These include the critical incident case, the next stage case, the live case, and the major issue case (Davies, 1981:44-45). Each of these types has a different approach.

Critical Incident Case Study. The critical incident case involves presenting students with events leading up to a problem and asking them to decide what information is required before a solution can be identified (Davies, 1981:44).

Next Stage Case Study. The next stage case study involves the presentation of facts leading up to a problem and asking the students to decide what they think will occur next (Davies, 1981:44).

Live Case Study. The live case study typically involves the instructor relating a recent news item to the class and asking them to decide what will happen next. This differs from the next stage case study in the fact that the students are able to witness the actual results as they occur and are able to compare their predictions to reality (Davies, 1981:44-45). Recently, the live case study method has been extended to actual companies. In these instances, the case has the added benefits of discussion or lecture on the actual problem by the company decision-makers, immediate access to the company by the students, and the actual decision within the company is about to be made or just recently made (Markulis, 1985:169).

Advantages of the Discussion Method. The complexity and breadth of the discussion method across six separate types of instruction is incredible. A method of this robust nature is sure to have strong advantages. The literature offers five unique advantages of the discussion method overall. The first advantage is that discussion methods allow for complete participation of all students in the learning situation (Davies, 1981:46). The second advantage of

discussion is that it attempts to utilize the pooled knowledge of the participants in an effort to realize a common goal (Davies, 1981:46). Stated another way, "discussion stimulates every person in the group to do constructive, creative thinking on a subject, contributing the benefits of his personal experience and ingenuity to a common pool for the benefit of all" (Staton, 1960:97-98). Another advantage of this method is that it is both stimulating and motivating to students when conducted properly (Davies, 1981:46). The fourth advantage is that the resulting solution or solutions is better than that obtained by individuals in the class (Davies, 1981:46). Finally, the fifth advantage of discussion is that it is a simulation of real world situations (Davies, 1981:46).

Disadvantages of the Discussion Method. As with any other method, there are disadvantages to using the discussion method as well. Four particular disadvantages from the literature follow. The first disadvantage is that it requires extra careful preparation and organization. If not done properly, the whole session can degenerate into aimless debate (Davies, 1981:46). The second disadvantage is that by its nature is limited in the number of participants that can effectively be accommodated, usually seven is optimal (Davies, 1981:46). The third disadvantage is that it is extremely time-consuming (Davies, 1981:46). The fourth disadvantage is that productive interaction can be thwarted by a dominant, autocratic leader. This leader can be either an instructor or a student (Davies, 1981:46).

Role Playing and Games. Role playing and games were included in the list of discussion types presented in the previous section. Although these instructional techniques are considered by some to be hybrids of the discussion method consisting of part demonstration and part case study, they are treated as separate methods by others. For this reason, we felt the best solution would be to

consider them separately from their origins, the demonstration and case study.

Role playing typically involves individuals acting out various characters which represent people encountered in particular situations of interest. The primary purpose of an exercise of this type is to provide students with an opportunity to develop and practice skills relating to human relations (Staton, 1960:124-125). It is also possible to exhibit the proper way to deal with certain situations (Davies, 1981:45). Mr. Davies suggests that this is particularly visible in interviewing. (Davies, 1981:45).

Games are primarily considered a type of case study in which a scenario is presented via a board game, computer, or the aid of a word processor (Davies, 1981:45). The difference between a game and a case study is not the medium through which the information is presented, however it is in the elements of chance, competition, and the inherent rules associated with play (Davies, 1981:45). Games are designed to account for chance through the use of dice, as in a board game, or in a random number generator, as in the case of the computer. Competition occurs naturally as a by-product of the game. Rules are stated prior to play in board games, and software can impose its own limitations on decisions.

Advantages of Role Playing and Games. The fact that role playing and games are considered to be primarily part of the discussion method, they exhibit the same set of advantages as the discussion method. The particular advantages that are emphasized more so as a result of role playing or games are those which capitalize on the similarities to the real world and the motivating effects they have on participants. In addition to these advantages, there have been several specifically aimed at games and simulations. A review of 28 years worth of research concerned with the effectiveness of simulation and games found that in 67 studies: 22 found that simulation is more effective than conventional classroom

instruction, 38 found no significant difference between the two methods, and finally three found conventional methods to be more effective (Randel, 1992:261). Also, there has been additional evidence that games are of value. According to a study done in 1991, the use of an instructional game has significant positive effects on student's motivation in four particular areas. These areas being: "attention, relevance, confidence, and satisfaction" (Klein, 1991:303). This finding was supported by others as well. According to Randel, "Whether simulations/games should be used for educational purposes depends on the subject matter" (Randel, 1992:269). She also noted that for classes such as "math, physics, and language arts, where the specific objectives can be stated, simulations/games can be used" (Randel, 1992:270). Particularly when student motivation is a problem, simulations/games would be a beneficial addition (Randel, 1992:270). Another advantage revealed in one study was that not only does the use of simulation and games produce higher scores on post-tests, but produces 'unencountered learning' by the students. This particular phenomenon is exhibited when students answered correctly post-test questions on ideas that were missed on the pre-test, but were not covered in the simulation/game (Allen, 1975:475). Also it was noted that simulation can provide an effective method for enhancing problem-solving skills (Allen, 1975:481).

Disadvantages of Role Playing and Games. Like the transferability of advantages from the discussion method to the role playing and games, the disadvantages of the discussion method are appropriate for role playing and games as well. Additionally, the list of disadvantages does not end there. The list continues. One particular disadvantage of role playing and games is, according to one expert, that no positive results were attributed to the use of games in the areas of interest, attitudes, feelings of efficacy, knowledge, or intellectual skills

(Reiser, 1977:14). Specifically, the author stated that "Taken as a whole, these results do not indicate that simulation games are a highly effective instructional device" (Reiser, 1977:16). In a similar study, one expert noted that although games positively affect motivation, they do not "contribute to enhanced performance when compared with a traditional method of practice" (Klein, 1991:306).

Individualized Instruction/Independent Study. The last major group of instructional techniques have been classified by several authors as either independent study or individualized instruction. Labels aside, this method is simply providing the student with a set of specific assignments and allowing the student to proceed at a pace comfortable to that individual (Davies, 1981:47; Novak, 1979:179-180). Important to the success of this method is explicit guidance as to the learning objectives as well as the periodic check to assess progress toward these objectives (Novak, 1979:180). Like the other instructional techniques, there are variations in the way it is implemented. The different approaches to individualized instruction include modular courses such as the Keller Plan (also known as the Personalized System of Instruction or PSI), audio-tutorial instruction/slide-tape presentations, computer assisted instruction, and projects.

Modular Courses, PSI, and Mastery Learning. Modular coursework, along with the Keller Plan (or PSI) are considered to be mastery learning techniques. Like all individualized instruction, the objectives are clearly stated and the work is set forth in modules or 'learning activity packages' (Novak, 1979:179). Modules are generally considered to be most similar to chapters in a text book (Novak, 1979:180). The purpose is to provide the student with a block of material to study at his/her own pace. The influence of mastery learning on this

procedure is evident when a student feels ready to proceed on to the next module. In order to do this, the student must show the instructor that mastery of the material has been attained. This is done through the use of tests (Davies, 1981:48; Novak, 1979:180).

Audio-Tutorial Instruction/Slide-Tape Presentations. Another popular method of individualized instruction is the audio-tutorial or slide-tape presentation. Introduced in 1961 on the campus of Purdue University by Sam Postlewait, this method "has become probably the most widely used instructional innovation on college campuses since 16mm educational films" (Novak, 1979:181). This method consists of a slide projector and related audio tapes to be viewed by the student at his/her leisure. This method has also grown to include texts, films, samples, manuals, and assignments (Davies, 1981:48).

Computer Assisted Instruction. Computer assisted instruction is the latest educational tool that technology has to offer. The use of computers in the classroom for instruction is no longer a dream, it is in fact a reality. The use of computers in instruction is varied. According to Mr. Novak, educators now use computers for "calculating, controlling video displays, generating test questions and maintaining performance records for individual students, and directly instructing individual students" (Novak, 1979:183).

Advantages of Individualized Instruction/Independent Study. Four primary advantages have been cited on behalf of individualized instruction and independent study methods. The first, and most widely acclaimed of these, is that students are able to proceed at their own pace (Davies, 1981:49). This means less wasted instruction time on those students that master concepts easily and quickly, and more time allowed for those students that require more time to learn the material. The second advantage is that it forces students to accept the

responsibility for their learning (Davies, 1981:49). It also focuses on the mastery of learning objectives, rather than instruction (Davies, 1981:49). The fourth advantage to individualized instruction is that it enables immediate feedback on progress toward goals (Davies, 1981:49).

Disadvantages of Individualized Instruction/Independent Study. The literature presents four disadvantages to individualized instruction as well. The first of which is the fact that it does not work well with students that are not highly motivated or highly able. These students tend to have their problems exaggerated by this process (Davies, 1981:49). The second disadvantage is that it is without much social interaction. Students who require the presence of other individuals do not fare well in this method. It can get lonely (Davies, 1981:49). The third disadvantage of this method is that tests may not always be appropriate for evaluation of mastery (Davies, 1981:49). The fourth disadvantage associated with individualized learning or independent study is that it poses logistical problems due to the varying rates at which the students are progressing. There may not be a place for students who progress at a faster pace and finish the program (Davies, 1981:49).

Assessment of the Usefulness of the Instructional Technique Literature. The preceding portion of the literature review has provided information necessary to address the first two investigative questions proposed in Chapter I. The taxonomies presented from the various authors constitute a framework of acceptable instructional tools used in the educational universe. It is from within the boundaries of this taxonomy of acceptable tools that we must choose an instructional technique appropriate to the unique demands and limitations of the LOG 299 course.

The brief descriptions, to include advantages and disadvantages of each technique, provided the individual criterion upon which each will be evaluated for appropriateness of use in conjunction with the LOG 299 course.

In order to proceed to the third investigative question, it becomes necessary to review the literature concerning the history and current issues surrounding Air Force logistics.

Logistics Principles and Current Issues

This portion of the literature review addresses the logistics principles employed at various times in US military history, as well as the current issues that affect the Joint Planning process. The lessons learned from World Wars I and II, the Korean War, the Vietnam Conflict, and Operations Desert Shield and Desert Storm, coupled with changes in the world order will be explored. These two areas of interest have combined to influence US military strategy, which affects virtually every aspect of the Department of Defense (DoD). Additionally, current issues surrounding Air Force logistics will be described.

Lessons Learned from Major US Conflicts of the Twentieth Century. As the US prepared for World War I (WWI) the government took complete control of all aspects of the nation's economy in order to control the output of war material and the various modes of transportation. This approach resulted in the desired increase in output, however, the lack of effective centralized coordination of transportation surfaced as a recurring problem from the Spanish-American War. The lack of proper planning and coordination resulted in delays of personnel and cargo as trains backed up along the east coast, while as many as 200 ships in New York harbor awaited cargo and fuel. Coupled with these problems was the lack of sealift necessary to transport 2 million troops and their equipment to Europe. The

inefficient management of transportation resources during WWI demonstrated the need for centralized management and proper coordination within and among the various modes of transportation when the military mobilized (Johnson, 1991:21).

The use of airlift was introduced in World War II (WWII) for large scale theater support, yet it was used sparingly stateside. The bulk of transportation problems again stemmed from the lack of adequate sealift, which was the limiting factor in the supply pipeline. The US government did not seize control of the transportation system during WWII, but rather acted in a supervisory role. This was an obvious break in practice from WWI. This break proved to be a wise decision as the transportation system worked well (Johnson, 1991:24).

During the Korean War the US experienced another problem with its pipeline supplying troops and equipment to the theater. Inefficient unloading of ships in Korea due to inadequate port facilities created a backlog of ships awaiting docking and unloading. Additionally, poor prioritization of ships awaiting docking resulted in unnecessary items being unloaded while ships carrying critical supplies were held waiting for an opportunity to dock (Johnson, 1991:24).

Lessons learned from the Korean War were implemented during the Vietnam Conflict. US logistics planners drafted plans for a war in Southeast Asia prior to the outbreak of war (Heiser, 1976:76). This advanced planning was a significant improvement over the lack of planning prior to WWI, WWII, and the Korean War. Typical logistics problems, however, existed in Vietnam that posed serious challenges for US forces. Vietnam's ports, highways, airfields, and communications were all antiquated in comparison to the needs of the US forces. These problems resulted in similar situations previously experienced during the Korean War. Incoming cargo was delayed due to a harbor backlog (Heiser, 1976:77). Even when cargo was off loaded it was delayed at the port because it

"could not be moved rapidly to point of storage or need" (Peppers, 1988:240). This was the result of dock saturation caused by Vietnam's poor infrastructure. Again, as during the Korean War, inadequate facilities and poor management of incoming cargo created a logistics nightmare (Heiser 1976; Peppers 1988).

As noted earlier, the lack of centralized control of transportation caused significant mobility problems during WWI, WWII, and in Korea and Vietnam. In an effort to correct this problem, "the President established USTRANSCOM to improve the effectiveness of defense transportation by eliminating duplication and streamlining procedures" (Fogleman, 1993:16). US Transportation Command (USTRANSCOM) faced its first real test with Operations Desert Shield and Desert Storm. US Central Command (USCENTCOM) was, and is, responsible for the Persian Gulf region and was the supported command during Desert Shield and Desert Storm. As with any contingency, uncertainties exist regarding the enemy's intentions, which call for flexibility when implementing an operational plan. As USCENTCOM modified the operational plan for the Persian Gulf contingency, force packages and transportation requirements changed accordingly, thereby stressing USTRANSCOM's flexibility. According to General Hansford T. Johnson, Commander-in-Chief USTRANSCOM, "USTRANSCOM was able to work with our components, the force providers, and USCENTCOM to incorporate these necessary changes into the logistical pipeline, always ensuring the highest priority cargo got to the theater as quickly as possible" (Johnson, 1991:30-32). Clearly the creation of USTRANSCOM as the centralized coordination agency for DOD transportation issues was a wise decision.

Another reason for the positive outcome of Operations Desert Shield and Desert Storm was that the Air Force Logistics Command (AFLC) was ready because it had kept current with USCENTCOM planning. AFLC had conducted a

logistics assessment review of the various scenarios for a Mideast war as predicted by CENTCOM (Suit, 1991). "Air Force logisticians possessed up-to-the-minute data from which to develop the spares and support equipment requirements that determined the mix of materiel shipped to the AOR with the deploying Air Force units" (Suit, 1991:12). The effectiveness of this advanced planning is in stark contrast to the lack of effective planning of previous contingencies.

Operations Desert Shield and Desert Storm depict the current threat of regional conflict rather than global confrontation. As the most recent war in US history it is often looked to as the model for future conflicts. Evaluating the Gulf War's successes and failures, and the reasons for each, is necessary to strengthen our forces for the future, however, it cannot be the basis for all future planning. It is unique, as is any war or conflict. A brief look at some aspects of the Gulf War's uniqueness shows that in many respects it was an ideal situation.

Iraq was politically isolated, whereas the United States was the leader of a strong multinational Coalition. The Coalition forces were afforded a long time interval to deploy and prepare, and there was little threat of attack during deployment or resupply to the Area of Responsibility (AOR). Combined with these factors were superb Host Nation Support (HNS) and Saudi Arabia's well developed coastal infrastructure. Two other major factors included the desert environment and another aspect of timing. The desert environment was well suited for air and armor combat, and presented few noncombatants. The timing of the Gulf War was particularly favorable. The US had built up its forces throughout the Cold War. With the threat of Soviet intervention virtually nonexistent, the US was free to move numerous forces from Europe to support the Gulf War. These factors contributed to the Coalition forces Air Supremacy. There were no effective air strikes on Coalition troops, ports, or facilities. Finally,

due to the location of the war there was no submarine threat and no significant anti-surface action. Coalition shipping was free from any significant threats. As can be seen in this brief review, the Gulf War was quite unique and these same ideal factors cannot be expected in future conflicts (Department of Defense, 1992:xvi-xvii).

Other changes in logistics practices employed by the US military are the use of prepositioning (prepo) ships and reliance on host nation support. During Operations Desert Shield and Desert Storm the United States made extensive use of these relatively new practices (Suit, 1991:12). Lieutenant General William G. Pagonis, USCENTCOM's single point of contact for logistical needs, remarked that virtually all equipment and supplies used in the first few weeks of Desert Shield came from prepo ships (Pagonis, 1992:208).

Effect of the Changing World Order. Significant changes in the world order which have taken place in recent years have brought profound changes to the US military. The fall of the Soviet Union decreased the threat of nuclear war, and halted the spread of communism and its accompanying goal of world domination. This event caused the US to realign its thinking on potential war scenarios from that of global war to that of regional conflicts. Accompanying this revised perspective of potential threats to the United States and its interests is a current draw down in US military forces. A consequence of the downsizing of the military is that fewer US forces will be forward deployed (Fogleman, 1993:16). The uncertainty of potential threats to US interests and the reduction in US military forces places increased responsibility on the military to learn from past mistakes and to better prepare for future contingencies. These factors also point to the need for the proper management of scarce transportation resources and the correct selection of force packages.

Current Issues Surrounding Air Force Logistics. Previously, lessons learned from logistics practices employed from World War I to the present were addressed. The specific focus of this literature was on transportation and mobilization principles. This section will address current issues that will affect the Joint Planning Process.

Prepositioning. As noted in Chapter I, the Department of Defense has changed its strategic focus from one of global to one of regional conflict. According the General Colin L. Powell, this change in focus has allowed subsequent changes in ways of providing logistics support. Under the former strategic focus, a Commander in Chief (CINC) needed enough stocks to fight his theater's forces, for a substantial time, without resupply from the CONUS. Under the latter strategic focus, a CINC needs only enough "starter" stocks until his forces are resupplied from the CONUS, or from other prepositioned "swing" stocks from another region. In order to support this strategy, some stocks are being repositioned from land to "afloat" propositioning ships. This approach to logistics support presents the possibility of substantial reductions in transportation requirements. "The Army, for example, has estimated that it can achieve a 50 percent reduction in war reserve requirements under this new concept. Combat logistics have entered a new era with our new strategy" (Powell, 1993:viii).

The concept of "starter" and "swing" stocks is based on the current National Military Strategy (NMS) as outlined in the most recent Bottom-Up Review, dated 1 September 1993. The NMS is geared toward ensuring US military forces can engage in two Major Regional Conflicts (MRCs), one in the East and one in the West, at the same time given the respective CINC's "starter" stocks and resupply from the CONUS. If there is but one MRC being fought, for example in the West, then prepositioned stocks will "swing" from the East in support of the MRC in the

West. It is anticipated that the "swing" stocks will reach the supported CINC faster than resupply from the CONUS.

The Air Force is currently prepositioning more stocks to enhance its responsiveness and is developing a better system of identifying those stocks for possible "swing" action. The prepositioned stocks will most likely be identified with Unit Type Codes (UTCs) and will be sourced via a TPFDD to "swing" in support of a MRC. Examples of typical theater "swing" stocks include ammunition, drop tanks, and maintenance support equipment (Grubbs, 1994).

Host Nation Support. Host Nation Support (HNS) is an important factor in any military operation involving the deployment of troops. The availability of host nation support greatly affects logisticians as they plan for contingency support. Any items such as stocks, equipment, or facilities, that can be obtained from the host nation can enhance the speed and efficiency of a deployment by negating the need to transport the items from the CONUS. Host Nation Support can be realized through contracting for the support or the host nation may provide the support at no cost to the US. With fewer US forces forward deployed, and the need for rapid mobility response, HNS is as important now as at any time in the past.

The level of HNS experienced by the US military has varied substantially throughout various conflicts. The amount of support has ranged from very poor to very impressive. As noted earlier, during the Korean War the US dealt with a poor communication and a poor transportation infrastructure. Also, the ports were woefully inadequate (Peppers, 1988). In stark contrast, Saudi Arabia's support as host nation was impressive. Three ports used by the Coalition forces comprised some of the largest and best equipped port facilities in the world (Pagonis, 1992:71). Also, supplies such as food, water, fuel, tents, and lumber were

available in country. This was in addition to critical services such as food services and transportation, and critical resources such as drivers and operators for various equipment used in support of combat forces. In addition to the ports noted earlier, various facilities such as lodging, warehouses, and air bases were provided by Saudi Arabia (Will and Wheeler, 1993:56-60).

Host Nation Support can come in various forms. It can be tangible as noted in the examples above or it can be in the form of political support. The lack of either can have a serious impact on a military operation. During the Gulf War the coalition forces enjoyed the political support of virtually the entire free world. The situation was somewhat different during the raid on Libya in 1986. Due to lack of support from France, a nation viewed as an American ally, US aircraft were not permitted to overfly that country. This lengthened the flight to targets in Libya, 1300 nautical miles, necessitating multiple aerial refuelings and increasing the risk to US airmen (Aviation Week & Space Technology, 1986). These examples of HNS illustrate the value of this factor in the success of an operation. Consequently, HNS is considered in the planning process of mobility support (Danish, 1993b).

Lean Logistics. Lean Logistics is a concept prevalent in the logistics profession, and is currently being adapted into Air Force logistics policy. Lean Logistics is a focused project to integrate state-of-the-art business practices such as: two-level maintenance, just-in-time(JIT), door-to-door, and pipeline visibility among others, across the broad area of Air Force logistics. The goal of implementing this concept is to improve and streamline policy, processes, and management structures which drive costs and investments in logistics infrastructure. Specifically, under this concept, repairables pipeline times will be reduced, express transportation will be used, and right size inventory will be

maintained. The repairables pipeline reduction will be accomplished by improving operations at depots and requiring more responsive service from contractors. Express transportation will require greater reliance on commercial carriers for door-to-door service. The resulting improvement in transportation service of increased flexibility and reduced travel time will also contribute to the reduction in the repairables pipeline. The improvement in depot operations and requiring more responsive service from contractors coupled with reliance on express transportation permits a dramatic change in inventory management. The current inventory system bases stock levels on a "just-in-case" perspective whereas Lean Logistics bases stock levels on a "guaranteed-on-time" perspective, thereby allowing inventory levels to be reduced to the "right size." Lean Logistics will ultimately result in a "smaller logistics infrastructure providing strong, less costly weapon system support to operational users, in peace and war" (Ziegler, 1994).

Two-Level Maintenance. The two-level maintenance concept currently being introduced into the Air Force has the potential to greatly affect mobility and associated planning efforts. Basically, under the two-level maintenance concept the intermediate- or shop-level maintenance transfers from the operational wing to a depot. Once this is accomplished, it is anticipated the endeavor will greatly reduce the "mobility footprint" by eliminating the personnel and equipment that are deployed to support the current three-level maintenance concept. This will alleviate some of the demand placed on scarce transportation resources during the initial deployment phase of an operation, but will increase the demands placed on the resupply pipeline (Cox, 1994).

As of this writing there are details of this process that have not yet been determined. For example, there is no guarantee that two-level maintenance will reduce the initial mobility footprint, but rather may reduce a "secondary mobility

footprint" since the Intermediate-Level Maintenance (ILM) UTCs are typically flowed to a theater around day 25 of an operation. In fact, this situation may actually increase the initial mobility footprint if the number of Line Replaceable Units (LRUs) are increased due to a lack of confidence in the resupply pipeline (Grubbs, 1994). In fact, current testing shows an increase in the size of Readiness Spares Packages (RSPs) for the B-52 weapons system. This increase is due to changes in RSP content where LRUs are substituted for Shop Replaceable Units (SRUs) (Tolman, 1994). Whether the increase is due to a commander's apprehension about resupply viability or changes in RSP content, the increase could have a negative impact on scarce transportation resources at the beginning of an operation when the deployment of combat forces is most critical.

Sealift. Sealift is a major issue for virtually any major military operation and should be considered in future planning. According to Les Aspin, former US Secretary of Defense,

> In any major regional conflict, most combat equipment and supplies would be transported by sea. While airlift and prepositioning provide the most rapid response for deterrence and initial defense, the deployment of significant heavy ground and air forces, their support equipment, and sustainment must come by sea. (Aspin, 1993:9)

Sealift, as a mode of travel used in deploying US military forces, has historically proven its indispensable value. This was demonstrated during Operations Desert Shield and Desert Storm, "...over 95 percent of the materiel moved to the Persian Gulf was moved by sealift" (Will and Wheeler, 1993:60).

Although airlift is the fastest mode of transportation, sealift may often be a viable alternative depending on the backlog of materiel awaiting airlift and the availability of sealift. During the Persian Gulf War the wait for available airlift at

an East Coast Aerial Port was as long as 35 days. In this situation, sealift requiring approximately 14 days travel time via a Fast Sealift Ship (FSS) was more efficient than airlift. This issue presents alternative solutions to logistics planners regarding the persistent airlift shortage dilemma (Dragich, 1994).

As a result of successful sealift operations during the Persian Gulf War and the need to increase US strategic mobility capabilities, the Navy is currently converting eight recently purchased container ships to roll-on/roll-off (RO/RO) configuration under the Fast Logistic Ship program. Once the conversion is completed, four of these ships will be docked on the East Coast and the other four ships will be docked on the Gulf Coast, thereby increasing our sealift capacity (Danish, 1993a).

Current Force Packages. As noted in the problem statement, some of the Unit Type Code data used in the current JPLAN exercise to build force packages are outdated. Current USAF UTCs available are contained in the USAF Manpower Force Packaging System (MANFOR), which is classified. The researchers will use an abbreviated, sanitized (unclassified) version of this document, obtained from Major James Weeks. The document consists only of that portion of the MANFOR relevant to the scenario contained in the JPLAN exercise.

The MANFOR lists the weapon system UTC along with a mission capabilities statement (MISCAP). The MISCAP describes the combat role and capability of the weapon system, lists the major functional areas, such as personnel and equipment, and specifies the required support UTC(s). A sample page from the MANFOR is included in Appendix A. The MANFOR will be used to ensure current forces are included in the educational tool as necessary.

The Manpower and Equipment Force Packaging System (MEFPAK) will be used to ensure the current logistic deployment data is used. A sample page of the MEFPAK is included in Appendix B.

Chapter Summary

This chapter has provided a review of relevant literature concerning the appropriateness of various instructional techniques, as well as, the latest information concerning current Air Force issues, weapons systems, and logistics policies and doctrine. This background information specifically addressed the first three investigative questions proposed in Chapter I. The purpose of addressing these questions was two-fold. First, it was to make possible the evaluation of the current JPLAN exercise with regard to appropriateness of use with the LOG 299 course. Secondly, the information will guide any possible modifications necessary to improve or replace the current exercise. Chapter III will describe the methodology to be employed in the evaluation and modification of the current JPLAN exercise.

III. Methodology

Purpose

The purpose of this chapter is to describe the methodology that will be employed to answer the four investigative questions outlined in Chapter I. Specifically, the methodology will serve as a means to evaluate the alternative instructional methods for use in the LOG 299 course, to determine which additional Air Force logistics issues and force packages should be included in a new educational tool, and to provide an indication of the difference between the original JPLAN exercise and the new educational tool.

Organization

The following description of the methodology will be partitioned into four distinct segments. The first segment will describe the methodology that will be employed in the evaluation of the various instructional methods presented in Chapter II. This will be followed by a description of the methodology to be used in evaluating the importance of including the various logistics issues and force package data presented in Chapter II, taking into account the course requirements and constraints. The third segment will describe the methodology used in developing an educational tool for use in LOG 299. The final segment will describe the methodology involved in measuring the differences between the original JPLAN exercise and the newly developed educational tool.

Evaluation of Instructional Methods

The first step in the process of answering the investigative questions proposed in Chapter I is to determine the acceptable instructional methods for use in education. This task has already been accomplished in Chapter II with a

literature review which yielded a robust taxonomy of acceptable methods.

The next step in this process is to evaluate these tools in order to decide which one is best suited for use in the LOG 299 course. In order to accomplish this task, we will identify the course objectives, course requirements, and the constraining resources inherent in the course. This information will be used to identify those methods that are appropriate to the unique demands and limitations of the course.

The final step in this process of evaluation will occur in the event that no single instructional method is clearly identified as the best option in the previous two segments. Once it has been established that these particular methods of instruction are capable of meeting all of the course constraints, it will then be necessary to discriminate between the alternatives to determine the best option.

The methodology used for making the ultimate decision in this case will involve comparison of the suitable alternatives for use on the basis of two criteria: ease of implementation and flexibility. 'Ease of implementation' is intended to account for the simplicity of instructions that would be required for an instructor who is either unfamiliar with the method or the course. Flexibility, in this case, refers to the surplus of constraining resources that would be available if the method were used in the LOG 299 course. For example, in the event that two methods are capable of operating within the requirements and constraints of the course, and one of them is easier to implement or can be accomplished in less time or for fewer dollars, it will be chosen. All things being equal, the instructional method which provides the most flexibility, while satisfying the course constraints, will be chosen. The ease of implementation and flexibility are important attributes for future application of the method. The world has changed significantly since the development of the original JPLAN. Assuming that this trend will continue

into the future, the new educational tool must be easy enough to implement by new instructors as time passes and flexible enough to allow the instructors to incorporate changes as they see fit.

Determining Essential Logistics Issues and Force Packages

Following the decision to choose the best instructional method, the next stage in our methodology is to incorporate the current force packages into the new educational tool, as well as determine which of the current Air Force logistics issues are essential to incorporate into the new educational tool. The updating of force packages will be a mechanical process of swapping out the old for the new.

The addition of logistics issues, however, will involve a certain amount of addition and deletion of material if the constraints of the course are binding on the amount of information that will be allowed. These individual decisions will be based on two criteria. The first of these criteria to be used in evaluating an issue for inclusion in the new tool will be whether or not the information is current. The second criterion used will be whether or not the issue has a significant impact on the joint planning process as it pertains to the objectives of the LOG 299 course. Only those issues that affect the decisions regarding force selection, transportation feasibility, or shortfall resolution will be included (Weeks, 1993b).

Educational Tool Development

The decisions made as a result of the first two stages of the methodology will determine, in large part, the methodology employed in the actual development of the new educational tool. For example, a decision to choose role-playing/games as the best instructional method will lead us to the decision to revise the current JPLAN exercise. This would primarily involve updating the issues and force packages contained therein with the information gathered in Chapter II.

JPLAN Exercise Revision. The specific steps involved in updating the JPLAN exercise to reflect the current force packages and issues include document retrieval, a review of force listings, a review of current JPLAN text and its included force listings, substitution of new data in place of old data, a comparison of current issues with those addressed in original JPLAN exercise, text additions and revisions, and the incorporation of supplemental readings or lecture.

The first of these steps, document retrieval, will consist of obtaining documents for use in locating up to date information on force packages and issues. The particular documents to be obtained include a sanitized version of the manpower and force listings (MANFOR), a Manpower and Equipment Force Packaging System (MEFPAK), a sample theater Prepositioned Stocks listing, and a course syllabus.

The next step will be to review these documents to extract the most current information on items such as Unit Type Codes (UTCs), typical prepositioning assets in a particular theater, and the specific requirements and constraints of the LOG 299 course. This information will be compared to the original JPLAN exercise to identify discrepancies. The information which is identified as no longer current will be replaced with the current data.

Similar to the comparison of the original JPLAN exercise force packages to the data contained in the literature, we will compare the logistics issues addressed in the original JPLAN exercise to those identified in the literature review in Chapter II. Those current issues not already addressed in the JPLAN exercise will be incorporated into the revised exercise. In addition, any issues identified which are no longer applicable will be deleted from the exercise.

Current issues that are incorporated into the exercise will require class lecture or supplemental readings to familiarize the students with the subject. The

final step then, in revising the JPLAN exercise, will be the addition of the supplemental reading materials for the students or providing the lecture material for the instructor. The supplemental reading materials will come from the literature addressed in our literature review. The lecture materials provided for the instructor will include the briefing slides also obtained in our review of literature in Chapter II.

JPLAN Exercise Replacement. A decision to choose any of the other instructional methods, however, will lead us to develop a completely different educational tool. The development of this other tool will be guided by written documents that outline the creation of course materials for instruction. The same comparisons will be made regarding the force packages and issues so that the new educational tool will be up to date.

Testing the Tools

The final segment of our methodology is concerned with the measurement of differences between the two educational tools. Specifically, we are interested in the differences in educational value, currency of the material, how representative the exercise is of the reality it attempts to simulate, and the efficacy of the students following exposure to the two tools.

Hypothesis Testing. In order to obtain this information, we will test four hypotheses. The hypotheses we will test include:

H_0: There is no difference in educational value between the tools
H_1: The new tool has greater educational value than the old tool

H_0: There is no difference in currency between the tools
H_1: The new tool is more current than the old tool

H_0: There is no difference in representativeness between the tools
H_1: The new tool is more representative of reality than the old tool

H_0: There is no difference in student efficacy following exposure to the two tools

H_1: Student efficacy is greater following exposure to the new tool

We expect the results of these tests to reveal that the new educational tool is superior to the existing JPLAN exercise in all four of the areas of interest.

Experimental Design. In order to determine the statistical significance of these differences, we will administer a questionnaire to a class of approximately 25 individuals participating in the course. The students will first be separated into two groups of ten. This will be done by the instructor so as to ensure a balance among the expertise in the groups. This is necessary since the students participating in the course come from a wide variety of career fields. The regular course lecture will be supplemented by the educational tools. One of the groups will be exposed to the original JPLAN first and then the new educational tool. The other group will be exposed to the new educational tool first and then the original JPLAN. Following exposure to both tools, the two groups will be given the questionnaire as presented in Figure 1.

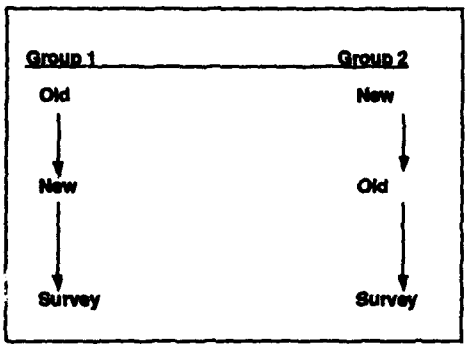

Figure 1. Experimental Design

Instrument Development. This questionnaire will consist of five distinct sections. All items on the questionnaire will be in the format of a seven point

Likert scale ranging from strongly disagree to strongly agree, with the centerpoint corresponding to a 'Neutral' response unless otherwise stated.

The first two sections will contain 18 statements which address the value of the exercise, the realism of the exercise, and the self-efficacy of the student. There will be three statements pertaining to each of these areas of interest. Statements #1 through #9 will be concerned only with responses regarding the original JPLAN Exercise. The exact same statements will be repeated in the same order for statements #10 through #18, which will be concerned only with responses regarding the revised JPLAN Exercise.

The third section of the questionnaire, statements #19 through #24, will consist of six comparative statements which address differences between the original and revised JPLANs. Three of these statements will address the difference in currency of the two exercises, while the remaining three statements will address the differences in value, realism, and efficacy between the two exercises.

The fourth section, questions #25 through #28, will consist of four open-ended questions which solicit comments/suggestions for improving each of the different versions of the JPLAN Exercise, as well as the exercise as a whole.

The final section of the questionnaire, question #29, will consist of a single question regarding the respondent's level of expertise in the joint planning process. This question will have three possible responses, as opposed to the seven possible responses for each of the statements in sections one through three. The length of the survey will be kept to a minimum for two reasons. The first reason for the survey's brevity is to keep the respondents interested and motivated. The second reason is to minimize the amount of time required to participate in the survey. The survey will require only 15 minutes to complete. This is particularly important in

an educational environment where time should be best utilized in valuable instruction.

Data Analysis. The resulting data from the survey will first be statistically analyzed to determine normality. Once the assumption of normality is met, a t-test will be performed to determine the differences between the two population means for each area. A t-test will be used because the small sample size does not justify the use of Z tables. In the event that this criterion is not met, it will become necessary to use a non-parametric test for the difference between two population means. The particular test to be performed will be the Wilcoxon Signed Rank Test for Independent Samples.

Chapter Summary

This chapter described the methodology to be employed in four distinct segments. The first segment described the evaluation of the instructional methods using the taxonomy presented in Chapter II. This was followed by a segment dealing with the addition or deletion of logistics issues and force packages using information also from Chapter II. Third was a segment which described the methodology involved in the development of the educational tool. Finally, the last segment described the development and use of an instrument to measure the difference between the original JPLAN and the new educational tool in four areas of interest. This chapter provides the blueprint for the methodology to be utilized in the research. The following chapter will summarize the research findings and analysis.

IV. Research Findings and Analysis

Purpose

The purpose of this chapter is to present the answers to the four investigative questions outlined in Chapter I. These findings were obtained by implementing the methodology described in Chapter III. The presentation of research findings will include a brief description of the activities which were undertaken in this process.

Organization

The following presentation of the research findings will be organized into four major sections. These sections correspond directly to the four segments of the methodology presented in Chapter III. The first section will begin with a description of the evaluation of the various instructional methods presented in Chapter II. This will include specific rationale for a decision to accept or reject each method based on the course requirements and objectives, as well as the inherent constraints of the course. This discussion will conclude with the answer to the first investigative question. The second section will address the determination of current force packages and logistics issues included in the updated educational tool. The third section will explain the activities involved in the development of the updated educational tool. Finally, the fourth section will describe the experiment, and present the analysis of the data obtained through administration of the measurement instrument.

Evaluation of Instructional Methods

The first investigative question presented in Chapter I is concerned with determining what constitutes an effective educational tool. A taxonomy of acceptable educational methods was revealed through research of the literature on

the subject, and was presented in Table 2, Chapter II. The specific method appropriate for use in the LOG 299 course had to be determined in terms of the course requirements, objectives, and constraints as outlined in the methodology described in Chapter III. This was accomplished through the development of the Method-Criteria matrix presented in Figure 2.

The Method-Criteria matrix was constructed by placing the five educational methods along the top, and by placing the LOG 299 specific requirements, objectives, and constraints along the left side. The result is a tabular evaluation matrix consisting of 70 cells. Each cell contains either a (+) or a (-). A (+) signifies congruence between that particular method and that particular criterion. Consequently, a (-) signifies that for some reason the method is not congruent with the associated criterion.

Lecture. The first instructional method, lecture, was rejected as an appropriate method for use in place of the current JPLAN Exercise. This method, although capable of meeting all of the constraint criteria, is unable to provide an effective means of meeting the course requirements and objectives. The primary reasons for this shortfall are that lecture is one-way communication and it does not lend itself to the acquisition of skills. For these reasons, lecture is unable to help students see the joint planning process in action and is a poor means of developing both management and interpersonal skills.

Demonstration/Performance. The second instructional method, demonstration/performance, was also rejected as an appropriate method to replace the current JPLAN Exercise. Demonstration/Performance can provide an effective medium for providing the students with an opportunity to see joint planning in action. Due to its nature, however, demonstration/performance does not allow for personal interaction, decision-making, or the application of management skills.

EDUCATIONAL METHODS	Lecture	Demonstration Performance	Discussion	Role Playing & Gaming	Individual Study
REQUIREMENTS AND OBJECTIVES					
Opportunity to see Joint Planning Process in Action	-	+	-	+	+
Gain Appreciation of Task Complexity	-	+	+	+	+
Opportunity to Apply Knowledge Gained in Class	-	+	+	+	+
Force Selection	-	+	+	+	+
Transportation Feasibility	-	+	+	+	+
Shortfall Resolution	-	+	+	+	+
Generate TPFDL	-	+	+	+	+
Apply Management Skills	-	-	+	+	+
Apply Decision-Making Skills	-	-	+	+	+
Apply Interpersonal Skills	-	-	+	+	-
CONSTRAINTS					
Time (12.5 hours)	+	+	+	+	-
Funds	+	+	+	+	-
Facilities and Equipment	+	+	+	+	-
Instructor (#)	+	-	+	+	+

Figure 2. Method-Criteria Matrix

Additionally, the amount of instructor attention necessary for each student to practice the skills with adequate supervision is not currently feasible with the two instructors available.

Discussion. The discussion method consists of a complex variety of types of discussion. These types range from directed discussions to case studies, and sometimes include role playing. Such an eclectic method is very comprehensive in nature and is therefore capable of meeting a wide variety of needs. The evaluation of the discussion method was not limited to any one type of discussion, however, the majority of the observations relied on the advantages of the case study method to meet the specified criteria. Role playing, although sometimes considered a discussion technique, was evaluated separately as it appeared in the literature in its own right. Discussion, in all its forms, was quite capable of meeting the constraint criteria, and almost all of the criteria related to the course requirements and objectives. None of the techniques of the discussion method, however, are able to provide the students with an opportunity to see the joint planning process in action. It was for this reason that the discussion method was also rejected as an appropriate tool to use in place of the JPLAN Exercise.

Role Playing/Gaming. Role playing/gaming was the only method which was congruent with each of the course requirements, objectives, and constraints. This method is capable of providing the students with the opportunity to see the joint planning process in action through the simulation of the real world. The acquisition of hands-on skills is also possible through role playing/games because the students must participate in the necessary activities first-hand.

Role playing/games involves the use of groups in a decision-making capacity, consequently, this method meets the remaining criteria of applying management, decision-making, and interpersonal skills. Finally, this method does not violate any of the constraints inherent in the course.

Individual Study. The last method evaluated was the individual study method. This method, like the discussion method, consists of more than one type of individual study technique. The evaluation of this method was not limited to any one individual study technique, but included all of them. Individual study is particularly effective at meeting each of the initial criterion in the matrix. This effectiveness, however, is the result of sacrifices in other areas. The students are able to learn at their own speed and will become proficient in the process. Effectiveness is gained at the expense of personal interaction and at great expense to the resources necessary to sustain operations. The use of individual study methods can be very time consuming depending on the abilities of the students, and requires an investment in equipment and materials far beyond those available in the LOG 299 course.

Finding #1: Appropriate Method. To answer the first investigative question, the authors assert that an effective educational tool is one that meets the requirements, objectives, and constraints of the intended course. After performing an evaluation of the accepted methods of instruction in terms of the criteria required for the LOG 299 course, the effective educational tool for use in the LOG 299 course should be a role playing/gaming technique.

Determination of Current Force Packages and Logistics Issues

The first step in the process of determining current force packages involved the comparison of current versions of the manpower and force listings (MANFOR) and manpower and equipment force packaging system (MEFPAK) to the forces listed in the JPLAN Exercise. Those force packages which were no longer listed in either the MANFOR or MEFPAK were identified in the text of the exercise. Current force packages were then identified which are capable of meeting the mission capabilities of those identified as no longer current in the JPLAN Exercise.

No issues currently presented in the JPLAN Exercise were found to be outdated. For this reason, it was not necessary to delete any issues from the exercise. The current issues presented in Chapter II were evaluated according to the prespecified criteria described in Chapter III. The issue had to be current and had to affect the students decisions regarding force selection, transportation feasibility, and shortfall resolution. Each of the issues presented in Chapter II, prepositioned stocks, host nation support, sealift, and lean logistics met all of these criteria.

Development of the Updated Educational Tool

As a result of the findings in these first two sections of the methodology, the development of the updated educational tool was accomplished by revising the existing JPLAN Exercise. Since the appropriate method was found to be role playing/gaming, the existing JPLAN provided a basic template upon which to build the updated educational tool. From this point forward the new educational tool will be referred to as the revised JPLAN Exercise.

Document Retrieval. The first step involved the retrieval of a sanitized MANFOR, a MEFPAK, a sample listing of prepositioned stocks, and a course syllabus. These documents were reviewed to extract the most current information with respect to UTCs, typical prepositioning assets in the theater of a major regional conflict (MRC), and specific course requirements and constraints.

Revisions to the Original JPLAN Exercise. This information was compared to the contents of the original JPLAN Exercise and discrepancies were identified and corrected. Grammar, terminology, and word flow corrections were also made to enhance the overall readability of the exercise. This updated, revised portion of the original JPLAN was renamed JPLAN Exercise Part I. This document is included in our research as Appendix C. The specific changes that were made have been identified with a thick bar along the side of whole paragraphs and individual words that were changed have been both bolded and italicized. Appendices C and D of the exercise were updated as well to reflect a realistic listing of available aircraft for a MRC, proper ramp space for these aircraft, and a realistic number of combat forces selected for such an engagement.

Data Handbook. Although not originally anticipated, it was revealed that a Basic Deployment Data Handbook for the students also required extensive updating. This document provides the students with a complete listing of the available UTCs and associated data to include manpower requirements, ramp space requirements, measurement tonnage, short tonnage and other logistic deployment data. Refer to Appendix D for a few sample pages from the handbook.

The task of updating this handbook involved the same steps as those in updating the original JPLAN Exercise as described previously. UTCs that were identified as no longer current were replaced with current UTCs that perform the

same or similar missions. In a few cases, the actual weapon system was no longer current. In these instances, the system which replaced the outdated one was added to the handbook listing and given the same Mission Capabilities Statement (MISCAP) as the original. Also, any force packages introduced into the JPLAN through our original updating procedures were added to the handbook along with their associated Combat Support (CS) and Combat Service Support (CSS) UTCs.

Additions to the Original JPLAN Exercise. In accordance with the methodology presented in Chapter III, we also incorporated the current logistics issues outlined in Chapter II. The issues of prepositioning, host nation support, and sealift were added to the original JPLAN Exercise in the form of a role playing scenario based on the revised JPLAN Exercise Part I. This scenario is called the JPLAN Exercise Part II. This document is presented as Appendix E.

The issues of lean logistics and two-level maintenance could not feasibly be presented in the context of this scenario, however they are a wonderful extension of the ideas presented. For this reason, we included the discussion of these issues into a post-exercise seminar using the scenario as a framework to explore the effects of these issues on the joint planning process. This was accomplished by providing the instructor with materials on the various issues, as well as an instructor's guide to provide clear direction for the implementation of the revised JPLAN Exercise (Parts I and II). The instructor's guide developed for the revised JPLAN Exercise is included as Appendix F.

Findings #2 and #3: Updated Tools and Relevant Issues. To answer the second and third investigative questions presented in Chapter I, the authors found that the original JPLAN should be revised rather than replaced because role playing/gaming was found to be the appropriate method of instruction in terms of the criteria required for the LOG 299 course. Also, all of the current issues presented in Chapter II are essential for incorporation into the revised JPLAN Exercise. None of the issues in the original JPLAN Exercise needed to be deleted.

Experimentation, Questionnaire Administration, and Preliminary Analysis

To measure the differences in the perceptions of the students with respect to the different educational tools, we developed the instrument called the JPLAN Exercise Questionnaire described in Chapter III. The questionnaire is provided for reference in Appendix G.

According to the experimental design, the students were separated into two groups by the course director as described in Chapter III. Each group consisted of two teams. The first week of class one group participated in the original JPLAN Exercise while the other group participated in the revised JPLAN Exercise. The following week the groups switched monitors and exercises. The monitors did not switch exercises from the first week as the students had. In this way, both groups were exposed to both exercises on separate occasions by the separate monitors.

Following the conclusion of both exercises, the JPLAN Exercise Questionnaire was administered by the researchers to all of the students of the LOG 299 course. They were given 30 minutes to complete the questionnaire. Subsequently, the questionnaires were collected by the researchers.

A preliminary analysis was done to identify any data which might be suspect, and to generate descriptive statistics to note any observed trends. The results of this preliminary analysis indicated no unexplained trends that were not clarified in the comparative questions. Four cases, however, were omitted from the primary analysis because there was reason to believe that these individuals did not read the questions fully. The specific reason for this conclusion is that each of these individuals answered two questions of opposite meaning with the same general response. The remaining 21 cases were coded into the computer for the primary analysis which follows. The actual data can be found in Appendix H.

Data Analysis

Prior to data analysis for the purpose of hypothesis testing, we generated a Pearson product moment correlation matrix to use in assessing the internal validity of the questionnaire. From this matrix, we were able to identify the strength of the relationships among the various questions in each area, as well as determine the direction of correlation. The direction of correlation was important in the case of questions that were written in opposing manners to check for respondent acquiescence.

As a result of this effort, we found that there was a strong (between 0.6229 and 0.7387) relationship among the value questions concerned with the original JPLAN Exercise. The value questions for the revised JPLAN Exercise were all very strongly related (between 0.7496 and 0.8478). The questions directed at the realism of the original exercise were weakly to strongly related (between -0.2876 and 0.5375). The same questions concerned with the revised exercise were moderately to strongly related (between -0.4014 and 0.5299). The first two questions on self-efficacy of the student following exposure to the original

exercise were very strongly related (0.7011), however, the third question was weakly related to the first two (between 0.2661 and 0.2707). The efficacy questions following exposure to the revised exercise were strongly to very strongly related (between 0.5250 and 0.9321). Finally, the currency questions presented in the questionnaire were all moderately to strongly related (between -0.4143 and 0.6908). In all three cases where opposite questions were posed for the same area of interest a negative correlation was observed. With the exception of the third question on self-efficacy, the questionnaire exhibits sufficient internal validity for the purposes of our research. The Pearson product moment correlation matrix can be found in Appendix H.

Following the check for internal validity of the questionnaire, the resulting data from the survey were first statistically analyzed to determine normality using the Wilk-Shapiro Rankit Plot. The test statistic for the Wilk-Shapiro Rankit Plot of each question was compared with a W test chart to determine normality. At alpha equal to 0.05 with 21 cases, only three of the 25 questions could be considered to follow the normal distribution. In addition to this finding, it is important to note also that the questionnaire data is discrete. This presents a problem in analysis because the Wilk-Shapiro Rankit Plot is predicated on an assumption of continuous data as the input.

Since the assumption of normality was not met, a t-test could not be performed to determine the differences between the two population means for each question. To test for the difference between two population means, we then used the non-parametric test identified in Chapter III, the Wilcoxon Signed Rank Test for Independent Samples. The results of this test are summarized in Table 3.

Table 3. Wilcoxon Signed Rank Test for the JPLAN Exercise Questionnaire

	One-tailed p-value	alpha = 0.01	alpha = 0.05	alpha = 0.10
QUESTIONS #1 AND #10 (**value**)	0.0742	Not significant	Not significant	Significant
QUESTIONS #2 AND #11 (**realism**)	0.0001	Significant	Significant	Significant
QUESTIONS #3 AND #12 (**efficacy**)	0.5332	Not significant	Not significant	Not significant
QUESTIONS #4 AND #13 (**value**)	0.0322	Not significant	Significant	Significant
QUESTIONS #5 AND #14 (**realism**)	0.1914	Not significant	Not significant	Not significant
QUESTIONS #6 AND #15 (**efficacy**)	0.2344	Not significant	Not significant	Not significant
QUESTIONS #7 AND #16 (**value**)	0.0541	Not significant	Not significant	Significant
QUESTIONS #8 AND #17 (**realism**)	0.0195	Not significant	Significant	Significant
QUESTIONS #9 AND #18 (**efficacy**)	0.0645	Not significant	Not significant	Significant

At the most stringent level, an alpha equal to 0.01, only one set of questions reveals a significant difference in the respondents perceptions for the original and revised exercises. In this instance, the students of the LOG 299 course considered the revised JPLAN Exercise to be more realistic than the original JPLAN Exercise. The second and third pair of questions directed at the difference in realism of the exercises differ drastically in their inferences. The second pair are not significant until an alpha equal to 0.1914 is used, however the third pair is very close to being significant under the most stringent standard of alpha equal to 0.01. The third question is on the borderline with a p-value equal to 0.0195. The incongruence of the results between the first and third pair of questions, and the second pair of

questions may be due to the fact that the second pair was worded in an opposing manner to that of the first and third realism questions and may have been misread by the respondents. The preliminary analysis identified this as a possible problem, however the cases involved were not omitted because the similarities in response to the questions of opposite meaning were slight and because the sample size was already dangerously small.

Less stringent standards, with an alpha equal to 0.05, yielded two sets of questions with significant results, in addition to the set identified as significant at the alpha of 0.01. The first pair of questions was directed at measuring the differences in perceptions of the students with regard to the value of the exercises, both original and revised. This pair of questions fell between the alpha of 0.01 and 0.05 with a p-value of 0.0322. The second pair of questions that revealed a significant difference in student perceptions between the original and revised JPLAN Exercises was the set of realism questions described above with a p-value of 0.0195. Three sets of questions came close to meeting this standard as well. Two of these question pairs were directed at measuring differences in student perception of value between the two exercises. These pairs of questions had p-values of 0.0541 and 0.0742 respectively. The third question pair was concerned with the self-efficacy of the students following exposure to both exercises. This pair had a p-value of 0.0645.

At the least stringent standard, with an alpha equal to 0.10, three pairs were identified as significant, in addition to those found significant at the alpha equal to 0.01 and 0.05 standards. These three pairs were those previously described as very close at the alpha equal to 0.05 standard.

Three question pairs were identified as not significant at any of these levels of confidence. Two of these question pairs were meant to measure the difference in the self-efficacy of the students after participating in both exercises. The p-values for each of these was 0.5332 and 0.2344 respectively. The final question pair, concerned with realism, was identified earlier as a possible problem due to its opposite wording. This question had a p-value of 0.1914.

The questions addressing the currency of the two exercises were not paired, but were written as comparative questions. In addition, one comparative question each was also written to address value, realism, and efficacy. For this reason, the Wilcoxon Signed Rank Test was not used to determine a significant difference between the student perceptions of currency between the exercises.

To determine significance of differences in these areas, we conducted an analysis of these questions using a Sign Test for a Population Median M. The null hypothesis for each of these questions was that the median response for the group was equal to four. The alternative hypothesis for each of these questions was that the median response for the group was greater than four, with one exception. Because question #21 was written with an opposing meaning, the alternative hypothesis for this question was that the median response for the group is less than four. The rejection region for the null hypothesis in this test occurs when the p-value for a question is less than 0.05. The results of these analyses are summarized in Table 4. The information presented in this figure reveals that we can reject the null hypotheses for each of the questions except question #21.

Table 4. Sign Test for a Population Median of 4 for JPLAN Exercise Questionnaire Comparative Questions

	Test Statistic S	$P(x \geq S)$	p-value
Question #19	18	0.99989	0.00011
Question #20	17	0.99926	0.00074
Question #21	12	0.80834	0.19166
Question #22	17	0.99926	0.00074
Question #23	16	0.99640	0.0036
Question #24	15	0.98670	0.0133

The purpose of this analysis was to provide objective, quantitative information to test the four hypotheses presented in Chapter III.

Hypothesis #1. Our null hypothesis stated that there were no differences in educational value between the exercises. Using the statistical analysis presented above, we must fail to reject this hypothesis at the alpha equal to 0.01 and 0.05 levels.

Hypothesis #2. Our null hypothesis stated that there were no differences in currency between the exercises. The Chi-square statistics calculated for the questions in this area indicate that there is in fact no appreciable difference in the exercises with respect to student's perceptions of currency at the alpha equal to 0.05 level. For this reason, we must fail to reject the null hypothesis.

Hypothesis #3. Our null hypothesis stated that there were no differences in the representation of reality between the exercises. The data analysis presented previously suggests that there is evidence of a significant difference in realism between the two exercises at the alpha equal to 0.01 and 0.05 levels.

For this reason, we reject the null hypothesis in favor of the alternative hypothesis that the revised exercise is more representative of reality than the original exercise.

Hypothesis #4. Our null hypothesis stated that there would be no difference in student efficacy following exposure to the two exercises. The data analysis tends to support this hypothesis. The Wilcoxon Signed Rank Test does not indicate a significant difference in student self-efficacy following exposure to both exercises, except in one pair of questions at the alpha equal to 0.10 level. The result is that we must fail to reject the null hypothesis that efficacy is not affected by exposure to the two exercises.

Finding #4: Significant Difference Among the Tools

The analysis of the data has resulted in the acceptance of only one of the four alternative hypotheses outlined in Chapter III. The revised JPLAN Exercise was considered more realistic than the original JPLAN Exercise. There was insufficient quantitative evidence, however, to state that the revised exercise was considered more valuable, more current, or increased the student's self-efficacy when compared to the original JPLAN Exercise. In addition to quantitative analyses, qualitative observations and analyses should be reported.

Qualitative Assessment

Personal interviews were conducted with the two exercise monitors following the completion of the course. The purpose of these interviews was to gather information extraneous to that found in the JPLAN Questionnaire alone. This information could then be used to clarify the quantitative analysis.

The first exercise monitor, Major James Weeks, is the LOG 299 Course Director. He monitored the revised JPLAN Exercise throughout the experiment. According to Major Weeks, the students that participated in the original JPLAN

Exercise first and the revised JPLAN Execise the following week were observed to comment favorably on the improved currency and realism of the revised JPLAN Exercise over the original JPLAN Exercise. Major Weeks felt that the revised JPLAN Exercise was substantially better than the original, and stated that it was his intention to use the revised JPLAN Exercise in place of the original in all future classes. Specifically, he commented that the revised JPLAN Exercise is "far superior" to the original (Weeks, 1994).

The second exercise monitor, Mr. Albert Rogers, is the LOG 299 Course Co-Director. Mr. Rogers monitored the original JPLAN Exercise throughout the experiment. In monitoring and debriefing the second group, he noted significant frustration among the group members. He attributed the frustration of the group to the lack of realism and flexibility in the original JPLAN Exercise in comparison to the revised JPLAN Exercise. The students viewed the Host Nation Support and Sealift options as critical to the realism of the exercise. Based on his observations and comparison of the two JPLAN exercises, Mr. Rogers' opinion is that the revised JPLAN Exercise is more current, realistic, and flexible than the original JPLAN Exercise.

These qualitative observations offer more detailed information than just an agreement or disagreement with the statements concerning currency and realism. Specifically, this information reveals possible reasons for the students responses. Additionally, these observations revealed that the revised JPLAN Exercise provides more flexibility to both the students and the monitors. This is congruent with one of the stated goals of the updated exercise as described in Chapter III.

Chapter Summary

This chapter presented the answers to the four investigative questions presented in Chapter I. This task was accomplished in several steps. The first step was the evaluation of the various alternative instructional methods outlined in Chapter II, followed by the determination of current force packages and logistics issues. The next step was the development of a revised JPLAN Exercise. Finally, this process was concluded with the quantitative measurement and qualitative evaluation of the differences between the original and revised exercises according to the guidelines described in Chapter III. The following chapter will provide the authors' conclusions and recommendations.

V. Conclusions and Recommendations

Purpose

The purpose of this chapter is to present conclusions drawn from the preceding four chapters of research and analysis. This effort has included the identification of a specific problem, a review of relevant literature, the development of an appropriate methodology, and an analysis of data to yield answers to our investigative questions. Additionally, this chapter is meant to provide recommendations for future research.

Organization

The presentation of conclusions will be divided into two sections. The first section will address conclusions specifically drawn from each of the four findings presented in Chapter III. The second section will address conclusions of a general nature. Following the presentation of our conclusions we will identify the specific limitations of our research efforts. We will conclude this chapter with recommendations for future research in this subject area, as well as recommendations for more effective accomplishment of a thesis effort in this area.

Conclusions Based On Findings

The purpose of this research was to provide the LOG 299 course director with a valuable educational tool to take the place of the current JPLAN Exercise. To accomplish this task, we developed the four investigative questions presented in Chapter I which would guide us toward the achievement of that objective. Specific conclusions based on the answers to these investigative questions are discussed below.

Conclusion #1. The first investigative question inquired about the effectiveness of an educational tool. Our research revealed a taxonomy of effective educational methods. These teaching techniques were summarized in Chapter II within Table 1.

The effectiveness of a particular method was found in the literature to be dependent upon the particular situation. Each of the five major instructional methods had its own advantages and disadvantages. We assert that for an educational tool to be effective, it must be capable of meeting the requirements, objectives, and constraints of the course or lesson for which it is intended.

For the purposes of the LOG 299 course and the objectives of the lesson in which the JPLAN exercise was used, we concluded that an exercise was the most effective educational tool. Table 3 in Chapter IV provides a visual representation of the process by which we made this conclusion.

Conclusion #2. The second investigative question addressed the issue of either revising the current JPLAN exercise or replacing it with a more appropriate educational tool. Once we concluded that an exercise was most appropriate for the lesson in which the JPLAN Exercise was currently being used, it became readily apparent that we should revise the current JPLAN Exercise to reflect current trends in combat logistics.

Conclusion #3. The third investigative question inquired about two separate issues. First, we needed to identify the most current logistics issues essential for incorporation into the revised JPLAN Exercise. We then needed to determine whether or not all issues could be included in the new educational tool without sacrificing quality or exceeding course constraints.

The review of relevant literature, as well as telephone interviews with Air Force officials, revealed that the issues of prepositioned stocks, host nation

support, sealift, lean logistics, and two-level maintenance were the most current logistics issues essential for incorporation into an educational tool for the LOG 299 course.

The incorporation of all of these issues into the exercise, without sacrificing quality, was not feasible. The issues of lean logistics and two-level maintenance were not well suited for use in an exercise. These issues were not included in the revised JPLAN Exercise, but were added to the lesson in discussion form. The remaining issues of prepositioned stocks, host nation support, and sealift were incorporated into the new exercise.

Conclusion #4. The fourth investigative question was concerned with determining whether or not there was a significant difference between the revised and original exercises. Given the changes we made to create the revised JPLAN Exercise, based on our findings from the first three investigative questions, we anticipated a significant difference in the attitudes of the students surveyed about the two exercises. We must conclude that there is no significant difference overall between the revised and original exercises.

We tested four hypotheses to determine a difference in the two exercises. These hypotheses assessed differences in value, realism, currency, and student self-efficacy. Of the four areas surveyed, only one was found to be significant. The students who participated in our experiment felt that the revised JPLAN Exercise was more representative of reality than the original exercise.

Considering the extensive efforts we expended to revise the JPLAN Exercise to make it a more current, more valuable, and more realistic educational experience, we were surprised to find that the students did not perceive significant differences between our revised version and the original exercise.

In the following section we will provide possible reasons for such surprising conclusions.

General Conclusions

When we developed the revised JPLAN Exercise, we expected it to result in an educational tool that would be considered far superior to the original. The actual results indicated that the students considered our revised JPLAN Exercise to be no different than the original. At first, this information caused us considerable confusion and distress. The fact that our efforts did not yield the results we were expecting caused us to look for an explanation. This thought process led us to the following conclusions.

Conclusion #5. Educational tools, like many other items, are often described in terms of both their processes and their content. Different tools may consist of differing content depending on the subject matter of interest or may contain the same content. The process involved, however, is dependent on the tool itself. Obviously, the process of instructing through lecture is different in nature than the process of instructing through the use of exercises.

With this perspective in mind, it was not so startling to find that the students viewed the revised and original JPLAN Exercises as similar. Although the two exercises differed significantly in raw content, they employed the same experiential processes. Similarly, it is interesting to note that the students found the revised JPLAN Exercise more realistic because the content was in fact changed to provide a more realistic scenario with actual logistics deployment data where possible.

From this information about the nature of learning tools we conclude that process alone may be the driving factor in the determination of value and currency measures of a particular educational tool. The content, whether accurate or not, only provides a relative framework within which the process makes sense to the student.

Conclusion #6. Self-efficacy may be in large part driven by the outcomes achieved by the student. In the case of our revised JPLAN Exercise, the self-efficacy of the students was not significantly improved over that of the original JPLAN Exercise. This may be explained by the fact that both of these exercises provided the same processes and resulted in the same outcomes for the students. With this perspective in mind, we would not expect much difference in the self-efficacy of the students.

Conclusion #7. One of the more perplexing questions that arose in the process of conducting this research was "Why was the exercise not updated earlier if the course director felt it was so inadequate?" Following the revision of the original JPLAN Exercise and after having witnessed the disappointing results, we have concluded that there are two reasons for this.

The first reason for not updating the exercise on a continuing basis is that this endeavor is very time consuming. This is coupled with the fact that the last decade has been characterized by frequent, often extreme changes. The second reason for not updating the exercise is possibly due to the fact that it still met the overall objectives of the course. This correlates well with the results of our analysis which show the value of the exercises to be the same. Once again, this may be due to the importance of process over content.

All of these conclusions, however, are dependent upon the results we obtained from our analysis in Chapter IV. These results are in turn dependent upon the experimental design in Figure 1 of Chapter III. Therefore, the limitations of our experimental design are an important factor to be considered.

Limitations of Our Research

Several limitations became apparent in our experimental design and in the research effort. These limitations should not negate the results of the study, but should be taken into careful consideration by those who may be contemplating follow-on research.

Scope. As noted in Chapter I, the findings of this particular study are limited to individuals participating in the LOG 299 course provided by the Air Force Institute of Technology, School of Systems and Logistics. Likewise, the educational tool developed as a part of this research effort was designed for use with the particular constraints of the LOG 299 course in mind and may not be valuable for use in courses of differing subject matter or courses under differing constraints.

Sample Size. The LOG 299 course usually accommodates between 20 and 25 students per class. The class which participated in this research effort contained only 25 students. Typically, it is important to have a sufficiently large sample size in order to make inferences about a particular population with any confidence or to obtain a reliable data set. Our sample size of 25 is not considered to be sufficiently large.

Experimental Design. If we were able to change just one facet of our research environment, we would have wished for more than one class to participate in the experiment. Unfortunately, we had to accept the situation as it was presented to us as researchers. For this reason, we were unable to perform a

true experiment. Our experimental design was driven by the fact that only one class of students was meeting for the LOG 299 course during the time our research was being conducted. This constraint limited our options and steered us toward the use of a modified one-shot case study as shown in Figure 1 of Chapter III.

The one-shot case study is the simplest of all experimental designs. This design is unable to control for many of the threats to internal validity. For this reason it is called a pre-experimental design. The weaknesses of this design are significant. First of all, it provides no adequate basis for the comparison of findings to other observations. Secondly, all one-shot case studies are subject to the threats of mortality, maturation, and history. Fortunately, we did not observe any mortality in our experiment. Unfortunately, however, we will never know the effects history or maturation may have had on our subjects.

Constraints. Finally, this research effort was limited by time and by the abilities of the researchers. The time constraints associated with this effort included the overall time allowed in our academic program, as well as deadlines imposed by the LOG 299 course schedule of offerings. The abilities of the researchers became a constraint in the development of a revised exercise which could incorporate improved database capabilities. Our lack of database programming knowledge made it difficult to update the computer portion of the exercise. This problem was abrogated by seeking the help of Major Mark Roth.

These limitations are significant to the interpretation of our research results and should be carefully considered in the event that replication of this study is attempted or follow-on research is accomplished. The following section is provided for the purpose of presenting our recommendations concerning future use of the revised JPLAN Exercise and the possibilities for further research in this area.

Recommendations For Use of the Revised JPLAN Exercise

Our first recommendation based on the results of this study is that the course director of the LOG 299 course should use the revised JPLAN Exercise in future course offerings. Although the analysis of the two exercises revealed that the students perceived little or no difference between the two exercises, we feel the updated exercise has solved the original problems identified in Chapter I. The information presented in the revised JPLAN Exercise represents the current state of the joint planning process at the time of our research.

We also recommend that the revised JPLAN Exercise should be updated periodically to reflect the current trends in logistics policy, as well as current forces. The process of learning will remain the same, however the information used in the exercise will be congruent with the environment the students must function within.

Recommendations For Further Research

The idea of separating the concepts of process and content with the intent of measuring the influence of both on learning opens up a multitude of research opportunities. The possibilities for future research in this area of interest are great. We would like to offer the following recommendations for consideration to those interested in further research.

An experiment should be accomplished in which two separate educational methods are used to teach the same block of material (same content) with the same overall objective. The differences between the underlying processes used in the two methods may provide significant differences in the value of the experiences and the self-efficacy of the students. This could support our conclusions that the process is the driving force in perceived value of educational tools.

A different experiment using two separate educational tools may also be used to teach the same content with completely different objectives. Similar to this, two separate educational tools could also be used to teach a completely different content with the same objectives. These two experiments may provide insights into the importance of the overall objectives on student self-efficacy.

An experiment should also be accomplished in which the same educational method is used to teach the same material (content) but with completely different objectives to two separate classes. This experiment would reveal the relationship between the learning objectives and the educational tools.

Finally, the same educational method could be used to teach completely different material (content) with the same learning objectives to two separate classes. This might provide more insight into the relationship between content and various educational tools (process).

Chapter Summary

This chapter presented the conclusions specifically drawn from each of the four findings presented in Chapter III, as well as conclusions of a general nature. Following the presentation of our conclusions we identified the specific limitations of our research efforts. We concluded this chapter, as well as this thesis effort, with recommendations for future research in this subject area.

Appendix A: MANFOR Sample

Prepared 94 Mar 10 MANPOWER FORCE ELEMENT LISTING As of 94 Mar 10 PCN SA200-18A

UTC - 3RTEN0 TITLE - TRS 18 RF 4C Strength - OFF 062 AMN 400 CIV 000 TOTAL 0462 Change Date - 931209

SEQ NR	Mission Capabilities Statement
1	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
2	Sortie Rate: XXXXXXXXXXXXXXXXXXXX
3	Crew Ratio: XXXXXXXXXXXXXXXXXXXX
4	Deployable To: MB, COB, LB, SB, BB
5	18 PAA RF-4C ANG UTC W/INDEP WRSK. No ECM
6	capability. Provides RECON SPTR for 1 CORPS, 3 DIV,
7	9 BOE, 30 BTN, or 8 TFS's. CMD, INFO, Safety, MAT
8	Staff, INTEL, Tng, Admin, OPS/Aircrews, Aircrew
9	SURV/PROT Equip, Flt Med, Unit Supply, Avionics
10	Maint, Fld Maint, Org Maint, Veh Maint, Mun Maint,
11	PPIF W/LAB. ILM Cap is in UTC HFASB. Pilot or Nav
12	AFSC's may be substituted for Sqdn Cmdr and Ops Off
13	positions. AFSC subs: 04016/04024 and 732x0/702x0
14	in FAC 2100. These AFSC's are interchangeable.

NOTE: XXX...X INDICATE INFORMATION NOT INCLUDED DUE TO CLASSIFIED NATURE.

Appendix B: MEFPAK Sample

** MEPPAK SUMMARY REPORT **

DATE 31 DEC 92

UTC MOVEMENT CHARACTERISTICS
(SUMMARY LIST)

UTC		UNIT TYPE NAME	PILOT UNIT	AUTH PERS	NO. PAX	REP CMD	BULK	OVER	OUT	*****SHORT TON REQUIREMENTS***** NONAIR	TOA TOTAL	ORGANIC	UTC TOTAL	DEP
3AFB1	TSE 04	OA 37B ATTRITION FILLER		4	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFC1	TFE 04	F 16 ATTRITION FILLER		4	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFC2	TFE 06	F 16 ATTRITION FILLER		6	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFD1	TFE 04	F 15 ATTRITION FILLER		4	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFD2	TFE 06	F 15 ATTRITIDN FILLER		6	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFE1	TFE 04	F 4E ATTRITION FILLER		8	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFE2	TFE 06	F 4E ATTRITION FILLER		12	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFF1	TRE 04	RF 4C ATTRITION FILLER		8	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFF2	TRE 06	RF 4C ATTRITION FILLER		12	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFG1	TFE 04	A 10 ATTRITION FILLER		4	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFG2	TFE 06	A 10 ATTRITION FILLER		6	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFH1	TAE 04	C130 ATTRITION FILLER		16	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFH2	TAE 06	C130 ATTRITION FILLER		24	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFJ1	TFE 04	A 7D ATTRITION FILLER		4	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AFJ2	TFE 06	A 7D ATTRITION FILLER		6	0	PAF	.0	.0	.0	.0	.0	.0	.0	P
3AGAJ	TSE 02	E 3 QUICK RESPONSE	0552AAAWG0000	101	61	CMB	39.2	82.2	.0	.0	121.4	.0	121.4	2
3AGEM	TSE 03	E 3 AWACS	0552AAAWG0000	240	180	CMB	78.6	168.0	.0	.0	246.6	.0	246.6	2
3AGEQ	TSE 01	E 3 AWACS	0552AWACW0000	32	12	CMB	.0	.0	.0	.0	.0	.7	.7	2
3AGET	TSE 02	E 3 AWACS	0552AAAWG0000	173	133	CMB	64.1	155.1	.0	.0	219.2	.0	219.2	2
3AGEU	TSE 01	E 3 AWACS AUG	0552AWACW0000	67	47	CMB	23.1	20.9	.0	.0	44.0	.0	44.0	2
3AGGT	TSE 03	0 2A		21	18	CMB	6.5	44.1	.1	.0	50.7	.0	50.7	2
3AGJA	TSS 05	EC130E ABCCC	0007ABCSQ0000	375	295	CMB	61.8	37.4	.0	.0	99.2	.0	99.2	2
3AGJC	TSE 02	EC130E ABCCC	0007ABCSQ0000	118	86	CMB	26.9	19.2	.0	.0	46.1	.0	46.1	2
3AGJD	TSE 03	EC130E ABCCC	0007ABCSQ0000	208	160	CMB	32.5	25.5	.0	.0	58.0	.0	58.0	2
3AGJE	TSE 03	EC130E ABCCC DEP	0007ABCSQ0000	201	153	CMB	31.3	11.8	.0	.0	43.1	.0	43.1	2
3ALJA	ACC 02	EC130E QUICK RESPONSE	0007ABCSQ0000	98	66	CMB	24.7	12.9	.0	.0	37.6	.0	37.6	2
3BACA	SBS 01	B 52		7	0	CMB	.0	.0	.0	.0	.0	.0	.0	P
3BACB	SBS 03	B 52		21	0	CMB	.0	.0	.0	.0	.0	.0	.0	P
3BACC	SBS 05	B 52		35	0	CMB	.0	.0	.0	.0	.0	.0	.0	P
3BACD	SBS 10	B 52		77	0	CMB	.0	.0	.0	.0	.0	.0	.0	P
3BACE	SBS 14	B 52		98	0	CMB	.0	.0	.0	.0	.0	.0	.0	P
3BADA	CRW 01	B 52		5	5	CMB	.0	.0	.0	.0	.0	.0	.0	P
3BADB	CRW 03	B 52		15	15	CMB	.0	.0	.0	.0	.0	.0	.0	P
3BADC	CRW 05	B 52		25	25	CMB	.0	.0	.0	.0	.0	.0	.0	P
3CAAD	ACC 01	EC135K TAC DEP CTL	0008ADCSQ0000	35	26	CMB	6.6	6.5	.0	.0	13.1	.0	13.1	2
3CAAE	ACC 04	EC135C		0	0	CMB	.0	.0	.0	.0	.0	.0	.0	4
3CAJA	TSE 01	EC135K QUICK RESPONSE	0008TDCSQ0000	15	6	CMB	.0	.0	.0	.0	.0	.7	.7	2
3CBAC	ACC 01	E 4B NEACP		66	0	CMB	.0	.0	.0	.0	.0	.0	.0	2
3DCAK	TEW 04	EC130H COMPASS CALL	0355WNGWG0000	278	226	CMB	63.0	36.2	2.2	.0	101.4	.0	101.4	1
3DCAN	TEW 05	EC130H COMPASS CALL	0355WNGWG0000	240	175	CMB	63.0	36.2	2.2	.0	101.4	.0	101.4	1
3DCJA	TEW 02	EC130H QUICK RESPONSE	0355WNGWG0000	108	82	CMB	30.4	5.4	2.2	.0	38.0	.0	38.0	1
3DSDB	TEW 06	EF111A	0366TFGWG0000	199	187	CMB	125.6	87.5	.0	.0	213.1	.0	213.1	2

Appendix C: JPLAN Exercise Part I

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LIST OF FIGURES

GENERAL INFORMATION

OBJECTIVES

The Joint Planning Exercise (JPLAN) is a modified version of an exercise used by the Air Command and Staff College at Maxwell AFB, AL. In its original form, it covers the entire process from initiation through the execution of a planning completed plan. This takes place over a series of ***four*** three-hour seminars.

In the AFIT version of JPLAN, you will be involved only in the PLAN DEVELOPMENT PHASE of the Deliberate Planning Process. The game simulates the real world Joint Operation Planning and Execution ***System*** (JOPES). As in JOPES, there are modules to create and modify force lists, generate a TPFFD, determine transportation feasibility, and resolve shortfalls.

THE BASIC OBJECTIVE OF JPLAN IS TO PROVIDE YOU WITH THE OPPORTUNITY TO ***EXPERIENCE*** THE JOINT PLANNING PROCESS AT WORK AND TO DEVELOP AN APPRECIATION FOR THE COMPLEXITY OF THE TASK! Also, you will have the opportunity to apply some of the knowledge acquired in the classroom. Finally, as with all simulations you will be able to apply your management, decision-making, and interpersonal skills.

JPLAN HAS BEEN DESIGNED TO REPRESENT THE REAL WORLD AS ***CLOSE*** AS POSSIBLE, HOWEVER, THERE ARE RESTRICTIONS TO INCREASE PLAYABILITY AND TO ALLOW THE MAXIMUM LEARNING IN A LIMITED TIME. KEEP THIS IN MIND AS YOU PARTICIPATE IN THE EXERCISE!!

GENERAL SCENARIO

JPLAN is a computer assisted simulation of the Joint Operation Planning and Execution System (JOPES). In this exercise, the JCS has directed the Commander in Chief, US Western Command (a UNIFIED Command) to prepare a plan for the defense of IGUANA, a US ally, against external aggression directed from the neighboring country of BRAZONA, which is hostile to Iguana and US interests there.

Planning for this contingency is already well underway and as a newly assigned member on the WESTAF Staff, the USAF component command of WESTCOM, you have been tasked to complete the FORCE PLANNING and prepare a TPFDD. Note that in the real world, this would be a combined effort by several agencies. For this exercise however, YOU ARE IT!!!

As indicated, most of the planning has been completed. JCS tasking to CINCWESTCOM resulted in the publication of a Planning Directive for CINCWESTCOM OPLAN 9601-Defense of Iguana. This document proposed four courses of action for CINC review. The

CINC selected course of action III for preparation of the plan. Mission Statements for planning have already been issued by the component commanders.

AN INTELLIGENCE ESTIMATE HAS BEEN COMPLETED. Based upon this estimate and estimates of the rest of the staff, and within the guidance provided, CINCWESTCOM issued a Concept of Operations to begin OPLAN development. Operations planners have completed the selection of major combat forces (CF) to be deployed and have selected beddown locations at six (6) airfields in Iguana.

It's at this point that the logistics planners begin the majority of their task. Each major combat force must be provided with the Combat Support (CS) and Combat Service Support (CSS) required to operate at its beddown location. In JPLAN, four (4) of the six bases are PRELOADED, that is, all Air Force CF, ***and some*** CS, and CSS units have been selected and loaded into the data base. Also, all ARMY forces (which will greatly impact your airlift) are preloaded. Specific ground rules are detailed later in these instructions.

Your IMMEDIATE TASK is to bring yourself up to date on the situation in Iguana and the steps taken to develop OPLAN 9601. To assist you in this area, the MISSION STATEMENT, CONCEPT OF OPS, and Air Force Major Combat Forces List have been assembled in these instructions. These may be of great help in building your TPFDD.

Specific instructions for TPFDD development, estimating the transportation feasibility of the plan, and resolving shortfalls are included. BEFORE COMING TO CLASS FOLLOWING RECEIPT OF THESE INSTRUCTIONS BECOME FAMILIAR WITH THEM!! A short JPLAN overview will be provided and operation of the computers will be demonstrated. ***A***fterwards, teams will move to assigned areas to begin work.

COMMAND RELATIONSHIPS

JPLAN ***represents*** the real world as much as possible. Although the theater and names of commands are FICTITIOUS, the relationships among the commands ***are*** the same as the real world. This is shown on the following page.

COMMAND LEVEL	REAL WORLD EXAMPLE	JPLAN
Unified Command	USEUCOM (Europe)	USWESTCOM
Component Command	USAFE	WESTAF
	USAREUR	ARWEST
	USNAVEUR	WESTFLEET

DEPLOYMENT TIMING

Timing in JPLAN is based on D-DAY, the day we expect to begin ground operations. Deployment will begin no EARLIER THAN D-10. You can move forces by air until D+10. These limits are established in the computer program, so you don't have to worry about them. In the real world deployments are based upon C-DAY!!!

CONCEPT DEVELOPMENT PHASE

During INITIATION PHASE, JCS, through the JSCP Vol I, tasked the CINCWESTCOM (unified command) to develop a plan for the defense of ***Iguana***. Both the major combat forces, as well as the transportation assets that can be used in planning, have been apportioned .

The CONCEPT DEVELOPMENT PHASE requires the unified commander to analyze the situation and decide on a concept of operations to accomplish his mission. For the JPLAN scenario, we simulate that the unified commander, his staff, and component commanders have already conferred in a preliminary planning conference. CINCWESTCOM has presented his personal views and a tentative evaluation of the problem at this meeting. His staff has been directed to work with the component commands and review all available intelligence, analyze the tasks in the ***Joint Strategic Capabilities Plan*** (JSCP), and provide guidance for his approval.

Based on the planning conference, staff estimates, and preliminary estimates of the situation, CINCWESTCOM developed assumptions and tentative courses of action. A planning directive has been issued to supporting commanders and the Transportation Operating Agencies (TOAs).

For JPLAN, COURSE OF ACTION (COA) III was selected and component commanders prepared mission statements to support it. Finally, each component commander prepared a COA for their command. In the case of WESTAF, this document expresses HOW the WESTAF commander feels the air operation will be conducted. The MISSION STATEMENT and COA for WESTAF are as follows. However, due to the number of contingencies we plan for, most plans do not go beyond the CONCEPT DEVELOPMENT PHASE (CONPLAN). But, since our tasking has directed us to prepare an OPLAN we will proceed with the PLAN DEVELOPMENT PHASE.

MISSION STATEMENT

By the direction of CINCWESTCOM, **Commander TF-906 (AFFOR) will DEPLOY and be FULLY operational by 2359 hrs on D-4.** Beginning on D-3 AFFOR will:

1. Conduct an aggressive counter air campaign to be completed by 0001 hours on D-1, and to insure air superiority during ARFOR ground operations.

2. Provide continuous close air support for ***AR***FOR.

3. Provide up to (15) tactical recon sorties per day.

Beginning on D-DAY, plan for continuous air operations in support of combined allied forces and an aggressive interdiction campaign.

CONCEPT OF OPERATIONS

*** (NOTE: This sample begins with paragraph #3 to coincide with the format specified in JOPES Vol I and AFR 28-3)

3. EXECUTION

a. Concept of Operations

(1) GENERAL: WESTCOM OPLAN 9601 involves the defense of Iguana and US citizens there from aggression on the part of Brazona through the use of Joint Task Force (JTF901) until a sub unified command (COMUSFORIGUANA) can be established. The Air Force component, TF906/AFFOR, will be composed of WESTAF forces, augmented by deploying ACC units. TF906/AFFOR will establish its HQ at BAKOA International Airport, and operate forces from there as well as Buni AB, Mudola AB, Molo AB, Molo Aux #1, and Prima AB. To accomplish the mission, TF906/AFFOR will require: Fighter aircraft to fly combat air patrol (CAP), provide air defense, and fly close air support (CAS) and interdiction sorties as necessary. TAC Recon, electronic warfare (EW), wild weasel (WW), airborne warning and control systems (AWACS), forward air control (FAC), search and rescue (SAR), and aerial refueling (AR) will be needed to support all fighter operations. All tasked units will plan for a minimum of 30 days of operations. Refer to ***Appendix D*** for detailed lists of force requirements

(2) DEPLOYMENT: Fighter, recon, defense suppression, SAR, and FAC units will deploy directly from CONUS to designated bases/operating locations in Iguana as follows:

(a) Fighters > Buni AB, Molo AB, Molo Aux #1 AB, and Mudola AB.
(b) TAC Recon > Molo Aux #1
(c) EW Units > Molo AB
(d) WW Units > Molo AB
(e) AWACS > Bakoa Int Airport
(f) SAR HQ > Bakoa Int Airport
(g) C-130 > Prima
(h) Helo's > Buni AB, Mudola AB, Bakoa Int Airport
(i) FAC Units > Buni AB, Mudola AB
(j) Tankers > Prima AB

** TACTICAL AIRLIFT UNITS WILL REMAIN AT "N.N.L.". (See Map!!)

All combat and combat support MUST be in place in Iguana NLT 2359 hours on D-4, ready to commence operations on D-3.

Combat, Combat Support, and Combat Service Support ***should*** forces will deploy to each of the six (6) bases in the SEQUENCE listed on the force planning worksheets ***(Handout)***. To assist in resolving STRATEGIC MOVEMENT CONFLICTS for assets having the same priority on the same ***Latest Arrival Date (LAD)***, WESTAF feels the bases should be considered having the following priority:

(1) BUNI (2) MOLO AUX #1 (3) MOLO (4) BAKOA (5) MUDOLA (6) PRIMA

(3) EMPLOYMENT: Beginning on D-3, the following actions will take place:

- TF906/AFFOR will conduct an aggressive 72-hour counter air campaign to neutralize the Brazonan air threat. Although scheduled to be complete by 2359 hrs on D-1, the counter air campaign may have to be continued as assets are available after D-Day.
- In addition to the air superiority missions flown, defense counter air operations will commence to defend the air space over Iguana.
- ***Each base with F-15E aircraft assigned*** will place one (1) squadron equivalent on PRIORITY A ALERT by D-3. Air defense operations will continue throughout the conflict.
- TAC Recon missions will be flown to augment intelligence efforts and provide bomb damage assessment (BDA) after key strikes in Brazona. As many as (15) sorties per day may have to be flown.
- Close air support (CAS) sorties will be flown as required to support Iguanan ground forces. After D-Day CAS sorties will be scheduled as needed. The aggressive interdiction air campaign will commence on D-Day and continue throughout the conflict.
- Tanker, SAR, EW, WW, and AWACS missions will be flown as necessary to augment the deployment, replacement and resupply, and medical evacuation.

PLAN DEVELOPMENT PHASE

INTRODUCTION

Now that we have reviewed the MISSION STATEMENT and Concept of Operations for this scenario, and since we have ***been*** tasked to build a complete OPLAN, we will move into the PLAN DEVELOPMENT Phase of JOPES. As indicated in the scenario, this phase is already partially completed. All major combat forces have been selected, and some of the support forces have been selected.

During the first part of the exercise, as part of WESTAF staff, your team will select the remaining USAF forces required to sustain operations under this OPLAN. This process is determined primarily by the conditions in the objective area where forces are deployed. In some cases, major airfields and port facilities exist that are capable of sustaining major joint military operations.

In the Iguanan case, bases essentially have only concrete runways, ramps, and a water supply. This requires a major effort to prepare the base for arriving units. The USAF Bare Base concept is the framework within which ***planners*** operate for such a deployment.

Following the selection of CS AND CSS forces, you will "go automated". Still acting as the WESTAF staff, your team will use the JPLAN program to enter your forces into the computer and produce an AF TPFDL. In recognition of your fine work, you will be promoted up to the WESTCOM staff. Army units will be integrated into the deployment to produce an overall TPFDL for the OPLAN. This will allow YOU to examine the flow into each base in Iguana.

Finally, acting as members of the WESTCOM staff, your team will use JPLAN to determine RESUPPLY/REPLACEMENT and to resolve shortfalls. Since the purpose of the exercise is primarily to develop an understanding and appreciation of these problems, you should insure that all required support is available, in the right place, in the right sequence, and at the right time.

FORCE PLANNING

SELECTION OF COMBAT SUPPORT AND COMBAT SERVICE SUPPORT FORCES

The complexity of support planning cannot be fully incorporated into a single academic exercise. For this reason, the number of capabilities you must consider has been limited as has the number of selections in the AFIT Basic Deployment Data Handbook. This exercise allows you to examine a representative

cross-section of the staff decisions which must be made in OPLAN development.

PRIOR TO CLASS, review the proposed force list for each base to ensure adequate support and priorities have been provided. During the first class session, each team will prepare a force list using the Force Planning Worksheet for BUNI and MUDOLA. When they are completed, review them for the correct and complete data. (Each entry needs UTC, POD, EMD, LAD, PRI). The population column helps you keep up with base population so you can more closely approximate the UTCs which are population-sensitive.

At ***this point***, it's important to understand the following terms:

BARE BASE: A base having, as a minimum, a runway, taxi way, and parking areas which are adequate for the deployed force, and possessing an adequate source of water that can be made potable.

COMBAT SUPPORT: Direct support required for operations of major combat forces. Examples are Munitions Maintenance, ***Intermediate-Level Maintenance***, Communications, etc.

COMBAT SERVICE SUPPORT: Services provided to the combat and combat support units. These are typical combat support group (CSG) functions such as: legal, finance, personnel, etc.

BACKGROUND MATERIAL

This background section is divided into two areas: (major combat units and support units). It summarizes the entire force planning process. YOU MUST UNDERSTAND THIS SECTION BEFORE YOU BEGIN YOUR FORCE SELECTION!!!

MAJOR COMBAT UNITS

We must start here because support of these units is what the problem is all about! You already have an approved Air Force major combat force list with beddown bases (SEE Appendix D). It is important to know what comes with these units when they deploy. When you list a UTC for deployment, the AFIT Basic Deployment Data Handbook will provide the manpower, logistics, and capabilities data peculiar to that unit. The following additional background will be helpful in determining what support is required and when.

"**Independent**" FIGHTER UTCs are built by ACC so that when the package is moved to an "established" base it is capable of

independent operations for a specific period. This means many skills and equipment are included in the UTC. For "exercise" purposes, here is the breakdown of a typical Fighter Wing squadron.

1. PERSONNEL:

(a) Commander, Operations Officer, Intel Officer, Flight Surgeon, Avionics & Munitions Officers, Maint Officer, and Aircrew for unit equipped (UE) aircraft.

(b) Maintenance personnel to keep aircraft operating at normal or surge capacity for up to (30) days.

(c) ***Limited*** back shop maintenance personnel to ***assist in keeping*** units operating at normal sortie rate only for up to (30) days. If surge rate is anticipated, an augmentation of personnel/equipment needed.

(d) Avionics/Munitions Maint personnel adequate for normal or surge capability for (30) days.

(e) Supply, Flt Medicine, Vehicle Maint, Aircrew Survival and Personnel Protection for continuous operations.

(f) CONTAINS NO COMBAT SUPPORT GROUP PERSONNEL!!!

2. LOGISTICS SUPPORT AVAILABLE:

(a) ***Readiness Spares Packages (RSP)***: The ***RSP*** is prepackaged, pre-palletized set of parts needed to keep the unit operating at normal sortie rate for (30) days on a REMOVE AND REPLACE BASIS! If the unit must operate at surge, the ***RSP*** is rapidly depleted since there is NO SQUADRON CAPABILITY for parts repair. This is why ***Intermediate-Level Maintenance (ILM)*** with specialized equipment must augment the squadron to provide the REPAIR and REPLACE capability to meet surge requirements. If a required part cannot be issued ***from*** the ***RSP*** or repaired on site, action must be taken to either obtain the part from another unit or initiate resupply from a support base;(called MICAP).

(b) Bare Base Support Package: This is a prepackaged, pre-palletized set of supplies and CONSUMABLES required for a (30) day squadron operation. It also contains a limited supply of rations (3 days for JPLAN). The packages are normally turned over to the central supply organization (BASE SUPPLY) as soon as it's established in the deployment sequence.

(c) Support Equipment: Support equipment includes all equipment required to perform the support function ***(i.e. transportation or medical support)*** EXCEPT that which is an

internal part of the mission equipment. It DOES NOT include any of the equipment required to perform mission operation functions ***such as, aerospace ground equipment (AGE) or munitions handling equipment***.

(d) Facilities: Portable buildings / shelters ARE NOT a normal part of squadron equipment. As such, a squadron does not possess deployable facilities and must rely on existing ones at the deployed location or the movement of deployable facilities such as Harvest Bare or Harvest Eagle.

SUPPORT FOR COMBAT UNITS

Based on what comes with the UTCs you ordered to build your required combat capability, you must now provide for an operating support base with ALL ITS PERSONNEL, FUNCTIONS, AND BUILDINGS BEFORE THE COMBAT UNITS DEPLOY AND COMMENCE OPERATIONS!!! The Bare Base concept provides the guidance for your planning actions. In summary, you should consider each of the unit types listed on the Force Planning Worksheet.

FORCE SELECTION PROCEDURE

Your task now is to develop the TWO (2) remaining bare bases, Buni and Mudola, by selecting the required Combat Support (CS) and Combat Services Support (CSS) forces and time-phasing their arrival and previously selected major combat forces into the desired bases. Use your major combat force list, the AFIT Basic Deployment Data Handbook, and the step by step procedures that follow. Your end product will be a computer listing which should show ***all*** Force Forces!! In the JOPES world, this listing is called a Time-Phased Force Deployment Listing (TPFDL). In this exercise, the Army TPFDL has already been loaded to decrease your workload, therefore, the listing you produce will actually include both Army and AF units. At this point, IGNORE THE FACT THAT ARMY UNITS SHOW UP AND TREAT THIS LIST AS IF IT WERE JUST THE AIR FORCE TPFDL.

Force lists for Bakoa, Molo, Molo Aux 1, and Prima have been pre-loaded. Tactical Air Control ***System*** (TACS) and Army forces have been pre-loaded for all six(6) bases. This was done to make your task easier! You may ADD, DELETE, or MODIFY the pre-loaded forces any way you wish with one exception: DO NOT DELETE ANY ARMY FORCES!!! You may, however, change their POD, LAD, and PRI later in the exercise as long as allowances are made for them to arrive at their FINAL destination by the ***preloaded LAD***.

To aid you in selecting the CS and CSS forces, we provide you with Force Planning Worksheets. Keep in mind these are pre-printed to cover a "worst case" scenario. If you feel that a particular type of support is not needed at that particular

base, don't fill in any data for that base. In fact, we recommend you draw a line through that type of UTC. ***You may want to begin by*** going down the listing and lining out what ever you feel isn't needed at a particular base, then go back and enter the data (UTC, EMD, LAD, PRI, and base population, if applicable) for each base you have left. ***The form is constructed in such a way*** that the UTCs should be brought to the base (POD) in the order listed (top to bottom).

The step-by-step procedures you should use to develop or check the pre-loaded forces of the Air Force TPFDL for the six (6) bare bases in Iguana are described in the following paragraphs.

STEP 1/BARE BASE CONCEPT:

One of the first decisions to be made is whether a base is to be a HARVEST BARE or HARVEST EAGLE deployment base! While Harvest Bare and Harvest Eagle are the two support systems in the AF for use at bare bases, it is vital to note the difference in; Composition, Complexity, Mobility, Weight, and Assembly of each. This information is summarized below: (***see Figure 1***)

a. HARVEST BARE (HB) consists of three (3) components: Base Augmentation Support Set (BASS), Maintenance/Operations Support Shelters (MOSS), and Modular Air Transportable Hospital (MATH).

(1) BASS consists of: basic facilities, equipment, and utilities required to convert a bare base into an operational base. A BASS is capable of providing total personnel support, including sufficient support equipment and tents to feed and billet a MAXIMUM of 4500 persons. Each BASS may be divided into three (3) increments of 1500 persons each. In addition to personnel support, the BASS contains fuel storage, hangers, and support shelters, along with aircraft maintenance shops which ARE NOT peculiar to a particular weapon system. The BASS DOES NOT INCLUDE MEDICAL or WEAPON SYSTEM PECULIAR EQUIPMENT, but does include Combat Support Group Personnel.

(2) MOSS: contains weapon system peculiar reusable, expandable shelters. The shelters are used in conjunction with a squadron's mission equipment to provide workshops for functions such as fire control and inertial navigation. A MOSS needs a BASS because the electrical distribution equipment is contained in the BASS. It DOES NOT contain personnel support, medical, or common weapon system maintenance facilities. Personnel and equipment come from ***Intermediate-Level Maintenance***, Munitions maintenance and Avionics maintenance UTCs peculiar to the supported weapons system.

(3) MATH: consists of deployable MODULES designed to provide medical support to personnel operating from a BARE BASE. The MATH includes the necessary medical equipment and the modules for each to perform specific functions such as surgery, wards, and clinics.

(4) HARVEST BARE packages require appropriate ***Standard Air Munitions Package (STAMP)*** and ***Standard Tanks, Rack, Adapters, and Pylons (STRAP)*** packages for fighter aircraft if prepositioned munitions and equipment ARE NOT available at the deployment base.

b. HARVEST EAGLE (HE) sets are air transportable packages designed to support a **MAXIMUM** of 1100 persons. A set includes all support equipment and tents necessary to billet, feed, and support the 1100 person population. ***For example,*** HE includes chaplain supplies, admin equipment (desks, typewriters, etc.), cots, sleeping bags, heaters, showers, and dining facilities. HE can be used to support ANY weapon system, but **DOES NOT** contain any aircraft support equipment. The HE **DOES NOT** include Combat Support Group (CSG) personnel!

(1) The basic HE set **MUST** be deployed with a suitable CSG for personnel support, i.e. the manpower needed to set up and operate the HE equipment.

(2) A HE package also requires appropriate STAMP and STRAP packages for fighter aircraft if prepositioned munitions and equipment are **NOT AVAILABLE** at the deployment base.

(3) Medical support at HE bases can be provided by either Air Transportable Clinics (ATC) or Air Transportable Hospitals (ATH). An ATC provides medical support to operational squadrons at a bare base and is capable of limited dispensary service but NO PATIENT holding capability. An ATH provides laboratory, X-ray, food services, medical maintenance, administration, and variable bed (inpatient) capability. Both units require an effective aeromedical evacuation system!

	TYPE SUPPORT REQ'D	PROVIDED AT HARVEST BARE BASE BY:	HARVEST EAGLE BASE BY:
1.	SUPPORT PERSONNEL	BASS	CSG
2.	SUPPORT EQUIPMENT	BASS	HE PACKAGE
3.	AIRCRAFT OPS & MAINTENANCE SUPPORT	MOSS	NONE*
4.	MEDICAL	MATH	ATH/ ATC
5.	AIR MUNITIONS	STAMP	
6.	TANKS/RACK/PYLON	STRAP	

Figure 1. HARVEST BARE/HARVEST EAGLE SUMMARY CHART

* A large aircraft maintenance shop capability normally would not be established at a HE base. Maintenance operations would be restricted to removal and replacement.

c. In this step, your team decides which bases will use HB and HE resources. Your CONSTRAINTS are that you can open ONLY TWO HB assets because only two BASS sets are available. Also, there are only ***eleven (11)*** MOSS sets available for this exercise as summarized below. In addition, HB may be used ONLY with ***F-15, A-10,*** F-4, F-16, and/or RF-4C weapon systems.

# SETS	MDS	ORGANIZATION SUPPORT CAPABILITY
6	F-15 MOSS	Squadron. Six sets equate to a two-wing support capability at three squadrons per wing. MOSS may deploy individually or in any combinations.
3	F-16 MOSS	Squadron. Three sq sets equate to a single wing support capability. BASS is required.
1	RF-4C MOSS	One squadron support capability with a post 30 day material augmentation.
1	OA-10 MOSS	One squadron support capability with a post 30 day material augmentation.

STEP 2/INITIAL BARE BASE BUILD-UP AND SEQUENCING:

a. The base must now be provided with the operating support necessary to receive the major combat and support units and equipment. Select the appropriate UTCs from the AFIT BASIC DEPLOYMENT DATA HANDBOOK for the type units shown below. Each team member will be furnished a worksheet on which to list the selected UTCs. The sequence below is **only a recommended sequence for you to follow when building you support forces list.**

Sequence	Description
1	Combat Control team
2	Site Survey Teams (for HE or Advance BASS:HB Base)
3	Security Police (Perimeter Defense)
4	***Airlift Control Element (ALCE)***/Aerial Port. NOTE>> ALCEs HAVE BEEN PRE-LOADED FOR YOU. Step 6 asks you to SELECT A PROPER SIZE AERIAL PORT TO UNLOAD CARGO/PAX AT YOUR BASES!!!
5	Communications, Quick Reaction Facility
6	NAVAIDS Package
7	Wing HQ (if req)
8	Civil Engineering, PRIME BEEF/RED HORSE (if req)
9	BAK 12 Barrier Team (Aircraft arresting)
10	Bare Base Weather (WX)

This completes the INITIAL bare base buildup. The base is now ready to receive the major combat and support forces. You should have a similar worksheet for each base (Buni & Mudola). You cannot enter this information into JPLAN yet since EMD, LAD, and PRI are still unknown.

STEP 3/MAJOR SUPPORT PACKAGE BUILD-UP:

a. HE Set: The number of HE packages can also be estimated at this time and finalized when the total population of each base is determined. YOU NEED TO REPEAT THE UTC FOR EACH POPULATION MULTIPLE OF 1100 PERSONS!

b. COMBAT SUPPORT GROUP: The CSG is required ONLY FOR A HARVEST EAGLE DEPLOYMENT. The size of the CSG is dependent upon total base population. Select the UTC for ESTIMATED base population at this time. You may resize it later.

c. BASS: The BASS is required ONLY FOR A HARVEST BARE DEPLOYMENT. The size of the BASS is also population dependent. Use your best estimate and select a UTC for the desired BASS.

d. MOSS: Select the appropriate MOSS based on the size and type of weapons systems which it supports. MOSS is appropriate ONLY for a HB deployment base.

e. MEDICAL: The USAF hospital facilities serve only Air Force personnel. The Army will bring in its own field hospitals. The following guidance is provided for you selection of medical units.

MATH	Deploy one MATH to each of the two ***bases*** where you place your two (2) available BASS, probably at Molo Aux 1 and at Buni.
ATC	Deploy ATCs to all the remaining bases due to the small size of the populations.
ATH	If you elect to deploy an ATH, select a size appropriate to your perception of need.

f. TACTICAL AEROMEDICAL EVACUATION SYSTEM: Pick two (2) strategically located bases and deploy TWO (2) appropriately-sized TAC Aeromedical Evacuation Systems.

g. SUPPLY ELEMENT: This decision MUST be based on final base population. At this point all you can do is enter a UTC based on a best estimate and resize the UTC later.

h. FUELS/***Liquid Oxygen (LOX)*** ELEMENT: Select appropriate sizes for each base, as determined by the number of squadron equivalents operating out of the base.

i. STANDARD AIR MUNITIONS PACKAGE (STAMP): This provides sufficient munitions for continuous operations of a single fighter squadron and is tailored to a specific weapons system for specified amounts of time. For this ***part of the*** exercise, ASSUME THERE ARE NO PREPOSITIONED MUNITIONS IN IGUANA. Deploy one (1) STAMP to each base for each squadron of F-16, ***F-15, A-10,*** or F-4G deployed. Assume also that a single STAMP will provide sufficient munitions to support the concept of operations until sealift can take up the resupply.

j. STANDARD TANKS, RACK, ADAPTERS, & PYLONS (STRAP): This provides the same capabilities in terms of tanks, rack, etc., as the STAMP does for munitions. Use the same planning guidance provided for STAMP.

STEP 4/OPERATIONAL UNITS:

Now enter the UTCs for the major combat and combat support units as follows:

a. AMC & ACC AIRCRAFT SQUADRONS/ELEMENTS UTCs: If more than one squadron of the same type is going to a single base, list the UTCs as many times as that UTC is required.

b. ACC & AMC AIRCRAFT SECURITY: Select the proper security and overhead for all ACC & AMC aircraft. Select priority 'A' aircraft security for all tanker aircraft ***and*** ACC aircraft on alert; Priority 'B' for ACC aircraft NOT on alert; and Priority 'C' for the ***OA-10s***, rescue helicopters, etc.

c. ***Intermediate-Level*** Maintenance:

E-3A aircraft will require no ***ILM*** until the post-30-day period.

F-16, EF-111A, ***F-15***, RF-4, F-4G, and ***O/A-10*** aircraft will require the appropriate ***Intermediate-Level*** Maintenance UTC at the outset IF surge rates are planned. If surge rates are not planned, the appropriate ***ILM*** augmentation UTCs would normally be required not later than 30 days subsequent to the deployment of the parent units. For a bare base, however, we recommend you deploy the ***ILM*** augmentation UTCs approximately 10 days after the deployment of parent units.

Tanker and Rescue units require no ***ILM***.

d. MUNITIONS MAINTENANCE: Munitions maintenance UTCs of proper size MUST be selected for F-16, ***F-15***, ***A-10***, and F-4G UTCs.

e. ***ENROUTE*** SUPPORT TEAM (EST), KC-135: Proper size ESTs must be selected for the KC-135 base.

f. TACTICAL AIR CONTROL SYSTEM (TACS): TACS forces have already been entered in JPLAN.

STEP 5/MISCELLANEOUS ADDITIONAL DEPLOYMENTS:

a. PERMANENT COMMUNICATIONS: Select appropriate permanent communications unit for each base. This section should be based on the number of flying units supported. Normally, either a squadron, wing, or multi-wing TAB communications package will be sufficient. Provide the proper communications facility at the tanker base.

b. TRANSIENT MAINTENANCE: Transient maintenance requirements are based on BASE POPULATION! At this point all you can do is make a "best estimate" entry and return to re-size the UTC later.

c. CIVIL ENGINEERING FIRE PROTECTION/CRASH RESCUE: Equipment is provided from HB sets and theater assets ***(See Appendix A)***. This is PERSONNEL augmentation only.

d. TANKER ADVON: To BAKOA, not the beddown location!!!

e. COMBAT ***CAMERA*** DOCUMENTATION UNITS: Select proper UTCs to be assigned to HQ, USFORIGUANA and subordinate units if applicable.

f. ARMAMENT RECORDING/PHOTO LAB: One for each major fighter aircraft type.

g. POSTAL AND COURIER: Choose one (1) for each base (based on estimated population).

STEP 6/SENSITIVITY ANALYSIS AND PRIORITIZATION:

a. You have now extracted all necessary information from the AFIT Basic Deployment Data Handbook with the EXCEPTION of the AMC self-support units and adjustments that may be required based on final population totals.

b. Go through the listings on the base worksheets and determine the following information for each unit:

EMD - EARLIEST MOVEMENT DATE (from Port of Embarkation)

For planning purposes, ***you may*** use the following ***suggestions*** when picking earliest movement dates for all units.

AMC units	D-10
Tankers	D-7
ACC units	D-7
AFMC equipment	D-7
Comm Units	D-7
Postal units	D-6

THESE DATES WERE DESIGNED FOR THIS EXERCISE AND DO NOT REFLECT GUIDANCE CRITERIA FOR ACTUAL UNIT DEPLOYMENT READINESS!! When you enter the D-date data in the columns of the worksheet, put "-7" for D-7, "-6" for D-6, etc.

LAD - LATEST ARRIVAL DATE > to POD. Relative to D-Day.

PRI - PRIORITY - in comparison w/ units having the same LAD.

c. ***Airlift Control Element (ALCE)***/AERIAL PORT: The ALCE/Aerial port size is SENSITIVE to the number of aircraft, cargo tons per day, location and local support. Since the complexity of sizing an ALCE would be beyond the scope of this exercise, we have pre-loaded them for you. Select an appropriately sized aerial port unit to provide aircraft on load/off load and cargo/passenger processing capabilities (UF.... series). Determine the need by running the M10 module.

COMPUTER LOADING OF SELECTED FORCES

After you select your forces, you are ready to "go automated". During the final portion of the JPLAN development

Phase, you will use the JPLAN, a computer program which parallels the JOPES ADP support program, to enter all your forces. Each team will have its own computer to build the TPFDD.

JPLAN was designed and built to provide you a means to avoid as much of the "stubby pencil" work as possible and will closely approximate the real world programs wherever possible, however, time constraints have dictated simplification of this system. The first letter of JPLAN modules corresponds with the actual JOPES programs. The F-series JPLAN modules correspond for the Force Requirements Generator (FRG) of JOPES; the M10 module corresponds to the Movements Requirements Generator (MRG); and the T10 module corresponds to the Transportation Feasibility Estimator (TFE).

JPLAN operates in a D-day mode, meaning inputs must be referenced by a Day "+" or "-" (e.g. D-7, or D+3). When using JPLAN, the above examples would be entered into the system as -7 and +3. THE ALLOWABLE RANGE OF D-DAY VALUES ARE -10 TO +15; THIS IS THE SPAN OF THE EXERCISE.

A list of the standard abbreviations used by JPLAN follows in ***Figure 2.*** Most are used as column headers. Understanding these will help you understand the JPLAN printouts.

ABBREVIATIONS	
LN	Line Number
DES	Destination
SVC	Parent Service
UTC	Unit Type Code
TM	Transportation Mode
POD	Port of Debarkation
PERS	# Personnel assigned to unit
BPERS	# Personnel requiring base support
PAX	Passengers
STONS	Short Tons of cargo to transport
OSIZE	Tons of Outsized cargo to transport
EMD	Earliest Movement Date
LAD	Latest Arrival Date
PRI	Priority
FAD	Feasible Arrival Date
ND	Not Deliverable with set dates

Figure 2. JPLAN Abbreviations

JPLAN contains six (6) separate modules to select, depending on the function you want to perform. These modules are described in the JPLAN User's manual.

FORCE LOADING PROCEDURE

To assist you in entering your forces for the first time, we recommend the following sequence of actions:

a. LOAD FORCES TO BUNI USING MODULE (F10).

b. CHECK YOUR ENTRIES USING MODULE (F30). Select the option for a particular POD and have part of your team review Buni's list while the rest loads Mudola!

c. LOAD FORCES FOR MUDOLA USING MODULE (F10).

d. CHECK YOUR ENTRIES USING MODULE (F30). Select the option for a particular POD.

You now must RE-EXAMINE those UTCs you selected based on base population to see if the "estimates" are still good. To do this, run the (M10) module. The summary will show total passenger and cargo deliveries by strategic airlift to each POD for each LAD and the CUMULATIVE BUILD-UP OF PERSONNEL for each POD. Compare the total base figures from the (M10) with your initial base population estimates. Remember, ***Army and other*** units will move into the field and require no base operational support (such as all of the TACS elements). If your initial base population estimates aren't close, select revised UTCs for the population-sensitive UTCs/units and use the (F40) module to make the necessary changes.

Execute module (F30), using the POD {P} option, to obtain a complete list of your forces, POD-by-POD. You may want to obtain several copies so each person working a POD can review their base.

Now you may wish to obtain two (2) products : (1) ENTIRE FORCE LIST (Use F30) and (2) POD ACTIVITY SUMMARY for each base (M10)!!!!

DEPLOYMENT PLANNING

CONGRATULATIONS!!! For the deployment planning phase, you will be promoted and move to WESTCOM staff to manage deployment planning, replacement and resupply planning, and transportation planning for the TOTAL ARMY AND AIR FORCE LISTS provided to you by the component commanders.

During this phase you will use the products of modules (F30) and (M10) of JPLAN to analyze and REFINE the integrated TPFDL (T10) which INCLUDES BOTH ARMY and AF requirements!!!!

An Army TPFDL is normally many times larger than an AF one due to the size and complexity of Army combat and supporting units. To make it feasible to consider Army forces in this exercise the Army TPFDL has been simplified by consolidation of many units into single UTCs. Again, to reduce your computer input workload, the ARMY FORCES HAVE BEEN LOADED FOR YOU!!!

Use the (F30) and (M10) printouts to take a preliminary look at the deployment flow. While to this point the JPLAN has provided only a "bookkeeping service", it is significant to note the quantity of data the computer can provide. ALL team members should be ACTIVELY INVOLVED in the review of data.

JPLAN Modules (F30) and (M10) can be used to provide planning data in a number of ways. EX: (F30) can be tasked to list all force requirements with a specified POD. Consequently, the data required to review overall schedule effectiveness can be quickly recalled and thus reduce the need to "manually" track data. ***Module (M10) operations are described in the following section.***

MODULE (M10) MOVEMENT REQUIREMENT GENERATOR (MRG)

This module summarizes information from the Force List for planning purposes. It shows total passenger and cargo deliveries by Strategic (STRAT) airlift to EACH POD for EACH LAD and the cumulative build-up of personnel at each POD. A theater-wide summary is also printed.

Module (M10) "ALL" option produces a POD activity Summary for ALL THE POD's - Bakoa/Buni/Prima/Molo/Molo Aux 1/Mudola

The POD Activity Summary TOTAL list at the end provides a look at the airlift demand for the WHOLE THEATER OF OPS for each LAD. Using the (M10) printout, all members of the team should analyze the data to ensure:

a. Combat Support Forces (CS) are ready to support when combat forces are ready to commence operations.

b. Combat forces WILL NOT arrive prior to cargo required for support.

c. Base support units are appropriate for base population

d. Daily logistics flow is REASONABLY CONSTANT and does not OBVIOUSLY overload a POD or available airlift.

e. Maintenance support units are provided as required for each deployed weapons system.

f. Proper relationship to your concept of operations. This is a primary criteria for OPLAN Review.

(1) Are forces SUITABLE, do we have the right ones?
(2) Are forces ADEQUATE, do we have enough?
(3) Package FEASIBLE, can we get it there on time?

TRANSPORTATION PLANNING AND SHORTFALL RESOLUTION

During this portion of the exercise, your team will undertake final transportation planning using the integrated TPFDL and will complete the GROSS transportation plan and feasibility estimate for OPLAN 9601.

The CINC has certain transportation assets in theater to support his logistical effort. One such effort is sealift movement of a separate mechanized infantry brigade from Bakoa NLT D-1. The augmentation forces deploying from CONUS are moved by the Transportation Operating Agencies (AMC, MSC, MTMC). The

strategic lift problem is jointly planned by the "supported" CINC, TRANSCOM, supporting commands, and FORSCOM. When directed by ***the National Command Authority (NCA)*** through ***the*** JCS other "supporting" commands exercise operational control for deploying units from alert to deployment. At the appropriate time, Change of Operational Command (CHOP) is made to the gaining CINC. To support this responsibility, supporting commands and components prepare deployment plans to support all unified command operations calling for augmentation.

You are tasked to plan only the critical period of the deployment (from D-10 to D+9) during which time only airlift is available to support the deployment. Thus, your broad estimate of required transportation will include ONLY airlift and should reflect the TOTAL NUMBER of aircraft sorties, by aircraft type, required at each POD. JPLAN will be used to demonstrate how planners apply constraints and determine movement feasibility of a plan. Problems and shortages WILL ARISE at each step, however, they may be resolved by the unified and/or component staffs. Often, they must be deferred to service staffs and/or JCS for resolution.

Although we work with WHOLE UTCs on our TPFDL, you should be aware that JPLAN programs will internally ***sequence*** UTCs as needed to flow the unit into theater. The only time you can see this action is on the (T10) report when a UTC cannot be completely delivered by its LAD. In that case, the report will reflect a "percentage" of what was delivered in both cargo and personnel and in the Feasible Arrival Date (FAD) column indicate the D-Day the last portion of the UTC would be delivered.

PROCEDURE

During this portion of JPLAN, you'll use module (T10) to determine the feasibility of transporting forces contained in your TPFDL (F30 printout) and the replacement and resupply requirements generated by module (M10) to the theater of ***operations***.

a. JPLAN computer programs work the transportation problem one day at a time between the airlift begin-and-end dates. The simulation considers each force requirement (a single line of data) in priority order using the sequence of events shown in ***Figure 3***.

COMPUTER SEQUENCING OF EVENTS FOR TRANSPORTATION

NOTE: See Appendix C for airlift availability.

(1) JPLAN assigns sufficient C-5s to carry all OUTSIZED CARGO included in this Force Requirement.

(2) If all the C-5s assigned in Step 1 are not completely full, then fill them with cargo in the following order:

  (a) OUTSIZED cargo from other force requirements with same POD.

  (b) SHORT TONS of cargo (other than outsized) from force requirements with same POD.

  (c) Passengers from force requirements with same POD.

(3) JPLAN assigns sufficient C-141s to carry all short tons of cargo.

(4) If all C-141s assigned in Step 3 are not completely full, fill them in the following order:

  (a) SHORT TONS of cargo (other than outsized) from other force requirements with same POD.

  (b) Passengers with same POD.

(5) After each force requirement is looked at in this manner, additional attempts are made to use any available aircraft sorties not yet assigned. The following order is used:

  (a) Assign C-5s to carry cargo
  (b) Assign C-141s to carry passengers
  (c) Assign C-5s to carry passengers

(6) If there are passengers left to be moved, then load CRAF aircraft until all passengers are moved or CRAF runs out.

Figure 3. Transportation Sequence of Events

b. This completes the simulation of one day's movement. The entire process is then repeated for each day. Each time aircraft are designated to carry a load ***of*** force requirements, ***the following checks*** are made.

(1) The POD for that force requirement must be able to handle the TYPE of aircraft being considered.

(2) The number of aircraft assigned cannot exceed the number of aircraft available.

(3) The load cannot be assigned to aircraft prior to the force's EMD.

(4) POD ramp space factor (N) cannot be exceeded.

(5) The daily capability of the AERIAL PORT for handling passengers and cargo at that POD cannot be exceeded.

Aircraft availability and POD constraints will not change as the exercise progresses. ALL PODs CAN HANDLE ALL TYPES OF STRAT AIRLIFT. Aircraft availability, ramp space, passenger, and cargo capacities are shown later in this section. Remember; STRAT airlift landings consume ramp space for a given day as shown on the RAMP SPACE REQUIREMENTS listing on the following page. When units with aircraft are deploying to an air base, the ramp space is reduced ***for the remainder of the exercise by an amount equal to the area required for the number and type of aircraft deployed***!!!

The (T10) printout looks very similar to the (F30) except the (T10) has three additional columns: (1) % of cargo delivered by LAD (2) % of Passengers delivered by LAD; and (3) the feasible arrival date (FAD) by which the last portion of the UTC can be delivered.

Any units which cannot be moved to the Port of Debarkation (POD) by the LAD will be flagged in one of two ways. First, if it arrives, but is later than the LAD specified, an asterisk (*) will be printed to the right of the FAD. Also, the computer will show the percentage of cargo and passengers that were capable of being delivered (0% to 100%). Second, if the UTC cannot be delivered to the POD by the time airlift ceases an "ND" or Not Deliverable will be printed in the FAD column. For this exercise, you'll probably never see the 'ND', however, if you do it indicates you've really overloaded one or more of your PODs. In any case you must change the POD or re-specify a LAD prior to D+15. By comparing the TFE and the Unused Transportation Capabilities Portion of the (T10) printout, you should be able to see the reason for the shortfalls.

THE KEY TO SHORTFALL RESOLUTION IS TO STUDY THE TFE PRINTOUT TO FIND THE CRITICAL (LARGE TONNAGE) UNITS CAUSING THE PROBLEM! Some ***asterisks*** (*) may reflect a symptom - not a problem. Once a few key units are identified, determine what to do and use module (F40) to make the necessary changes. Run a (T10) to check results. WARNING!! DO NOT MAKE TOO MANY CHANGES

(MAX 5 - 6) BEFORE RUNNING THE T10 REPORT AS SOME CHANGES WILL CREATE EVEN MORE SHORTFALLS THAN BEFORE! Keep in mind that the major problems will probably occur at Buni and Molo Aux 1 since they are the two (2) largest PODs. Be careful not to move too much away from them at one time.

SHORTFALL RESOLUTION STRATEGIES

Now that you hopefully understand how to read and interpret the listings, let's look at options available to transportation planners to aid in shortfall resolutions. Some of them may also be available to you, as indicated in the parenthetical information following each option. Use these ideas and others to work your problems.

a. Change the mode of transportation from sealift to air or vice-versa. (This isn't a viable option for this ***part of the*** exercise)

b. Move the EMD back, keeping the LAD, PRI, and POD the same. THIS IS PROBABLY THE BEST OPTION AVAILABLE IF YOU HAVE SUFFICIENT RAMP SPACE AT THE POD. Remember that while you can move the dates to earlier ones you are limited to D-10. WARNING!! DO NOT JUST MOVE ALL UTC EMDs TO D-10 AS THIS WILL JUST CREATE A MAJOR MESS FOR YOU AND NO TIME TO SORT IT OUT!!! Try to work again with the KEY UNITS (heavy tonnage) and move them.

c. ***For some of the large Army armor and field artillery (FA) units, you may wish to change the POD to Molo, Bakoa, or Mudola (near rail heads for transshipment),or to Prima as a last resort!*** If you choose this method you must move the EMD and LAD dates to allow for intra-theater movement to its original destination. (See ***Figure 4*** for specific guidelines).

As you resolve shortfalls by shifting PODs, keep in mind that some of the units have OUTSIZED (OS) CARGO that can be moved only by C-5s. If you move any unit to a different POD and it has OS cargo, you CANNOT move it by INTRA-THEATER airlift; it must be ***transported over land***!

d. Move the LAD back keeping all else the same. THIS IS PROBABLY THE WORST THING YOU CAN DO!! It will only aggravate the problem by "squeezing" the spread between the EMD and LAD. You already have a shortfall because the airlift system didn't have enough time to get that particular UTC to the POD on time, so moving the LAD date closer to the EMD will only make things worse.

e. Shift the Priority (PRI) of a UTC within the same LAD. This option is not effective as in reality you end up swapping one shortfall for another.

f. Trim the support UTCs for more austere operations, however, you may spend hours deciding where to cut with very little eventually gained.

If the original POD is:	And the new POD is:	Then the # of days to move EMD & LAD back is:
Buni	Bakoa, Molo, or Molo Aux 1	2
	Prima or Mudola	4
Bakoa, Molo, or Molo Aux 1	Any other in same area (Bak, Mol, Aux)	1
	Buni	2
	Prima or Mudola	2
Prima or Mudola	the other	3
	Bakoa, Molo, or Molo Aux 1	2
	Buni	1

Figure 4. INTRA-THEATER MOVEMENT GUIDE

APPENDIX A: STANDARD PLANNING FACTORS

1. Logistics: Logistics are not assumed away for this exercise, but some assumptions are allowed:

   a. Once POL facilities are provided for a given base, adequate POL resupply delivery is assumed.

   b. Each arriving force package is supplied with consumable*s* for three (3) days of operations.

   c. Once adequate munitions are positioned in Iguana ***they*** can be delivered anywhere in Iguana by secure means.

2. Operations:

   a. Tactical fighter and Reconnaissance units:

      (1) 1.5 sorties per day per assigned aircraft w/o ***intermediate-level*** maintenance augmentation. Surge: 2.5 sorties per 24 hr period for 72 hours.

      (2) 2.0 ***sorties*** per day per assigned aircraft, WITH ***intermediate-level*** maintenance augmentation. Surge rate: 2.5 sorties per 24 hr period for 72 hours.

      (3) If surge is employed, sortie rates will be 1.0 with ***intermediate-level*** maintenance and 0.08 w/o it for three (3) days after.

      (4) ***Intermediate-level*** maintenance is required for ALL fighter & recon aircraft operations 30 days after deployment aircraft.

   b. Rescue, TAS, and AWACS:

      (1) 2.0 sorties per day per aircraft (except AWACS) with sortie length as follows:

Helicopter	>	1.5 hrs
Observation	>	4.0 hrs
AWACS	>	1 per day (12+)

      (2) ***Intermediate-level*** maintenance augmentation is REQUIRED for aircraft operations 30 days after deployment for aircraft units. For BARE BASE, ***ILM*** support MUST arrive 10 days after deployment of parent Units!!!

c. Daily in-commission rates would increase the number of aircraft required. These computations are disregarded here to simplify the exercise.

APPENDIX B: AB OPERATION REPORTS (ABORTS FILE)

(Extract)

>>>>> Aerial Ports and Air Operating Bases File.
Provides physical and operating characteristics of air bases throughout the world.

AIRFIELD CHARACTERISTICS

BAKOA INTERNATIONAL AIRPORT

Runways:	01-***19*** / 8,000' concrete 18-36 / 5,500' asphalt 15-33 / 4,300' asphalt
Taxiways:	From ramp areas to each runway; all runways joined by taxiways.
Ramps:	Several Ramp Areas: (N=1500) ***or 1,500,000 square feet.*** - Passenger terminal can handle (5) DC-8/707 aircraft for on/off load. - North ramp can park approx. 30 fighters - South ramp can park (7) DC-8/707 aircraftand 40 C-141/C-130 or (20) C-5 aircraft. - General aviation ramp can park and service 15 light aircraft; ramp surface is poor & reinforcement req'd if aircraft of larger than 15,000 lbs to be used. - Several hundred acres of improved sodded area are usable for ground operations.
Buildings:	Major passenger terminal. Some freight warehousing. (4) maintenance docks (DC-8/707). Tower. General Aviation Bldg.
POL:	Adequate for present use. Point-to-point refuel (jet fuel) at Pax terminal only. Storage, pump system capacity easily expandable; bladder tie-in.
Water:	Connected to Bakoa city water and sewer system lines; water is USUALLY potable, but light purification recommended.
Power:	Adequate for present requirements; 240V, 50 CPS. Transformers/converters required.

Communications:	24-hour tower, VHF, UHF, HF, land lines via Bakoa commercial circuits. Some IAF land lines. Tower, civil air comm currently operated under contract by Scandinavian Air Ways.
Radar:	LIMITED. No Precision Approach Radar (PAR) Surveillance approach capability only!
Navaids:	(1) LF NDB, (1) TVOR located on airdrome.
Other:	Expandability. Flat sodded land surrounding aerodrome suitable for temporary buildings and roads. - No hazards. - Indigenous Support: Limited. Unskilled labor abundant.
Present Use and Occupancy:	Primary use is a civil air terminal. Major facilities operated by contract. Major users of airport are TA and JAB.

BUNI AIR BASE

Runways:	09-27, 9,500' concrete 09-27, 5,000' sod
Taxiways:	One, concrete, joins ramp.
Ramp:	One asphalt provides parking for 50 fighter and 18 transport (C-130) aircraft. Ramps can also handle C-141/C-5 aircraft. Off-ramp parking is sod and unlimited; sod area also available for cargo on/off load. (N = 2300) ***or 2,300,000 square feet.***
Buildings:	One (1) small (30' x 30') building south ramp.
POL:	None and No storage.
Water:	Piped in from nearby lake. Plentiful, potability unknown.
Power:	NONE.
Communications:	NONE.
Radar:	NONE.
Navaids:	One (1) low power LF NDB, 014 / 4.2 from field. Operates on request.
Other:	- Expandability: base is located in flat area. - Hazards: wildlife has been seen grazing within the base perimeter. - Indigenous Support Available: UNKNOWN.
Present Use and Occupancy:	Unoccupied. Occasionally used by IAF transports in civil action operations. IAF has used as a forward fighter/recce base for short periods when transport was available for log support.
Remarks:	Surface access from Bakoa City via dirt highway (230 miles). Highway is a repeated target of insurgents. Portions impassable during rainy season.

MOLO AUX #1

Runways:	09-27, 8,500' concrete 17-35, 8,500' concrete
Taxiway:	Asphalt covered concrete servicing each runway.
Ramps:	Concrete and asphalt parking for approximately 80 fighters. Ramps can also handle C-130/C-141/C-5 aircraft. Asphalt is suitable for taxi, loading and turnaround operations. (N = 2200) ***or 2,200,000 square feet.***
Buildings:	One (1) (40' x 50') base operations building; fixed tower & mobile tower; storage sheds (open sides) on north ramp. Three (3) one-story bldgs (barracks); (3) guard towers; several small sheds; (4) permanent maintenance docks; (15) permanent barracks bldg; (2) large office bldg; several misc permanent bldgs, empty TACC
POL:	(2) 6,000 bbl tanks, not in use. Condition unknown. (8) refueling points east end of ramp status unknown.
Water:	Two sources. Bakoa City water system, MARGINAL potability. Natural spring-fed lake, 2 miles south of field pump, and line system to field, repair status unknown.
Power:	Available from Bakoa City, 240V, 50 CPS.
Communications:	VHF, UHF in mobile twr unit. Surface lines to Bakoa City, status unknown. Fixed tower has provisions for UHF, VHF, HF equipment.
Navaids:	None at field. LF NDB, TVOR at Bakoa AP. TACAN presently inoperable.
Other:	- Expandability: Sod areas easily expandable for all weather capability with improved drainage. Several suitable sites for tents/bldgs. - Hazards: Large animals, wildlife and cattle on field at erratic intervals.

Present use and Occupancy:	Unoccupied. Formally an IAF and USAF base. Old HQ 618th Air Division (USAF).
Remarks:	Good access over all-weather roads to Bakoa.

MOLO AIR BASE

Runways:	14-32, 12,000' concrete 14-32, 5,500' asphalt
Taxiways:	(1) parallel ea runway (asphalt); (2) from ramp area to 14-32 concrete, (1) to asphalt runway from ramp.
Ramps:	Two. (1) concrete ramp, NE side of field, will hold approximately (40) fighters for refueling and maintenance. (1) asphalt ramp, SW side of field. Will hold (15) C-141/C-130 or (7) C-5s. Minor aerial port capability. Sod areas can be used to park and on/off load aircraft. (N = 1400) or ***1,400,000 square ft***.
Buildings:	Flight line: tower, base ops. (3) maint docks for fighters. (2) hangers (small fighter). Asmall alert facility. GCI Vans. Main Base: barracks, misc bldgs; 1-2 storyoffice bldg (HQ IAF). Several parade/athletic fields.
POL:	AVGAS, JP-4. Modern system (8,000 bbl) built with US MAP funds. Easily expandable w/ added tankage, permanent or bladder. (25) refueling points, (3) truck stations on NE. Truck only on SW ramp.
Water:	Bakoa City lines. MARGINALLY potable.
Power:	Bakoa City system; 240V, 50 CPS. Presently uses 35% of capacity of system. Outages are common due to poor maintenance and labor strikes.
Communications:	UHF, VHF, HF. Surface lines to Bakoa City. Military circuits to Bakoa IAP/Molo Aux #1.
Radar:	Surveillance; GCI facility at field.

Navaids:	One low power LF NDB & one TVOR at field. TACAN at field on test basis, hours unknown.
Other:	- Expandability: LIMITED. - Indigenous Support: NONE.
Present use and Occupancy:	HQ AID; operating base for AD Wg and attack Wg. BASE IS CROWDED.

MUDOLA AIR BASE

Runways:	01-19, 8,000' concrete 05-23, 4,500' concrete 15-33, 5,000' asphalt
Taxiways:	(1) parallel 01-*19;* (1) joining 19 with 23; both are concrete; sod taxiways from 15-33 to ramp. NARROW TAXIWAYS; 30'.
Ramps:	(1) concrete ramp. Capacity (5) C-130s or (32) fighters. Can also accommodate C-141s and C-5s. Gnd taxi space limited. Areas between taxiways are improved; suitable for all weather ground ops. (N = 1400) ***or 1,400,000 square feet.***
Buildings:	Small (50' x 60') Base Ops. Mobile tower unit, barracks, admin bldgs, misc bldg located (2) miles from flight line.
POL:	(1) 4000 bbl AVGAS tank. (1) 5000 bbl JP-4 tank. NO REFUELING POINTS. Fuel trucks. Fuel depot in Mudolaville, 12 miles north. Capacity unknown.
Water:	POTABLE. Obtained from several nearby lakes via portable pumps.
Power:	Provided by various portable generators.
Communications:	VHF, UHF from portable tower when in operation.
Radar:	NONE.
Navaids:	(1) LF NDB available on request.
Other:	- Facilities can be expanded in sod areas. - Hazards: Bird strikes are common. - Indigenous support: Unknown.

Present use and Occupancy:	IAF composite transport wing, often used for civic action transport ops. Flight training. Major Iguanian Army and AID technical training center near Mudolaville.
Remarks:	All-weather access to Mudolaville, 17 miles north. Unpaved highway to Bakoa (350 mi) through Mudolaville, open all seasons. Insurgents often cut off route. Runway 15-***33*** and south end 19 & 23 subject to temporary flooding in rainy season.

PRIMA AIR BASE

Runways:	09-27, 11,000' concrete 09-27, 2,500' sod 14-32, 8,000' concrete
Taxiways:	(1) parallel ea concrete runway to ramp.
Ramp:	Concrete. Ramp parking for (25) C-130 and (20) fighters. Aerial port ramp capable of on/off load (10) C-130s. Extensive warehouses next to ramp. 300 acres adjoining sod area suitable for loading ops. Can on/off load C-5/C-141s. (N = 1200) ***or 1,200,000 square feet.***
Buildings:	Base Ops, Airport Ops Center, vehicle park, fixed tower, (4) C-130 maintenance docks, (4) maint hangers (C-130/C-141).
POL:	20,000 bbl storage system. (15) refueling pts AVGAS avail by truck.
Water:	Self-contained base system from wells.
Power:	Generating plant on base.
Communications:	UHF, VHF, HF.
Navaids:	TACAN, TVOR, surveillance radar, PAR, on request.

Other:	- Airfield has limited support facilities. - Expandable. - Hazards: NONE. - Highway to Caliente and Bakoa open during dry season.
Present use and Occupancy:	Operational site for tactical airlift wing. A skeleton AMC ACP to support channel traffic. Aerial Port unit capable of (40) C-141 ops daily, 24 hours.

APPENDIX C: AIRCRAFT AVAILABILITY, POD CONSTRAINTS, & RAMP SPACE REQUIREMENTS

AIRCRAFT AVAILABILITY

DAY	C-5	C-141	CRAF
-10	84	138	60
-9	84	138	60
-8	84	138	60
-7	84	138	60
-6	84	138	60
-5	84	138	60
-4	84	138	60
-3	84	138	60
-2	84	138	60
-1	84	138	60
0	84	138	60
+1 to +10	84	138	60

POD CONSTRAINTS

	***** CAPACITY *****			RAMP SPACE	**PORT CAPACITY**	
POD	C-5	C-141	CRAF	(X 1000')	PAX	TONS
BAK	YES	YES	YES	1500	7700	2100
BUN	YES	YES	YES	2300	9800	2700
MOL	YES	YES	YES	1400	7000	2000
AUX	YES	YES	YES	2200	9800	2700
MUD	YES	YES	YES	1400	7000	2000
PRM	YES	YES	YES	1200	6300	1800

RAMP SPACE REQ'D FOR AIRCRAFT PARKING/ONLOAD/OFFLOAD

TYPE	SQ FT	TYPE	SQ FT
C-5	55,000	E-3A	23,000
C-141	27,000	KC-135	23,000
CRAF	40,000	C-130	13,000
F-16	2,000	MH-53	2,000
F-4(All)	2,000	MH-60	2,000
F-111	2,000	O/A-10	2,000
F-15	2,000		

APPENDIX D: HQ WESTCOM APPROVED MAJOR COMBAT FORCE LIST, WESTAF

CINCWEST OPLAN 9601

Unit Type	Parent Service	Force Description	Source	POD
3AGEM0*	USAF	AWACS (3) E-3A	ACC	BAKOA
3AGEM0	USAF	AWACS (3) E-3A	ACC	BAKOA
3FSGB0	USAF	Quick Response F-4G (4)	ACC	MOLO
3FSJA0	USAF	Wild Weasel, F-4G (24)	ACC	MOLO
3DSDH0*	USAF	EF-111A (8)	ACC	MOLO
3FKJU0*	USAF	Ftr, F-16C/D (18)	ACC	AUX 1
3FKJU0	USAF	Ftr, F-16C/D (18)	ACC	MUDOLA
3FKM30	USAF	Ftr, F-16C/D LANTIRN(18)	ACC	MUDOLA
3RTEP0*	USAF	Recon, RF-4C (9)	ACC	AUX 1
3SAXH0	USAF	EC-130E Volant Solo (2)	ACC	PRIMA
3SAGB0	USAF	MC-130E Talon II (3)	AFSOC	PRIMA
3SAGB0	USAF	MC-130E Talon II (3)	AFSOC	PRIMA
3SS550	USAF	MH-53J Pave Low (5)	AFSOC	BUNI
3SS550	USAF	MH-53J Pave Low (5)	AFSOC	MUDOLA
3SS650	USAF	MH-60G (5)	AFSOC	BAKOA
3FVBS0	USAF	A-10 (12)	ACC	BUNI
3FQKB0*	USAF	F-15E (18)	ACC	BUNI
3FQDF0	USAF	F-15E (18)	ACC	BUNI
3YCA20*	USAF	KC-135 (10)	ACC	PRIMA
3FVC20	USAF	OA-10 (12)	ACC	MUDOLA

- *** These forces are PRE-LOADED in the computer for you!!!**

YOU MUST LOAD THE UTC FOR THE OTHER FORCES LISTED HERE !!!!

Appendix D: Databook Excerpt

UTC	MEFPAK RESP CMD	UNIT TYPE NAME	LEVEL	~MANPOWER REQUIRED~ OFF	MAN	CIV	TOTAL	PAX
3RTEN	ACC	AVIATION, TAC RECON, RF-4C, 18UE	SQ	62	400	0	462	318

** MISSION/CAPABILITIES **

STANDARD TACTICAL RECONNAISSANCE SQUADRON CAPABLE OF PROVIDING DAY/NIGHT ALL WEATHER RECONNAISSANCE SUPPORT FOR ONE CORPS OR THREE ACC FIGHTER WINGS. MB, SB, LB, BD. COMMAND, UNIT SUPPLY, MAINT CONTROL, QUALITY CONTROL, ALL ON-ACFT MAINT, INTEL, OPS, AIRCREWS, AIRCREW SURVIVAL/PROTECTIVE EQUIP, FLIGHT MED, VEHICLE MAINT, MUNITIONS SERVICES, PHOTO PROCESSING/INTERPRETATION FACILITY WITH LAB, OPTICAL AND PHOTO RADAR INTERPRETATION. REQUIRES UTC HFASB.

** LOGISTIC DEPLOYMENTREQUIREMENTS **

	SHORT TON	MEAS TON	VEH-A/C SQ FT
TOTAL	299	1814	4078
OUTSIZED	90	828	0
NON-AIR	0	0	0

Appendix E: JPLAN Exercise Part II

Table of Contents

GENERAL INFORMATION

INTRODUCTION

Part I of the JPLAN Exercise should have provided you with an opportunity to gain an appreciation for the complexity of the Joint Planning Process. The issues of force selection, transportation feasibility, and shortfall resolution were prevalent in your generation of a viable TPFDL. The scarcity of available airlift as a major factor in US military operations was also demonstrated in Part I of this exercise. As evidenced in your supplemental readings, shortages in strategic airlift are expected for the foreseeable future. This reality prompts logisticians to develop new methods, or improve existing methods, of deploying force packages to a theater of operations and maintaining adequate supply of that theater's forces.

OBJECTIVES

THE BASIC OBJECTIVE OF PART II OF THE JPLAN EXERCISE IS TO ENHANCE YOUR UNDERSTANDING OF THE VARIOUS LOGISTICS OPTIONS THAT COMPLEMENT THE STRATEGIC AIRLIFT ASPECT OF MOBILITY. You will have the opportunity to apply knowledge obtained from the supplemental readings on logistic principles and current issues, as well as from classroom lecture. As with Part I of the JPLAN Exercise, you will also have the opportunity to apply your management, decision-making, and interpersonal skills.

PLAN DEVELOPMENT PHASE

INTRODUCTION

Utilizing both the MISSION STATEMENT and the CONCEPT OF OPERATIONS detailed in Part I of the JPLAN Exercise, you are now tasked to develop another complete OPLAN. Once again, we will move into the PLAN DEVELOPMENT phase of the JOPES. All major combat forces have already been selected for you, along with some of the support packages.

As logistics planners, your team has the responsibility of selecting the remaining Combat Support (CS) and Combat Service Support (CSS) force packages necessary to sustain the operations outlined in WESTCOM OPLAN 9601. These decisions, primarily based on the condition of the objective area where the force is deployed, may differ from those you arrived at for Part I of this exercise. The reasons for these differences are the result of current issues in logistics being employed in this part of the exercise.

Following the selection of CS and CSS force packages, you will be required to enter your forces into the computer and generate an Air Force TPFDL, as you did in Part I of this exercise. Finally, you will compare the results of Part I of this exercise to the results obtained in Part II. This will provide a framework for the discussion of current issues in Air Force logistics. Keep in mind that the purpose of Part II of this exercise is to enhance your understanding of the various logistics options that complement strategic airlift.

BACKGROUND MATERIAL

This background section will be divided into three areas: (prepositioning, host nation support, and sealift). These issues, previously addressed in supplemental readings and classroom discussion, will be described in the context of this scenario. **YOU MUST BE FAMILIAR WITH THIS INFORMATION AND THE ASSOCIATED CONCEPTS BEFORE YOU BEGIN YOUR FORCE SELECTION!!!!**

PREPOSITIONING

Intelligence reports received in the last 12 months indicated that rising tensions between Brazona and Iguana were likely to erupt into a Major Regional Conflict (MRC). US interests in Iguana, a strong ally, had prompted senior officials within the Department of Defense to begin contingency preparations in the likelihood this might occur.

These preparations involved the prepositioning of various CS and CSS force packages that were likely to be necessary if US forces were to deploy into the region. Afloat and land-based prepositioning was used with various CS and CSS force packages prepositioned aboard the USS Doolittle off the coast of N.N.L. and some at the port of Bakoa. See Appendix A for a listing of all prepositioned stocks. Refer to the Intra-Theater Movement Guide in Part I for movement of prepositioned stocks. Also note that stocks prepositioned on the USS Doolittle must be moved to Bakoa for intra-theater movement. This process requires two days.

HOST NATION SUPPORT

Iguana, in the last few years, has gone to great lengths to become competitive in the world auto market. The country, although without the natural resources or raw materials necessary for auto manufacture, has spent significant funds to promote the industry. In an effort to facilitate this market, Iguana has constructed a deep sea port in Bakoa. This port is equipped with the latest Materials Handling Equipment (MHE) and is considered to be a state-of-the-art port facility.

The Iguana government has already notified US military planners that the use of this port, its associated heavy equipment, and the national rail system is approved if desired in the future. Requests for these and/or other resources should be directed to the Iguanan Minister of Negotiations.

SEALIFT

The construction of the new port at Bakoa has opened up the option of sealift as an alternative mode to airlift for the delivery of combat, CS, and CSS force packages. The type and quantity of ships available, their capacity, and departure/arrival dates will be determined by the course director. Travel duration will necessarily be fictitious to enhance playability due to the limited window of operations of the JPLAN Exercise (from D-10 to D+10). Specific guidance concerning the sealift assets available for use at the present time, as well as the capacity and sailing time of each, will be provided by the course director.

APPENDIX A: US PREPOSITIONED SUPPLIES IN OR NEAR THE IGUANAN THEATER

UTC	DESCRIPTION	QTY	STONS	LOCATION
HHBAB	F-15E STRAPP	4	19	N.N.L.
HHBAF	F-15C/D STRAPP	4	13	N.N.L.
HHBAL	A-10 STRAPP	2	13	N.N.L.
HHBBA	A-10 STAMP	2	325	N.N.L.
HHJSB	F-16 STAMP	5	655	N.N.L.
HHJSC	F-4G STAMP	4	325	N.N.L.
HHJTC	F-16 STRAPP	4	13	N.N.L.
HHJTD	F-4G STRAPP	5	18	N.N.L.
XFFLX	HARVEST EAGLE	2	314	BAKOA
XFFYA	F-15E MOSS, ORG LVL, SQ SIZE	2	132	BAKOA
XFFYB	F-15E MOSS, IL, SQ SIZE	1	402	BAKOA
XFFYC	A-10 MOSS, ORG LVL, SQ SIZE	1	295	BAKOA
XFFYD	A-10 MOSS, IL, SQ SIZE	1	503	BAKOA
XFFYE	F-16 MOSS, ORG LVL, SQ SIZE	2	74	BAKOA

Appendix F: Instructor Guide

JPLAN EXERCISE INSTRUCTOR GUIDE

Lesson Objectives

The intent of the revised JPLAN Exercise is to maintain all of the teaching objectives contained in Part I, namely: force selection, transportation feasibility, shortfall resolution, and TPFDL generation. In addition to this, the students should develop an appreciation for the benefits of options which complement the use of airlift, such as prepositioning, Host Nation Support (HNS), and sealift.

Background

Part I of the revised JPLAN Exercise is to be administered in the same manner as the original. It is the result of major revisions in the form of updated UTCs, as well as minor changes to enhance word flow and realism. The most significant changes to the exercise are contained in Part II. This portion of the exercise incorporates prepositioning, Host Nation Support (HNS), and sealift into the overall scenario. The combination of the airlift portion of JPLAN and the sealift option is an exercise called RADEX.

Instructor's Guidance: Part I

Part I of the revised JPLAN Exercise should be accomplished in the first day of the exercise. The students should be given approximately 2 hours to complete the Force Planning Worksheet. Following this, the students should

enter this data into the computer and generate a TPFDL. The students should check the TPFDL against the Force Planning Worksheet to identify possible errors made in entering the data into the computer. This data, once verified as correct, will be used to generate a Transportation Feasibility Estimate. This whole process should take approximately 3 hours. Once transportation feasibility is evaluated by the computer and the instructor, the students are encouraged to spend the remainder of the class period attempting to resolve any shortfalls identified. This should be done in an effort to arrive at the "best" possible solution. This process should take approximately 2 hours.

Instructor's Guidance: Part II

Part II of the revised JPLAN Exercise should be accomplished on the second day of the exercise. The students should take the TPFDL generated in Part I of the exercise and amend it based on their utilization of prepositioned stocks, HNS, and sealift. The students should then run the transportation feasibility estimator function and revise the TPFDL as necessary. These activities should take 4 hours to complete.

Part II of the revised JPLAN Exercise is designed to give the students an opportunity to experience other, joint planning options currently in use, and to do this while

utilizing them in an effort to help resolve some of the airlift shortfalls encountered in Part I of the exercise.

Prepositioning

A listing of the prepositioned stocks can be found in Appendix A of Part II, and are listed according to UTC and location. Currently the Air Force is determining the best method of identifying prepositioned stocks, and it is anticipated that building prepo UTCs will be the best option. When a definitive course of action is determined, the prepo listing should be revised.

Host Nation Support

A "state-of-the-art" port facility at Bakoa, associated heavy equipment, and the national railroad system are the only defined HNS identified to the students in Part II of the revised JPLAN Exercise. All other forms of reasonable HNS may be provided at the discretion of the exercise monitor, who has been identified to the students as the "Iguanan Minister of Negotiations" as the point of contact for HNS. This option was included to afford the course director flexibility in incorporating a variety of scenarios such as in country transportation and indigenous labor.

Sealift

The sealift option provides the students with an alternative mode of transporting necessary Combat, Combat Support (CS), and Combat Service Support (CSS) force

packages that adversely affected airlift feasibility in Part I of the revised JPLAN Exercise. For added flexibility, the type, quantity, capacity, and departure/arrival dates are at the course director's discretion and may be varied to reflect multiple scenarios for different groups of students.

Other Issues

Other pertinent logistics issues include lean-logistics and Two-Level Maintenance. Incorporation of these issues into the exercise was not feasible, however, discussion of these issues among the different groups may prove to be beneficial. For example, current implementation of the Two-Level Maintenance concept is causing some RSPs to increase in size as Line Replaceable Units (LRUs) are being substituted for Shop Replaceable Units (SRUs). This is in contrast to the mix encountered under the Three-Level Maintenance concept. The impact of this practice on already scarce lift resources may be significant. This problem may occur not only during initial deployment, but also during subsequent resupply operations. These issues, as well as others (JIT distribution, commercial over-night carriers, etc.), should be discussed. Information on these issues is included later in this guide. Additionally, the authors of this instructor's guide suggest that the instructor remain in close contact with the Air Staff in an effort to keep abreast of the most current logistics issues, and to provide

a forum for the discussion of these issues in the context of the exercise.

Following the generation of an amended TPFDL and an associated transportation feasibility estimate, a comparison of these estimates with those from the previous day's efforts in Part I should be used to facilitate a meaningful discussion on the effects of prepositioning, HNS, and sealift on the transportation feasibility. We suspect that the students will be impressed with the idea that airlift is not the only option for deploying CS and CSS force packages under the auspices of a joint planning process. The issues presented earlier, such as two-level maintenance, should be included in this discussion session which should last about 2 hours.

Instructor's Guidance: caution about intervention

Although there is a considerable amount of flexibility built into the exercise in Part II, we caution the exercise monitors to **avoid intervening if at all possible**. If unable to avoid this, please limit intervention to no more than two times on the part of any group. This request is made for two reasons. First, this helps to ensure that a clear determination of the causal relationships between the new issues and transportation feasibility can be made. Any intervention in the exercise makes it more difficult, if not impossible, for the students to "see" the effects of

utilizing prepo, HNS, or sealift. Second, this helps to maintain student interest in the exercise. It should be carefully noted that too much intervention may cause the students to give up on the exercise. This could occur if they feel that nothing they do will help because another "situation" is sure to occur that will prevent them from accomplishing their task. For this reason, avoid if at all possible placing the groups into no-win situations.

Instructor's Guidance: additional Information

In the event that intervention is preferred, we would like to offer some generic examples to provide a sense of direction for the instructor. The following situations are presented as a template for possible intervention on the part of the instructor:

Prepositioning

1) The afloat prepositioned stocks aboard the USS Doolittle have been damaged beyond use as the ship has taken on water as the result of a broken seal in the ship's hull.

2) Prepo stocks (all or some) at Bakoa have been destroyed by saboteurs.

3) Prepo stocks being transported intra-theater are interdicted by bandits/weather/damaged rail/damaged roads etc.

These or similar occurrences should be used carefully, keeping in mind that the idea behind Part II of this exercise is to witness the benefits of other forms of supplying a theater of operations besides airlift. Giving the students prepositioned stocks, just to destroy or delay them, does not serve this purpose well at all. An exception to this may occur if the object of discussion is to highlight the differences between the groups which are allowed to utilize varying amounts of the prepo stocks.

Host Nation Support

1) As the Minister of Negotiations, you may grant anything, within reason, that the students request in the way of Host Nation Support. This could include such items as flat-bed trucks, drivers, other indigenous labor, etc.

2) Natural disasters and/or enemy sabotage could damage or destroy the port/rail/roads/MHE.

As with the prepositioning examples, it is important to bear in mind that the goal of this part of the exercise is to witness the benefits derived from utilizing resources other than airlift when possible. Care should be taken to avoid negating the effects of these through malicious intervention, if possible.

Sealift

1) The Strait to the west of N.N.L. could become a choke point which is blockaded, causing sealift to be useless.

2) The port at Bakoa could also be put out of commission for a stated period of time, or for the entire exercise.

The sealift option is intended for the same purposes as the other two options and should not be reckoned with in order to ensure the value of sealift as an alternative mode of transport in place of or to complement airlift. As the instructor, you have the flexibility to dictate the type, quantity, capacity, and departure/arrival dates of the vessels. This is done by manipulating the data in the computer program which evaluates the exercise.

BACKGROUND ON LEAN LOGISTICS AND TWO-LEVEL MAINTENANCE

Lean Logistics. Lean Logistics is a concept prevalent in the logistics profession, and is currently being adapted into Air Force logistics policy. Lean Logistics is a focused project to integrate state-of-the-art business practices such as: two-level maintenance, just-in-time(JIT), door-to-door, and pipeline visibility among

others, across the broad area of Air Force logistics. The goal of implementing this concept is to improve and streamline policy, processes, and management structures which drive costs and investments in logistics infrastructure. Specifically, under this concept, repairables pipeline times will be reduced, express transportation will be used, and right size inventory will be maintained. The repairables pipeline reduction will be accomplished by improving operations at depots and requiring more responsive service from contractors. Express transportation will require greater reliance on commercial carriers for door-to-door service. The resulting improvement in transportation service of increased flexibility and reduced travel time will also contribute to the reduction in the repairables pipeline. The improvement in depot operations and requiring more responsive service from contractors coupled with reliance on express transportation permits a dramatic change in inventory management. The current inventory system bases stock levels on a "just-in-case" perspective whereas Lean Logistics bases stock levels on a "guaranteed-on-time" perspective, thereby allowing inventory levels to be reduced to the "right size." Lean Logistics will ultimately result in a "smaller logistics infrastructure providing strong, less costly weapon system support to operational users, in peace and war" (Ziegler, 1994).

Two-Level Maintenance. The two-level maintenance concept currently being introduced into the Air Force has the potential to greatly affect mobility and associated planning efforts. Basically, under the two-level maintenance concept the intermediate- or shop-level maintenance transfers from the operational wing to a depot. Once this is accomplished, it is anticipated the endeavor will greatly reduce the "mobility footprint" by eliminating the personnel and equipment that are deployed to support the current three-level maintenance concept. This will alleviate some of the demand placed on scarce transportation resources during the initial deployment phase of an operation, but will increase the demands placed on the resupply pipeline (Cox, 1994).

As of this writing there are details of this process that have not yet been determined. For example, there is no guarantee that two-level maintenance will reduce the initial mobility footprint, but rather may reduce a "secondary mobility footprint" since the Intermediate-Level Maintenance (ILM) UTCs are typically flowed to a theater around day 25 of an operation. In fact, this situation may actually increase the initial mobility footprint if the number of Line Replaceable Units (LRUs) are increased due to a lack of confidence in the resupply pipeline (Grubbs, 1994). In fact, current testing shows an increase in the size of Readiness Spares Packages (RSPs) for the B-52 weapons

system. This increase is due to changes in RSP content where LRUs are substituted for Shop Replaceable Units (SRUs) (Tolman, 1994). Whether the increase is due to a commander's apprehension about resupply viability or changes in RSP content, the increase could have a negative impact on scarce transportation resources at the beginning of an operation when the deployment of combat forces is most critical.

CONCLUSION

The purpose of this document is to provide instructions regarding the implementation of the revised JPLAN Exercise. The intent has been to present general guidelines rather than being directive in nature. The authors hope this guide helps in the administration of the JPLAN Exercise.

References

Cox, Lee, Lieutenant Colonel, USAF. Two-Level Maintenance Office, DCS Logistics, Air Force Materiel Command, Wright-Patterson AFB, OH. "Two-Level Maintenance." Briefing. 1994.

Grubbs, Lawrence L., Major, USAF. Action Officer, Logistics Plans and Concepts Division, Headquarters USAF. Telephone interview. 23 February 1994.

Tolman, Thomas. Maintenance Specialist, Two-Level Maintenance Office, DCS Logistics, Air Force Materiel Command, Wright-Patterson AFB, OH. Telephone interview. 4 March 1994.

Ziegler, Ken, Colonel, USAF. Chief, Two-Level Maintenance Policy Division, DCS Logistics, Headquarters USAF. "Air Force Lean Logistics." Briefing. 1994.

Appendix G: JPLAN Exercise Questionnaire

JPLAN Exercise Questionnaire

Instructions

1. Please respond to statements 1-24, and question 29, by circling the most appropriate response. Questions 25-28 require your written comments and recommendations. Please write your comments/recommendations directly on the questionnaire in the space provided, or attach additional sheets if necessary.

2. DO NOT write your name anywhere on the questionnaire. Your responses are to be anonymous.

Statements 1-9 are concerned with the original JPLAN Exercise.

1. The objective of the JPLAN Exercise is to "apply the principles of joint planning in the preparation of a simulated operation plan." The exercise accomplished that objective.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

2. The exercise scenario and its contents are representative of reality.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

3. I am more knowledgeable of the joint planning process because of this exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

4. This exercise contributed to my ability to perform force selection.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

5. The exercise scenario and its contents are unrealistic.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

6. My knowledge of the joint planning process has been enhanced through the exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

7. One of the goals of the JPLAN Exercise is to provide students with experience identifying options to resolve transportation and deployment shortfalls. This exercise achieved that goal.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

8. This exercise scenario and its contents are typical of what I expect to encounter in future joint planning operations.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

9. I will be more effective in my job due to my exposure to this exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

Statements 10-18 are concerned with the revised JPLAN Exercise.

10. The objective of the JPLAN Exercise is to "apply the principles of joint planning in the preparation of a simulated operation plan." The exercise accomplished that objective.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

11. The exercise scenario and its contents are representative of reality.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

12. I am more knowledgeable of the joint planning process because of this exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

13. This exercise contributed to my ability to perform force selection.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

14. The exercise scenario and its contents are unrealistic.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

15. My knowledge of the joint planning process has been enhanced through the exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

16. One of the goals of the JPLAN Exercise is to provide students with experience identifying options to resolve transportation and deployment shortfalls. This exercise achieved that goal.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

17. This exercise scenario and its contents are typical of what I expect to encounter in future joint planning operations.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

18. I will be more effective in my job due to my exposure to this exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

Statements 19-24 are concerned with a comparison of the two versions of the JPLAN Exercise.

19. The information contained in the revised JPLAN Exercise is more current than that of the original JPLAN Exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

20. The revised JPLAN Exercise more closely resembles the present Joint Planning environment than the original JPLAN Exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

21. The original JPLAN Exercise is more up to date than the revised JPLAN Exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

22. The objective of the JPLAN Exercise is to "apply the principles of joint planning in the preparation of a simulated operation plan." The revised JPLAN Exercise is better at meeting this objective than the original JPLAN Exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

23. The Weapons Systems and Unit Type Codes presented in the revised JPLAN Exercise are more current than those presented in the original JPLAN Exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

24. I am better prepared because of my experience with the revised JPLAN Exercise, as opposed to the original JPLAN Exercise.

Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

Questions 25-28 solicit your comments and recommendations for improving the JPLAN Exercise.

25. What would you have changed/improved in the original JPLAN Exercise (not already evident in the revised JPLAN Exercise)?

26. What changes/improvements do you suggest for the revised JPLAN Exercise?

27. Considering your active duty Air Force experience, what subject areas should be included or given increased emphasis in the JPLAN Exercise, if any?

28. What subject areas should be deleted or reduced in emphasis in the JPLAN Exercise, if any?

Question 29 is concerned with your personal familiarity with logistics planning.

29. How would you characterize the extent of your experience in the logistics planning area?

A. No experience
B. Less than 4 years experience
C. More than 4 years experience

Appendix H: Data Analysis Printouts

JPLAN Exercise Questionnaire Data

CASE	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	3	3	3	1	5	4	3	1	4	3
2	6	3	6	6	3	7	5	5	6	6
3	3	4	5	4	5	5	5	3	4	6
4	6	5	6	5	3	7	7	4	4	6
5	7	7	7	6	3	7	7	4	6	7
6	6	5	6	5	4	6	4	6	6	7
7	5	3	7	5	2	7	5	4	5	6
8	7	5	5	6	3	5	7	6	5	7
9	6	5	6	5	3	5	5	5	4	6
10	5	4	5	3	5	5	6	3	3	5
11	5	5	5	5	4	3	5	3	4	5
12	7	5	5	5	2	5	6	5	3	7
13	6	5	7	5	4	6	6	6	7	6
14	6	4	6	5	4	5	5	5	4	5
15	6	5	7	5	4	6	7	5	5	6
16	6	5	6	7	3	6	5	5	6	6
17	6	5	7	5	3	7	7	5	4	6
18	6	5	6	5	3	6	6	5	4	6
19	6	3	5	5	5	5	5	5	5	5
20	5	5	5	5	4	5	5	4	5	5
21	3	3	2	4	4	5	5	2	5	4
22	6	5	4	5	2	4	6	5	5	6
23	6	4	5	5	4	5	6	5	5	6
24	5	4	5	5	4	5	5	4	4	6
25	5	4	7	5	2	5	6	5	5	7

JPLAN Exercise Questionnaire Data

CASE	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
1	3	1	1	5	2	3	1	1	3	1
2	6	6	5	3	7	7	5	6	7	4
3	6	6	6	3		6	5	5	6	5
4	5	7	5	6	7	7	4	4	6	6
5	7	6	6	3	6	7	4	6	6	6
6	6	7	5	5	7	7	7	7	6	7
7	6	7	5	2	7	6	4	5	7	7
8	5	5	6	3	5	6	6	5	7	6
9	6	5	6	3	6	6	5	4	6	6
10	5	5	5	5	5	5	3	4	6	6
11	6	5	4	3	5	6	6	4	7	7
12	6	6	6	2	6	6	6	4	6	6
13	6	7	5	3	6	6	5	7	6	6
14	5	5	5	4	5	5	5	4	5	5
15	5	6	6	4	6	7	5	6	6	5
16	6	6	7	3	6	6	6	7	6	6
17	5	7	5	3	7	6	5	4	5	4
18	5	6	6	3	6	6	5	4	5	5
19	3	5	5	3	5	6	5	5	7	6
20	5	5	5	4	5	5	4	5	4	4
21	5	4	5	3	5	5	4	5	6	4
22	5	4	5	2	4	6	5	5	5	6
23	4	5	5	4	5	5	5	5	7	6
24	4	5	5	4	5	6	4	5	4	5
25	6	7	6	1	6	7	6	7	7	7

JPLAN Exercise Questionnaire Data

CASE	Q21	Q22	Q23	Q24	Q29
1	4	2	5	2	5
2	7	7	7	6	3
3	2	6	6	6	5
4	4	7	7	6	3
5	3	7	6	6	1
6	5	7	5	7	1
7	1	7	7	5	3
8	2	6	7	6	5
9	3	7	5	5	5
10	5	5	4	5	3
11	7	7	7	5	5
12	2	5	5	5	3
13	4	7	6	6	1
14	4	5	5	5	3
15	3	4	6	3	3
16	7	7	6	5	3
17	1	7	5	4	1
18	3	4	4	5	1
19	7	7	6	6	3
20	4	4	3	3	3
21	3	5	6	4	3
22	5	6	4	4	3
23	3	6	6	6	5
24	4	6	4	5	5
25	2	7	6	6	5

DESCRIPTIVE STATISTICS

VARIABLE	N	MEAN	SD	MINIMUM	MAXIMUM
Q1	21	5.4761	1.2090	3.0000	7.0000
Q2	21	4.5238	0.9283	3.0000	7.0000
Q3	21	5.5238	1.3645	2.0000	7.0000
Q4	21	4.7142	1.0556	1.0000	6.0000
Q5	21	3.4761	0.9807	2.0000	5.0000
Q6	21	5.4761	0.9283	4.0000	7.0000
Q7	21	5.6666	1.0645	3.0000	7.0000
Q8	21	4.3809	1.2836	1.0000	6.0000
Q9	21	4.6190	0.9734	3.0000	7.0000
Q10	21	5.8571	1.0141	3.0000	7.0000
Q11	21	5.2381	0.8890	3.0000	7.0000
Q12	21	5.5238	1.4359	1.0000	7.0000
Q13	21	5.1904	1.0779	1.0000	6.0000
Q14	21	3.4285	1.2071	1.0000	6.0000
Q15	21	5.5238	1.1670	2.0000	7.0000
Q16	21	5.8571	0.9636	3.0000	7.0000
Q17	21	4.6666	1.2382	1.0000	7.0000
Q18	21	4.8571	1.3522	1.0000	7.0000
Q19	21	5.6666	1.0645	3.0000	7.0000
Q20	21	5.3809	1.3592	1.0000	7.0000
Q21	21	3.1904	1.2090	1.0000	5.0000
Q22	21	5.7142	1.3835	2.0000	7.0000
Q23	21	5.3333	1.1105	3.0000	7.0000
Q24	21	4.9523	1.2440	2.0000	7.0000
Q29	21	3.1904	1.5368	1.0000	5.0000

Pearson Product Moment Correlation Coefficients Matrix

	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Q2	0.7466						
Q3	0.5686	0.4830					
Q4	0.7387	0.6195	0.5604				
Q5	-0.5381	-0.2876	-0.3451	-0.5864			
Q6	0.3670	0.3923	0.7011	0.4519	-0.2615		
Q7	0.6345	0.5902	0.4704	0.6229	-0.4150	0.4722	
Q8	0.8116	0.5375	0.6226	0.7855	-0.4690	0.2597	0.4635
Q9	0.1618	0.2872	0.2707	0.3754	-0.0623	0.2661	0.0643
Q10	0.7106	0.6145	0.6349	0.8006	-0.5817	0.3945	0.5557
Q11	0.3544	0.5077	0.5515	0.5556	-0.4232	0.4615	0.2993
Q12	0.4539	0.3840	0.7972	0.6644	-0.3990	0.7412	0.5124
Q13	0.5024	0.4949	0.4727	0.7972	-0.4212	0.3045	0.6245
Q14	-0.1126	-0.0319	-0.1735	-0.3700	0.6637	0.0765	-0.1945
Q15	0.4877	0.3802	0.7297	0.6552	-0.4472	0.8197	0.4695
Q16	0.5334	0.5908	0.6682	0.7443	-0.5064	0.5829	0.5849
Q17	0.5455	0.3769	0.4044	0.7268	-0.4392	0.1450	0.3287
Q18	0.2883	0.3414	0.4761	0.6355	-0.2100	0.2959	0.3126
Q19	0.3237	0.0843	0.3671	0.4894	-0.3671	0.3204	0.4706
Q20	0.5534	0.3094	0.5340	0.6720	-0.5179	0.3245	0.4031
Q21	-0.0309	0.0848	-0.3059	-0.2686	0.4257	-0.3521	-0.2978
Q22	0.3843	0.3170	0.5335	0.6260	-0.4474	0.5005	0.3734
Q23	0.0621	-0.0808	0.2420	0.2133	-0.1989	0.4203	0.3101
Q24	0.3815	0.2824	0.3983	0.5222	-0.1854	0.3237	0.2517
Q29	-0.3741	-0.4939	-0.3838	-0.2730	0.1358	-0.6274	-0.2649

	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Q9	0.3620						
Q10	0.7737	0.2460					
Q11	0.3985	0.3411	0.6496				
Q12	0.6188	0.2572	0.7406	0.6807			
Q13	0.5954	0.0726	0.7579	0.6807	0.6753		
Q14	-0.2720	-0.1520	-0.3967	-0.4725	-0.2225	-0.4501	
Q15	0.5611	0.1844	0.6578	0.6448	0.9321	0.6322	-0.1318
Q16	0.6121	0.3122	0.8478	0.6836	0.8156	0.7496	-0.2456
Q17	0.8389	0.2627	0.7963	0.5299	0.6374	0.7242	-0.4014
Q18	0.5802	0.7163	0.6406	0.6119	0.6585	0.6027	-0.3282
Q19	0.4269	0.2573	0.6020	0.5635	0.5778	0.6245	-0.3502
Q20	0.6578	0.2663	0.8031	0.6659	0.7124	0.6988	-0.3178
Q21	-0.0813	0.1072	-0.3029	-0.2769	-0.3483	-0.3361	0.5922
Q22	0.5148	0.3606	0.6821	0.6271	0.7083	0.5077	-0.2823
Q23	0.0818	0.3083	0.2664	0.2701	0.3240	0.1531	-0.1119
Q24	0.5129	0.2733	0.7077	0.5532	0.6304	0.5291	-0.0856
Q29	-0.2921	-0.3501	-0.1741	-0.4008	-0.4553	-0.1437	-0.0462

	Q15	Q16	Q17	Q18	Q19	Q20	Q21
Q16	0.7813						
Q17	0.5767	0.6704					
Q18	0.5250	0.7126	0.6569				
Q19	0.5500	0.5361	0.5563	0.5557			
Q20	0.6559	0.7307	0.6733	0.6839	0.7832		
Q21	-0.3577	-0.1900	-0.2226	-0.0131	-0.4143	-0.0768	
Q22	0.6857	0.6804	0.5253	0.5918	0.6110	0.7520	-0.2348
Q23	0.3215	0.3271	0.1576	0.2331	0.6908	0.3091	-0.4965
Q24	0.5346	0.5780	0.6059	0.5605	0.6670	0.7800	-0.0602
Q29	-0.5045	-0.3183	-0.1752	-0.2750	0.0407	-0.1322	-0.1281

	Q22	Q23	Q24
Q23	0.4230		
Q24	0.7470	0.4102	
Q29	-0.1612	0.1367	-0.0996

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	September 1994	Master's Thesis

4. TITLE AND SUBTITLE
ANALYSIS OF THE JPLAN EXERCISE AS AN EXPERIENTIAL LEARNING TOOL

5. FUNDING NUMBERS

6. AUTHOR(S)
Mark J. Lynch, Second Lieutenant USAF
Michael E. Washington, Captain USAF

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Air Force Institute of Technology,
WPAFB OH 45433-6583

8. PERFORMING ORGANIZATION REPORT NUMBER
AFIT/GLM/LA/94S-27

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
HQ USAF/LGXX
Washington DC 20330

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The purpose of this study is to develop an effective educational tool for the Combat Logistics course offered at the Air Force Institute of Technology. The current tool being used, the JPLAN Exercise, was identified as outdated in several areas. The research focused upon four investigative questions: (1) what makes an effective educational tool?, (2) should the existing exercise be revised or replaced?, (3) which logistics principles are essential for incorporation into the educational tool?, and (4) is the updated tool significantly different from the original? To answer these questions, we conducted an extensive literature review that focused on two areas. The first area was concerned with accepted educational methods. The second area was concerned with logistics lessons learned from major US conflicts since World War I, as well as current military logistics issues. This information was used to develop a revised JPLAN Exercise. This revised exercise was given to students along with the original exercise. We surveyed the students about differences in value, currency, and realism between the two exercises, as well as their perceived self-efficacy following exposure to each. Recommendations were to begin using the revised JPLAN Exercise in future course offerings, as well as to perform further research.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Education, Instructional Materials, Joint Military Activities, Learning, Logistics, Logistics Management, Logistics Planning, Prepositioning (Logistics)	165
	16. PRICE CODE

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