

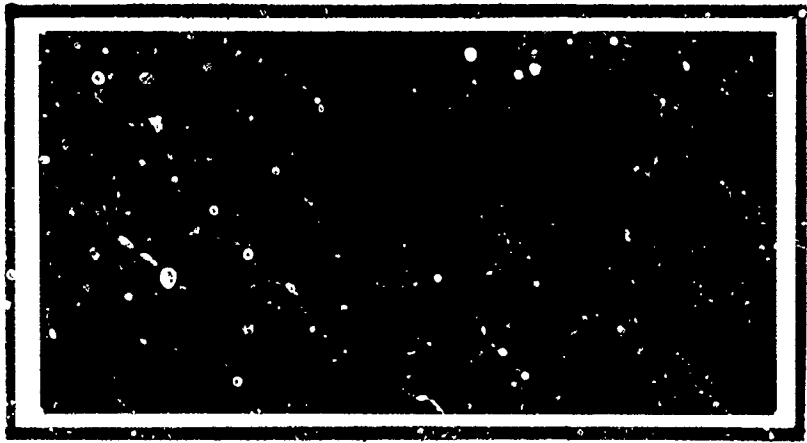
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IMPROVING LOGISTICS REALISM IN  
COMMAND POST EXERCISES INVOLVING THE  
KC-135A/E/R AIRCRAFT USING A HISTORICAL  
AIRCRAFT MAINTENANCE DATABASE MODEL

THESIS

Lyndon S. Anderson  
Captain, USAF

AFIT/GLM/LSM/90S-2

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IMPROVING LOGISTICS REALISM IN COMMAND POST EXERCISES INVOLVING  
THE KC-135A/E/R AIRCRAFT USING A HISTORICAL AIRCRAFT  
MAINTENANCE DATABASE MODEL

THESIS

Presented to the Faculty of the School of Systems and Logistics  
of the Air Force Institute of Technology  
Air University  
In Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Logistics Management

Lyndon S. Anderson, B.S.

Captain, USAF

September 1990

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Lyndon S. Anderson

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Abstract

*thesis,*  
This ~~study~~ under the sponsorship of HQ SAC/LGL, investigated a method to improve realism in Command Post Exercises (CPX) involving the KC-135A/E/R aircraft by developing a historical database model. The model is based on the premise that realistic data collected from actual war-like missions can be placed in a database for use by response cell members to provide simulated, yet realistic, logistical requirements during CPXs. European Tanker Task Force flying mission data was used as source data for the development of the model. Associated documentation was also developed to support the model. A mock exercise simulating a CPX was used to test the model and its associated documentation. Analysis of the test results lead the researcher to conclude that the model provides response cell members with a useful tool to obtain realistic logistical information they need to carry out their duties effectively. Recommendations include using the model and documentation as required by HQ SAC/LGL, and conducting further research to test the hypothesis that historical database models improve realism at the response cell level during CPXs.

*Approved!*  
*Cargo aircraft, Tanker aircraft. (KR)*

IMPROVING LOGISTICS REALISM  
IN COMMAND POST EXERCISES INVOLVING THE KC-135A/E/R AIRCRAFT  
USING A HISTORICAL AIRCRAFT MAINTENANCE DATABASE MODEL

I. Introduction

Background

The national defense of the United States depends on the ability of its military to successfully accomplish national defense objectives. Of critical importance to the military is how it prepares to carry out this tasking. During peacetime, the military is always faced with the dilemma of maintaining force readiness. A primary method for maintaining force readiness is through the use of military exercises.

Military exercises offer a tremendous opportunity to prepare military forces for war. They have become one of the most effective ways of educating military forces on the experiences and rigors of war short of actual combat. More effective still, are military exercises that successfully create the illusion of reality. Realistic exercises can be an extremely powerful influence, especially on those who have limited operational experience (Perla, 1985:77). With each passing year, fewer people with actual combat

experience remain in military service (Furlong, 1984:4). Of critical importance, then, is generating as much reality as possible within military exercises to get as much educational value as possible for an ever increasing inexperienced force. Inexperience within the military can have serious consequences in time of war. Failure to train realistically can lead decision makers to draw conclusions about war that could be disastrous (McCarty, 1988:2).

Improved exercise realism can be accomplished through the use of logistic considerations. Frequently, as seen throughout history, logistic considerations have been the deciding factor between victory and defeat.. The classic and universal military problem of ignoring logistics (Russo, 1987:7) must be overcome. To put logistics in proper context, Lt Col McCarty relates it to strategy and tactics by stating "what a commander wants to do (strategy) through the use of military forces (tactics) is almost totally dependent on what there is to do it with (logistics) (McCarty, 1988:19)."

Logistic considerations must assume equal prominence with strategy. It has been written that there can be no strategy without logistics. Jerome Peppers supports this by identifying two important reasons. First, all nations are constrained by limited resources, and as such, require a logistics system to effectively use what resources are

available. Second, a logistic system is made up of everything other than operational employment, and must be treated as such. Failure to do so can lead to a "dangerously thin and weak philosophical foundation (Peppers, 1986:14)."

With these points in mind, military planners must reconsider the objectives of military exercises with a central issue revolving around how the element of realism can best be achieved (Hall, 1989:Ch 1, 2).

A number of logistical models have been developed to provide improved realism in military exercises. The most widely used model is mathematically based and uses random number generators to determine logistic requirements. For example, with command post exercises (CPX), the logistic requirements often controlled by a random number generated model include aircraft landing status, aircraft availability, and time needed to repair the aircraft (Hall, 1989:Ch 2, 9).

A second type of logistic model, an aircraft maintenance database, can be used to improve realism in military exercises. This model is based on the premise that historical data collected from actual aircraft deployments can be used as both input and output for the model. With this approach, the input of actual aircraft maintenance data is captured and reused as output during an exercise. The result thereby dramatically improves the realism of the

logistic requirements of the exercise. The concept has an added advantage of simplifying what otherwise would be a difficult project to model using mathematical techniques (Hall, 1989:Ch 1, 7-8). As with the random number generator model, logistic requirements most often controlled by the aircraft maintenance database model during CPXs include aircraft landing status, aircraft availability, and time needed to repair the aircraft. Aircraft availability is a critical limiting factor in force employment. Consequently, "a valid, mature and consistently reliable means is needed to govern aircraft availability and other logistic requirements during command post exercises where practically all forces are simulated (Hall, 1989:Ch 1, 3)."

#### General Issue

The Directorate of Contingency Logistics (LGL) at Strategic Air Command (SAC) Headquarters wants to expand the use of an aircraft maintenance database model to improve logistics realism during European Command Post Exercises. The B-52G aircraft maintenance database model has improved management of aircraft availability, and has improved the establishment of aircraft logistical requirements at the response cell level during CPXs.

### Problem Statement

Logistics realism needs to be improved during command post exercises involving KC-135A/E/R aircraft.

### Research Objective

The objective of this research effort is to develop an aircraft maintenance database model for the KC-135A/E/R aircraft. The model will be an extension of the B-52G aircraft maintenance database concept (See Hall, 1989:Ch 1, 4), and will be used by Strategic Air Command during command post exercises. The researcher shall refer to the model as the KC-135A/E/R database model.

### Investigative Questions

The researcher will use the following investigative questions to guide this research, and test whether the concepts and design of the KC-135A/E/R database model can improve logistics realism over current methods.

1. Can data from KC-135A/E/R aircraft flying European Tanker Task Force missions more accurately depict aircraft maintenance requirements than routine peacetime flying data?
2. Does statistical analysis support or reject the null hypothesis that there is no improved difference in logistics realism between the KC-135A/E/R database model and mathematical models currently in use?
3. Can the KC-135A/E/R database model be used to determine aircraft availability based on logistical support levels?



4. Can realistic demands for aircraft spare parts be determined effectively using the KC-135-A/E/R database model?
5. Can the KC-135A/E/R database model be designed in a manner for use in compressed exercise schedules?
6. What limitations does the KC-135A/E/R database model pose on response cell personnel, and what effect do these limitations have on the objectives of the command post exercise?  
(Hall, 1989:Ch 1, 8-9)

### Scope

This thesis effort will provide a validated aircraft maintenance logistics database for Strategic Air Command's KC-135A/E/R tanker aircraft only. The basic concept, however, can be expanded to include other weapon systems simulated during CPXs (Hall, 1989:Ch 1, 9).

### Assumptions

The KC-135A/E/R database model is developed based on the assumption that the ETTF source data represents the best available data that depicts expected wartime mission requirements.

### Limitations

The KC-135A/E/R database model is limited in its use by factors that make up the source data. Factors such as mission duration, repair turn around time, integrated combat turn procedures, and surge conditions affect the development of the KC-135A/E/R database model. Use of the model for

applications with markedly different preconditions may induce errors that may cause less realistic outcome from the model (Hall, 1989:Ch 1, 10). For example, during integrated combat turns, the aircraft repair time (turn around time) is generally much shorter because maintenance and refueling procedures, normally performed separately, can be performed concurrently.

#### Key Terms and Definitions

Aircraft Maintenance Database. A historical collection of related maintenance and supply data arranged as a tabular handbook that provides detailed aircraft logistical information to response cell personnel for use during command post exercises.

Aircraft Maintenance Landing Code. Codes assigned to support inflight discrepancies during the provisioning process to indicate to maintenance and supply personnel the maintenance levels authorized to remove and replace, repair, overhaul, assemble, inspect and test, and to condemn items (McCann, 1981:409).

Command Post Exercise. A military exercise in which the existence and movement of combat forces is simulated (Hall, 1989:Ch 1, 11).

Database. "A collection of detailed information on the actual procedures used in planning and executing an activity (McCann, 1981:194)."

European Tanker Task Force. A task force comprised of tanker aircraft temporarily formed to support European flying missions.

Field Training Exercise. "An exercise conducted in the field under simulated war conditions in which troops and armament of one side are actually present, while those of the other side may be imaginary or an outline (DoD, 1987:143)."

Job Control Number. A seven digit number assigned to a specific inflight discrepancy for use by maintenance personnel.

Maintainability. "A characteristic of design and installation expressed as the probability that an item will be restored to a specific condition within a given period of time when the maintenance is performed using prescribed procedures and resources (McCann, 1981:406)."

Military Exercise. "Any practice operation for the purpose of increasing proficiency of personnel in the performance of their tasks. In an exercise, simulated enemy action is used as a training device for the friendly forces, and may be wholly or partly imaginary. Unlike a maneuver, an exercise is not intended to test proficiency, but is used to develop it (Heflin, 1956:193)."

National Stock Number. "A two part 13 digit stock number assigned to each item of supply repetitively used, purchased, stocked, or distributed within the federal government (McCann, 1981:466)."

Nomenclature. "A set or system of official names or titles given to items of material and equipment (McCann, 1981:471)."

Response Cell. "A small group of people deployed to a forward operating location during command post exercises to complete the communications loop to various head quarters and simulate the existence, capabilities, and requirements of combat forces (Hall, 1989:Ch 1, 12)."

STARTEX. "Start date and time of military exercise (Hall, 1989:Ch 1, 12)."

Task Force. "A temporary grouping of units under one commander formed for the purpose of carrying out a specific operation or mission (Quick, 1973:473)."

War Game. "A simulation, by what ever means, of a military operation involving two or more opposing forces and using rules, data and procedures designed to depict actual or assumed real life situations (Quick, 1973:496)."

War Readiness Spares Kit (WRSK). "An air transportable package of spares and repair parts required to sustain planned wartime or contingency operations of a weapon system for a specified period of time pending resupply (McCann, 1981:738)."

Work Unit Code (WUC). "An alpha-numeric code made up normally of two alpha characters which identify a specific subsystem of an aircraft or other major equipment and three numbers which identify a specific component within a subsystem (Hall, 1989:Ch 1, 13)."

### Summary

This chapter provided an introductory explanation of the need for increased logistics realism in military exercises. Additionally, the specific research objective, key investigative questions, research scope and limitations were all discussed and will be used to direct the research effort. Chapter II will provide a review of the applicable literature.

## II. Literature Review

### General

Preparation for war through peacetime training, as Karl Von Clausewitz aptly explains in his book, On War, is a time honored concept we in the Department of Defense must continue to exploit to the fullest (Clausewitz, 1950:332). The ancient philosopher Horace once said, "a wise man in times of peace prepares for war (Heinl, 1967:247)." Military exercises provide the opportunity to test and improve the capabilities of our forces short of actual combat (War Games 1984:1). A key element to the success or failure of any military exercise is the element of logistics. "Logistics provides the means and arrangements that bring strategy and tactics together to provide combat power (Heinl, 1967:175)." Good planning includes logistics and should go a step further and include the element of realism. Realism by definition integrates logistics, strategy, and tactics to provide a scenario that reasonably replicates war. Realism prepares commanders for success in combat (Hall, 1989:Ch 1, 5).

Command post exercises (CPX) attempt to provide logistics realism by using different modeling approaches. These exercises simulate the existence and movement of combat forces, and heavily task communications and coordination of the various elements of the exercise (Perry, 1987:9; Hall and Miller, 1990:33). The [Air Force] should strive to

achieve as much logistics realism as possible in CPXs to develop the wartime skills of our senior leadership and their staffs by teaching them how to respond to realistic wartime scenarios (Hoover, 1984:27). This literature review examines the components: military exercise, logistics, realism, and command post exercise to better explain their relationships.

### Military Exercises

Military exercises have long been recognized as an important element in any effective military organization. Field Marshal Erwin Rommel, a German battlefield General of World War II, once said: 'the best form of 'welfare' for the troops is first-class training (Heinl, 1967:323)'. Military exercises provide that training and give us an opportunity to learn new procedures, learn from mistakes, and hone warfighting skills. The practice we gain from military exercises will eventually lead to a smooth, more effective combat force.

Though military exercise should be used as tools to improve war fighting capability, they are often misused and fail to provide objectivity; rather, they may reflect a biased point of view or promote a position favored by the initiators of the exercise. Our system of validating exercises tends to favor those exercises we win while labeling those exercises we lose as 'unfair' or 'unrealistic (Fur-

long, 1984:6-7).<sup>1</sup> Lt Cdr John Melos (a pseudonym of an active duty Naval Officer), states that "Naval exercises frequently ignore inconvenient threats and disregard friendly force losses (Melos, 1988:76).<sup>2</sup> He goes on to say that commanders believe "exercises must be a success where U.S. forces win (Melos, 1988:76).<sup>3</sup> This approach can result in planning that ignores potential threats in a real-world situation. The general attitude prevailing in military exercises is that the enemy is allowed to play, as long as they don't adversely effect the desired outcome of the exercise (Melos, 1988:77). Officers in charge of an exercise will often attempt to create conditions that favor success because they don't want it to appear that units under their command "failed" during an exercise (Melos, 1988:76). Our commanders must understand that we often learn more by losing in a military exercise than in winning (Furlong, 1984:7).

Throughout this literature review many articles voiced criticism of military exercises with little emphasis on ways to improve. Lt Col Hoover, however, in his article, "Logistics Realism in Exercises", proposes several basic improvements for military exercises:



1. Expand senior management awareness of the criticality of logistic realism in exercise activity.
2. Establish an active exercise management organization at HQ USAF level to focus on logistics aspects.
3. Eliminate current exercise magic and success assured planning.
4. Have fewer exercises of better quality.  
(Hoover, 1984:29)

Another method of improving the performance of military exercises includes well thought-out logistical plans.

#### Logistics

Commanders of a military exercise must be fully aware of how logistics can affect the progress and outcome of the exercise (Eccles, 1982:23).

The need for commanders to understand the inter-relationship between logistics, strategy, and tactics is essential to success in war. The primary objective of logistics is to sustain our combat forces (Eccles, 1959:35). Failure to consider logistic requirements can lead to a misunderstanding of what levels the logistics system can or cannot support (Hall, 1989:Ch 5, 1). As Rear Admiral (ret) Henry E. Eccles states in his book, Logistics in the National Defense, "Strategy and tactics provide the scheme for the conduct of military operations; logistics provides the means therefor (Eccles, 1959:19)." It is important, then, to

realize that no strategic decision can be correct unless adequate consideration has been given to logistics (Peppers, 1986:14).

There is often a communications disconnect between logisticians and operators in understanding the principles of logistics and how they relate to the bigger picture of operational strategy and tactics. Col Gene S. Bartlow, in his article "The Operator-Logistician Disconnect," states that operators and logisticians must understand each other's world (Bartlow, 1988:23). He explains that operators often don't understand the role logistics plays in warfare, and logisticians don't understand the concepts of operation (Bartlow, 1988:23). Because of this disconnect, well planned exercises from an operations point of view will often overlook logistical requirements (Ogan, 1983:21).

As commanders gain an understanding of how logistics plays in warfare, they can factor logistics realism into plans and concepts. Together, logistical requirements and operational concepts can then be periodically exercised to ensure operational requirements are met (Bartlow, 1988:23; Gorby, 1980:25).

## Realism

Karl Von Clausewitz believed logistics realism must be present in military exercises so officers can receive training in the "mechanical aspects of war (Furlong, 1984:5)." Realism then, is the application of truthful planning factors for the situation described in the exercise scenario (Hoover, 1984:27). Without logistics realism in military exercises, officers become dubious in the presence of danger, death, and live ammunition (Heinl, 1967:57).

Logistics realism is imperative to any successful military exercise. If an exercise does not provide realism, the benefit of practice in real world application is lost (Hoover, 1984:27). Exercise realism is a fundamental ingredient to gaining and maintaining the highest degree of military proficiency (Hoover, 1984:27). When exercise realism is coupled with logistics realism, commanders can understand the types of material problems they may face. Improved exercise and logistic realism will help commanders prepare for the process of directing units and fighting in a wartime environment (Furlong, 1984:5).

Lt Gen Raymond B. Furlong believes realistic military exercises should identify and develop those officers who have the character and intellect needed for success in warfare (Furlong, 1984:5). To do this, he explains that exercises must reproduce "danger, exertion, uncertainty, and

chance,' along with resource limitations and resource losses (Furlong, 1984:5). Lt Cmdr Melos supports this point as well. He adds that realistic elements force the commanders to experience the handling of forces that have taken losses, instead of commanding forces that remain intact (Melos, 1988:77). They learn to find out what really works and what does not (Melos, 1988:77). Though realism is essential to the development of sound leadership, it is constrained by the element of time.

Time plays an important role with respect to realism. Usually there is not enough time allowed in an exercise to achieve the levels of realism needed to meet the objectives of the exercise (Hagel, 1989:Ch 1, 4). However, with improved planning, logistics realism can be incorporated in exercises while staying within the time constraints of the exercise and still provide a high degree of realism (Hoover, 1984:29). More important, though, are the effects simulations have on realism in military exercises.

Simulations (or artificialities), if used unwisely, fail to provide a realistic picture of events to the commanders (HQ MSG 102025Z, 1988:2-3). The simulations are often so deeply entrenched within the exercise that commanders are not confronted with realistic logistical issues that may dramatically affect operational decisions during actual war (Eccles, 1959:300). Fortunately, exercise real-

ism is becoming an increasingly important concern for our senior leadership. The Joint Chiefs of Staff have issued a mandate to all Services requiring they develop improved procedures to eliminate needless exercise artificialities and improve realism (Hall and Miller, 1990:33).

Wise use of simulations, though, allow an exercise to challenge the commander's war fighting capability without requiring his wartime resources to be in place. This is often the case with command post exercises.

#### Command Post Exercises

Command post exercises are designed to test wartime procedures while simulating the existence and movement of combat forces. As Maj Gregg T. Perry explains in his article "Limitations of JCS Exercises,":

CPXs tend to be manpower intensive both in planning and in execution. Some unique limitations of CPXs include scenario script dependency, where the exercise is tightly controlled by a set sequence of events. Heavily scripted CPXs occur because planners must create situations that drive the players to exercise the procedures which will accomplish specific objectives. CPXs are also limited by level of play constraints. By design, these exercises test the planning and command-control procedures to include our highest levels of government. Often, this means the level of play will include the National Command Authorities (the President and Secretary of Defense), the Joint Chiefs of Staff, and/or the Unified commanders. Exercise play at this level of government takes a lot of time and often requires high level decisions which affect the play of lower level participants. Additionally, real world commitments may keep the same high level players from part-

icipating in the exercises, further degrading realism. (Perry, 1987:8-9)

The direction a CPX can take in a military exercise can be broken down into two schools of thought. Capt Russ Hall and Lt Col Phillip Miller report that one school maintains CPXs should be "procedural-only" exercises; meaning, only limited and highly controlled elements of realism are allowed as part of the exercise. The reported benefit of this method is the control exercise planners maintain in determining exercise outcome, and in maintaining a degree of latitude in determining what activities will be exercised. The second school of thought maintains that CPXs should embody as much realism as possible without exceeding the limitations and objectives of the exercise. Hall and Miller note both groups do agree that logistics realism must be improved in CPXs. (Hall and Miller, 1990:33)

The purposes of a CPX, to include exercise realism, often vary. Generally though, a CPX should provide a training ground that incorporates the disciplines of strategy, tactics, and logistics together into an integrated whole (Hall, 1989:Ch 1, 6). There is often a tradeoff between logistics realism, and achieving the goals of the exercise. Realism is often lost and the purpose is undermined because the wrong players are used, or over-simplified logistic

inputs are used, or we fail to follow through on logistical limiting factors (Hagel, 1989:Ch 1, 5;Ch 6, 7-8).

These limitations can be overcome. Maj Gregg T. Perry also states that "CPX limitations can be overcome by effective, realistic scenario planning, and staff involvement at all levels (Perry, 1987:9). Another article on the subject, by Maj James D. Gorby says ". . . real world data should be used (when security permits) to reflect actual logistics capabilities and shortfalls (Gorby, 1980:24-30)." Several logistics officers at Air Command and Staff College in 1979 said it was normal during exercises to "'assume the equipment is available and ready.'" Consequently, the only thing learned during the exercises was how to fill out reports and use the message center (Gorby, 1980:25)." Though this example is somewhat dated, these same types of assumptions continue to exist in many of our military exercises today. Maj Steven J. Hagel suggests in his Thesis, Realism in Exercises, that we can improve realism by:

1. Having more involvement by our senior level leadership.
2. Using the actual players during the exercise instead of substitutes.
3. Extending the time of the exercise.
4. Conducting more intensive logistic exercises.  
(Hagel, 1989:Ch 6, 4)

Maj Hagel also suggests the Air Force can improve logistics realism in CPXs by using improved mathematical simulation modeling or realistic databases (Hagel, 1989:- Ch 6, 4).

Several approaches, according to Capt Hall, have been taken to improve CPX reality. An antiquated method for handling aircraft activity used Pareto's principle (the 80/20 rule) (See Stock and Lambert, 1987:419). This method assumed a percentage of the aircraft returned in mission capable condition; the aircraft simply refueled, rearmed and was ready for another mission. The remaining aircraft landed needing repair. This method didn't always identify which system(s) on the aircraft required repair or what parts would be needed to fix the system(s) (Hall, 1989:- Ch 2, 9).

Mathematical simulation modeling, currently in use throughout the Air Force, improves realism considerably. Mathematical modeling, as Capt Hall reports, uses peacetime repair and failure data to determine aircraft availability, aircraft landing status, discrepancy repair times, and repair parts. This method can be expanded to include other logistical activities such as petroleum, oil, lubricant (POL), and munitions requirements (Hall, 1989:Ch 2, 9-10).

A relatively new method, historical databasing, uses near wartime data to manage aircraft availability, determine



aircraft landing status, repair parts needed, and time to repair the aircraft. This method relies on near war-like data in place of peacetime repair and failure rates because of the significant differences that exist with system failures under combat conditions. As reported by Capt Hall, components with high failure rates during peacetime may fail infrequently, if at all, under combat conditions. Likewise, components that fail infrequently during peacetime may fail frequently under combat flying conditions (Hall, 1989:Ch 2, 9-10).

Hall and Miller report that this approach forestalls the question of internal or external validity because actual aircraft discrepancies and parts requirements are derived from near war-like conditions and used in a relatively unaltered state (Hall and Miller, 1990:34).

Hall and Miller also report that several benefits exist that are associated with the use of historical databasing. First, the database is reflective of the real world, and as such, many of the complex real world influences are accounted for automatically. Second, performance, reliability, and maintainability of aircraft systems are reflected within the database. Third, specific supply and maintenance information is readily available for the user i.e. NSNs, Noun, WUCs, quantity on order, repair times, and discrepancies. Fourth, the database is easily developed and

can be easily modified. Fifth, the database is based on real events, and as such, is easily accepted and used. Sixth, the database is not dependent on computer support for use; therefore, it is quite useful at any forward operating location. Finally, from an exercise planner's point of view, the results from the database can be foreseen. This allows proponents of the procedural-only CPXs to maintain control and anticipate possible logistical shortfalls that may result from the use of the database. (Hall and Miller, 1990:35)

#### Summary

Military exercises play a crucial role in maintaining strong readiness. They allow us to prepare for war during peacetime. Exercises should be used as an unbiased tool to improve our warfighting capability. In preparing exercises we should look closely at the interrelationship between logistics, strategy, and tactics, in order to match combat capability with sound operational principles. Operators and logisticians need to fully understand the principles by which each other operates, and should try to integrate these principles when planning military exercises. Realism must be an integral part of these exercises so that commanders can develop their warfighting skills under war-like conditions. Realistic military exercises should be designed to

develop the character, intellect, and leadership our commanders will need to be successful in warfare. Logistics realism at the CPX level must echo these desirable conditions. Though heavily laden with simulation, wise use of limiting factors can help overcome the undesirable consequences of simulation with effective, realistic scenario planning, and strong staff involvement. Continued improvements with historical databasing and mathematical modeling techniques should continue to improve realism at the command post exercise level.

Chapter III will discuss the methodology used throughout this research effort.

### III. Methodology

#### Overview

The method outlined in Table 1 will be used to achieve the objective of this thesis. The steps outlined in the table will follow the basic methodology used during the development of the B-52G database model (Hall, 1989:- Ch 3, 1).

TABLE 1  
RESEARCH METHODOLOGY

- 
1. Collect data
    - a) Procure ETTF ELF-1 mission data
    - b) Verify useability of data . .
  2. Develop KC-135A/E/R database model
    - a) Develop database reference tables
    - b) Develop practice database reference tables for use with the information guide
  3. Develop information guide
  4. Develop database evaluation surveys
  5. Test KC-135A/E/R database model
  6. Conduct field evaluations, observations, and interviews
  7. Analyze results
-

A discussion of the research methodology follows. It will examine the procedure to be used to complete each step of the methodology as outlined in Table 1. For the sake of clarity, steps 4 and 6 will be combined under the sub-heading "Developing and Conducting the Evaluation."

#### Data Collection

Data collection will involve a two-step process. The first step involves finding an adequate source for the raw data needed to build the database model. To provide as much realism as possible, the data used to develop the KC-135-A/E/R database model should come from a unit whose flying mission closely replicates expected wartime missions. ELF 1 mission data (data collected during support of Saudi Arabian E3 aircraft) from European Tanker Task Force (ETTF) should meet this requirement and is targeted for use in developing the database model.

The second step involves performing verification analysis of the data to determine its usability. The intent here is to insure the data provides the necessary information needed to develop the database model, and to insure the data accurately reflects realistic maintenance conditions.

During the procurement process, the researcher will screen all source data to ensure that it provides sufficient information, and in sufficient quantity, to develop the database model. The source data should include the follow-

ing items: aircraft maintenance landing code, in-flight discrepancies, quantity ordered, work unit code, job control number, national stock number, and nomenclature for the part(s) ordered. To ensure data accuracy, weapon system experts will be used to validate the data.

#### KC-135A/E/R Database Model Development

Development of the KC-135A/E/R database model will involve the merging of maintenance and supply data elements as depicted in Figure 1.

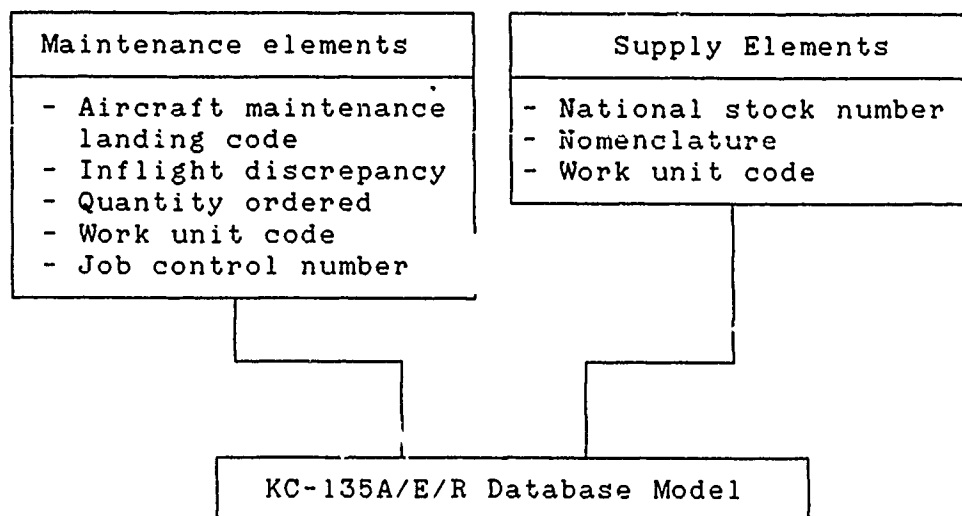


Figure 1. KC-135A/E/R Database Model  
Source Data Input

The work unit code (WUC) will be used as the key field to link elements of the maintenance and supply databases. The researcher will link the two databases by developing a software program that matches the necessary supply data with the appropriate maintenance data using WRSK listings supplied by SAC headquarters.

A condensed version of the KC-135A/E/R database model will also be developed for training purposes, and will be used with the information guide. The condensed database will simply be a collection of events taken from the KC-135A/E/R database model.

#### Information Guide Development

The information guide will be a modification of an existing guide developed to support the B-52G Aircraft Maintenance Database Model (Hall, 1989:Ap B). The purpose of the information guide is to provide a standardized method to train and/or familiarize response cell personnel with procedures on how to manage aircraft activities, as well as procedures on how to use the database model during a CPX. Modifications to the information guide will include adjustments for the KC-135 contingency phase inspection, and modification of the time required to perform preflight/thru-flight inspections.

The information guide will consist of detailed, step by step procedures to handle the following items:

1. Aircraft inspections:

- a. Phase inspections
- b. Hourly postflight inspections (HPO)
- c. Preflight/thruflight inspections

2. Supply requirements:

- a. Validating WRSK listings
- b. Parts ordering
- c. Cannibalization
- d. Mission Capability (MICAP) items
- e. Minimum Essential Systems List (MESL) items

3. Documenting exercise forms:

- a. Initial forms set up (STARTEX)
- b. Using the database

4. Handling special cases:

- a. Accounting for aircraft attrition
- b. Additional/replacement aircraft  
(Hall, 1989:Ch 3, 3-4)

Developing and Conducting the Evaluation

A written response survey, interviews and observations will be used to evaluate the effectiveness of the KC-135-A/E/R database model. The researcher will modify an existing survey (Hall, 1989:Ap D) and develop further questions for use during the evaluation phase of the research. CPX response cell members will be evaluated using the survey to test the hypothesis that there is an improved difference in logistics realism between the KC-135A/E/R database model and other mathematical models in use today.

The survey will employ the use of a Likert scale as a means of quantifying responses (See Emory, 1985:255). The



reliability of the survey instrument will be tested using the Cronbach's Coefficient Alpha technique (See Emory, 1985:100). The content validity of the survey instrument will rely on expert opinion to ensure questions are developed that adequately cover the usefulness of the model and its associated training material (See Emory, 1985:95).

The interview will be used primarily to improve the quality of evaluation information by adding to, and clarifying information gathered during the surveying procedure. The interview will focus on capturing the concerns and suggestions response cell personnel may have with using the KC-135A/E/R database model and information guide. The interview method will employ face-to-face interview techniques, with responses recorded in writing (See Emory, 1985:160-169, 178-183).

Observations will be used by the researcher to view first hand how effective the response cell personnel are in using the KC-135A/E/R database model. The observations will be inferential, and variables will be judged qualitatively. Variables for the observation will concentrate on the degree of usefulness each model provides their respective response cell personnel. The researcher shall focus his attention on evaluating several characteristics of the model to include training, ease of use, accuracy, and supportability.

These particular characteristics of the model have been singled out for several reasons. The model must be easy to use and simple to understand. During CPXs little time is provided for training. The response cell personnel generally must take it upon themselves to learn the system they will use during the exercise. If the system is overly complicated, it can lead to confusion, poor performance by response cell members, and inaccurate information passed to decision makers. Consequently, a database model that is easily understood and used, is critical in order to be an effective and reliable tool. The data provided by the model must also be accurate. If not, the credibility of the model is questioned leading to demotivation by the users, and inaccurate information passed up the chain of command. Finally, the model must be supportable, meaning that it must provide the necessary information needed to accurately task the supply system under realistic conditions.

#### Test KC-135A/E/R Database Model

The KC-135A/E/R database model will be tested during the 1990 Crested Eagle CPX. The exercise will provide the means by which the model's usefulness can be validated. A static group design will be used as the experimental design for the test. Such a design involves administering the database during the CPX and making comparisons between response cells using the KC-135A/E/R Database Model and a

control group of response cells not using the database model. Comparative analysis will then focus on evaluation survey responses from response cell members who have experience in using both the KC-135A/E/R database model and other mathematical models during CPXs. A separate analysis, through survey evaluations, will also be conducted on response cell members that have used only the KC-135A/E/R database model. Specific analysis procedures will be discussed next.

### Analysis of Findings and Results

An extensive analysis of the survey evaluations will be conducted comparing the two samples of response cell personnel. The first population will include those personnel with experience in using both the KC-135A/E/R database model and other mathematical models. A statistical analysis of survey evaluations, will be conducted using a studentized paired T-test to determine if there is a difference in logistics realism between the KC-135A/E/R database model and the mathematical model. The second population will include those response cell personnel who have experience in using just the KC-135A/E/R database model. Here a statistical analysis of the survey evaluations will be conducted using the Friedman's non-parametric two way analysis of variance (ANOVA) procedure to determine if there is a significant difference of opinion among users concerning the usefulness

of the KC-135A/E/R database model. A non-parametric procedure should be used if the data variability for the collected data is not equal. Equal variance is a necessary assumption for use of Parametric ANOVA procedures. The Friedman procedure will be used, rather than the Kruskal Wallis procedure, to reduce data variability by blocking the data by the individual questions from the evaluation survey. This process will reduce the within variability of the data thereby increasing the F statistic. Consequently, differences of opinion among respondents will be amplified.

#### Summary

The research methodology provides a sequential set of steps the researcher will use to progress through the research. Chapter IV will outline the results found from this effort.

#### IV. Results, Findings, and Analysis

##### Overview

The methodology outlined in Chapter III was used as a guide for data collection, development of the database model, development of the information guide, and development of the evaluation surveys. Modification, however, had to be made for testing the database model and conducting field evaluations because of the cancellation of the 1990 Crested Eagle CPX.

A suitable alternate CPX was not available to test the database model within the time constraints of the research project. Therefore, a mock exercise was conducted to test the database model using volunteer graduate students from the Air Force Institute of Technology's School of Systems and Logistics. A survey was administered following the termination of the mock exercise to evaluate the database, and information guide. Details of the procedure used; and results, findings, and analysis, will be presented under the headings "Testing the KC-135A/E/R Database Model," and "Evaluations, Observations, and Interviews" later in this chapter.

The results of the methodology will be presented in the same sequence of events as outlined in Table 1 of Chapter III. Data collection will first be discussed followed by development of the database model, development of the infor-

mation guide, development of the evaluation surveys, testing of the database model, evaluation of the database model, and finally, an analysis of the evaluation results.

#### Data Collection

Data collection was accomplished through a two step process. The first step involved locating an adequate source of data that met the requirements for the database model. Once found, the second step involved validating the data to ensure it provided the realism and accuracy necessary for use in the database model. The detailed explanation of each step will be discussed next.

ELF-1 ETTF mission data (data collected during Saudi Arabian E3 aircraft Tanker Task Force support) was initially targeted for use as source data for the database model. The use of ELF-1 mission data would provide an element of realism that depicted war-like flying conditions that could easily be incorporated into the database model. However, necessary supply data was not available and an alternate source of data had to be found. The next best available source data that depicted war-like flying conditions was that of routine ETTF flying missions. With ETTF mission data, both the maintenance and supply data elements were available and in sufficient quantity to build the database model. Consequently, the ETTF mission data was chosen by

SAC/LGL and this researcher as source data for the KC-135-A/E/R database model.

The source data included the following maintenance and supply database elements (among others):

1. Aircraft/System Maintenance Landing Code
2. Inflight Discrepancies
3. Maintenance Repair Times
4. Repair Parts by:
  - a. Work Unit Code (WUC)
  - b. Quantity Ordered

The source data did not include associated NSN and Nomenclature (Noun) supply data elements for each required part. However, the remaining supply data elements could be extracted from WRSK listings, the VAMOSC (Visibility in Management of Operating and Support Cost) computer generated support system, as well as through manual research.

The source data was provided by the 11th Strategic Group at RAF Fairford, UK. The data was generated using the PCN SG054-35A Maintenance History Report for on-equipment maintenance, and covers five months of maintenance activity starting 1 June 1989 and ending 31 October 1989.

The source data was initially screened by the researcher and two senior NCOs from the 7th Organizational Maintenance Squadron's Tanker Branch at Carswell AFB to ensure the data was realistic and accurate. Cross checks

were performed randomly to verify that the elements reported in each data field matched the reported maintenance discrepancy. Approximately 30 percent of the database was checked in this manner. Less than five percent of the discrepancies checked contained error. Most of the errors resulted from technicians failing to record the proper WUC for the specific component; most of these errors were accurate to the first three places of the WUC. Consequently, the researcher concluded the source data provided a strong degree of realism and accuracy, and the development of the database model commenced.

#### KC-135A/E/R Database Model Development

##### Full Version.

A primary objective of this research effort was to develop a database model that provides information in a realistic form that can be useful to CPX response cell personnel. To be successful, the database model must take the input data from ETTF missions, along with associated supply data, and provide output data for the database model that will ensure full realism was preserved.

To develop the database model, source data elements had to be merged with NSNs to make the database model complete. A six step process was used to fully develop the model.

The first step involved developing a format for the database model, and selecting a software package to support



it. To maintain consistency and standardization, a format duplicating that of the B-52G Historical Database Model was used. By maintaining a high degree of consistency and standardization, response cell personnel familiar with one historical database model can easily transition to another model with little or no difficulty resulting from the format of the database model. With the format set, a spreadsheet software, QUATTRO version 1.2, was selected. This particular software package was selected primarily because of its ease of use, and availability.

In step two of the development process, maintenance and supply elements from the source data were manually extracted from the Maintenance History Report and placed in a QUATTRO data file. The elements extracted for the maintenance history report included:

1. Aircraft/System Maintenance Landing Code
2. Inflight Discrepancies
3. Maintenance Repair Times
4. Repair Parts by:
  - a. WUC
  - b. Quantity Ordered

Once complete, the NSN had to be linked with the associated WUC from the maintenance history report and placed in the QUATTRO data file.

Step three involved performing the linking process. This process turned out to be rather long and laborious. A portion of the required linking was accomplished using WRSK data files supplied by HQ SAC/LGSMO. WUCs were extracted from the QUATTRO data file and placed in a DBASE III+ file along with the WRSK data. A DBASE III+ program was written to search the WRSK data for a matching WUC and link the WUC to the NSN. Once complete, the new file was imported back into the QUATTRO data file.

Not all WUCs could be linked using this process though. A computer software support system called VAMOSC was used to link 70 WUCs with NSNs. The VAMOSC system is a support system under the control of HQ AFLCs Cost Accounting Directorate (AFLC/ACC). Though used for cost accounting purposes, the VAMOSC system has the capability of cross referencing a WUC for the KC-135 aircraft with its associated NSN and Noun.

Even after using the VAMOSC system, 17 additional WUCs had to be manually researched. Once the research was complete, the collected WUCs and matching NSNs from both the VAMOSC system and through manual research were entered into the QUATTRO data file.

Step four involved the simple process of assigning maintenance event control numbers to the database elements in the data file. The database elements associated with an

individual sortie were grouped together and a maintenance event control number was assigned to identify each sortie.

Step five in the final preparation of the database model development involved the deletion of unnecessary records from the data file. The only records deleted from the data file were those that did not contribute to the purpose of the database design. These records were classified as insignificant, minor discrepancies, requiring no parts, and that did not impair or degrade from the mission of the aircraft.

The final step for the development of the database model development involved identifying the overall fix time for a sortie having a Code 3 discrepancy and placing an asterisk in the adjacent LNDG CODE column. With this final step to the data file finished, the database model was ready for testing.

The completed KC-135A/E/R Aircraft Maintenance Logistics Database is located in Appendix A. The columns of the database, as defined by Capt Hall, follows:

Maintenance Event Control Number - The control number is used to identify a 'maintenance event' for a particular aircraft on the CPX MX Worksheets 1 and 2. A maintenance event includes all the lines of discrepancies in the database associated with an aircraft

landing from a sortie. It also provides a means of record keeping for later analysis.

Acft T.N. - The aircraft tail number to which the maintenance event is assigned is entered in this column (by the user).

Lndg Code - Identifies the maintenance condition of an aircraft returning from a mission.

Code 1: Aircraft/system(s) fully operational. Aircraft is landing with no known discrepancies which would adversely affect performance of the aircraft/system(s).

Code 2: Aircraft/system(s) having minor discrepancies which may affect operating performance but will generally not preclude the aircraft from flying another mission prior to repair.

Code 3: Aircraft/system(s) having discrepancies which render the aircraft and/or system(s) unusable. Generally, aircraft are not flown until Code 3 discrepancies are repaired.

Fix Time - The time needed to repair a discrepancy listed in the database. The times listed do not include normal refuel, phase, HPO, preflight/thruflight or inspections. (Time in hours to the nearest tenth). The overall aircraft fix time is identified by an asterisk in the Lndg Code column when an aircraft has Code 3 discrepancies.

NSN - The national stock number (NSN) of the needed repair parts.

Noun - The nomenclature of the needed repair part.

WUC - The work unit Code (WUC) identifies a major repair part, system or subsystem.

Qty - Quantity of repair part(s), if needed.

- In WRSK    - For the user to identify if the repair part is available in the WRSK (Yes/No).
- MESL       - For the user to identify whether the affected system is on the minimum essential systems list (MESL) in AFR 65-110, SAC Supplement 1, if the part is not on-hand (Yes/No).
- Msg DTG    - For the user to record the date-time-group of the message requesting a part not available in the WRSK.
- Remarks    - To provide a short, general description of the discrepancy associated with each record. (Hall, 1989:Ch 4, 9-11)

The database model incorporates a high degree of internal and external validity. Capt Hall's elaboration of the inherent validity strengths of historical database models are fully supported by and incorporated into this database model. He argues that the method used to develop historical database models forestalls any question of either internal or external validity because actual aircraft discrepancies and part requirements are used in a relatively unaltered state. The historical database model uses data from actual aircraft flying missions. Additionally, internal validity can be confirmed by ensuring exact one to one relationships as database fields are joined and through follow-up verification checks of all fields within each record in the database. (Hall, 1989:Ch 4, 12)

### Practice Database.

A condensed version of the database model was developed for use with the information guide solely for training purposes. Once the full version was complete, a practice database was built by extracting a small number of maintenance events and placing them together in a separate database file. The maintenance events selected present a broad variation of discrepancies to response cell personnel during their pre-exercise training session. This will allow enhanced training by providing response cell personnel an opportunity to view the data before hand, so that questions concerning the database model may be asked. The Practice Database is located in Appendix C.

A set of training slides have also been developed to enhance the training process. Some of the slides were duplicated from the B-52G Historical Aircraft Maintenance Database Model and modified to support the KC-135A/E/R Database (See Hall, 1989:Ap F). The training slides are located in Appendix F.

### Information Guide

An information guide is needed as documentation to provide clear and concise procedures and training on how to manage aircraft activities, and how to use the database model.

The information guide is a replication of the one used with the B-52G Aircraft Maintenance Database Model (See Hall, 1989:Ap B). Modifications to the content have been made to accommodate the KC-135A/E/R aircraft. These modifications include adjustments for the KC-135 contingency phase inspection, and modification of the preflight/thruflight inspection time requirement.

The information guide is designed to provide the user with a set of practical requirements in a set of procedures that are easily understood, and in a format that allows quick access to the information. The guide is also arranged in an order that coincides with expected pre-exercise training sessions.

The procedures outlined in the information guide are based on current aircraft maintenance requirements, and current supply procedures as directed by SAC regulation and appropriate technical data (as of this writing). The specific procedures cover the following areas:

1. Aircraft inspections:

- a. The purpose, frequency, and how to handle the phase inspections.
- b. The purpose, frequency, and how to handle the hourly postflight (HPO) inspections.
- c. Accounting for aircraft preflight/thruflight inspections.

2. Aircraft parts requirements:

- a. Checking the WRSK listing for available parts.
- b. Ordering of parts.

- c. Interpreting the Minimum Essential System List (MESL) in AFR 65-110, SAC Supplement 1.
  - d. Handling cannibalization of MICAP parts.
3. Documentation of exercise forms:
- a. Initial setup of forms at the start of the exercise (STARTEX).
  - b. Extracting maintenance events from the database and plotting the data.
4. Handling special cases:
- a. Dealing with late takeoffs, maintenance cancellations.
  - b. Accounting for ground or airborne attrition of aircraft.
  - c. Incorporating additional/replacement aircraft in the flow of events.
  - d. Handling of aircraft diverted from other locations. (Hall, 1989:Ch 4, 12-13)

The completed KC-135A/E/R Database Model Information Guide is located in Appendix B.

#### Evaluation Survey Development

Two written response surveys were used to evaluate the effectiveness of the KC-135A/E/R database model. The surveys were designed to test the hypothesis that the KC-135A/E/R database model improves logistics realism in CPXs, and that the database model is easy to use.

Two survey instruments were needed to accommodate the two population groups to be sampled (See Appendix E). The first evaluation survey, titled "KC-135A/E/R Aircraft Maintenance Logistics Database Evaluation, Evaluation Survey 1," was administered to all personnel participating in the mock exercise. With this group, the survey instrument was de-



signed to allow comparisons of opinion among respondents with respect to the test hypothesis. That is, the results would help answer the question "does the database model provide realistic logistical information to the response cell member?". With the sample population having no previous CPX experience, they are not capable of making a judgement on whether the database model improves realism over existing models currently in use. Therefore, a second survey instrument, titled "Evaluation 2, Previous Experience in CPX," was needed to evaluate those personnel who have had previous experience as a response cell member so that a comparison of improved realism can be made between the database model and other models currently in use.

Both evaluation surveys were developed using a five point Likert scale to quantify responses. Three constructs were used as a basis for developing questions in the surveys. The first construct asked questions to determine if the database model is realistic. Questions 1 and 5 in the first evaluation survey, and questions 1 and 4 in the second evaluation survey were used in support of the first construct. The second construct asked questions to determine if the database model was easy to use. Questions 2, 3, 4, 6, and 7, of Evaluation Survey 1, and questions 2, 3, 5, 6, and 7 of Evaluation Survey 2 were used in support of the second construct. The third construct asked questions to determine the usefulness of the information guide. Ques-

tions 9 and 10 of the first survey, and question 8 of the second survey were used in support of the third construct.

Many of the questions used in both surveys were modified from an existing survey used to evaluate the B-52G database model. The B-52G survey was used because it provided a fairly high measure of consistency in its ability to measure the usefulness of the B-52G Database Model. To make this claim, a test of the B-52G evaluation survey's reliability was conducted by this researcher to determine its internal consistency. A Cronbach's coefficient alpha of .7985 was computed using the SPSS-X mainframe statistical software package. Based on these findings, the researcher concluded the B-52G Model's evaluation survey provided a fair degree of internal consistency and would therefore be a useful guide toward the development of the two evaluation surveys for this research effort.

#### Testing the KC-135A/E/R Database Model

The KC-135A/E/R Database Model was tested during a mock exercise held at the Air Force Institute of Technology's School of Systems and Logistics on 20 April 1990. Its purpose was to validate the model's usefulness by determining if the model met the objectives of this research effort; namely, to provide improved logistical realism for response cell members during a CPX.

In validating the model, three specific constructs were tested. First and foremost, the element of realism was

tested. Realistic tasking orders were used by each response cell team to launch, recover, and maintain their fleet of aircraft throughout the exercise. Second, ease of use of the database, CPX maintenance worksheets, and information guide were tested. A highly compressed time line was used to artificially induce time constraints on the response cell team members during the exercise. If the database and its associated material were difficult to use, this would be amplified under an artificially induced time constraint. Finally, the need for minimal training was tested. Each team was provided a copy of the Information Guide to read four days prior to the beginning of the exercise. Additionally, a one hour training session was provided just prior to the start of the exercise to ensure each member was somewhat familiar with their responsibilities. The need for minimal training is considered critical to the success of the model. Typically, only minimal training is provided to response cell personnel prior to accomplishing their duties as a response cell member. The model and its associated documentation should provide enough information, as stand alone documents, so response cell members can understand and use the database model effectively during an exercise.

### Composition of the Mock Exercise.

A total of thirteen Officers from the School of Systems and Logistics volunteered to participate as response cell members during the mock exercise. Each, from their respective backgrounds, provided a unique perspective to the exercise. The thirteen volunteers consisted of one rated navigator, two logistics planners and ten aircraft maintenance officers.

The mock exercise was composed of five teams each containing two or three personnel. Each team was assigned either 7, 9, 11, 13, or 15 aircraft as the primary number of aircraft assigned (PAA) under their control. Each aircraft was assigned fabricated tail numbers and total airframe flying hours. Each team was assigned a specific set of maintenance event control numbers (from the database) for use during the exercise. This would allow the team members to collectively sample a broader portion of the database model during the exercise than would otherwise be sampled if they had all started from the same point. Additionally, teams 1 and 2 used the WRSK listing designed to support a deployment of 10 aircraft, while teams 3, 4 and 5 used the WRSK listing supporting a deployment of 15 aircraft.

The exercise covered a 48 hour period of time compressed into four hours of actual exercise play. Each team received two tasking orders during the exercise (See Appendix G). The tasking orders were designed to realistically

reflect demands placed on a response cell during a CPX. Finally, the researcher acted as the exercise coordinator and exercise controller. He determined when necessary mission capable (MICAP) parts and routine refill of the WRSK were received. His purpose was to duplicate the communication and coordination processes that would typically exist between the regional Logistic Readiness Center (LRC) and the response cells.

Table 2 provides a synopsis of specific team composition and assignments used throughout the exercise.

TABLE 2  
MOCK EXERCISE TEAM COMPOSITION AND ASSIGNMENTS

	<u># of Personnel on Team</u>	<u>Primary Aircraft Assigned</u>	<u>Maint. Event Control # Used</u>	<u>WRSK list Used</u>
Team 1	2	7	300 - 359	10
Team 2	2	9	225 - 299	10
Team 3	3	11	150 - 224	15
Team 4	3	13	075 - 149	15
Team 5	3	15	001 - 074	15

Worksheets were used by each team to track their progress through the exercise. The worksheets are the same as

those developed by Capt Hall for the B-52G Database Model (See Hall, 1989:Ap E), and are located in Appendix D.

The objective for each team was to maintain their fleet of aircraft in the highest state of readiness possible while fulfilling the tasking orders levied upon them by CPX headquarters.

#### Evaluation Survey 1 Results.

At the completion of the mock exercise each participant completed the KC-135 Aircraft Maintenance Logistics Database Evaluation (Evaluation Survey 1). Those personnel who, at some previous time in their career, had participated as a CPX response cell member also completed a second Evaluation Survey (Evaluation Survey 2) (See Appendix E).

The results of Evaluation Survey 1 will be presented first. Each question will be listed along with summary statistics and associated comments made by each respondent.

1. ----- The database helped make exercise play in the response cell more realistic.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
I K	A D E F G H J M	B L	C	
Total Responses = 13		Mean = 2.15		Stddev = .80

Why or how?

- A. (no comment)
  - B. "I really don't have anything to compare with."
  - C. "Everything was Code 2 and used parts only once."
  - D. "Having realistic MX breaks to fix times lends credibility."
  - E. "Actual maintenance discrepancies easy to relate to real world."
  - F. "Conditions realistic, especially parts availability."
  - G. "We need a scenario to go by."
  - H. "Knowing the status of the acft on landing allowed some gaming prior to filling line."
  - I. "Provided factual times for maint. actions that made you take the required amount of time to complete. It doesn't allow you to cheat."
  - J. "Good format for depicting MX and supply events."
  - K. "Provided the core for maintenance involvement."
  - L. "Because I have no experience with tankers I don't have any feeling for how realistic the database really was."
  - M. (no comment)
-

2. ----- The database makes it easy to get the information I need to plot aircraft maintenance actions, inspections, and turn times.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
A F G I J K L	B C D H	E		
Total Responses = 12		Mean = 1.50		Std'd Dev = .67

Why or how?

- A. "You have real world info instead of simulated times."
- B. (no comment)
- C. "It's unknown as to whether supply support was realistically tasked."
- D. (no comment)
- E. "Nothing to compare it with."
- F. "All needed info available."
- G. (no comment)
- H. "Everything important to the exercise was readily available."
- I. All actions had easily understood times that were readily available."
- J. "MX hours well depicted."
- K. "You might add blank lines where inputs should be written in the database (tail number)."
- L. "Exceptionally easy to use. I originally thought the time compression would be a real limiting factor. In the end we could have handled 2-3 times our tasking (9 PAA)."



M. (Participant did not respond to this question)

3. ----- The database makes it easy to get the information I need to determine the availability of each aircraft.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
B F G I J K	A D H L M		E	C
Total Responses = 13		Mean = 1.92		Std Dev = 1.26

Why or how?

- A. "Once you place a maint. event control number with an aircraft you can better determine its availability."
- B. "I can quickly determine availability."
- C. "All the necessary info was given to develop a flow schedule."
- D. (no comment)
- E. "This info comes from the CPX worksheets."
- F. "Database with background knowledge made this task easy."
- G. (no comment)
- H. (no comment)
- I. "Condition codes of aircraft and the discrepancies were clear enough to determine if the acft was able to make its mission."

J. "By identifying type (Code) of discrepancy and mean maintenance time (MMT)."

K. "Clearly specified."

L. "My lack of tanker experience made me guess on a few aircraft availability times, but in general, if this were a fighter database the info would have been more than sufficient and my answer would be a 'Strongly Agree'."

M. (no comment)

4. ----- The database makes it easy for me to determine what repair parts I need when an aircraft lands.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
ABDEFGH IJKLM		C		
Total Responses = 13		Mean = 1.15		Stdrd Dev = .55

Why or how?

A. "We had the parts actually used to fix the aircraft."

B. "The MECN made it quite clear what parts were required."

C. (no comment)

D. "Specific description of problems."

E. "The info is readily available."

F. "Sure, the MDC would increase availability of parts."

G. (no comment)

H. (no comment)

I. "Yes, it tells me exactly what part I need."

J. "Very realistic. All the input data is there."

K. "Clearly specified."

L. "Very easy to use, almost instant understanding of the format."

M. "NSNs provided."

5. ----- Having the discrepancy associated with a given part requirement helped make the demands more realistic.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
A D J K L	B E F G H I	C M		
Total Responses = 13		Mean = 1.77		Std Dev = .73

Why or how?

A. (no comment)

B. (no comment)

C. "It's unknown whether this is true because can't assess whether demands are realistic for this aircraft."

D. "Same as # 1 [Having realistic MX breaks to fix times lends credibility.]."

E. "Shows the relation between the write-up and the parts required."

- F. "Tends to be more of a learning tool for those that don't know."
- G. (no comment)
- H. "In this scenario, the discrepancy was not really a player."
- I. (no comment)
- J. "Having a part levied against the downtime, or vice versa, provides credibility."
- K. "Would help in judging the condition of the A/C."
- L. "Absolutely - if I was provided the part requirement only, I would be providing a total guess, the discrepancy is very helpful."
- M. (no comment)

6. ----- Having the noun and work unit code associated with the national stock number for a needed part helped me locate the part in the WRSK listing and more easily identify the item in message traffic.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
I L	H K	A G	J	B C D E F M
Total Responses = 13		Mean = 3.53		Std Dev = 1.61

Why or how?

- A. "The NOUN did not help in the WRSK listing- the WUC did, unless the part was not listed with WUC - having the ability to sort the

WRSK listing by NSN would make parts much easier to find."

- B. "We still had to check every stock number. The WUC didn't match the stock number."
- C. "The WRSK list needs to be sequenced by NSN."
- D. "NSN and WUC didn't help on this particular exercise because of the WRSK listing format."
- E. "WUC didn't help at all with the WRSK. The NOUN was not available in the WRSK listing. May have helped in messages."
- F. "NSN need to be ordered, nomenclature should be included."
- G. "NOUN wasn't available in WRSK listing. It would have been helpful."
- H. "In this case, no. If listing were aligned in WUC order then yes - would recommend in NSN order."
- I. "Would have if I used listing right. However, the proper way to use the list needs to be stressed to those who will be using it. Also, the info needs to be sorted by WUC, NSN."
- J. "We didn't know that the WUC grouped everything together. An oversight on our part."
- K. "Need to stress WUC as a way of finding the NSN. NSN or WUC need to be in sequential order."
- L. "We searched the NOUN and WUC columns first."
- M. "We did not find any WUCs in the listing."

- 
7. ----- Having the noun and work unit code associated with the national stock number for a needed part helped me determine whether a part was essential to fly a given mission and track cannibalizations.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
	D E F G H	A B C	I J K L	M
Total Responses = 13		Mean = 3.08		Stdrd Dev = 1.04

Why or how?

- A. "Never really came into play - used the WUC to check the MESL on two items."
- B. "In our scenario we only needed one part, and it was a Code 2 write-up."
- C. "Did not use the MESL."
- D. "Helped relate to the MESL."
- E. "Made checking the MESL easy having the NOUN the WUC was used in tracking CANN parts."
- F. "Background and MESL also helped."
- G. "WUC was needed to cross reference to MESL. We tracked CANNs on CPX MX worksheet."
- H. "Again, not in this case - but if a CANN log were MX, then yes."
- I. "The NOUN and NSN don't tell me if the part is critical."
- J. "The landing code tells me if the part is important or not. We didn't have CANNs so it was difficult to test this. Additionally, I can't remember having seen the tracking of CANNs in the book."
- K. "Doesn't help track cannibalizations. WUC not overly useful."
- L. "Made no difference. Our decision on part essentialability had nothing to do with NOUN

and WUC availability. We did not accomplish any CANNs."

M. "Unfamiliar with the part redundancy within the aircraft."

8. ----- The CPX MX Worksheets along with the new symbols and charting technique streamlined the tracking of each aircraft's flying and maintenance requirements.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
I J K	A B D E G H L	C F M		
Total Responses = 13		Mean = 2.00		Stddev = .71

Why or how?

- A. "Easy to work with and understand. Tracking all the numbers make the sheets very cluttered. Some symbol other than just "maint" would be useful for tracking maint."
- B. "The symbols made it easier to track aircraft."
- C. "I've never done this before so I can't say whether it's an improvement or not."
- D. "As long as it's standardized it really didn't matter much what the symbols were."
- E. "Nothing to compare with, but it did seem to flow smoothly after training familiarization."
- F. "Another team member used CPX MX worksheets, he didn't seem to experience any problems."

- G. "No method specified for CANNs. Had just enough room without tracking refueling points."
- H. "Everything important to the exercise was readily available."
- I. "Was easy to understand and follow."
- J. "Gave a good standardized format. Needs to have two horizontal lines per mission."
- K. "Standardized symbols helped. Should carry-over maintenance be included on the work-sheets?"
- L. "It was very easy to chart but I don't know why we tracked ARCT and fuel loads."
- M. "I don't know how it was done before."

9. ----- Working with the practice data base and other training materials adequately prepared me for using the database during the exercise.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
G H L	A B C D F I J K M		E	
Total Responses = 13		Mean = 1.92		Std'd Dev = .76

Why or how?

- A. "Helped me to quickly become familiar with info."
- B. "The example prior to STARTEX was sufficient."
- C. (no comment)



- D. "Gave me a feel for how all the documents fit together."
- E. "Not enough time was available during training but having some additional time at the beginning of STARTEX helped."
- F. "Operations ran very smoothly, no problems."
- G. (no comment)
- H. (no comment)
- I. "It gave me some practical experience."
- J. "Practice makes perfect. Training on the rest of the MESL (or its importance) would have even been fine."
- K. "We were rushed in our classroom training."
- L. "Yes - the short training session and your availability in the early exercise phase provided excellent preparation."
- M. "It helped explain what I wasn't sure of by just reading the book."

10. ----- The information guide helped me understand my job in the response cell and answered the questions I had.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5
A H I J	B C F G K L M	D		E
Total Responses = 13		Mean = 2.00		Stdrd Dev = 1.08

Why or how?

- a. What information was not provided that would have been helpful?
- b. What information was provided that was not useful or helpful?

- A. "Well put together - contains the needed info for completing the response cell requirements."
- B. "Along with the intro prior to STARTEX."
- C. "See comments in the Guide."
- D. "I didn't get it in time to read it fully."
- E. "After thoroughly studying the guide (read through two or more times) it covered everything quite well."  
"Better description of how Code 2's could be handled - parts use, cancelled maintenance."  
"Fuel loads and ARCT times were not used."
- F. "Briefing was more helpful."
- G. "Info on tracking Code 2s could have been more specific."  
"The ability to look ahead to determine landing codes before takeoff detracted from realism. Phase and HPO hours should be tracked descending rather than ascending. A brief write-up on concept of maintenance for the airframe would have been helpful i.e. pre-flights immediately before flight instead of on swings. Phase theory - hours versus days."
- H. (no comment)
- I. "The 'NUTSHELLs' in the book were great!"
- J. "The recaps (NUTSHELLs) were a valuable aid during the exercise."

- K. "The in a NUTSHELL sections were very useful. You might put them in an implementation checklist or appendix."
- "Emphasis needs to be placed on not accomplishing tasks before possible. (i.e. follow exercise times realistically.)"
- L. "The guide and the training session prepared me adequately. Either tool standing alone would not have been sufficient in the time we had available."
- "I was confused on the concurrency of MX actions."
- M. "It helped me (even though I only had limited time to review it prior to the exercise)."
- "Parts list in NSN sequence."
- "WUC Codes."
- "We should not have been given A/C status until it returned. (possibly in a sealed envelope)"
- 

Evaluation Survey 1 provided a fairly high measure of internal consistency in its ability to measure the usefulness of the KC-135 Database Model. A Cronbach's coefficient alpha of .7561 was measured for Evaluation Survey 1.

#### Analysis of Findings and Results.

##### Non-statistical Analysis.

A non-statistical analysis of the research design, and of the data collected, was performed to identify trends or possible inconsistencies with the data that confuse, cause

disorder, or otherwise prevent a clear understanding of the data results. The collected data must be as free as possible from confounds so that correct conclusions can be inferred from its results. For this data set, confounds were caused by the experimental design, to include the environment the test was conducted in, and by the personnel used in testing of the database model.

An optimal environment to test the database model would have been during an actual CPX where personnel, familiar with the aircraft, would have been deployed at forward operating locations. Though this environment would have presented its own set of confounds, it would have provided a truer picture of the database model's useability. This should occur, primarily, because the environment for which the database model is intended to be used would be in place, along with personnel qualified to act as response cell members.

Unfortunately, a CPX was not available for the testing of the database model. The next best option available to the researcher, in the time allotted for completion of the research effort, was to conduct a "Mock" exercise to test the database model. This would be done by simulating a CPX environment at AFIT using volunteer graduate students to run the database model. On a scale of desirability, where a

test of the database model using a CPX would rate a top score of 10, a mock exercise only rates a three.

A mock exercise is not as desirable as a CPX to test the database model for several reasons. A large number of artificially induced confounds exist with a mock exercise that could adversely bias, taint, or skew the test results.

Duplication of the CPX environment is one such example. The majority of the volunteers, as well as this researcher, have had no previous exposure to the CPX environment. It is therefore difficult to capture those elements of purpose that exist in a CPX where the mission, objectives, scope, and overall limitations of the exercise are understood. To reduce this confound in the mock exercise, the researcher conducted extensive informal interviews with several personnel knowledgeable of CPXs to gain an understanding of how a CPX, at the response cell level, is conducted.

Another confound that can effect the data was the amount of time the volunteers could devote to the mock exercise. Due to the academic pressures of a full course load plus thesis research, volunteers were only asked to devote half a day to this research effort. Therefore, the researcher elected to compress 48 hours of actual CPX play into four hours of mock exercise play. To reduce the possible effects of this confound, only essential exercise inputs were given to the personnel so that their efforts

could remain focused on testing the database model during the entire four hours of exercise play.

Still another confound that can effect the data results revolve around the backgrounds of the volunteers. Three considerations come into play here. First, a narrow point of view with evaluating the database model may be present. Ten of the 13 volunteers are aircraft maintenance officers. Some may evaluate the database model from a purely maintenance point of view without regard for broader logistical considerations the model can have in support of the overall mission.

Second, eleven of the 13 volunteers have had no previous experience with CPXs. Therefore, they have no frame of reference to draw from to understand how the many parts of the exercise fit together as a whole. They may therefore be limited in understanding the overall impact, complexities, and interdisciplinary relationships that must exist between logistical support and operational requirements needed to meet mission taskings. To further expand this point, a converse side may also exist. The two volunteers who had previous experience as response cell members, had that experience in a tactical environment. There may be enough of a difference in CPX procedures among the major commands to cause possible bias in how this database model was evaluated. Preconceived expectations may not have been satisfied with the mock exercise that would have normally

occurred in a tactical CPX. Little can be done to counter this confound except recognizing that it exists, and recruiting personnel with experience or with a compatible background to those personnel typically used in CPXs. The researcher made every effort to ensure this confound was minimized.

The third and most important possible confound relating to the background of the volunteers is that none of the personnel had any experience with the KC-135 aircraft. Both from an operations point of view and from a maintenance point of view it would be difficult to evaluate the usefulness of the database model without having some KC-135 aircraft background.

An important next step was to carefully scrutinize the respondent's comments. Many of the confounds previously identified were evident in the comments made by the respondents. Additionally, analysis of the comments identified further confounds that may have tainted the test results.

The most noted problem, identified by 7 of the 13 respondents, dealt with the format of the WRSK supply listing. The respondents had difficulty determining if a needed part was available in supply because the WRSK listing was not sorted by NSN or WUC. This forced the respondents to search through each page of the WRSK listing to determine if the needed part was available. Though the WRSK listing is not part of the database model itself, it is a necessary

tool to monitor consumption data for supply parts. Unfortunately, the data results of question six reflect this problem thereby severely tainting the overall evaluation of the database model.

A second problem, identified by five respondents, deals with the inherent design of the database model. Because the entire database is available to response cell members at the beginning of an exercise, "gaming" can result. That is, response cell members can determine, ahead of time, what their future needs will be. If not controlled at the response cell level, exercise realism can be seriously effected. The supply system can be unjustly tasked through the requisition of parts not yet needed, which will lead to inflated aircraft availability.

The third problem, identified by four respondents, supports an earlier identified confound of the mock exercise. Namely, the respondents had no previous CPX experience they could use for comparison against this database model. Without prior CPX experience, it was difficult to make an objective evaluation. Clearer stated evaluation objectives could have reduced this confound somewhat.

Other comments made by the respondents that supported or identified possible confounds included lack of experience with the aircraft (3 comments), unfamiliar with exercise procedures (2 comments), and not understanding the question (1 comment).



Several comments were hard to interpret. Five comments did not make any sense what-so-ever with respect to the question being asked. This may have resulted from an unclear understanding of the question. Another comment was made that was inconsistent with the respondent's numerical response for that question. This may be attributed to a miss-mark by the respondent, or, as stated earlier, an unclear understanding of the question being asked.

Finally, a single comment was made concerning the unrealistically low number of Code 3 discrepancies identified in the database. Though this comment supports an earlier identified confound stemming from unfamiliarity with the aircraft, it is nevertheless a comment worth investigating.

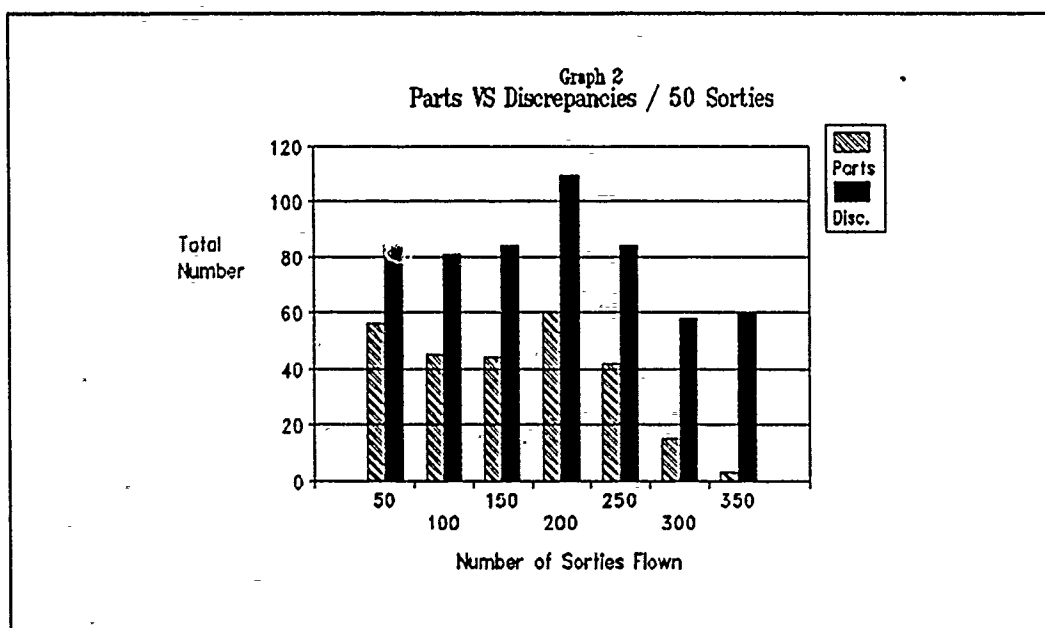
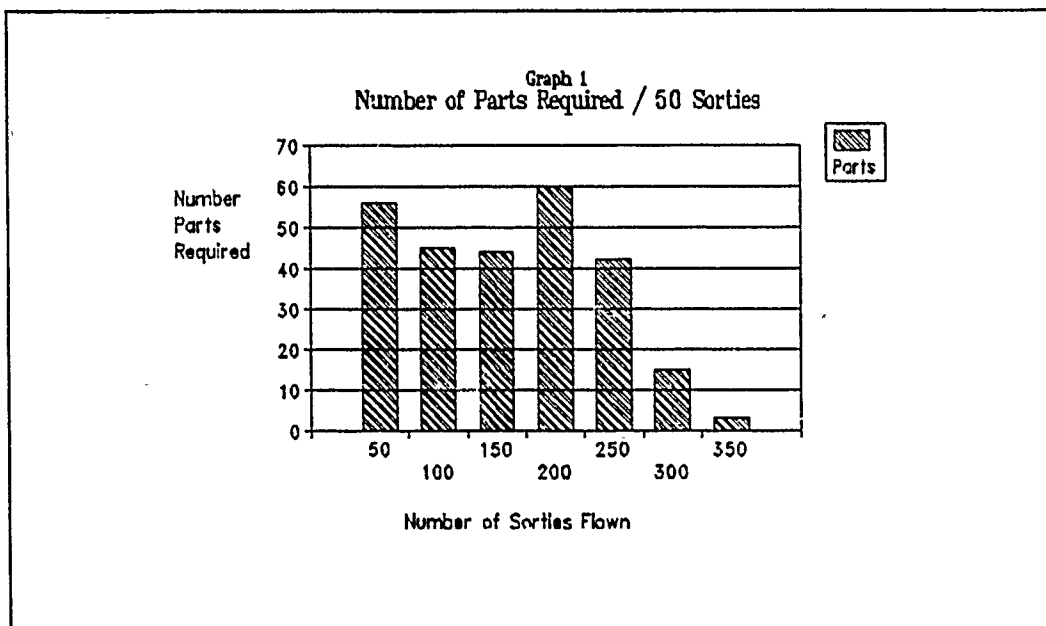
During the development phase of the database model, the researcher had also identified an abnormally low number of Code 3 discrepancies present in the source data. At present the researcher has been unable to pin point the exact cause. The data does not appear abnormal to the maintenance experts who reviewed the raw data. The experts argue that aircraft typically deployed to support ETTF requirements tend to have fewer Code 3 discrepancies. Though this appears to be the case with this database model, the researcher has been unable to confirm or disprove this argument.

A second concern with the database model is reflected in the dramatic decrease in the number of discrepancies per aircraft and an associated decrease in the number of parts replaced. Figure 2, Graph 1, shows the number of parts replaced every 50 sorties flown. From this graph it

ing has occurred to effect the number for the five months the ETTF data covers. Reduction in parts consumed may be partially explained by an apparent decrease in the number of discrepancies reported.

Figure 2, Graph 2, shows the relationship between the total number of discrepancies reported per every 50 sorties flown and the number of parts replaced for each of those 50 sorties. As would be expected, as the total number of discrepancies decrease, the parts consumption should decrease as well; however, as Graph 2 shows, parts consumption drops sharply in relation to the decreased number of discrepancies. The researcher believes some other event, besides a decrease in discrepancies, has occurred to cause the sharp drop in parts consumption. As yet, the researcher has been unable to isolate the cause.

With the non-statistical analysis of the data complete, it is now necessary to perform statistical analysis.



**Figure 2. Graphical Comparison of Parts/Discrepancies From ETTF Source Data**

### Statistical Analysis.

Statistical analysis will be performed using STATISTIX II, An Interactive Statistical Analysis Program for Micro-computers, by NH Analytical Software.

### Identifying Confounds.

Several steps were taken during the analysis to statistically identify outliers caused by confounds within the data. Outliers are those possibly faulty extreme measurements that stand out from the rest of the data (McClave and Benson, 1988:126). Outliers can taint or skew the data causing erroneous results when analyzed.

A first step in the analysis was to review the raw data. Table 3 shows the raw data in a form easily used for comparison. The vertical axis corresponds to each of the questions from Evaluation Survey 1 found in Appendix E. The horizontal axis corresponds to each of the 13 respondents. Each coordinate represents the numerical value from the likert scale the respondent chose in response to the associated question. Descriptive statistics for the data is provided in Table 4. Here, the calculated mean and standard deviation are displayed, along with the sample size for each respondent's associated probability distribution.

A missing data value is present in this data as indicated in Table 3. The Friedman non-parametric ANOVA procedure, a statistical procedure that will be used in

later data analysis, does not allow for missing data. Therefore, to overcome this obstacle without affecting the procedure's results, the respondent's probability distribution mean value of 2.5 will be substituted and used for all statistical calculations.

TABLE 3  
EVALUATION SURVEY 1  
RAW DATA MATRIX

---

Respondents (Treatment)

(Block)

Quest.	A	B	C	D	E	F	G	H	I	J	K	L	M
1	3	2	4	2	2	2	2	2	1	2	1	3	2
2	2	1	2	2	3	1	1	2	1	1	1	1	*
3	1	2	5	2	4	1	1	2	1	1	1	2	2
4	1	1	3	1	1	1	1	1	1	1	1	1	1
5	1	1	3	1	2	2	2	2	2	1	1	1	3
6	5	3	5	5	5	5	3	2	1	4	2	1	5
7	3	3	3	2	2	2	2	2	4	4	4	4	5
8	2	2	3	2	2	3	2	2	1	1	1	2	3
9	2	2	2	2	4	2	1	1	2	2	2	1	2
10	2	1	2	3	5	2	2	1	1	1	2	2	2

\* Missing data value.

---

TABLE 4  
DESCRIPTIVE STATISTICS  
EVALUATION SURVEY 1 DATA

<u>Respondents</u>	<u>Sample Size</u>	<u>Mean</u>	<u>Standard Deviation</u>
A	10	2.20	1.229
B	10	1.80	0.788
C	10	3.20	1.135
D	10	2.20	1.135
E	10	3.00	1.414
F	10	2.10	1.197
G	10	1.70	0.675
H	10	1.70	0.483
I	10	1.50	0.972
J	10	1.80	1.229
K	10	1.60	0.966
L	10	1.80	1.033
M	9 *	2.50	1.310

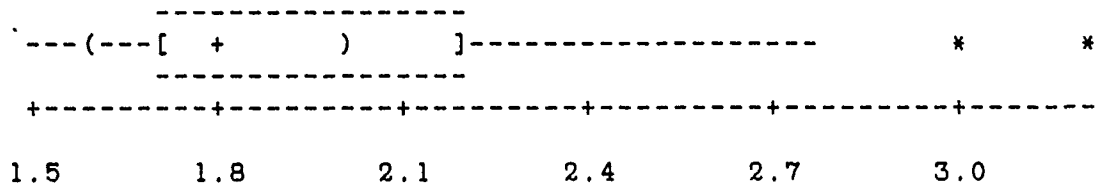
\* Missing data value

Box and Whisker plots, shown in Figure 3, were used to evaluate the raw data to determine if potential outliers exist. The first plot evaluates if any outliers exist in the data with respect to the respondents, while the second

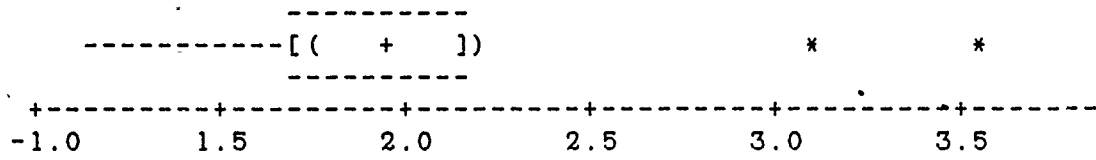
plot evaluates the existence of outliers with respect to the evaluation survey questions.



### Respondent Box and Whisker Plot



### Question Box and Whisker Plot



- + The middle (MEDIAN) for the data set.
- [ ] Encloses the middle half of the data.
- ( ) Represent approximately 95% confidence intervals about the medians.
- "Whiskers" that indicate typical data values.
- \* Indicates POSSIBLE outliers.



Figure 3. Box and Whisker Plot  
Evaluation Survey 1 Data

As can be seen from Figure 3, two possible outliers exist within the data set for both the respondents and the

questions. It is important to determine, statistically, if outliers do in fact exist in the data set so appropriate measures can be taken to eliminate their influence. A Friedman non-parametric 2-way ANOVA test was used to test the null hypothesis that no difference exists in the probability distribution for each of the respondents, and that no difference exists in the probability distribution for each of the survey questions. The results can be seen in Table 5.

TABLE 5  
FRIEDMAN TEST  
DETERMINATION OF OUTLIERS

	<u>Test Statistic</u>	<u>P-Value</u>
Respondents	37.26	.0002
Questions	44.43	.0000

At the .05 level of significance, the null hypothesis can be rejected based on the P-Value for the two tests. The conclusion that can be drawn from these tests are that differences do exist in the probability distributions for both the respondents and for the questions.



The next questions to answer, then, are which distributions are different, and, does a pattern exist that supports the results of the Box and Whisker plot that outliers exist in the data for both the respondents and the questions?

To answer these questions, a Wilcoxon Signed Ranked test was first performed for each possible pair of questions. The researcher felt it important to identify any possible outliers with the questions first so corrective actions can be taken prior to performing the Wilcoxon Signed Ranked test on the respondents. That is, by first eliminating confounds inherent with the questions, the confounds inherent with respect to respondents are clearer to recognize. Table 6 will show the results of the test for each pair of questions. The test null hypothesis used during each of the tests is that both probability distributions are identical. The test was conducted at the .05 level of significance. A matrix is used to show the relationships between the pairs of questions being tested. A series of asterisks (\*) and Xs will be used to represent the results of the test. An asterisk indicates a P-Value greater than the .05 level of significance, along with a conclusion that both probability distributions are identical. An X indicates a P-Value less than the .05 level of significance and follows with a conclusion that the null hypothesis can

be rejected. With an X result, the resulting conclusion is that the two probability distributions are different. To provide proof that outliers do exist with respect to the questions, the Xs are expected to be concentrated among the possible outlier(s). If no outliers exist, the Xs should be mixed uniformly throughout the matrix.

The results of the Wilcoxon Signed Rank test show questions 4 and 6 have an abnormally large number of differences in their probability distributions as compared to the others. Question 4 can be explained because 12 of the 13 volunteers marked the same response to the question (See Question 4, Survey 1, This Chapter). No confounds were identified to justify removal of this question from the data set. Question 6 is singled out because its probability distribution is also significantly different than those of the other questions. Six of the 13 respondents responded with a 'strongly disagree' to the question. As noted in the non-statistical analysis section of this chapter, seven of the 13 respondents provided comments reflecting dissatisfaction with the format of the WRSK listing. The results of the Wilcoxon Signed Rank test, coupled with the comments made by the respondents provide enough evidence to conclude a confound exists that is effecting the results of the data set. That is, the unsatisfactory format of the WRSK listing is reflected in the responses made by the respondents.

TABLE 6  
WILCOXON SIGNED RANK TEST  
QUESTIONS

### Evaluation Survey Questions

	1	2	3	4	5	6	7	8	9	10	
		*	*	X	*	X	*	*	*	*	1
			*	*	*	X	X	*	*	*	2
				X	*	X	*	*	*	*	3
					X	X	X	X	X	X	4
						X	X	*	*	*	5
							*	X	X	X	6
								X	X	*	7
									*	*	8
										*	9
											10

Total \* = 26

Total X = 19

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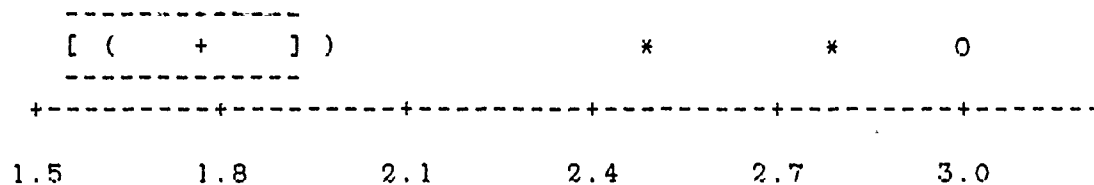
.45

Frequency distribution of X for each Question										
	1	2	3	4	5	6	7	8	9	10
Total Xs per Quest.	2	2	2	8	3	8	5	3	3	2

Consequently, an analysis of the data to determine the usefulness of the database model is seriously tainted by the

responses made for question 6. Therefore, responses to question 6 will be removed from the data set.

With question 6 removed from the data set, a second Box and Whiskers plot was performed on the data. Figure 4 shows that two possible and one probable outlier exists with respect to the probability distributions of the respondents.



- + The middle (MEDIAN) for the data set.
- [ ] Encloses the middle half of the data.
- ( ) Represent approximately 95% confidence intervals about the medians.
- "Whiskers" that indicate typical data values.
- \* Indicates POSSIBLE outliers.
- O PROBABLE outlier.

Figure 4. Box and Whisker Plot of Data Set  
With Question Six Removed

Analysis should be performed on any outliers that lie beyond the fences to determine if they belong to a different population as compared with the sample which was drawn.

A Wilcoxon Signed Rank test can now be performed on the data to determine if the possible outliers identified can be isolated.

Table 7 shows the results of the test for each pair of respondents. The same test hypothesis used during the previous Wilcoxon Signed Rank test will be used here as well. To restate again, the test null hypothesis for each pair of respondents is that both probability distributions are identical. The test was conducted at the .05 level of significance. Again, a matrix is used to show the relationships between the pairs of questions being tested. A series of asterisks (\*) and Xs will also be used to represent the results of the test. An asterisk and X have the same meaning as described earlier in this section. To provide proof that outliers do exist with respect to the respondents, the Xs should be concentrated among the possible outlier(s). If no outliers exist, the Xs should be mixed uniformly throughout the matrix.

As can be seen from the frequency distribution in Table 7, respondents C and M have the largest concentration of non-identical probability distributions. Though a third outlier was identified with the Box and Whisker plot, the results of the Wilcoxon Signed Rank test failed to support that a third outlier exists. The results of the Wilcoxon

TABLE 7  
WILCOXON SIGNED RANK TEST  
RESPONDENTS

	A	B	C	D	E	F	G	H	I	J	K	L	M	
	*	*	*	*	*	*	*	*	*	*	*	*	*	A
		X	*	*	*	*	*	*	*	*	*	*	*	B
			*	*	X	X	X	X	X	X	X	*	*	C
				*	*	*	*	*	*	*	*	*	*	D
					*	*	*	*	*	*	*	*	*	E
						*	*	*	*	*	*	*	*	F
							*	*	*	*	*	*	X	G
								*	*	*	*	*	X	H
									*	*	*	*	X	I
										*	*	*	X	J
											*	*	X	K
												*	X	L
													*	M

Total \* = 65

Total X = 13

78

Frequency distribution of X  
for Respondents

	A	B	C	D	E	F	G	H	I	J	K	L	M
Total Xs per Resp.	0	1	8	0	0	1	2	2	2	2	2	1	5

Signed Rank test, however, provides enough evidence to categorize respondents C and M as outliers to the data set. Consequently, the responses from respondent C and respondent M will be removed from the data set.

It must be noted at this point that a double edge sword exists with the collected data. On the one hand, a reduction in number of respondents, from an already small sample size, weakens the strength of the statistical results. On the other hand, allowing confounds to exist in the data set prevents a clear understanding of the data. Confounds cloud the water, so to speak, preventing the observance of true cause and effect relationships. This researcher believes it more important to have a small amount of data, clear of confounding effects, than to have a larger amount of data with confounds that adversely influence the relationships of the independent and dependent variable being tested.

#### Analyzing Modified Data.

With suspected confounds removed from the data set, evaluation of the modified data set can now be accomplished. As stated in the Evaluation Survey Development section of this chapter, the intent is to determine whether, in the opinion of the volunteers, the database model is a useful tool in providing realistic logistical information to response cell members.

Descriptive statistics and the Friedman non-parametric two-way ANOVA procedure were used on the data set to evaluate the opinion of the volunteers. Descriptive statistics for the data set are shown in Table 8.

TABLE 8  
DESCRIPTIVE STATISTICS  
MODIFIED EVALUATION SURVEY 1 DATA

<u>Respondents</u>	<u>Sample Size</u>	<u>Mean</u>	<u>Standard Deviation</u>
A	9	1.89	0.782
B	9	1.67	0.707
D	9	1.89	0.601
E	9	2.78	1.302
F	9	1.78	0.667
G	9	1.56	0.527
H	9	1.67	0.500
I	9	1.56	1.014
J	9	1.56	1.014
K	9	1.56	1.014
L	9	<u>1.89</u>	1.054

Average Mean = 1.80

As Table 8 shows, the average mean for all respondents is 1.80. The question that must now be answered is whether 1.80 is representative for all respondents.



An analysis of variance (ANOVA) procedure can be used to determine if the average mean is representative for all respondents. Many ANOVA procedures exist. In choosing which procedure to use, i.e. parametric, non-parametric, one-way or two-way, assumptions for each procedure had to be analyzed against the data. Parametric ANOVA procedures have restrictive data assumptions that, in this case, were not met. Parametric ANOVA procedures require the response variance be statistically equal. The standard deviations for each of the respondents are not statistically equal and thereby prevent the use of parametric ANOVA procedures. On the other hand, non-parametric procedures are far less restrictive on required data assumptions. Furthermore, their strength lies in their general applicability (McClave and Benson 1988:991). The two non-parametric procedures considered for use were the Kruskal-Wallis one-way ANOVA and the Friedman two-way ANOVA. The Friedman two-way ANOVA was chosen over the one-way ANOVA procedure because it allows the blocking of variables. The advantage here is that the blocking of variables reduces the "Within" variability for the denominator in the F statistic calculation. Consequently, a larger F statistic results which amplifies the differences in the probability distributions during the test. The results of the Friedman test are shown in Table 9. The procedure tests the null hypothesis that no difference

exists in the probability distribution for each of the respondents at the .05 level of significance.

TABLE 9  
ANALYSIS OF MODIFIED DATA USING FRIEDMAN'S TEST

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	<u>Test Statistic</u>	<u>P-Value</u>
Respondents	12.76	.2372

---

The results of the test show that the null hypothesis cannot be rejected at the .05 level of significance. Meaning, enough statistical evidence does not exist to dispute the hypothesis that the probability distributions for each respondent are identical.

Evaluation Survey 2 Data Analysis.

The second evaluation survey was given to personnel who have had previous CPX experience as a response cell member. The purpose of this survey was to provide a means of measuring the degree of logistic realism provided by the database model over other methods in use today. To provide meaningful statistical comparisons, participants must satisfy two conditions. First, they must have had previous experience as a response cell member during a CPX at some time in their

career. Second, they should be somewhat familiar with the KC-135 aircraft to include its capabilities and its logistical support requirements. Of the thirteen participants, only two individuals have had previous CPX experience, and neither of them had any experience with the KC-135 aircraft. Even though the two individuals completed Evaluation Survey 2, their responses provided no information that could be useful for meaningful statistical analysis and was therefore not used.

#### Summary

Chapter IV provided a detailed discussion of the analysis, findings, and results of this thesis effort. The Chapter focused on procedures used to collect source data for the database model, procedures for development of the database model, procedures for the testing of the database model, and procedures used to analyze the results. Chapter V will now focus on conclusions that can be drawn from this thesis effort, along with recommendations to further the advancement of this effort.

## V. Conclusions and Recommendations

### Overview

The intention of this thesis effort is to provide an alternative method for determining and evaluating critical logistical requirements to support mission taskings during Command Post Exercises (CPXs). Furthermore, it is intended to make exercise play at the response cell level more realistic so that the environment of war in CPXs is more closely replicated and our forces and command authorities are better prepared to carry out their duties more effectively.

Through this research, a historical aircraft maintenance database model has been used to improve exercise realism. Historical database models are based on the premise that realistic data collected from actual war-like missions can be placed in a database for use by response cell members to provide simulated, yet realistic, logistical requirements during Command Post Exercises. Historical database models realistically task logistic needs against operational requirements to meet mission taskings. Consequently, meaningful constraints are imposed that force exercise players to think through problems that would more realistically exist under war-like conditions.

Sound strategic and tactical decisions cannot be made without realistic input on logistical support capabilities. The database model takes a significant step toward providing

decision makers a clearer picture of logistical capabilities by incorporating war-like logistical data into exercise play at the response cell level.

This chapter contains the concluding remarks and recommendations from the foregoing presentation. A discussion on meeting the research objectives, to include conclusions, will be presented first, followed by recommendations for handling the research documents and recommendations for further research efforts. The chapter will close with summary remarks.

#### Primary Findings

The primary purpose of this thesis effort was to provide HQ SAC/LGL a historical database model that would improve realism in CPXs for use with the KC-135A/E/R aircraft. To accomplish this objective, several investigative questions were used to guide the research effort (See Ch 1, Pg 5-6).

The first research question examines the issue of war-like exercise or deployment data versus routine peacetime training data. Of critical importance to the historical database model is the use of war-like data in the database development. Considerable research was conducted through literature searches and informal telephone interviews to determine if ETTF missions accurately depicted aircraft logistics requirements during war. Though no hard and

conclusive research evidence was found to support the premise that ETTF data depicts aircraft logistics requirements more realistically than does other routine peacetime flying data, it is reasonable to expect that the training missions flown during ETTF deployments realistically replicate expected wartime mission taskings. With this supposition, it would logically follow that aircraft logistics requirements from ETTF missions would provide more realism than would routine peacetime flying data.

The next four investigative questions were examined during a mock exercise that was designed to test the database model. Constructs employed in Evaluation Survey 1 (See Appendix E) were designed to answer the investigative questions concerning whether the database model was realistic, whether the database model was easy to use, and whether the database model provided the needed information necessary for response cell members to carry out their duties effectively. The mock exercise also demonstrated the capability of the database model to be used in compressed exercise schedules. The database model's capability, to be used during compressed exercise schedules, offer a high degree of flexibility where time considerations become a constraint to the exercise.

## Conclusions

Due to the limitations imposed by the mock exercise testing procedure, only superficial conclusions can be made concerning the data collected from Evaluation Survey 1.

The degree of confidence in the conclusions are partially based on the degree to which confounds effecting the data are minimized. The degree to which confounds exist in an experiment has an inverse effect on the degree of confidence placed on the test results. A higher degree of confidence is accepted as the effects of confounds on the experiment are recognized and reduced. The limitations of conducting a mock exercise to test the database model rather than using a CPX (the preferred method) are realized by an increased effect of confounds on the experiment results. Consequently, less confidence is placed on the final analysis of the data. Therefore, only limited generalized conclusions can be made about the database model.

Final analysis of the data show that the probability distributions for each respondent are statistically identical with an average mean of 1.80 (See Ch 4, Table 8). Based on the Likert scale, as used in Evaluation Survey 1, the average mean score suggests the respondents "Tend To Agree" the database model was useful toward providing realistic logistical information to response cell members. Therefore, the researcher concludes that the database model

provides response cell members with a useful tool to obtain realistic logistical information they would need to carry out their duties effectively.

A conclusion cannot be made, however, regarding whether the database model improves logistical realism over existing mathematical models currently in use. To make such a conclusion would require a comparative analysis of personnel with prior experience using both mathematical models and historical database models. Unfortunately, personnel were not available during the mock exercise that possessed the necessary CPX experience and aircraft experience to perform any meaningful statistical analysis.

### Recommendations

#### Handling Research Documents.

It is recommended that SAC/LGL maintain and reproduce as necessary the KC-135A/E/R Aircraft Maintenance Logistics Database, Information Guide, Practice Database, and Training Slides.

#### Future Research.

Both with the B-52G database model and with this database model, statistical evidence has not been gathered in sufficient quantity to prove or disprove the hypothesis that historical databasing improves realism in CPXs over other existing methods. A next step in the research is to test



these models extensively at the CPX level. Information gathered through this research effort and previous research by Capt Hall (See Hall, 1989) provide a foundation of solid pre-test data. Testing the models using a Pre-test/Post-test experimental design would provide useful statistical information to determine if the models support the hypothesis of improved logistics realism during CPXs. Therefore, it is recommended that SAC/LGL solicit further research to validate the hypothesis that historical databasing (to include both the B-52G and the KC-135A/E/R database models) improves realism over mathematical models currently in use today. This type of research could be accomplished either through the Air Force Institute of Technology's School of Systems and Logistics Graduate Program, or through the Air Force Logistics Management Center (AFLMC) at Gunter AFB, Alabama.

It is also recommended that the Historical Database Model be expanded to include other aircraft in the Air Force inventory. Tactical aircraft, to include the F-15 and F-16, would be ideal candidates for such a database model. Tactical aircraft should have readily available source data to develop the database model. Military Exercises such as Red Flag, Coronet Warrior, or even routine deployments can provide the logistical data necessary to develop the historical database model.

## Summary

The defense forces of this nation operate in an ever changing and dynamic environment. The dramatic changes in world events since 1989 have caused considerable debate over the needed strength of our nation's defense forces. A perceived decreasing threat from WARSAW Pact countries have caused this nation to reconsider its threats and to adjust its military strength accordingly. Furthermore, the Bush Administration and the American public expect the Defense Department to work more effectively with their limited resources. The defense forces of this nation should work smarter toward maximizing military effectiveness with the resources they are provided.

Budget reductions resulting from this changing environment will surely lead to reductions in our force capabilities. Among others, a most notable reduced force capability will result from a reduction in manpower authorizations. As our manning authorizations are reduced, the most experienced and educated of our forces leave the military via early retirement opportunities or through "Early Out" programs. Voids left by these departures are generally filled with inexperienced and unseasoned personnel.

The challenge to all Air Force leaders is to minimize the effects of force reductions on military readiness

through proactive employment of tools such as the Historical Database Model concept. The use of Historical Databasing during Command Post Exercises provide the needed, improved, and realistic training for military leaders that allow force readiness to be maintained effectively. Furthermore, an added benefit of the Historical Database Modeling concept is that it is relatively inexpensive to develop. As evidenced by both this thesis effort and the B-52G thesis effort, only one person, through the sponsorship of SAC/LGL, was needed to develop the historical database model and its associated documentation. The actual time needed to develop such a model can be dramatically reduced over the year used to develop this thesis effort. This could be accomplished by employing a person full time and using a methodology similar to the one employed by this researcher or by the methodology used by Capt Hall during his research effort (See Hall, 1989:Ch 3, 1).

Another benefit of historical databasing is its simplicity. The model is relatively easy to build if available data exists. Source data needed for this type of model can be gathered through Flag Exercises or aircraft deployments so long as the flying missions closely replicate expected wartime taskings. Because war-like data is readily available for many aircraft types, the model has broad application over a wide variety of CPX scenarios. The model

can be applied to CPXs of varying types and degrees and does not require any specialized training or equipment beyond minimal familiarization training. Additionally, the model is based on accepted maintenance practices used in one form or another by most major commands throughout the Air Force.

Another important benefit of the model is that it is used at the lowest level of a CPX. At the response cell level, both logistic requirements and operational needs must merge to effectively accomplish mission taskings. Consequently, by use of the model, a clearer picture of a units capabilities, limitations, weaknesses, and strengths emerge and ripple through the exercise command and support infrastructures. The resulting benefit is improved realism at all levels. Logisticians and operators work jointly to solve constraining problems while decision makers at all levels are provided alternatives based on a more realistic foundation of logistical support. Recommendations and decisions can now be based on realistic input rather than generated and often inaccurate data.

Improved realism in CPXs does not have to be a result of sophisticated and complex systems. Simplistic, yet effective tools are available. The historical database modeling concept is one such tool whose time has come.

# Appendix A: KC-135A/E/R Aircraft Maintenance Logistics Database

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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A/cft Logg Fix T.M. Code Time	NSN	MOUN	HUC	Qty	In HRSK	MESL	Hsq	DTG	REMARKS
SS 2 0.5	MAINTENANCE EVENT CONTROL NUMBER: 6620006212902	TOTALIZER GAUGE	51911	1	KKC-135A/E/R			T/01:0 OFFLOAD TOTALIZER INOPERATIVE	
SS 2 3.0	MAINTENANCE EVENT CONTROL NUMBER: 5821001387991	#2 RCVR XMTX	63500	1	KKC-135A/E/R			T/01:0:30 #2 COMM RADIO W/N ACCEPT PRE	
2 1.5	5930010853351	PRESSURE SWITCH	72900	1				T/01:0:45 DNS LOW AIR LIGHT ILLUMINATE	
2 3.0	599900	RDR ANTENNA	72200	1				T/01:0:30 RADAR STAB UNRELIABLE, DUMPS	
SS 2 7.0	MAINTENANCE EVENT CONTROL NUMBER: 5841008454243	STAB DATA GEN	72200	1	KKC-135A/E/R			T/01:0:10 APN 59 RADAR PRESENTATION UN	
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER: 1630005466170FL	BOOM NOZZLE	46771	1	KKC-135A/E/R			P/F BOOM SIGNAL COIL CHECKS OPEN	
2 4.5	2915002965828	F/L CNTRL VLV	46461	1				T/01:1:15 4000 LBS FUEL XFERRED FROM F	
SS 2 4.0	MAINTENANCE EVENT CONTROL NUMBER: 1630005656170FL	BOOM NOZZLE	46771	1	KKC-135A/E/R			P/F BOOM SIGNAL COIL CHECKS OPEN	
2 12.0	6610001593519	PITOT TUBE	51156	1				T/01:4:00 PILOT'S AIRSPEED INDICATOR U	
SS 3 12.0	MAINTENANCE EVENT CONTROL NUMBER: 1650009205725	FWD A/R PUMP LH	45199	1	KKC-135A/E/R			P/F WFO FLUID FOUND IN FORWARD BODY F	
SS 2 6.5	MAINTENANCE EVENT CONTROL NUMBER: 6610004631865	ALTIMETER	51132	1	KKC-135A/E/R			T/01:1:00 PILOT'S ALTIMETER W/N RESET	
SS 2 4.0	MAINTENANCE EVENT CONTROL NUMBER: 5930011460486	RCVR XMITTER	72200	1	KKC-135A/E/R			T/01:0:40 RADAR HAS EXCESSIVE GROUND F	

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Actt Lndg Flt	T.R. Code	Time	MSH	NOUN	HUC	Qty	HRSK	MESL	Msg	DTG	REMARKS
SS	2	5.5									
MAINTENANCE EVENT CONTROL NUMBER: 9 KDC-135A/E/R											
			590908571413	RDR ANTENNA	72280	1					T/O+1:00 NAV'S APN-59 RADAR PICTURE H
SS	2	2.5									
MAINTENANCE EVENT CONTROL NUMBER: 10 KDC-135A/E/R											
			5826011244793	RCVR XMITTER	72080	1					T/O+0:05 PILOT'S RADIO ALTIMETER FLAG
SS	2	9.0									
MAINTENANCE EVENT CONTROL NUMBER: 11 KDC-135A/E/R											
			6610011464953	FSAS COMPUTER	51800	1					T/O+0:30 FCAS FLAP INPUT INTERMITTENT
			1560000987239FL	FLAP XMITTER	51424	1					
SS	2	7.0									
MAINTENANCE EVENT CONTROL NUMBER: 12 KDC-135A/E/R											
			5920002804465	RCVR XMITTER	72080	1					T/O+0:45 NAV'S APN-59 RADAR INOPERATI
			6615005892592	HC-1 AMPLIFIER	52111	1					T/O+0:30 ELEVATOR AXIS DOESN'T RESPON
SS	2	3.0									
MAINTENANCE EVENT CONTROL NUMBER: 13 KDC-135A/E/R											
					64115	0					P/F PILOT'S INTERPHONE YOKE AND NOSEH
					46850	0					T/O+0:10 SIGNAL COIL TEST METER INOPE
					5241F	0					T/O+1:00 N1 COMPASS 3 DEGREES IN ERRO
					23HAK	0					T/O+4:55 #3 ENG RPH BELOW IDLE WITH T
					51310	0					
SS	2	4.5									
MAINTENANCE EVENT CONTROL NUMBER: 14 KDC-135A/E/R											
			5031005384250	CONTROL BOX	64110	1					T/O+0:15 PILOT'S INTERPHONE CUTS OUT
			6640002839598	LIGHT	44266	1					T/O+4:00 RIGHT MAIN LANDING GEAR LIGH
			6240002287130	LIGHT	44225	1					T/O+2:00 PDI CENTER HOLD LIGHT OUT ON

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KC-135 H/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Actl Ldg Fix T.N. Code Time	NSN	NUON	HUC	Qty	MRSK	HESL	Hsq	DTG	REMARKS
SS									
	MAINTENANCE EVENT CONTROL NUMBER:	15	KC-135A/E/R						
2	6610012270781	FUEL HGT CHPTR	51E00	1					T/010:30 FSR DISPLAYED FUEL HGT SWST
	6610011464953	FSAS CHPTR	51E00	1					
2	5826001345974	SLEN COUPLER	51R00	1					T/012:30 BOTH HSI HEADING SET MARKERS
SS									
	MAINTENANCE EVENT CONTROL NUMBER:	16	KC-135A/E/R						
2	6610012277222	FUEL HGT CHPTR	51E00	1					FUEL INDICATION FOR #1 RESERVE FLUCTU
SS									
	MAINTENANCE EVENT CONTROL NUMBER:	17	KC-135A/E/R						
2	590501053767000	RDR ANTENNA	122H0	1					T/011:00 PILOT AND NAV'S RDR SHOWS RD
SS									
	MAINTENANCE EVENT CONTROL NUMBER:	18	KC-135A/E/R						
2			42000	0					T/011:50 ELECTRICAL GENERATORS SHAPPI
SS									
	MAINTENANCE EVENT CONTROL NUMBER:	19	KC-135A/E/R						
2			230H0	0					T/010:05 ON T/0, #3 ENG EGT FLUCTUATE
SS									
	MAINTENANCE EVENT CONTROL NUMBER:	20	KC-135A/E/R						
2			46750	0					T/010:20 B00H LATCH LEVER DOESN'T DIS
2			46850	0					T/010:20 SIGNAL COIL TEST WILL NOT RU
2	5826001345981	HSI	51H00	1					T/010:01 PILOT'S COURSE KNOB ON HSI I
2			51E00	0					T/013:00 FSR/CAS DUMPED ALL INS AND D
SS									
	MAINTENANCE EVENT CONTROL NUMBER:	21	KC-135A/E/R						
2	5821011030155	CONTROL BOX	61H00	1					T/011:00 HF RADIO TRANSMIT AND RECEIV
SS									
	MAINTENANCE EVENT CONTROL NUMBER:	22	KC-135A/E/R						

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NC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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A/cft	Lnlg	Fix	MSN	NOUN	HUC	Qty	In	HRSK	HESL	Hsq	DTG	REMARKS
T.H.	Code	Time	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
2	1.0		6610052277222	TFHP	63NR0	0						T/010:30 #1 UHF RADIO NEAR BUT READING
2	8.6				51EB0	1						T/012:30 #2 MAIN FUEL TANK AFT BOOST
SS			MAINTENANCE EVENT CONTROL NUMBER:		23	01C-135A/E/R						
2	4.0		1660005881200		72200	0						
2	3.5		5920002801465	RCVR WHITER	7208A	1						T/010:30 APN-59 INOPERATIVE IN SEARCH
												T/010:30 COULD NOT PRINT APN-69 BEHCO
SS			MAINTENANCE EVENT CONTROL NUMBER:		24	01C-135A/E/R						
2	7.5		1660005881200	AUTO PRES CNTRL	41216	1						T/011:00 AT 14,000 FT. CABL. SSURE
SS			MAINTENANCE EVENT CONTROL NUMBER:		25	01C-135A/E/R						
2	1.0				23NRK	0						T/014:05 #2 ENG OIL PRESS AND RPM DR0
SS			MAINTENANCE EVENT CONTROL NUMBER:		26	01C-135A/E/R						
2	7.2				52110	0						T/014:00 AUTOPILOT AILERON AXIS CAUSE
2	4.0				51100	0						T/011:00 AIRSPEED INDICATOR 5 KNOTS OF
SS			MAINTENANCE EVENT CONTROL NUMBER:		27	01C-135A/E/R						
2	2.5		5841008047159	RDR CNTRL BX	72210	1						T/010:05 APN-59 PICTURE ONLY? IN 30NM
SS			MAINTENANCE EVENT CONTROL NUMBER:		28	01C-135A/E/R						
2	2.0		6610001401414	TAS INDICATOR	46330	0						T/012:00 80NM NO22LE W/N REMAIN SEATE
2	23.0		6610005300028	PLOT QVI	51131	1						T/010:10 NAV'S TAS INDICATOR READS 50
					51116	1						
SS			MAINTENANCE EVENT CONTROL NUMBER:		29	01C-135A/E/R						
2	2.7		1650006336249	ACCUMLATOR	45161	1						T/010:10 LEFT HYD SYSTEM READS LOH



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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft Indg Fix T.N. Code Time	NSN	MOUM	HUC	In Qty WRSK	MESL	Hsq DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====
SS 2 1.5			30 63XAO	KC-135A/E/RD 0			P/F #1 COMM RADIO INOPERATIVE
SS 2 2.5 2 6.5			31 5131C 51111	KC-135A/E/RD 1 0			T/011:00 OFFLOAD TOTALIZER AND TRANSF T/010:22 PILOT'S AIRSPEED INDICATOR R
SS 2 2.0 2 0.5			32 -11116 -4-225	KC-135A/E/RD 0 3			T/011:00 NO INCREASE IN #2 EPR WHEN # T/012:00 CENTER FWD AND AFT PILOT OVR
SS 2 7.0 2 8.5			33 63900 72900	KC-135A/E/RD 0 1			T/010:30 COMM #2 RADIO UNABLE TO TRAN T/013:00 NAV'S CDU W/N TAKE WAYPOINT
SS 2 1.0			34 12000	KC-135A/E/RD 0			T/010:30 PILOT'S SEAT PERIODICALLY UN
SS 2 8.2 2 6.0			35 5131C 5241F	KC-135A/E/RD 1 1			T/010:10 ALL FUEL FLOW GAUGES READ LO T/010:30 AUTOPILOT W/N HOLD HEADING,
SS 2 1.0 2 1.5			36 64110 5241F	KC-135A/E/RD 1 1			T/010:30 INSTRUCTOR'S INTERPHONE PANE T/010:45 J4 COMPASS BEGAN DRIFTING OF

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft Lndg Fix T.H. Code Time	MSN	NOUW	HUC	Qty	MRSK	MESL	Hsq	DIG	REMARKS
SS									
2	1.0	MAINTENANCE EVENT CONTROL NUMBER:	37	KKC-135A/E/RD					T/O 0:30 HF RADIO WENT, FAULT LIGHT I
2	1.5	6615005704968 N1 SLAVE CONTL	61000	0					T/O 1:00 N1 COMPASS DISPLAYS WRONG HE
			5241E	1					
SS									42 EPR INOPERATIVE
2	8.0	MAINTENANCE EVENT CONTROL NUMBER:	38	KKC-135A/E/RD					
		6720000784470 EPR XOUER	23H00	1					
SS									
2	1.0	MAINTENANCE EVENT CONTROL NUMBER:	39	KKC-135A/E/RD					T/O 0:05 NAV'S RADAR SCOPE SPIRES ABO
2	3.0	5841010537874 SCOPE	722E0	1					T/O 0:30 PILOT'S RUI SHOWS CONSTANT 5
		6615005506628 GYRO	51142	1					
SS									
2	2.7	MAINTENANCE EVENT CONTROL NUMBER:	40	KKC-135A/E/RD					T/O 1:00 OFFLOAD TOTALIZER READS 15.4
			51310	0					
			46350	0					
SS									
2	3.2	MAINTENANCE EVENT CONTROL NUMBER:	41	KKC-135A/E/RD					T/O 1:00 AUTOPILOT TURN KNOB W/N TURN
2	1.5	5826001345977 A01	52126	0					T/O 2:00 PILOT'S RUI SHOWS 5 DEGREES
			5100B	1					
SS									
2	2.0	MAINTENANCE EVENT CONTROL NUMBER:	42	KKC-135A/E/RD					T/O 0:45 AILERON AXIS OF AUTOPILOT W.
		6615005350179 COUPLER	52113	1					
SS									
2	2.0	MAINTENANCE EVENT CONTROL NUMBER:	43	KKC-135A/E/RD					T/O 1:00 WHEN 800H WAS IN TRAIL BUON
			46250	0					
SS									
		MAINTENANCE EVENT CONTROL NUMBER:	44	KKC-135A/E/RD					

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NC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Aircraft T.N. Code	Fix Time	NSN	NOUN	WUC	In Qty	MRSK	MSL	Msg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
* 3	3.0	3010007395580HS	FLEX SHAFT	42196	1					#3 ENG CSD SHAFT SHEARED
2	1.0	3010007395580HS	FLEX SHAFT	42196	1					T/014:30 #3 GENERATOR QUIT
SS	2.0		MAINTENANCE EVENT CONTROL NUMBER:	45	QC-135A/E/R					P/F BOOM SIGHTING GOOD HOSE FITTING L
2	2.0			46322	0					P/F H1 COMPASS DIRECTIONAL GYRO HEAD
				5241F	0					
SS	2		MAINTENANCE EVENT CONTROL NUMBER:	46	QC-135A/E/R					T/011:00 AUTOPILOT W/N HOLD WINGS LEV
	6.0			52135	0					
SS	2		MAINTENANCE EVENT CONTROL NUMBER:	47	QC-135A/E/R					T/010:05 PILOT'S RADIO ALT FLAG IN VI
	1.0	5826011244793	RCVR/XMITTER	72000	1					T/010:10 PILOT'S RATE OF TURN FLAG RE
2	1.7	5826001345974	GYRO	5100E	1					P/F COPILOT'S INERTIAL REEL W/N LATCH
2	0.5			1200H	0					
SS	2		MAINTENANCE EVENT CONTROL NUMBER:	48	QC-135A/E/R					P/F COPILOT'S HSI HEADING FLAG IN VIE
	0.1			5100D	0					
SS	2		MAINTENANCE EVENT CONTROL NUMBER:	49	QC-135A/E/R					T/011:00 PILOT'S RADIO ALTYMETER FLAG
	1.0	5826001345981	HSI	72000	0					T/013:00 COPILOT'S HSI HEADING FLAG C
2	21.0			5100D	1					
SS	3		MAINTENANCE EVENT CONTROL NUMBER:	50	QC-135A/E/R					#1 GENERATOR HAS NO LOAD
	0.5	6615005932592	AMPLIFIER	4215H	0					P/F AUTOPILOT ALLECON AXIS ENGAGES BU
2	3.5			52111	1					T/010:30 ALTITUDE HOLD DOES NOT MAINT
2	2.5	661500561979	CONTROLLER	52134	1					T/011:30 TACAN INOPERATIVE
2	2.3	5999008671413	RCVR/XMITTER	71200	1					

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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A/cft Lndg fix I.R. Code Line	NSN	MOUH	MUC	In Qty WRSK	HESL	Hsg DTG	REMARKS
SS 2 3.0			51 46856	KKC-135A/E/R 0			T/012:00 BOOMER TRIGGERED DISCON TO DISCONNECT THEN TO READY
SS 3 46.0 2 3.7			52 49421 51A0B 1	KKC-135A/E/R 0 1			T/010:40 #2 ENG FIRELIGHT ILLUMINATED T/010:10 PILOT'S ROA GAVE EXCESSIVE C
SS 3 75.5			53 51142	KKC-135A/E/R 1			HD1 GYRO CANNIBALIZED FOR OTHER AIRCR
SS 2 5.0			54 46856	KKC-135A/E/R 0			T/011:00 BOOMER'S SIGNAL COIL SENDS 0
SS 3 1.0			55 46771	KKC-135A/E/R 0			BOOMER'S SIGNAL COIL PRESS TO TEST 01
SS 2 1.0 2 2.0			56 46850 23000 0	KKC-135A/E/R 0 0			T/010:30 BOOM SYSTEM ADVANCED TO CONT T/012:30 #1 ENG W/H RESPOND TO ENG TH
SS 2 2.5 2 2.5			57 51860 5826001345976 COMPUTER	KKC-135A/E/R 1 1			T/010:01 COPILOT'S ADI COMMAND BARS H T/014:00 PILOT'S ADI COMMAND BARS DIR
SS				58 KKC-135A/E/R			

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KC-135 H/E/R A CRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft	Ldg	Fix	T.N.	Code	Time	MSN	MOUH	WUC	Qty	WRSK	HESL	Hsg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
2	2	11.0				6680005506462	PRUBE	51555	1					T/041:00 #4 MAIN FUEL TANK GAUGE READ
2	2	2.0						51E00	0					T/041:30 FSAS DID NOT LOAD ALL HAYPOI
2	2	1.0				5826001345982	FLT DIR CONTL	51A0A	1					T/040:30 COPILLOT'S ALTIMETER DOES NOT
SS						MAINTENANCE EVENT CONTROL NUMBER:		59	KC-135A/E/PD					
2	2	4.0						51100	0					T/040:20 COPILLOT'S AIRSPEED INDICATOR
2	2	1.0						23LBA	0					T/044:00 #3 ENG ANTI-ICE VALVE CIRCUT
SS						MAINTENANCE EVENT CONTROL NUMBER:		60	KC-135A/E/PD					#3 ENG DUE ANTI-ICE ELECTRIC CHECKOUT
2	2	0.5						23LBA	0					
SS						MAINTENANCE EVENT CONTROL NUMBER:		61	KC-135A/E/PD					
2	2	2.5				5826001345974	GYRO	51A0E	1					T/041:30 PILOT'S ROI TILT'S RIGHT APPX
SS						MAINTENANCE EVENT CONTROL NUMBER:		62	KC-135A/E/PD					
2	2	2.0				5836001345973	AMPLIFIER	51A0C	1					T/040:30 PILOT'S ROI GYRO FLAG IN VIE
SS						MAINTENANCE EVENT CONTROL NUMBER:		63	KC-135A/E/PD					
2	2	0.7						6419C	0					T/044:45 IP SEAT RADIO SELECTOR SWITC
SS						MAINTENANCE EVENT CONTROL NUMBER:		64	KC-135A/E/PD					
2	2	2.0				1830006566170FL	TERMINAL	46771	2					T/043:00 SIGNAL COIL STAYS IN OPEN PO
SS						MAINTENANCE EVENT CONTROL NUMBER:		65	KC-135A/E/PD					
2	2	0.7						4635A	0					T/042:15 800M A21MUTH GAUGE DOESN'T H
2	2	4.0						51E00	0					T/043:00 CENTER HING TANK FUEL GAUGE

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NC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft Lndg Fix T.N. Code Time	MSN	NOUN	HUC	Qty	In WRSK	MESL	Msg DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER:	66	KC-135A/E/R)	0				T/010:15 800M SLUGGISH AND W/N ATTAIN
		46755						
SS 2 3.0	MAINTENANCE EVENT CONTROL NUMBER:	67	KC-135A/E/R)	0				T/010:20 800M W/N REACH 45 DEGREES LO
		46755						
SS 2 2.5	MAINTENANCE EVENT CONTROL NUMBER:	68	KC-135A/E/R)	0				T/010:01 #1 ENG FIRE LIGHT ILLUMINATE
2 1.5		49421						T/010:30 PILOT'S INTERPHONE SWITCH TR
		64110						
SS 2 4.7	MAINTENANCE EVENT CONTROL NUMBER:	69	KC-135A/E/R)	1				T/012:00 ATTITUDE LIGHT ILLUMINATED
2 1.0	6615005506628 GYRO	51142						T/011:00 #1 ENG IGNITION CIRCUIT OPEN
	2925002936481 EXCITER BOX	23KAA						
SS 2 8.0	MAINTENANCE EVENT CONTROL NUMBER:	70	KC-135A/E/R)	1				PILOT'S ALTITUDE READS 425 FT IN STA
	6610000863840 ALTIMETER	5117C						
SS 2 3.0	MAINTENANCE EVENT CONTROL NUMBER:	71	KC-135A/E/R)	1				#4 MAIN TANK LED INOP AT LEFT HAND DI
2 3.0	6610012277222 JFHP	51E80						T/011:30 INS HAD TWO UNINITIATED TURN
	6605010182181 INU	72Y80						
SS 2 1.1	MAINTENANCE EVENT CONTROL NUMBER:	72	KC-135A/E/R)	1				IP'S INTERPHONE BOX HAS A SHORT IN YO
	5831005384250 INPH BOX	64110						
SS 2 3.0	MAINTENANCE EVENT CONTROL NUMBER:	73	KC-135A/E/R)	1				T/011:00 PILOT'S ATTITUDE INDICATOR SH
	6615005506628 GYRO	51142						

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HC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft	Ln	Fix	Time	NSN	MOIN	HUC	Qty	MRSK	HESL	Msg	DIG	REMARKS
SS	2	2.0				74		KC-135A/E/R				
	2	6.5				722X0	1					T/012:15 RDR PICTURE SWITCHED TO 50 N
	2	6.5				51A0B	1					T/010:20 PILOT'S FLIGHT DIRECTOR GYRO
	2	0.5				51143	1					T/010:20 DOPPLER SYSTEM GIVES ERRONEO
	2	0.5				72100	0					
SS	2	1.5				75		KC-135A/E/R				
	2	1.5				722X0	1					T/013:00 APN-59 RADAR WENT BLANK
SS	2	1.0				76		KC-135A/E/R				
	2	1.0				46357	0					T/011:00 800H ELEVATION GUAGE READS 1
SS	2	3.0				77		KC-135A/E/R				
	2	0.5				72200	0					T/010:10 INS DUMPED POSITION AFTER TA
	2	1.0				650HA	1					T/011:00 IFF/SIF INOP, FAILS ALL IN-F
	2	1.5				72HAB	0					T/010:50 ASD-15 RDR PRESS GAUGE STEAD
	2	1.5				51E00	0					T/010:30 FSH/CHS CRUISE, DESCENT, AND
SS	2	2.0				78		KC-135A/E/R				
	2	5.5				450HA	1					T/011:30 IFF/SIF GROUND STATION REPOB
	2	5.5				722X0	0					T/012:30 RDR INOPERATIVE, ZERO MAG CU
	2	5.5				72220	1					
SS	2	1.0				79		KC-135A/E/R				
	2	1.0				47131	0					P/F OXYGEN FLOW REGULATOR IN 800H P00
	2	1.1				52420	1					T/010:01 COPILOT'S NSI COMPASS CARD L

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KC-135 H/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft Logg Fix T.N. Code Time	MSN	NOUN	HUC	Qty	In WRSK	HESL	Hsg	DTG	REMARKS
SS 2 1.5			46351	80	KC-135A/E/R	0			T/011:00 BOOM OVERRIDE SYSTEM INOPERA
SS 2 2.5	6615005506628	GYRO	51142	81	KC-135A/E/R	1			PILOT'S ATTITUDE LIGHT PRECESSED
SS 2 0.5	5826011244793	RCVR/XMITTER	72040	82	KC-135A/E/R	1			CB ON COPILOT'S ALTITUDE OPEN
2 3.5			23040	0					*2 ENG EGT READS 25 DEGREES ABOVE OTH
2 2.5	5826001345981	HSI	51140	1					COPILOT'S HSI BRNDS
SS 2 0.1			9111A	83	KC-135A/E/R	0			P/F SEAL BROKEN ON BOTH SMOKE MASKS
SS 2 2.0			46755	84	KC-135A/E/R	0			T/010:10 BOOM ONLY ATTAINS 10 DEGREES
2 0.1			7208A	0					T/010:10 EDR SEARCH MODE HAS MUCH DIS
2 2.5	5930005814562	SWITCH	64112	1					T/014:00 PILOT'S MINE SWITCH STICKS 1
SS 2 0.5			44211	85	KC-135A/E/R	1			T/012:00 NOSE WHEEL LANDING LIGHT INU
SS 2 2.5	5826001745979	PITCH COMPUTER	51140	86	KC-135A/E/R	1			T/015:30 PILOT'S FLIGHT DIRECTOR SHOW
SS				87	KC-135A/E/R				



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Acft Lndg Fix T.N. Code Time	NSN	MOON	HUC	Qty	In HACK	Hsg DTG	REMARKS
2 2.0	2935007397317RU	BLD VLV GOVERNOR	23LAC	1			T/O 0:50 #3 ENG BLEED VALVE STICKS AT
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER: 88 CKC-135A/E/RD 46750 0						T/O 1:00 BDOH DOES NOT APPEAR TO STOP
SS 2 3.0	MAINTENANCE EVENT CONTROL NUMBER: 89 CKC-135A/E/RD 51142 1						T/O 2:00 PILOT'S A01 GYRO WARNING FLA
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER: 90 CKC-135A/E/RD 722E0 1						T/O 0:10 RADAR PICTURE SPIKES INTERNI
SS 2 4.5 2 3.0	MAINTENANCE EVENT CONTROL NUMBER: 91 CKC-135A/E/RD 51843 1 6685005155146 AIR BULB 61000 0						T/O 0:30 COPILOT'S FREE AIR TEMP GAUG T/O 0:30 COUPLER FAULT LIGHT ON HF RA
SS 2 2.0 2 2.1	MAINTENANCE EVENT CONTROL NUMBER: 92 CKC-135A/E/RD 6411D 1 5831005195583 INPH CONTRL BOX 13080 0						T/O 1:45 BDOHER'S RADIO SYSTEM HAD LO T/O 5:15 EIGHT ALG DOOR FAILED TO CLO
SS 2 1.2	MAINTENANCE EVENT CONTROL NUMBER: 93 CKC-135A/E/RD 722F0 1						T/O 4:00 PILOT'S ROR SCOPE HAS NO PIC
SS 2 2.5 2 1.0 2 2.6 2 3.0	MAINTENANCE EVENT CONTROL NUMBER: 94 CKC-135A/E/RD 72CBA 1 5920000106852 FUSE 44211 1 6240002839598 LIGHT 13HAF 0 1.100 0						T/O 1:00 APN-69 RDR INOPERATIVE T/O 4:20 NOSE GEAR LANDING LIGHT INOP T/O 4:50 NOSE GEAR INDICATOR DOES NOT T/O 4:50 PROBABLE LIGHTNING STRIKE ON

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft Lndg Fld	T.N. Code	Time	NSN	MOUN	HUC	Qty	In	MSL	Msg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS	2	1.5	MAINTENANCE EVENT CONTROL NUMBER: 5831005195883	INPH CONTRL BOX	95	6411D	1	KC-135A/E/R			T/0+1:00 BOOMER'S INTERPHONE ON RUDDER
	2	1.0				622RD	0				T/0+2:00 TOWER REPORTED VHF UNREADABLE
	2	1.0				51E00	0				T/0+2:00 FSA/CAS PANEL CENTER OF GRAV
SS	2	6.0	MAINTENANCE EVENT CONTROL NUMBER: 6605005518187	STDBY COMPASS	96	51213	1	KC-135A/E/R			STANDBY COMPASS 120 DEGREES OUT, JAMM
											REQUIRED COMPASS SWING WILL BE PE
SS	2	2.4	MAINTENANCE EVENT CONTROL NUMBER: 5920010953313	POWER SUPPLY	97	722F0	1	KC-135A/E/R			T/0+0:02 PILOT'S ROR SCOPE WENT FUZZY
SS	2	4.0	MAINTENANCE EVENT CONTROL NUMBER: 6615005334926	INTEGRATOR	98	51E00	0	KC-135A/E/R			T/0+0:30 PILOT'S FAS/CAS TRUE AIR SPE
	2	1.5				5211N	1				T/0+0:40 AUTOPILOT AILERON AXIS INOP
SS	3	4.0	MAINTENANCE EVENT CONTROL NUMBER: 2995007797317RU	BLO VLV GOVERNOR	99	23LAC	1	KC-135A/E/R			#3 ENG HAS LOW TRT
	3	2.0	4820008631072RU	OIL PRES RLF VLV		23JHH	1				#3 ENG OIL PRESSURE LOW
SS	2	16.0	MAINTENANCE EVENT CONTROL NUMBER: 6615005269441	AILERON FOLLOWUP	100	521J5	1	KC-135A/E/R			T/0+1:00 IN RPVG MODE, THE FQVG GIVES
	2	0.5				46810	0				T/0+3:00 HYD FLUID ALL OVER ROOM SIGN
SS	2	1.0	MAINTENANCE EVENT CONTROL NUMBER: 148JC		101	148JC	0	KC-135A/E/R			T/0+4:00 RUDDER HYD PRESSURE GAUGE RE

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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A/cft Lndg Fix T.M. Code Time	MSG	NSN	NOON	WUC	In Qty WRSK	MESL	Msg DTG	REMARKS
SS								
2	7.0			102	(KC-135A/E/R)			T/041:30 COPILOT'S ATT INDICATOR STUC
2	3.0	6615008367399	PTCH & ROLL GYRO	51800	0			T/041:00 AUTOPILOT TURN KNOB FUNCTION
2	2.7	6605005301633	R/P GYRO	52110	1			
				52141	1			
				51500	0			T/042:00 #1 RESERVE TANK GAUGE INTERM
SS								
2	0.2	6220005833442	LIGHT	103	(KC-135A/E/R)			T/043:00 AIRCRAFT LEFT SIDE LANDING L
				44253	1			
SS								
2	1.0			104	(KC-135A/E/R)			T/042:00 800M SIGNAL SYSTEM ADVANCED
2	3.0	5836010121930	RCVR/WHITTER	46850	0			T/043:00 TACAN BROKE LOCK AND FAULT L
				71280	1			
SS								
2	7.0			105	(KC-135A/E/R)			T/040:10 AILERON AND ELEVATOR AXIS OF
				52121	0			
SS								
2	1.5			106	(KC-135A/E/R)			T/040:30 INS INU DRIFTS EXCESSIVELY
2	4.0			72900	0			T/043:50 COPILOT'S ADI GLIDESLOPE FLA
				51800	0			
SS								
2	1.0			107	(KC-135A/E/R)			T/041:00 POSITION INDICATOR LIGHT ON
2	1.0	6240002287130	LIGHT	44225	1			T/041:00 TAIL MOUNTED FLOOD LIGHT SHO
2	2.0	61150081801830H	GENERATOR	44224	0			T/040:20 COPILOT'S INSTRUMENT GENERAT
				42211	1			
SS								
				108	(KC-135A/E/R)			

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A/cft Lndg T.N. Code Time	NSH	NOUW	HUC	Qty	In HACK	HESL	Msg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
2 0.5	6605010182181	INU	72780	1					T/0100:01 INS HAS EXCESSIVE DRIFT FOLL
2 1.0			46850	0					T/0110:00 BOOM SIGNAL COIL H/W RUN THR
SS									RADAR SYSTEM INOPERATIVE
2 4.3	MAINTENANCE EVENT CONTROL NUMBER: 109								
	5841008047159	RDR CONTRL BOX	72210	1					
SS									T/0100:30 NAVY'S INTERPHONE BARELY AUDI
2 2.0	MAINTENANCE EVENT CONTROL NUMBER: 110								
			64112	0					
SS									T/0110:00 FDI LIGHTS ON LEFT SIDE BURN
2 0.5	MAINTENANCE EVENT CONTROL NUMBER: 111								
	6240002287130	LIGHT	44225	2					
SS									T/0120:00 H/D LEAK NEAR BOOM SIGHTING
2 0.5	MAINTENANCE EVENT CONTROL NUMBER: 112								
			46310	0					
			12880	0					T/0140:25 BOOMER LOST PENCIL IN COCKPI
SS									RADAR STERILIZER INOPERATIVE
2 1.0	MAINTENANCE EVENT CONTROL NUMBER: 113								
			72280	0					
SS									T/0100:45 CENTER REPORTED UHF RECEPITO
2 2.0	MAINTENANCE EVENT CONTROL NUMBER: 114								
	5821011948161	RECEIVER	63800	1					
2 0.5			1114K	0					T/0110:00 COPILOT'S #3 WINDOW HAS TWO
SS									T/0103:00 A/R SYSTEM ADVANCED FROM REA
2 0.0	MAINTENANCE EVENT CONTROL NUMBER: 115								
			46771	0					

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Acft Lndg Fix I.N. Code Time	SS	MSN	MAINTENANCE EVENT	CONTROL NUMBER	WUC	Qty	In HRSK	HESL	Hsg DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
2 1.0	SS		MAINTENANCE EVENT	CONTROL NUMBER: 116	138AB	0	KC-135H/E/R			LEFT SIDE STRUT ACTUATOR LEAKING
2 2.0	SS		MAINTENANCE EVENT	CONTROL NUMBER: 117	635A0	1	KC-135H/E/R			T/O+2:00 COMH #2 DOES NOT TRANSMIT ON
2 3.0	SS		MAINTENANCE EVENT	CONTROL NUMBER: 118	46850	0	KC-135H/E/R			T/O+0:50 800H FIRES THROUGH TO A DISC
2 8.5 2 3.0	SS		MAINTENANCE EVENT	CONTROL NUMBER: 119	23EE0 46840	0 0	KC-135H/E/R			T/O+0:10 #3 THROTTLE SETTING 1 1/2 KN T/O+2:00 800H HOIST MOTOR ALLOWS 800H
2 1.0	SS		MAINTENANCE EVENT	CONTROL NUMBER: 120	64112	0	KC-135H/E/R			T/O+3:00 COPILLOT'S INTERPHONE SWITCH
2 0.0 2 1.0	SS		MAINTENANCE EVENT	CONTROL NUMBER: 121	44225 11143	0 0	KC-135H/E/R			T/O+1:30 PDI LIGHTS FOR TELESCOPING H T/O+0:30 COPILLOT'S #2 WINDOW MAKES HH
2 3.0 2 3.0 2 3.0	SS		MAINTENANCE EVENT	CONTROL NUMBER: 122	52132 51A00 52132	1 0	KC-135H/E/R			T/O+0:10 AUTOPILOT SYSTEM CAUSES A CO T/O+0:20 COPILLOT'S ALTITUDE HOLD COMH T/O+2:00 AUTOPILOT AILERON TURN KNOB
2 2.1	SS		MAINTENANCE EVENT	CONTROL NUMBER: 123	72M99	0	KC-135H/E/R			T/O+0:05 A5A-15 SYSTEM INDICATES LOW

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Acft Lndg Flt T.N. Code Time	NSN	NOON	HUC	Qty	In WRSK	MESL	Hsg DTG	REMARKS
2 4.4	6685005267881	WHITTER	51631	1				T/0+3:30 PILOT'S RUDDER PRESSURE GAUG
SS 2 4.0	MAINTENANCE EVENT CONTROL NUMBER:	124	25000	0				T/0+0:01 #2 & #3 THROTTLES W/N REACH
SS 2 0.5	6240002287130	LIGHT	44225	2				T/0+0:45 LEFT ROH OF PDI LIGHTS INOPE
2 2.5			46730	0				T/0+1:00 FORWARD A/R PUMP IN AFT BODY
SS 2 0.5	MAINTENANCE EVENT CONTROL NUMBER:	126	11443	0				T/0+1:00 HEAVY ICE BUILD-UP ON SIGHT
SS 2 1.5	66100023651430X	INDICATOR	51800	1				T/0+0:05 COPILOT'S ANGLE OF ATTACK IN
2 4.5	5841007946401	CONTROL	7244C	1				T/0+0:30 ASQ-15 SYSTEM W/N HOLD PRESS
2 10.2	6110004839247	VOLTAGE REG	4215H	1				T/0+0:10 ELECTRICAL POWER SURGED IN A
2 2.0	6115001366617UH	GENERATOR	4215L	1				T/0+1:55 PILOT'S RIGHT BRAKE PEDAL MA
	1630006394232	CONTL SHIELD	13EDR	1				
SS 2 0.5	MAINTENANCE EVENT CONTROL NUMBER:	128	11199	0				T/0+4:40 STUD ON CREW ENTRY WATCH BRO
2 1.0			63X00	0				P/F PILOT'S RADIO RECEPTION HAS LOUD
SS 2 0.2	6605005501633	GYRO	64110	0				T/0+0:10 BOOMER'S INTERPHONE PANEL IN
2 0.8			52141	1				T/0+0:30 AP VG INOP ON CLIMBOUT
2 2.5			61000	0				T/0+1:30 HF RADIO INOPERATIVE

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Acft Lndg Fix T.N. Code Time	SS	NSN	MOUH	HUC	Qty	In HRSK	MESL	Msg	DTG	REMARKS
2 7.0	SS	MAINTENANCE EVENT CONTROL NUMBER: 5930010825525 RELAY	130	72VH0	1	KC-135A/E/R				T/010:15 DURING A/R, THE AUTOPILOT GV
2 2.0	SS	MAINTENANCE EVENT CONTROL NUMBER: 5826001345974 SLEH COUPLER	131	51AJ0	1	KC-135A/E/R				T/010:40 COPILOT'S HEADING-BUG CANNOT
2 4.0	SS	MAINTENANCE EVENT CONTROL NUMBER: 42156	132	42156	0	KC-135A/E/R				T/013:00 #1 BUS TIE TRIPS OFF-LINE AF
2 4.0				51R00	0					T/013:00 PILOT'S COMMAND BARS DID NOT
2 1.0				111-K	0					T/013:00 PRESSURIZATION LEAK SOMEHMER
2 1.0	SS	MAINTENANCE EVENT CONTROL NUMBER: 23NAD	133	23NAD	0	KC-135A/E/R				T/011:00 #3 THROTTLE KNOB OVER ONE KH
3 2.5	SS	MAINTENANCE EVENT CONTROL NUMBER: 13ECC	134	13ECC	0	KC-135A/E/R				WARNING HORN CUTOFF KNOB INOP
2 2.5	SS	MAINTENANCE EVENT CONTROL NUMBER: 6130007128567H1 PWR SUPPLY	135	5131C	1	KC-135A/E/R				T/011:00 FUEL TRANSFER RATE INDICATIO
2 1.0				63AC0	1					T/010:20 CONN #2 SYSTEM INOPERATIVE
2 2.0	SS	MAINTENANCE EVENT CONTROL NUMBER: 41116	136	41116	0	KC-135A/E/R				T/011:30 #2 BLEED VALVE H/M CLOSE
2 3.5	SS	MAINTENANCE EVENT CONTROL NUMBER: 137	137	12MHE	0	KC-135A/E/R				T/012:00 A3A-15 FAILED TO HOLD PRESSU

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Flight Logdy Fix T.H. Code Time	MSG	MOUN	HUC	In Qty HRSK	MSL	Msg DNG	REMARKS
2 3.5			51E00	0			T/013:00 FSA/CAS DATA #1 & #4 EPR FAI
SS 2 1.2			138	(KC-135A/E/R)			
2 3.0	1650008714772	CNSNT SPD DRIVE	51BEO 42A37	0 1			T/010:20 PILOT'S ANGLE OF ATTACK INDI T/010:25 #1 GENERATOR INOPERATIVE
SS 2 2.0	6605010182181	1MU	139	(KC-135A/E/R)			T/016:30 INS 20 NM OFF COURSE AFTER 6
SS 2 2.0			140	(KC-135A/E/R)			
2 4.0	6615005506628	MD1 GYRO	51142	1			T/010:30 PILOT'S ALTITUDE INDICATOR 0
	6615005892592	AMPLIFIER	52111	1			T/010:30 AUTOPILOT ALTITUDE HOLD HAND
	5306008892927	ELEV SERV0 MOTOR	52123	1			
SS 2 26.0			141	(KC-135A/E/R)			
	6615005269441	ELEV FOLLOWUP	52137	1			T/010:30 AUTOPILOT ELEVATOR AXIS USCL
	6615005892592	AMPLIFIER	52111	1			
	5306008892927	ELEV SERV0 MOTOR	52123	1			
	6615007787467	STHB TRIM ACT.	52124	1			
SS 2 1.0			142	(KC-135A/E/R)			T/014:00 ALL FOUR FUEL FLOW METERES
	6130007720567NT	PWR SUPPLY	5131C	1			
SS 2 0.5			143	(KC-135A/E/R)			T/014:00 #2 RESERVE BRAKE GAUGE W/N P
			45161	0			
SS			144	(KC-135A/E/R)			



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Acft Ldg Fix I.M. Code Time	NSN	NOON	HUC	Qty	In MRSK	MESL	Msg	DTG	REMARKS
2 0.5			23H80	0					T/040:01 #3 EPR GAUGE INDICATIONS SLU
2 8.1			51111	0					T/040:01 TRT EXCEEDED ON ALL 4 ENGINE
2 6.0	3010007395580H3	SHAFT	42196	1					T/040:13 #1 ENG FIRE LIGHT ILLUMINATE
2 1.5	1650003790844	FLANGE	42174	1					T/040:15 HYD LIGHT W/H STAY ILLUMINAT
2 1.5	4320009334697H5	HYD CHECK VLV	4511E	1					P/F CNOT WRITTEN UP FROM PREVIOUS FLT
			63KAO	0					
2 2.0			145						ALL FOUR ENGINES DUE POWER RUN CHECKO
			23D00	0					
2 2.0			146						T/041:15 AFTER 2ND CONTACT, A/R CONTR
			46782	1					
2 4.5			147						T/044:00 PILOT'S FD-109 DID NOT GIVE
2 1.0			51AC0	1					T/044:00 #2 ENGINE BUS TIE BREAKER IL
			4215K	1					
2 1.3			140						T/040:00 #1 ENG SLOW TO TAKE WATER
			23R0A	1					
			23KSN	1					
2 6.2			149						T/044:00 #4 RESERVE FUEL QUANTITY INO
2 0.2			51554	1					T/044:00 800H NOZZLE LIGHT INOPERATIV
2 1.5			44232	1					T/044:00 COPILOT'S FLIGHT DIRECTOR LI
			44171	0					
2 1.0			150						#2 GENERATOR INOPERATIVE
			4215K	1					

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A/cft T.M. Code	Ln'dg Fix Time	NSH	NUOH	MUC	Qty	In HRSK	HESL	Hsg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS	2	6.0			151	KC-135A/E/R				HF COUPLER CAUSES FAULT CODE
				61000	0					
SS	2	0.5			152	KC-135A/E/R				T/O+0:30 BIRD STRIKE ON RIGHT SIDE OF
				11000	0					
SS	2	0.7			153	KC-135A/E/R				T/O+1:30 PILOT'S RADIO ALTIMETER LIGHT
				72000	1					
SS	2	2.0			154	KC-135A/E/R				T/O+1:00 #3 ENG RPM INDICATION HIGH C
		1.5			23LAC	1				T/O+1:00 #3 ENG H/H REACH HRT DURING
		2.0			64112	1				P/F PILOT'S UNF ROCKER SWITCH ON YOKE
		4.0			5241F	1				T/O+0:20 N1 COMPASS 4 DEGREES IN EPR
SS	2	1.2			155	KC-135A/E/R				T/O+0:30 PILOT'S ANGLE OF ATTACK GAUG
				51000	0					
SS	2	5.0			156	KC-135A/E/R				T/O+0:01 PILOT'S AND COPILOT'S RGA CO
				51000	0					
SS	2	2.0			157	KC-135A/E/R				T/O+1:00 AUTOPILOT INDUCED PITCH OSC
				52143	1					
SS	2	6.0			158	KC-135A/E/R				T/O+0:10 PILOT'S COMMAND BARS INTERMI
				51000	1					

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Flight Line	Fix	T.M. Code	Time	NSN	MOUN	WUC	Qty	MRSK	MESL	Hsg	DIG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS	2	8.0		MAINTENANCE EVENT CONTROL NUMBER: 6615005094801	AXIS RATE SENSOR	52143	159	(KC-135A/E/R)	1			AUTOPILOT ELEVATOR AXIS FLUCTUATES UP
SS	2	4.8		MAINTENANCE EVENT CONTROL NUMBER: 5826001345981	HST	51180	160	(KC-135A/E/R)	0			T/041:00 AUTOPILOT ELEVATOR AXIS FLUC
SS	2	1.0		6610005303064	INDICATOR	51421	51180	1				T/040:30 COPILOT'S HEADING SLEN SHITC
SS	2	1.0					51421	1				T/040:05 LEFT INBOARD FLAP INDICATOR
SS	2	0.5		MAINTENANCE EVENT CONTROL NUMBER: 6210005426393	SWITCH	51899	161	(KC-135A/E/R)	1			PILOT'S CENTRAL YOKE SLEN SWITCH MISS
SS	2	1.0		MAINTENANCE EVENT CONTROL NUMBER: 162		47199	162	(KC-135A/E/R)	0			COPILOT'S QUICK DON MICROPHONE ACTIVA
SS	2	1.0		MAINTENANCE EVENT CONTROL NUMBER: 163		48356	163	(KC-135A/E/R)	0			T/041:00 BOOM MOULD CYCLE THROUGH FRO
SS	2	1.5		MAINTENANCE EVENT CONTROL NUMBER: 2995007397317RU	BLO VLV GOVERNOR	231AC	164	(KC-135A/E/R)	0			T/040:20 COPILOT'S ANGLE OF ATTACK GA
SS	2	3.0		2995007397317RU	BLO VLV GOVERNOR	231AC	1					T/040:45 #1 ENG W/N REACH HRT AT TEMP
SS	2	2.0		2995007397317RU	BLO VLV GOVERNOR	231AC	1					T/040:45 #2 ENGINE W/N ACHIEVE HRT AT
SS	2	1.0		5841010701344	RCVR:WHITTER	72180	0					T/040:20 #4 THROTTLE TOO FAR AFT OF 0
SS	2	2.0		6240002287130	LIGHT	44225	1					T/040:50 APN-218 DOPPLER WENT INTO HE
SS	2	0.5				1114R	3					T/041:00 FDI ELEVATION LIGHTS REPORTE
SS	2	0.5					0					T/041:00 BUBBLES IN BOOM SIGHTING MIN

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Aircraft T.N. Code	Fix Time	NSN	MOUN	HUC	Qty	In WRSK	HESL	Hsg	DTG	REMARKS
SS	2	2.2	MAINTENANCE EVENT CONTROL NUMBER: 6615007787467	165 52124	1	KC-135A/E/R				T/014:45 STAB TRIM STOPPED WORKING IN
SS	2	4.0	MAINTENANCE EVENT CONTROL NUMBER: 1680006566170FL 800H NOZZLE	166 46771	1	KC-135A/E/R				T/011:00 AFTER CONTACT WITH RECEIVER
SS	2	1.0	MAINTENANCE EVENT CONTROL NUMBER: 3388A	167 0	0	KC-135A/E/R				T/010:01 #3 ENGINE COMPRESSOR STALLED
SS	2	1.5	MAINTENANCE EVENT CONTROL NUMBER: 5335011051187 INTRPN RECEPTCL	168 64126	1	KC-135A/E/R				FORWARD GROUND INTERPHONE INOPERATIVE
SS	2	1.2	MAINTENANCE EVENT CONTROL NUMBER: 2915002893941 CHECK VALVE	169 45147	1	KC-135A/E/R				#4 ENGINE LEAKING HYD FLUID FROM UNKN
SS	2	1.0	MAINTENANCE EVENT CONTROL NUMBER: 41130	170 0	0	KC-135A/E/R				T/011:00 800H WINDOW DEFROST INOP
2	0.5			1204J	0					T/011:00 PILOT'S INERTIAL REEL LOCKS
2	2.5	6610011519454	1000	51E00	1					T/010:30 FSA/CAS PANEL LIGHTS FADE IN
SS	2	25.0	MAINTENANCE EVENT CONTROL NUMBER: 66800005264380 PANEL	171 52E00	0	KC-135A/E/R				#2 MAIN TANK REPOS 2300 LBS LOW
2	1.0	2915003853440	WATER PUMP	515J3	1					#4 ENGINE WATER PUMP BINDING
SS	2	12.1	MAINTENANCE EVENT CONTROL NUMBER: 53060083927 ELEV SERVO MOTOR	172 52123	1	KC-135A/E/R				T/012:30 AUTOPILOT ELEV/ALT HOLD AXIS

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A/cft Lndg Flt I.N. Code Time	MSN	NOUN	MUC	Q-1085K	HESL	Hsg DTG	REMARKS
2 5.5	6605005301633	BYPO	52141	1			T/013:00 PILOT'S HEADING FLAG ON HSI
2 3.5	5826001345981	HSI	51080	1			T/013:10 #2 GEN FREQ & KWS CONTROL RH
2 1.0	1650008964613	CSO	42194	1			T/010:15 BOOMER'S SIGHTING WINDOW HIA
			11146	0			
SS 2 0.8	MAINTENANCE EVENT CONTROL NUMBER: 173 KC-135A/E/R						T/010:45 BOOMER'S FORWARD INTERPHONE
			64115	0			
SS 2 4.2	MAINTENANCE EVENT CONTROL NUMBER: 174 KC-135A/E/R						T/010:01 DURING CLIMBOUT FSA/CAS 1CDU
2 17.9	6610012278781	COMPUTER	51000	1			T/010:45 SEVERE KWS LOAD SHAPPING NOT
2 2.0	1650008964613	CSO	42194	1			T/011:00 RADAR WEAK AND TARGET FUZZY
2 3.0			72200	0			T/015:00 WARNING HORN SOUNDED WITH TH
2 6.2			13000	0			AIRCRAFT REQUIRES JACKING TO TROUBLE
			13080	0			
SS 2 6.0	MAINTENANCE EVENT CONTROL NUMBER: 175 KC-135A/E/R						T/010:35 INS LOW AIR LIGHT ON
2 0.5	5930010853351	AIR FLOW SENSOR	72900	1			T/011:00 #3 FUEL GAUGE SHOWS ERRATIC
2 1.0			51515	0			T/010:10 FSA/CAS RDU H/N DISPLAY CLIM
2 1.0	66100000348635	RDU	51000	1			T/011:30 FSA/CAS DATA PG 2 TRUE AIR S
2 2.0			46795	0			T/011:30 BOOM TRAILED AT 33-34 DEGREE
2 1.0			51516	0			CENTER WING & #4 MAIN TANKS READING I
SS 2 0.2	MAINTENANCE EVENT CONTROL NUMBER: 176 KC-135A/E/R						FSA TRUE AIRSPEED INDICATOR REQUIRES
			51131	0			
SS 2 2.9	MAINTENANCE EVENT CONTROL NUMBER: 177 KC-135A/E/R						T/014:00 APRN-59 FAILED TO HAVE ANY PR
	5999008671413	RCOR/SHITTER	72280	1			

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A/cft Lndg Fld	T.H. Code	Time	MSN	MIUN	HUC	Qty	HRSK	MSL	Msg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS	2	7.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	178	KC-135A/E/R	1					T/010:00 #3 GENERATOR GAVE ERRATIC IN
SS	2	33.5	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	179	KC-135A/E/R	0					T/012:00 #4 MAIN TANK BURNS FASTER TH
SS	2	7.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	180	KC-135A/E/R	1					T/010:00 #3 GENERATOR W/H TAKE LOAD F
SS	2	2.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	181	KC-135A/E/R	0					T/011:00 800H ACCUMULATOR DID NOT HOL
SS	2	1.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	182	KC-135A/E/R	0					T/010:00 PILOT'S RGA ROTATION CONTINU
SS	2	1.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	183	KC-135A/E/R	1					T/013:00 COPILOT'S NAV LOC/APP AUTO H
SS	2	2.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	184	KC-135A/E/R	1					T/010:05 FUEL FLOW READINGS LOW FOR R
SS	2	4.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	185	KC-135A/E/R	0					T/010:30 #2 CORN RADIO SQUELCH SWITCH
SS	2	6.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	186	KC-135A/E/R	1					T/012:00 APN-S9 NAV RADAR STAB SWITCH
SS	2	1.5	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	187	KC-135A/E/R	1					T/012:00 #3 EPR GAUGE SLOWLY BEGAN RO
SS	2	2.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	188	KC-135A/E/R	0					T/010:10 #3 ENG OIL PRESSURE HAS HIGH
SS	3	8.0	MAINTENANCE EVENT CONTROL NUMBER: 6115001366617UH GENERATOR 1650008564613 CSU	189	KC-135A/E/R	1					T/013:00 #2 ENG IN FLIGHT EMERGENCY F

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Actt Lndg f-x I.N. Code Line	SS	MSN	NOUN	MUC	Qty	In NRSK	MESL	Msg DTG	REMARKS
MAINTENANCE EVENT CONTROL NUMBER: 6620004459417	2	3.0	TRANSDUCER	184 23806	1	KKC-135A/E/R)			T/010:45 BLEED VALVE ON #3 ENG STICKS
MAINTENANCE EVENT CONTROL NUMBER: 5821012587579	2	2.2	RCVR/XMITTER	185 61040	1	KKC-135A/E/R)			T/014:00 HF RADIO UNUSABLE
	2	8.2		51800	0				T/013:00 WARNING LIGHT ON FSA/CAS ILL
	2	9.5		46899	0				T/012:00 FUEL PANEL "XFER RATE" & "FU
MAINTENANCE EVENT CONTROL NUMBER: 66200006212902	2	1.0	TRANSMITTER	51996	1				T/013:00 SIGNAL AMP CIRCUIT BREAKER P
	2	0.5		46851	0				T/010:30 800H CANNOT BE LOWERED WITH
				46840	0				
MAINTENANCE EVENT CONTROL NUMBER: 2995006475995	2	3.0	SWITCH	186 23099	1	KKC-135A/E/R)			T/012:00 #3 ENGINE LOW OIL PRESSURE L
	2	1.0		46904	0				T/013:30 FIVE SECOND DELAY OCCURED DU
	2	1.0		46768	0				T/012:00 800H TRAILS AT 3 DEGREES RIG
	2	0.5		63800	0				T/012:00 #1 C/H RADIO SQUELCH CUTS 0
MAINTENANCE EVENT CONTROL NUMBER: 5826001345981	2	1.0	MSI	51840	1				T/011:00 COURSE SELECTOR ON PILOT'S H
	2	1.0	SWITCH	64115	1				T/011:00 HOT MIKE AT 800H STATION IN
	2	4.0		51840	0				T/013:00 N1 & J4 READ 5 DEGREES IN ER
	2	1.0	MOTOR	52121	1				T/012:00 AILERON AXIS OF AUTOPILOT IN
MAINTENANCE EVENT CONTROL NUMBER: 6615005350145	2	2.0		187 46755	0	KKC-135A/E/R)			T/010:30 800H TRAILS AT 33 DEGREE ELE
	2	1.5		46771	0				T/010:30 800H NOZZLE HAS EXCESSIVE FU
	2	3.0		46841	0				T/011:00 800H W/N FLY UP TO STOM POSI
	2	4.0		46851	0				T/010:40 A/R CONTROL CIRCUIT BREAKER
MAINTENANCE EVENT CONTROL NUMBER: 6615005350145	2	2.0		188 44225	0	KKC-135A/E/R)			T/011:00 PILOT DIRECTOR LIGHT CIRCUIT
	2	1.0		23810	0				T/014:00 #2 ENG IGNITION CIRCUIT BREH

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Acft Lndg Fix T.N. Code Time	NSN	NOUN	MUC	Qty	In HRSK	MSL	Msg DTS	REMARKS
SS 2 1.8		MAINTENANCE EVENT CONTROL NUMBER:	189	KC-135A/E/R				T/011:00 800M CONTROLS ARE VERY STIFF
			-46775	0				
SS 2 1.0		MAINTENANCE EVENT CONTROL NUMBER:	190	KC-135A/E/R				T/010:00 STALL WARNING HORN SOUNDED H
2 2.0			23NCR	0				T/010:40 UNF RADIO #2 UNREADABLE USIN
			63200	0				
			63800	0				
SS 2 3.0		MAINTENANCE EVENT CONTROL NUMBER:	191	KC-135A/E/R				T/013:00 RADAR SCOPE LOST PICTURE IN
2 4.0			72240	1				T/011:00 #4 ENG OIL PRESSURE READS LO
			23HOF	1				
SS 2 1.5		MAINTENANCE EVENT CONTROL NUMBER:	192	KC-135A/E/R				T/013:45 COPILOT'S ATTITUDE GYRO FAIL
			52199	1				
SS 2 0.5		MAINTENANCE EVENT CONTROL NUMBER:	193	KC-135A/E/R				T/014:30 800M IS EXTREMELY DIFFICULT
2 0.5			-46980	0				T/013:00 800M DISCONNECT LIGHT DOES N
2 3.0			46951	0				T/010:01 COPILOT'S COMMAND BARS WENT U
			51840	1				
SS 2 3.5		MAINTENANCE EVENT CONTROL NUMBER:	194	KC-135A/E/R				T/011:00 PILOT'S AND COPILOT'S HDG SL
2 0.2			51830	1				PILOT'S WINDSHIELD WIPER BROKEN
			4114E	0				
SS 2 8.0		MAINTENANCE EVENT CONTROL NUMBER:	195	KC-135A/E/R				T/011:30 MODE FUNCTION OF FSO/CAS EDU
			51840	1				



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Airt Lndg Fix T.N. Code Time	NSN	NOUN	HUC	Qty	In HRSK	MESL	Msg DTG	REMARKS
2 3.0	6130007720567M	PHR SUPPLY	5131C	1				T/013:00 OFFLOAD TOTALIZER IS INACCUR
2 1.0	6630005313125	PHR SUPPLY	51914	1				T/013:00 SMALL HYD LEAK OBSERVED ON B
			46814	0				
SS	MAINTENANCE EVENT CONTROL NUMBER:	196	KC-135A/E/R)					
2 0.5		46854	0					T/011:00 BOOM SYSTEM INADVERTANTLY GO
2 0.2		46854	0					T/011:00 BOOM AUTOMATICALLY DISCONNECT
2 2.1	2915003859440	WATER PUMP	23R0R	1				T/010:00 #2 ENG SLOW TO TAKE WATER
2 2.5	5895000994522	RCVR/XMITTER	6586R	1				IFF/SIF INOPERATIVE
2 6.0	5330007024715	CANNON PLUG	23H0F	1				T/011:06 #2 ENG OIL PRESSURE GAUGE FL
	6685011429716	CANNON PLUG	51393	1				
SS	MAINTENANCE EVENT CONTROL NUMBER:	197	KC-135A/E/R)					
2 6.8	5330007024715	TRANSMITTER	23H0F	1				T/011:00 #4 ENG OIL PRESSURE GAUGE FL
SS	MAINTENANCE EVENT CONTROL NUMBER:	198	KC-135H/E/R)					
2 15.0	5841001339183	RCVR/XMITTER	722C0	1				T/010:10 APN-59 RADAR PICTURE IS BLUR
SS	MAINTENANCE EVENT CONTROL NUMBER:	199	KC-135H/E/R)					
2 3.0		72000	0					T/013:00 NAVIGATOR'S RADAR INOPERATIVE
2 2.5		72200	0					T/013:10 RADAR TILT READS 10-15 LOW F
		72000	0					
		722H0	0					
SS	MAINTENANCE EVENT CONTROL NUMBER:	200	KC-135H/E/R)					
2 2.0		52410	0					T/011:00 H1 R J4 COMPASSES ARE OFF BY
SS	MAINTENANCE EVENT CONTROL NUMBER:	201	KC-135H/E/R)					

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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A/cft Lndg Fix T.N. Code Time	MSN	NOUN	HUC	Qty	In MRSK	MESL	Hsg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
2 3.0	6615005094801	AXIS RATE SENSOR	52143	1					T/010:45 RUDDER AXIS OF AUTOPILOT DEF
2 9.8	6130007728567NT	PAR SUPPLY	5131C	1					T/012:30 800M OFFLOAD TOTALIZER INHOPE
2 2.5	66200006212902	800M O/L XMITTER	51911	1					T/010:55 AUTOPILOT ELEVATOR AXIS CAUS
2 22.0	6615005094801	AMPLIFIER	52143	1					T/014:00 RIGHT HYD SYSTEM PRESSURE RE
	43200009334697MS	HYD PUMP	4511E	2					
	1560000987239FL	PT HYD SVS ACCUM		1					
	1560000987239FL	800M ACCUM		1					
	1560000987239FL	RUDDER ACCUM		1					
	43300002773274	AIR FILTER	45142	1					
2 2.0	-4820007172679MS	AIR PRESS REGLTR	45141	1					T/012:30 CABIN PRESS MAINTAINED 1000
2 2.0			41126	0					T/012:00 BROKEN WIRE AT PILOT'S NOSEH
			64199	0					
SS	MAINTENANCE EVENT CONTROL NUMBER:	202							
2 1.0			49410	0					T/010:01 WARNING HORN W/HN CUT OUT WHE
2 1.5	6615005506623	ADI	51142	1					T/011:20 COPILOT'S ADI INOPERATIVE
SS	MAINTENANCE EVENT CONTROL NUMBER:	203							
2 0.1	6240002387130	LIGHT	44225	4					T/011:30 PDI LIGHTS INOPERATIVE
2 4.5			72210	0					P/F RADAR HAS AN INTERMITTENT SHEEP
	5335010537676CH	ANTENNA	72240	1					
2 2.5	6620006212902	O/L T12R XMITTER	51911	1					T/011:30 800M SYSTEM OFFLOAD TOTALIZE
SS	MAINTENANCE EVENT CONTROL NUMBER:	204							
2 1.0	6240007637744	RDR CONTR BOX	72210	1					T/010:05 SEARCH RADAR NEVER REACHED P
SS	MAINTENANCE EVENT CONTROL NUMBER:	205							
2 2.9			5241F	0					T/011:00 AUTOPILOT W/HN HOLD WINGS LEV

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Acft Lndg Fix T.N. Code Time	NSN	MOUN	HUC	Qty	In WRSK	HESL	Hsg DTG	REMARKS
SS 2 1.0	MAINTENANCE EVENT CONTROL NUMBER:	206	KC-135A/E/R	0				T/O+1:00 BOOM ENGAGED LIGHT INOPERATI
SS 2 3.0	MAINTENANCE EVENT CONTROL NUMBER:	207	KC-135A/E/R	0				T/O+2:45 #3 ENG HYD OVERHEAT LIGHT IL
SS 2 9.0	MAINTENANCE EVENT CONTROL NUMBER:	208	KC-135A/E/R	1				T/O+0:40 AUTOPILOT ALTITUDE HOLD VARI
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER:	209	KC-135A/E/R	0				T/O+0:10 CABIN COMPARTMENT TEMPERATUR
SS 2 1.2	53260112-44793	RCVR/XMITTER	4124A	0				T/O+0:05 PILOT'S AND COPILOT'S RADIO
SS 2 2.0			729H0	1				T/O+2:00 BOOMER'S #1 COM IN BOOM COM
SS 2 0.1	MAINTENANCE EVENT CONTROL NUMBER:	210	KC-135A/E/R	0				T/O+1:00 AUTOPILOT W/N HOLD HEADING I
SS 2 4.5	MAINTENANCE EVENT CONTROL NUMBER:	211	KC-135A/E/R	0				T/O+0:20 #4 ENG EGT GAUGE FLUCTUATES
SS 2 7.5	MAINTENANCE EVENT CONTROL NUMBER:	212	KC-135A/E/R	1				PILOT'S COMMAND BARS OPPOSITE ONLY IN
SS 2 1.5	50260013-45376	COMPUTER	514C0	0				NW'S RGA WARNING LIGHT INOPERATIVE
SS 2 4.1	MAINTENANCE EVENT CONTROL NUMBER:	213	KC-135A/E/R	0				DHS BATTERY TRAY MISSING BONDING STRA

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Flt Ldg Fix T.N. Code Time	MSG	HOUR	HUC	Qty	In HRSK	MSG DTG	REMARKS
SS 2 4.1	MAINTENANCE EVENT CONTROL NUMBER: 214 5835000894522 PCVR/XMITTER	658AA	1				T/010:00 1FF AC INPUT CIRCUIT BRENNER
SS 2 2.1	MAINTENANCE EVENT CONTROL NUMBER: 215 6805010346834 DMC	72HRE	0				T/010:30 APN-59 RADAR W/N HOLD PRESSU
2 1.0		721A0	1				T/010:45 UNS HALFUNCTION CODE 02-54 0
2 0.5		63000	0				T/011:00 #1 COMM RADIO FAILED TO SHIT
2 0.2	6240002839598 LIGHT	44211	1				T/011:10 NOSE WHEEL LANDING LIGHT IND
SS 2 1.0	MAINTENANCE EVENT CONTROL NUMBER: 216 12A00		0				T/010:30 INSTRUCTOR PILOT'S SEAT OFF
SS 2 0.8	MAINTENANCE EVENT CONTROL NUMBER: 217 6240002839598 LIGHT	44211	1				T/014:10 TR-1 LIGHT INOPERATIVE
2 1.0		42177	0				T/010:15 #3 GEN KM INDICATOR WAS WIND
2 0.5		46322	0				T/013:00 EXCESSIVE AMOUNT OF HYD FLUI
SS 2 7.0	MAINTENANCE EVENT CONTROL NUMBER: 218 1850008564613 CSO	51500	0				T/010:0 #2 MAIN TANK FUEL INDICATOR
2 3.0		42177	0				T/010:10 #3 GEN WAS LOAD SHIFTING, IS
SS 2 15.8	MAINTENANCE EVENT CONTROL NUMBER: 219 43200007018626RU DUCT	2194	1				T/010:30 #3 GEN AD LARGE SHAPPING LOH
SS 2	MAINTENANCE EVENT CONTROL NUMBER: 220 KC-135H/E/R	42163	2				

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Left Lndg Fix T.H. Code Time	NSH	MOU-4	MUC	Qty	In MRSK	MESL	Hsg DTG	REMARKS
2 2.5			23RAD	0				T/O 0:10 THROTTLES 1 & 4 ARE 2-3 KNOB
SS 2 12.0			221 23RAD	0	KC-135A/E/R			MAIN WATER TANK HAS LEAK
SS 2 3.0			222 51AB0	1	KC-135A/E/R			T/O 5:00 COPILOT'S ATTITUDE WARNING A
SS 2 5.5			223 23RAD	0	KC-135A/E/R			T/O 4:00 #1 ENG LAGS BEHIND ALL OTHER
SS 2 2.5			224 51142	1	KC-135A/E/R			T/O 0:30 COPILOT'S ALTITUDE INDICATOR
SS 3 3.5			225 65BAR	0	KC-135A/E/R			PART REMOVED AND REINSTALLED AS CANNI
SS 2 1.5			226 46351	0	KC-135A/E/R			T/O 1:02 BOOM SIGNAL COIL INOP ON FIR
2 0.5			46782	0				T/O 1:05 CONSIDERABLE AMOUNT OF FUEL
2 2.0			63400	0				T/O 1:10 HAVE QUICK RADIO INOPERATIVE
2 1.5			73200	0				T/O 1:15 RADAR HAS ONE EXTRA RANGE RA
SS 2 1.0			227 61000	0	KC-135A/E/R			T/O 1:00 HG RADIO WON'T RECEIVE OR TR

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Acft Lndg Flt T.N. Code Time	MSN	MOUN	HUC	Qty	WRSK	MSL	Hsg DTG	REMARKS
SS 2 1.5	MAINTENANCE EVENT CONTROL NUMBER:	228	KKC-135A/E/R	0				T/0+0:20 #2 DIGIT FOR THE MODE 3/A SL
SS 2 4.0	MAINTENANCE EVENT CONTROL NUMBER:	229	KKC-135A/E/R	0				CENTER WING LINE VALVE LIGHT INOP IN
2 4.0		51EB0	0					COPILOT'S SLEW BUG MOVES LEFT WITH 00
SS 2 2.2	MAINTENANCE EVENT CONTROL NUMBER:	230	KKC-135A/E/R	0				#1 ENG OIL PRESSURE INDICATOR READS H
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER:	231	KKC-135A/E/R	0				T/0+0:01 #1 ENG OIL PRESSURE READ BET
2 1.0	5841010537874 INDICATOR	722E0	1					T/0+1:00 RADAR SHOWS A MIRROR IMAGE 8
2 1.0	5841010781344 ELEMENT	721E0	1					T/0+1:30 LED ELEMENT ON DOPPLER GUIDA
SS 2 6.8	MAINTENANCE EVENT CONTROL NUMBER:	232	KKC-135A/E/R	1				T/0+0:30 PILOT'S ADI GYRO FLAG APPEAR
2 5.7	6615005506628 HD1 GYRO	51142	1					T/0+1:00 NAV'S SCOPE DISPLAYED SPECKS
SS 2 2.2	MAINTENANCE EVENT CONTROL NUMBER:	233	KKC-135A/E/R	0				T/0+1:00 HF RADIO INOPERATIVE
SS 2 0.2	MAINTENANCE EVENT CONTROL NUMBER:	234	KKC-135A/E/R	0				RIGHT SIDE HYD AUXILIARY PUMP FAILS TO
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER:	235	KKC-135A/E/R	1				HF COUPLER FAULT LIGHT REMAINS ON AFT

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Acft Lndg Fix T.N. Code Time	SS	NSN	MOON	HUC	Qty	MRSK	MESL	Msg DTG	REMARKS
2 2.0	5821012587579	RCVR/TRANSMITTER	236	610A0	1	KC-135A/E/R			T/O 0:30 HF COUPLER LIGHTS CAME ON WH
2 1.0			237	51E00	0	KC-135A/E/R			T/O 0:05 FSR/CAS HAS A BIT BALL INDIC
2 11.5	6615006367399	GYRO	238	52110	1	KC-135A/E/R			T/O 0:30 AUTOPILOT AILERON AXIS DID N
	1560000987239FL	AMPLIFIER	5211A	1					
2 2.0			239	52110	0	KC-135A/E/R			T/O 0:40 AILERON AXIS ERRATIC
2 1.0			240	46811	0	KC-135A/E/R			T/O 1:00 HYD FLUID LEAKING FROM BOOM
2 3.0			722L0	0					T/O 0:10 APN-59 RADAR TILT UNRELIABLE
2 1.3			47130	0					T/O 0:30 INSTRUCTOR'S OXYGEN ON/OFF L
2 2.8			241	72VR0	0	KC-135A/E/R			T/O 0:40 PILOT COULD NOT SELECT INS H
2 1.8	5826010124864	CONVERTER	242	71280	1	KC-135A/E/R			T/O 0:01 TACAN SELF TEST FAILED
2 1.0			46775	0					T/O 1:00 BOOM HAS LOUD BANGING NOISE
2 8.0	6615005269441	SYNCHRO	52135	1					T/O 0:45 AUTOPILOT AILERON AXIS NON F

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A/cft Lndg Fld F.N. Code Time	MSN	NOON	HUC	In Qty WRSK	MESL	Msg DTG	REMARKS
SS 2 2.8			44225	243	KC-135A/E/R	0	T/01 1:30 RECEIVER LIGHTS W/N GIVE "UP"
SS 2 12.0			52123	244	KC-135A/E/R	1	T/01 0:05 (REPEAT) RUDDER PEDALS FLUTT
2 3.2			63840	0		0	T/01 0:05 #1 COMM RADIO HAS STATIC CLI
2 2.8			51500	1		1	T/01 0:30 DNS DRIFT READS 10 DEGREES R
2 10.0			52123	1		1	T/01 4:15 ELEVATOR AXIS INOPERATIVE
SS 2 1.0			72180	245	KC-135A/E/R	0	P/F DOPPLER W/N INITIATE DURING PREFL
SS 2 0.2			64000	246	KC-135A/E/R	0	QUICK DON ON PILOT'S SIDE MICROPHONE
SS 2 1.5			71880	247	KC-135A/E/R	0	P/F PILOT'S INTERPHONE MONITOR COULD
SS 2 1.0			51840	248	KC-135A/E/R	0	T/01 2:00 NAV'S TEMP INDICATOR HAS 3-S
2 1.0			51500	1		1	T/01 1:00 FSAS DISPLAYING NO NAV FUEL
2 0.8			1114H	0		0	T/01 0:30 COPILOT'S #1 WINDSCREEN HAS
2 1.0			72200	1		1	T/01 1:00 NAV INS/DNS DISPLAY "H" INDI
SS 2 1.5			41218	249	KC-135A/E/R	1	T/01 0:05 COCKPIT TEMPERATURE CONTROL



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Acft Lndg Fix T.N. Code Time	NSN	NOON	HUC	Qty	In MRSK	MESL	Msg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS 2 1.0		MAINTENANCE EVENT CONTROL NUMBER:	250	72YB0	0	KC-135A/E/R			T/O+2:00 INS H/N TAKE TACAM UPDATE
SS 2 1.5		MAINTENANCE EVENT CONTROL NUMBER:	251	4514C	0	KC-135A/E/R			T/O+3:00 LOST LEFT HYD SYSTEM IN FLIG
SS 2 4.0		MAINTENANCE EVENT CONTROL NUMBER:	252	5242B	1	KC-135A/E/R			T/O+0:15 J4 COMPASS OFF 8° 6 DEGREES
		6615011564148 J4 GYRO	5242C	1					
		6605008329691 CONTROL PANEL	5242C	1					
SS 2 5.1		MAINTENANCE EVENT CONTROL NUMBER:	253	51E80	1	KC-135A/E/R			T/O+4:16 #1 MAIN TANK ENG MANIFOLD VA
2 21.0		661001227222 BULB	52123	1					T/O+1:20 AUTOPILOT ELEVATOR AXIS, WHE
		5306008892927 ELEV SERVO MOTOR	52132	1					
		6615005094814 FLIGHT CONTRLR	4215H	0					T/O+0:00 #2 BUS TIE TRIPPED UPON ENGI
SS 2 2.0		MAINTENANCE EVENT CONTROL NUMBER:	254	632HA	1	KC-135H/E/R			T/O+1:00 #2 COMM RADIO HAS INTERMITTE
		5821011948161 RCVR/XMITTER	632HA	1					
SS 2 0.8		MAINTENANCE EVENT CONTROL NUMBER:	255	23HAD	1	KC-135H/E/R			T/O+1:30 #1 ENG EPR GAUGE ROTATED APP
		6620000784470 TRANSDUCER	23HAD	1					
SS 2 7.5		MAINTENANCE EVENT CONTROL NUMBER:	256	52124	1	KC-135H/E/R			T/O+2:20 AUTOPILOT ELEVATOR AXIS WENT
		5306001511414 SERVO MOTOR	52124	1					
SS		MAINTENANCE EVENT CONTROL NUMBER:	257			KC-135A/E/R			

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A/cft Lndg T.N. Code Time	MSN	NOUN	HUC	In Qty HRSK	MESL	Hsg DTG	REMARKS
2 0.5	6615005892592	RECTIFIER	1208A	0			T/0+0:45 NAV APN-69 INOPERATIVE
2 0.5			52111	2			T/0+0:30 ELEVATOR AXIS DOES NOT RESP
SS 2 22.9			258	KKC-135A/E/R			T/0+0:15 INCOMING TRANSMISSIONS AND I
			6411D	0			
SS 2 0.5			259	KKC-135A/E/R			T/0+1:20 FSA DISPLAYED FMS FAIL ERROR
			51EC0	0			
SS 2 2.5			260	KKC-135A/E/R			T/0+1:00 PILOT AND NAV RADAR SHOWS TH
			72280	0			
SS 2 1.0			261	KKC-135A/E/R			T/0+0:01 PILOT'S COURSE KNOB ON FLIGH
			51RAD	0			
SS 2 1.0			262	KKC-135A/E/R			T/0+2:30 #2 MAIN FUEL TANK AFT BOOST
			51ER0	0			
SS 2 9.0			263	KKC-135A/E/R			T/0+0:30 COULD NOT PAINT APN-69 BEAC
			7208A	0			
SS 2 6.0			264	KKC-135A/E/R			#1 UHF INOPERATIVE
			63400	0			
SS 2 8.8			265	KKC-135A/E/R			T/0+0:03 APN-59 PICTURE AVAILABLE ONL
			72210	1			

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Acft Lndg Fix T.R. Code Time	NSN	NOUN	HWC	Qty	In MRSK	HESL	Msg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS 2 2.0		MAINTENANCE EVENT CONTROL NUMBER:	266	51116	0	KC-135A/E/R			T/010:10 NAV'S TRUE AIR SPEED INDICAT
SS 2 0.5		MAINTENANCE EVENT CONTROL NUMBER:	267	72YCO	0	KC-135A/E/R			T/013:00 NAV'S COU W/N TAKE WAYPOINT
SS 2 0.5		MAINTENANCE EVENT CONTROL NUMBER:	268	5131C 5241F	0	KC-135A/E/R			T/010:10 ALL FUEL FLOW GAUGES READ 1.0 T/010:30 AUTOPILOT W/N HOLD HEADING.
SS 2 1.0		MAINTENANCE EVENT CONTROL NUMBER:	269	65BBA	0	KC-135A/E/R			IFF W/N SELF TEST
SS 2 2.0		MAINTENANCE EVENT CONTROL NUMBER:	270	64110	0	KC-135A/E/R			T/010:30 INSTRUCTOR'S INTERPHONE PANE
SS 2 3.5		MAINTENANCE EVENT CONTROL NUMBER:	271	722E0 51142	0	KC-135A/E/R			T/010:05 RADAR SPIKES ABOUT EVERY 20 T/010:30 PILOT'S ADI SHOWED CONSTANT
SS 2 1.0		MAINTENANCE EVENT CONTROL NUMBER:	272	52113	0	KC-135A/E/R			T/010:45 AUTOPILOT ALLERON AXIS KNOB
SS 2 1.0	58260013-4537-1	MAINTENANCE EVENT CONTROL NUMBER:	273	5111E	1	KC-135A/E/R			T/010:10 PILOT'S RATE OF TURN FLAG RE

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Aircraft T.M. Code	Ln Fix Time	NSN	MOUN	HUC	Qty	MRSK	MESL	Msg	DTG	REMARKS
SS	2	1.5			274	(KC-135A/E/R)	0			T/013:00 COPILOT'S HSI HEADING FLAG C
SS	2	1.0			275	(KC-135A/E/R)	0			T/010:30 ALTITUDE HOLD DOES NOT HOLD
	2	2.5			52134		0			T/011:30 TACAN RED LIGHT CAME ON AND
					71280		0			
SS	2	0.5			276	(KC-135A/E/R)	0			T/010:30 COPILOT'S ALTITUDE HOLD ON F
SS	2	0.5			277	(KC-135A/E/R)	0			T/010:30 PILOT'S ADI GYRO FLAG IN VIE
SS	2	5.0			278	(KC-135A/E/R)	0			T/012:00 FLIGHT DIRECTOR ATTITUDE LIG
SS	2	0.2			279	(KC-135A/E/R)	0			T/011:00 PILOT'S ATTITUDE INDICATOR: SH
SS	2	10.8			280	(KC-135A/E/R)	1			T/010:15 RADAR PICTURE AT 50 NM RANGE
	2	1.8			72280		0			T/010:20 PILOT'S FLIGHT DIRECTOR GYRO
					51143		0			
SS	2	0.5			281	(KC-135A/E/R)	0			T/011:30 IFF/SIF GROUND STATION REPR
					6508A		0			

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Acft Lndg Fix T.N. Code Time	NSN	MOON	WUC	In Qty MKSK	MESL	Msg DTG	REMARKS
2 4.5			722X0	0			T/012:30 RADAR INOP WITH ZERO MAGNETI
SS 2 0.2			282 722X0	0	KC-135A/E/R		T/010:05 RADAR SYSTEM INOPERATIVE
SS 2 4.0			283 52420	0	KC-135A/E/R		T/011:20 COPILOT'S HSI COMPASS CARD L
SS 2 2.0			284 51000	0	KC-135A/E/R		T/015:30 PILOT'S FLIGHT DIRECTOR SHOW
SS 2 3.0			285 52411	0	KC-135A/E/R		T/010:30 N1 COMPASS LAGGED 8 DEGREES
SS 2 1.0			286 51142	0	KC-135A/E/R		T/012:00 PILOT'S ADI GYRO WARNING FLA
SS 2 8.0			287 722E0	0	KC-135A/E/R		T/011:10 RADAR PICTURE SPIKES INTERMI
SS 2 4.5			288 51343	0	KC-135A/E/R		T/010:30 COPILOT'S FREE AIR TEMP GAUG
SS 2 7.2			289 61000	0	KC-135A/E/R		HF RADIO HAS INTERMITTENT FAULT LIGHT

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Act'l Lndg Fix T.N. Code Time	NSN	NOUN	HUC	Qty	In WRSK	MESL	Msg DTG	REMARKS
SS 2 6.5			64110	290	0	KKC-135A/E/R)		T/011:45 890M RADIO SYSTEM HAD LOUD A
SS 2 8.5	5920010953319	AMPLIFIER	722F0	291	1	KKC-135A/E/R)		T/014:00 PILOT'S RADAR SCOPE HAD NO P
SS 2 2.2			64110	292	0	KKC-135A/E/R)		T/011:00 800M INTERPHONE SWITCH STICK
SS 2 0.2			51213	293	0	KKC-135H/E/R)		STANDBY COMPASS STUCK AT 240 DEGREE M
SS 2 4.0	5831005195883	RELAY	64110	294	1	KKC-135H/E/R)		INTERPHONE BOX CALL RELAY STICKS
SS 2 5.8			722F0	295	0	KKC-135A/E/R)		T/011:00 PILOT'S RADAR SCOPE WENT FUZ
SS 2 2.0			52135	296	0	KKC-135H/E/R)		T/011:00 AUTOPILOT VS MODE GIVES 4 DE
SS 2 1.0			71240	297	0	KKC-135H/E/R)		T/013:30 TACAN BROKE LOCK AND FAULT L
SS				298		KKC-135A/E/R)		

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Aircraft F.M. Code	Lnch Time	NSH	MOON	HUC	In Qty	MRSK	MSL	Hsg	DIG	REMARKS
2	0.5			72VH0	0					T/010:00 INS HAS EXCESSIVE DRIFT FULL
2	1.5			299	0					T/010:45 CENTER REPORTED COMM #2 TRAN
2	4.8			300	1					T/012:00 #2 COMM DOES NOT TRANSMIT ON
2	2.0			301	0					#2 COMM WON'T RECEIVE IN GUARD POSITI
2	0.2 0.5			302	0					T/010:10 AUTOPILOT FLIES IN A CONSTAN T/012:00 AUTOPILOT AILERON TURN KNOB
2	13.3			303	0					RADAR T-DECK MAGNETIC CURRENT INTERHI
2	0.5			304	0					T/010:30 COPILOT'S ANGLE OF ATTACK IN
2	1.0			305	0					T/010:30 AUTOPILOT VS MODE INOPERATIV
2	9.2			306	0					IFF/SIF MODE 4 CAUTION LIGHT W/H GO 0

=====

KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Airft Logd Fix I.N. Code Time	MSN	NOUN	HUC	Qty	In WRSK	HESL	Msg DTG	REMARKS
SS 2 1.0			307 65BAC	0		KC-135A/E/R		IFF/SIF CAUTION LIGHT W/N ILLUMINATE
SS 2 0.8			308 5131C	0		KC-135A/E/R		T/041:00 FUEL XFER AND FUEL XFER RATE
2 1.2			6320A	0				T/040:20 CREW CAN'T HEAR OTHER MEMBER
SS 2 0.5			309 72Y80	0		KC-135A/E/R		T/045:00 INS 20 NM OFF COURSE AFTER 6
SS 2 4.5			310 52123	0		KC-135A/E/R		T/040:30 AUTOPILOT ALTITUDE HOLD HAND
SS 2 5.5			311 52123	0		KC-135A/E/R		T/040:30 AUTOPILOT ELEVATOR AXIS OSCI
SS 2 0.5			312 5131C	0		KC-135A/E/R		T/044:00 ALL FOUR FUEL FLOW XMITTERS
SS 2 7.0			313 634C0	0		KC-135A/E/R		41 UHF W/N TRANSMIT
SS 2 2.5			314 722L0	0		KC-135A/E/R		RADAR TILT KNOB LOOSE ON CONTROL BOX



Acft	Lndg	Fix	HSN	NOUN	MUC	Qty	In	HRSK	HESL	Hsq	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
2	0.1		MAINTENANCE EVENT	CONTROL NUMBER:	315	0	0	0	0			T/0011:30 PILOT'S RADIO ALTIMETER LIGHT
2	1.5		MAINTENANCE EVENT	CONTROL NUMBER:	316	0	0	0	0			T/0010:20 H1 COMPASS 4 DEGREES IN ERROR
2	0.1		MAINTENANCE EVENT	CONTROL NUMBER:	317	0	0	0	0			T/0011:00 AUTOPILOT INDULCED PITCH OSCIL
2	1.0		MAINTENANCE EVENT	CONTROL NUMBER:	318	0	0	0	0			T/0010:10 PILOT'S COMMAND BARS INTERCH
2	1.0		MAINTENANCE EVENT	CONTROL NUMBER:	319	0	0	0	0			T/0010:30 COPILOT'S HEADING SLEW SWITCH
2	1.0		MAINTENANCE EVENT	CONTROL NUMBER:	319	0	0	0	0			T/0010:05 LEFT INBOARD FLAP INDICATOR
2	8.0		MAINTENANCE EVENT	CONTROL NUMBER:	320	0	0	0	0			T/0010:50 APN-218 DOPPLER HEAT INTO ME
2	0.5		MAINTENANCE EVENT	CONTROL NUMBER:	321	0	0	0	0			T/0012:50 AUTOPILOT ELEV ALTITUDE HOLD
2	0.5		MAINTENANCE EVENT	CONTROL NUMBER:	321	0	0	0	0			T/0013:00 PILOT'S HEADING FLAG ON HSI
2	9.0		MAINTENANCE EVENT	CONTROL NUMBER:	322	0	0	0	0			T/0014:00 APN-59 FAILED TO HAVE ANY PR

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KC-135 H/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft	Indy	Fix	NSN	MOUN	HUC	Qty	HRSK	HESL	Hsg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS	2	0.2			323	KC-135A/E/R	0				T/O 3:00 COPILOT'S NAV LOC/APP AUTO H
					51AB						
SS	2	1.0			324	KC-135A/E/R	0				T/O 0:05 FUEL FLOW READINGS LOW FOR A
					5131C						
SS	2	0.2			325	KC-135A/E/R	0				T/O 0:45 BLEED VALVE ON #3 ENG STICKS
					23H06						
SS	2	2.0			326	KC-135A/E/R	1				HF CONTROL ON/OFF SWITCH BROKEN
					61DC0						
SS	2	0.5			327	KC-135A/E/R	1				T/O 3:00 N1 & J4 COMPASSES READ 5 DEG
		1.5			51ABD						T/O 4:30 GUARD ON #2 COMM DOES NOT HO
		1.0			635H0						T/O 2:00 AILERON AXIS OF AUTOPILOT CA
					52121						
SS	2	3.5			328	KC-135A/E/R	0				#2 COMM TRANSMITS AND RECEIVES INTER
					632AB						
SS	2	0.8			329	KC-135A/E/R	0				T/O 0:01 COPILOT'S COMMAND BARS WENT
					51BH0						
SS	2	0.5			330	KC-135A/E/R	0				T/O 3:00 OFFLOAD TOTALIZER IS INACCUR
					5131C						

=====

KC-135 H/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Hcft	Lndg	Fix	NSN	NOUN	HUC	Qty	In	MESL	Hsq	DTG	REMARKS
Time	Code	Time	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS	2	1.5	MAINTENANCE EVENT CONTROL NUMBER: 6615005094801	GYRO	331	0	KC-135H/E/R				T/010:45 RUDDER AXIS OF AUTOPILOT COM
	2	0.5			52143	1					T/012:30 OFFLOAD TOTALIZER INOPERATIV
	2	0.8			5131C	0					T/010:55 AUTOPILOT ELEV AXIS CAUSING
					52111	0					
SS	2	4.0	MAINTENANCE EVENT CONTROL NUMBER:		332	0	KC-135H/E/R				P/F RADAR HAS INTERMITTENT SHEEP
					722A0	0					
SS	2	13.0	MAINTENANCE EVENT CONTROL NUMBER:		333	0	KC-135H/E/R				T/010:05 SEARCH RADAR NEVER REACHED B
					722L0	0					
SS	2	0.2	MAINTENANCE EVENT CONTROL NUMBER:		334	0	KC-135H/E/R				T/010:40 AUTOPILOT ALTITUDE HOLD VARI
					52143	0					
SS	2	0.5	MAINTENANCE EVENT CONTROL NUMBER:		335	0	KC-135H/E/R				T/010:05 AUTOPILOT AILERON AXIS UNUSH
					52111	0					
SS	2	5.8	MAINTENANCE EVENT CONTROL NUMBER:		336	0	KC-135H/E/R				T/010:01 IFF AC INPUT CIRCUIT BREAKER:
					658CA	0					
SS	2	1.0	MAINTENANCE EVENT CONTROL NUMBER:		337	0	KC-135H/E/R				T/013:00 #2 COMM RADIO HAS A LOUD SQU
					632HA	0					
SS	2	1.0	MAINTENANCE EVENT CONTROL NUMBER:		338	0	KC-135H/E/R				T/015:00 COPILLOT'S ATTITUDE WARNING A
					51N80	0					

=====

NC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft Lndg Fix T.N. Code Time	NSH	NOUN	HUC	Qty	In MRSK	HESL	Msg DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====
SS 2 4.0			339 51142	0	KC-135A/E/R			T/0+0:30 COPILOT'S ALTITUDE INDICATOR
SS 2 2.0			340 51142	0	KC-135A/E/R			T/0+0:30 PILOT'S ADI GYRO FLAG APPEAR
SS 2 3.0			341 61000	0	KC-135A/E/R			HF COUPLER LIGHT REMAINS ON AFTER SEL
SS 2 0.5			342 72210	0	KC-135A/E/R			T/0+0:10 APN-59 RADAR TILT UNRELIABLE
SS 2 0.5			343 71280	0	KC-135A/E/R			T/0+0:01 TACAN SELF TEST FAILED INFLI
SS 2 3.1			344 52144	0	KC-135A/E/R			AUTAPILOT AXIS RATE SENSOR HAS NO ROL
SS 2 8.0			345 71044	0	KC-135A/E/R			PILOT'S INTERPHONE VOLUME LEVEL HIGH
SS 2 4.0			346 52143	0	KC-135A/E/R			T/0+1:00 AUTOPILOT RUDDER AXIS OSCILL
SS			347		KC-135A/E/R			

===== KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0 =====

Acraft Logg T.N. Code	Fix Time	MSN	NOUN	HUC	In Qty WRSK	MESL	Hsg DTG	REMARKS
2	1.5			52122	0			T/010:05 RUDDER PEDALS FLUTTER WITH R
2	0.5			52123	0			T/014:15 AUTOPILOT ELEVATOR AXIS INOP
SS								
2	0.5			348	0	KC-135A/E/R		T/011:00 FSAS DISPLAYING NO NAV FUEL
2	0.5			51EE0	0			T/011:00 NAV INS/DNS DISPLAY "H" INDI
				72YCO	0			
SS								
2	4.0			349	0	KC-135A/E/R		T/010:15 J4 COMPASS 6 DEGREES IN ERRO
				5242C	0			
SS								
2	4.5			350	0	KC-135A/E/R		T/011:20 AUTOPILOT ELEVATOR AXIS MOUL
				52132	0			
SS								
2	2.0			351	0	KC-135A/E/R		T/011:00 #2 COMH HAS INTERMITTENTLY 6
				632NA	0			
SS								
2	5.0			352	0	KC-135A/E/R		T/011:30 AUTOPILOT ELEV AXIS WENT FUL
				52124	0			

## Appendix B: Information Guide

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## KC-135/A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE INFORMATION GUIDE (Hall, 1989:Ap B)

### Introduction

1. The KC-135A/E/R Aircraft Maintenance Database and its associated worksheets and instructions were developed to make response cell play more realistic during command post exercises. The database places aircraft availability at realistic levels without impeding other objectives at higher echelons of exercise play. Additionally, realistic demands for aircraft parts are generated. The database information can be viewed as the information a battle staff would normally receive from the aircraft readiness center.

2. Information for the database was derived from data gathered during routine European tanker task force flying missions. Therefore, the data is based upon actual aircraft maintenance in support of flying operations. The database can be expected to produce results consistent with realistic occurrences. However, the results during your particular exercise will be dependent upon the taskings you receive.

3. The information and guidance on the following pages is to help you use the database as well as determine other factors which have a direct bearing on your aircraft availability and parts requirements.

4. Remember that you will face many problems and challenges in this exercise. In most cases, they are the same problems and challenges that your unit could expect to face in an actual deployment. Work as diplomatically as possible with your host unit to resolve problems. The database should help you keep your thoughts focused along these lines. Make sure you share the things you learn with your home unit so they can be better prepared for deployment.

### Overview

This information guide will help you:

1. Understand the structure and use of the database.
2. Initially set up your aircraft worksheets.
3. Document the CPX MX Worksheets 1 and 2.
4. Determine aircraft downtime and availability.
5. Determine parts required and their availability in the war readiness spares kit (WRSK).



## I. The Database Format

The columns of the database are as follows:

**Maintenance Event Control Number** - The control number is used to identify a "maintenance event" for a particular aircraft on the CPX MX Worksheets 1 and 2. A maintenance event includes all the lines in the database associated with a specific maintenance event control number. It also provides a means of record keeping for later analysis.

**Acft T.N.** - The aircraft tail number to which the maintenance event is assigned is entered in this block (by the user).

**Lndg Code** - Identifies the maintenance condition of an aircraft returning from a mission.

Code 1: Aircraft/system(s) fully operational. Aircraft is landing with no known discrepancies which would adversely affect performance of the aircraft/system(s).

Code 2: Aircraft/system(s) has/have minor discrepancies which may affect operating performance but will generally not preclude the aircraft from flying another mission prior to repair.

Code 3: Aircraft/system(s) has/have discrepancies which render the aircraft and/or system(s) unusable. Generally, aircraft are not flown until Code 3 discrepancies are repaired.

**Fix Time** - The time needed to repair a discrepancy listed in the database. The times listed do not include normal refuel, phase, HPO, preflight/thruflight/postflight inspection. (Time in hours to the nearest tenth) The overall fix time is identified by an asterisk in the Lndg Code column when an aircraft has Code 3 discrepancies.

**NSN** - The national stock number (NSN) of the needed repair parts.

Noun	-	The nomenclature of the needed repair part.
WUC	-	The work unit code (WUC) associated with the major repair part or system.
Qty	-	Quantity of repair part(s) if needed.
In WRSK	-	For the user to identify if the repair part is available in the WRSK (Yes/No).
MESL	-	For the user to identify whether the affected system is on the minimum essential systems list (MESL) if the part is not on-hand (Yes/No).
Msg DTG	-	For the user to write the date-time-group of the message requesting a part not available in the WRSK.
Remarks	-	To provide a short, general description of the discrepancy associated with a maintenance event.

## II. Aircraft Inspections

1. Phase Inspection. Aircraft maintenance and scheduling is based, in part, on flying time and phase hours. Maintenance is a cyclic process and a phase inspection starts the cycle. A phase inspection is accomplished every 200 flying hours. In the "real world" environment, an aircraft which has flown a 5-hour mission immediately following a phase is counted as having 195 hours remaining until the next phase. However, in the interest of "simplicity" for this exercise, we will accumulate flying/phase hours (i.e.  $0 + 5 = 5$ ,  $5 + 5 = 10$ , etc).

a. When 200 hours have been accumulated on an aircraft, you remove the aircraft from the flying schedule (line-up) and perform a contingency phase inspection. Contingency phase inspections are much different from those accomplished during peacetime. The contingency phase is an abbreviated phase inspection to inspect critical items crucial to combat mission effectiveness. The amount of time required to perform each phase inspection is determined by using Table B-1. Because phase inspection teams improve their proficiency with each successive contingency phase inspection, each phase takes less time to perform than the last until 31 hours is reached.

(1) You also have a 10 percent (20 hour) leeway on when to accomplish the phase which helps streamline the scheduling process. In other words, depending on mission requirements, you can accomplish the phase inspection any time between the 180 and 220-hour point. However, you should attempt to accomplish the phase as close to the 200-hour point as possible.

(2) To further explain, an aircraft could be tasked to fly a 8-hour mission if it had 220.0 or less hours accumulated since last phase. However, it would not be good scheduling practice to do so. Furthermore, if an aircraft lands with 220.1 hours accumulated since last phase, it is "GROUNDED" until the phase has been completed.

b. To improve your readiness and aircraft availability, ensure you stagger the phase hours of your aircraft. The phase inspection schedule can have dramatic effects on your aircraft availability and readiness, both good and bad. No two aircraft should be allowed to come due or be undergoing phase inspection at the same time, if at all possible. Generally speaking, you will not have the maintenance capability to phase more than one aircraft at a time. Plan

which aircraft you will fly to keep your overall phase schedule balanced.

c. Upon completion of a phase inspection, you must "reset the clock." This means the aircraft now has 0.0 phase hours accumulated. Remember to update the CPX MX worksheet.

d. Other maintenance actions can and should be accomplished concurrently with the phase inspection. However, some fix times from the database may exceed the phase time. When this occurs, use the longer database fix time. In either case, a 4-hour preflight/thruflight must be added to whichever time is longer to account for refueling, servicing, ground crew and air crew preflight times.

e. If an aircraft flush (emergency evacuation) is imminent, an aircraft can be considered flyable if it has been undergoing phase inspection for less than 2 hours. Furthermore, an aircraft overdue phase inspection can be launched in an emergency, assuming it is in flyable condition.

#### PHASE INSPECTION IN A NUTSHELL

- Due every 200 +/- 20 (180 to 220) flying hours (since last phase).
- Use Table B-1 to determine the time required to perform the phase inspection.
- Use the longer of either the 31-hour phase time or the database fix time and then add the 4-hour preflight/thruflight.
- Reset the aircraft's phase hours to 0.0 hours (accumulated).
- Aircraft is flushable if less than 2 hours from the phase start time.

Figure B-1. Phase Inspection In a Nutshell

f. Determine the time required to perform a contingency phase inspection from Table B-1. The table reflects that the phase team becomes more efficient each time they perform the inspection. For example, the first aircraft which comes due for a phase inspection will take the phase inspection team 72 hours to complete. However, when the second aircraft comes due for a phase inspection, it will take the team only 59 hours to perform, and so on. The sixth phase inspection and all others will take the team 31 hours to perform.

TABLE B-1  
CONTINGENCY PHASE INSPECTION TIMES

Phases performed by the phase team	Time Required to Perform
1st	72.0 hours
2nd	59.0 hours
3rd	48.0 hours
4th	39.0 hours
5th	33.0 hours
6th and all other phase inspections performed	31.0 hours

2. Hourly Post-flight (HPO) Inspection. The HPO is another inspection that affects flying hour and maintenance scheduling.

a. The HPO is accomplished every 50 hours. However, no HPO is required at the 200-hour point because it is accomplished as a part of the phase inspection. A 10 percent (5 hour) leeway is also provided for this inspection providing a 45 to 55 hour window (since last inspection) in which to accomplish the inspection. In other words, the inspection can be performed after the aircraft has accrued 45 flying hours, but the aircraft cannot be launched with more than 55 flying hours since last HPO or phase until the inspection has been completed. This inspection requires 2 hours to complete.

b. The database fix time and the 4-hour preflight/thru-flight time is added to the 2-hour HPO.

#### HPO INSPECTION IN A NUTSHELL

- Due every 50 +/- 5 (45 to 55) flying hours (since last HPO).
- Takes 2 hours to complete.
- The database fix time and the 4-hour preflight/thruflight times are added to the 2-hour HPO.
- Reset HPO hours to 0.0 when:
  - An HPO inspection is completed.
  - A phase inspection is completed (HPO is integral part of phase).

Figure B-2. HPO Inspection In a Nutshell

### III. Aircraft Parts

1. Many assumptions have been made in the area of aircraft parts. Our objective is to drive demands for the critical parts reflected in the database. So that the database is kept to a manageable size, many less critical parts are not shown. The deployed unit has an extensive amount of bench stock with them.

2. Part(s) requirements are identified in the database by national stock number (NSN), noun (nomenclature), work unit code (WUC) and the quantity required. A WRSK (CSMS asset master file) listing identifies authorizations by stock number and WUC, and indicates the quantity authorized and quantity on-hand.

3. When a part or parts are identified in the database for a maintenance event (Code 2 or 3), the current WRSK listing for the deploying unit should be checked.

a. If the part is available in the WRSK, simply write "yes" in the "In WRSK" column of the database and consider the aircraft repaired within the specified database fix time.

b. If the part is not available in the WRSK, the appropriate Logistics Readiness Center (LRC) should be notified of the exercise part requirement via message. The NSN, noun, WUC and quantity are shown in the database. Post the message Date-Time-Group (DTG) in the "Msg DTG" column.

(1) Non-Essential System. If the system is not listed in the Minimum Essential Systems List (MESL, AFR 65-110/SAC Sup 1), or the system is Code 2, or there is a high probability the aircraft could complete its mission without the replacement part, fly the aircraft "as is". Do not cannibalize if nothing would be gained by doing so. Your goal is to maximize aircraft availability. See paragraph 5 for more discussion of the MESL.

(2) Essential System. If the system is essential, then cannibalization is probably in order. Refer to paragraph 5 for help in determining whether a system is essential in the conventional or SIOP role. Remember to consolidate cannibalizations to as few aircraft as possible. If the option to cannibalize is selected, the aircraft receiving the part can be considered flyable at the end of its database fix time.

(3) Make sure cannibalization actions are shown on the CPX MX Worksheets and the database. This way you

will know exactly what has been cannibalized from an aircraft and can better track the MICAP condition. A MICAP condition exists when the non-availability of a part renders an aircraft or system out of commission for its intended purpose.

(4) Consider the "donor" aircraft flyable when notified by the LRC that the MICAP is satisfied and the database fix time has elapsed. If the LRC fails to notify you of the delivery date for a MICAP part, consider the delivery date of the part to be 7 days from date and time the aircraft was declared MICAP.

4. Update the quantities on the WRSK listing and keep them current. When parts are used out of the WRSK, reduce the on-hand quantity by the number taken (in pencil). Likewise, when items are received, show the appropriate quantity increases.

5. The MESL excerpt from AFR 65-110/SAC Sup 1, Attachment 1 is included in your response cell kit to help you determine whether or not an aircraft must have a particular system operational to fly an air refueling mission. This determination is necessary because there are many Code 3 discrepancies which may, in fact, be flyable.

a. When a question arises about whether an aircraft can be flown without replacing a part which is zero balance in the WRSK:

(1). Get the first two digits of the WUC of the part identified in the database. These two digits correspond with the digits in the "WUC" column in the MESL listing.

(2). Next, follow the row across the page to the "Conventional" column or "SIOP" column. An "X" in the appropriate column indicates that the system needs to be operational to fly the conventional or SIOP mission. When a number is listed in parentheses, go to the footnote with that number. The footnote will tell you what the system must be capable of in order to be considered flyable.

b. It is important that operations and logistics personnel discuss system requirements when there is any question about the flyability of an aircraft for discrepancies where a replacement part is not available. Many work-arounds must be used in a time of conflict. Consider the feasibility of various alternatives to the problems. You may find, however, that cannibalization may be the only viable option.



#### IV. Initial Forms Set-up

1. All entries should be made in pencil so changes can be made quickly and easily.

2. Figure B-3 shows the preferred charting symbols and sample documentation for CPX MX Worksheets 1 and 2.

3. CPX MX Worksheets 1 and 2 are almost identical. CPX MX Worksheet 2 is simply an extension of CPX MX Worksheet 1 without the STARTEX (Start Exercise) data section.

4. CPX MX Worksheet 1 - STARTEX Data Section:

a. From the aircraft listing provided in your response cell bag, enter the aircraft tail numbers in the 'Acft T.N.' column and each aircraft's hours in the 'Acft Hrs' column.

b. Determine and enter each aircraft's STARTEX phase and HPO hours from Table B-2 as follows:

(1) Go horizontally across the top of Table B-2 to the column which matches the number of primary aircraft assigned (PAA) for your location. Then proceed down the column transcribing the phase and HPO hours for each aircraft to the STARTEX data section of the CPX MX Worksheet 1. The numbers were selected at random from uniform distributions to establish a standardized starting basis for exercise play.

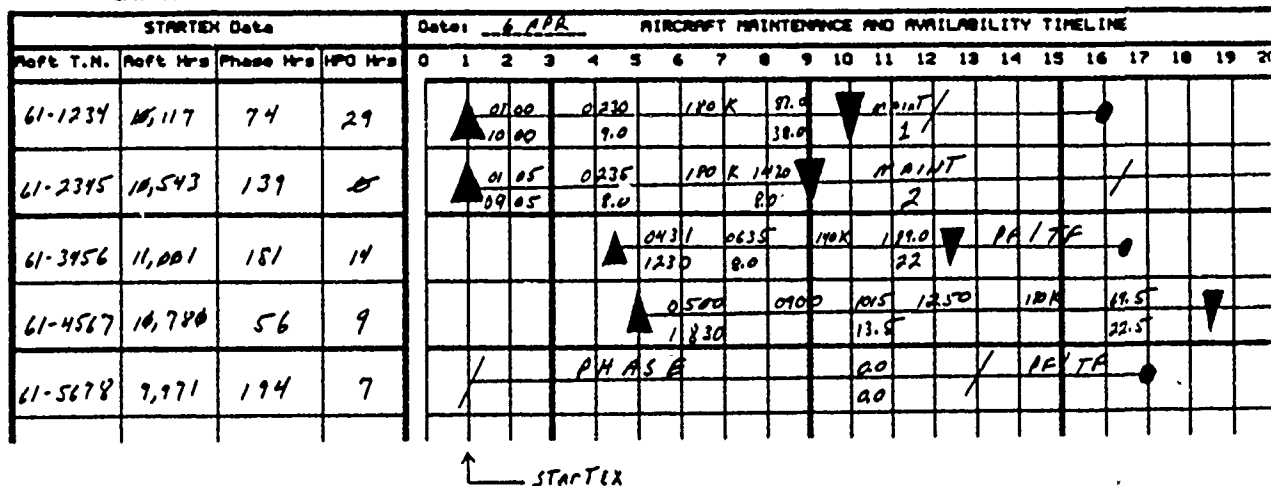
(2) Improve your overall readiness by performing phase inspections or HPOs, as appropriate, at STARTEX on aircraft which are above the lower hour limits for the inspections to be performed (if your taskings will allow).

5. CPX MX Worksheets 1 and 2 - Timeline Section:

a. Post the date at the top of the worksheet.

b. Each number running across the top represents an hour on the 24 hour clock.

c. Document activity in this section using the symbols and example shown in Figure B-3. The best procedure is to tape these forms together to create a continuous horizontally-running scroll with the date at the top of each form.



## KEY TO TIMELINE DOCUMENTATION

(Sched T.O.) (ARCT) (Fuel Load) (Phase Hours) (Type Maintenance)



(Sched Lndg) (Sortie Times) (HPO Hours) (Maint Event Control Number)

### KEY SYMBOLS

- ▲ - Aircraft Launch
- ▼ - Aircraft Landing
- - Aircraft available for tasking
- - Aircraft in NMC/ Cann Status
- A - Aircraft Attrited (Air Loss)
- G - Aircraft Attrited (Ground Loss)

### TIMELINE LENGEND

Sched T.O. - Scheduled Takeoff Time  
 Sched Lndg - Scheduled Landing Time  
 ARCT - Air Refueling Control Time  
 Fuel Load - Fuel Load Required for Mission  
 Sortie Time - Duration of Sortie in Hours  
 Phase Hrs - Phase Inspection Hrs Accum.  
 HPO Hrs - Hourly Postflight Hrs Accum.  
 Type Maint - Type of Maint. Being Performed  
 Maint Event Control Number - (From Database)  
 PF/TF - Preflight/Thruflight

Figure B-3. Timeline Documentation and Special Symbols

TABLE B-2

## AIRCRAFT PHASE AND HPO TIMES AT STARTEX (Accumulated Hours)

Acft Line #	5 PAA		6 PAA		7 PAA		8 PAA		9 PAA		10 PAA		11 PAA		12 PAA		13 PAA		14 PAA		15 PAA	
	PH	HPO	PH	HPO	PH	HPO	PH	HPO	PH	HPO	PH	HPO	PH	HPO	PH	HPO	PH	HPO	PH	HPO	PH	HPO
1	81	10	12	2	166	15	167	25	129	22	105	30	156	7	180	4	64	14	125	28	14	8
2	29	22	76	29	39	46	194	1	73	6	47	24	189	6	48	19	196	6	89	26	102	30
3	5	24	89	32	42	48	48	33	144	11	150	14	61	27	23	16	191	30	78	4	166	1
4	179	42	156	48	47	39	188	27	101	48	53	8	99	18	187	13	133	25	127	13	55	49
5	115	37	164	9	185	6	69	32	189	33	183	3	113	17	99	33	196	38	65	44	54	3
6			186	28	75	14	41	21	40	46	170	33	125	49	56	18	110	0	33	29	110	23
7					104	36	143	12	23	22	45	10	168	48	147	20	126	27	35	17	62	35
8							174	40	16	28	130	7	147	31	126	31	92	15	180	5	127	46
9									148	2	25	42	86	23	20	16	41	39	23	18	143	50
10											173	16	197	42	154	19	142	18	197	24	69	36
11													59	9	143	13	41	38	104	14	150	34
12															172	47	147	18	94	45	24	32
13																	48	36	103	18	70	15
14																			71	47	10	48
15																					23	12

## V. At STARTEX

1. During the exercise, please make comments directly on the database, worksheets and information guides where the comments apply. As you find problems or have suggestions for improving these documents, please write them down. This is probably the best and easiest way for us to know how to make genuine improvements to the system.

2. Upon initiation of flying activity (STARTEX), the following procedures will be used:

a. Plotting Sorties. When mission taskings are received and mission planning is complete, plot the sorties on the CPX MX Worksheets 1 and/or 2 using the symbols and charting technique shown in Figure B-3. The tanker planner will provide you with the scheduled takeoff and landing times, air refueling control time (ARCT), and sortie duration. You will be concerned with four types of times when plotting the aircraft timelines: 1) sortie time, 2) phase and/or HPO times when applicable, 3) fix time, and lastly 4) preflight/thruflight times. The 4-hour preflight/thru-flight is used to account not only preflight/thruflights/postflights, but also refueling, and servicing.

(1) Determine which aircraft you will fly. Then, on the CPX MX Worksheet 1, draw an up-triangle (takeoff) at the takeoff time and a down-triangle (landing) at the landing time of each aircraft you select to fly. Connect the triangles with a straight-line (timeline). Above and below the timeline post the scheduled takeoff and landing times, ARCT, and sortie duration as shown in Figure B-3.

(2) Determine each aircraft's accumulated phase and HPO hours by adding the sortie duration to the previous hours accumulated and enter the totals on the timeline as shown in Figure B-3.

b. Plotting Maintenance Events. Starting with the first aircraft to land:

(1) On the CPX MX Worksheet 1 or 2, if any inspections (HPO or Phase) are due, extend the timeline from the landing symbol (down-triangle) for the proper number of hours and end the line with a slash. Identify the type of inspection above the line and reset the appropriate hours to 0.0. Show phase hours above the line and HPO hours below the line.

(2) Next, go to the first unassigned maintenance event in the database. A maintenance event is defined as all the lines of the database associated with a specific "maintenance event control number". The maintenance event is unassigned until an aircraft T.N. is posted in the "Acft T.N." column in the database.

(3) Post the tail number of the landing aircraft in the Acft T.N. column on the database.

(4) From the database, we select the longest "Fix Time" associated with a Code 3 discrepancy. This is easily identified by an asterisk in the "Lndg Code" column. The hours in the fix time column following the asterisk will be the maintenance fix time for the whole aircraft. Extend the timeline for the fix time hours and post the "maintenance event control number" below the timeline as shown in Figure B-3. If there are no Code 3 discrepancy's listed, then no fix time hours are plotted. This is because the aircraft is "mission capable" even with Code 2 discrepancies. However, the maintenance event is still assigned to that aircraft and parts are consumed.

(5) Finally, extend the timeline to show the 4-hour preflight/thruflight time and label it "PF/TF". At the end of the timeline accounting for PF/TF, place a circle symbol (aircraft available for tasking) as shown in Figure B-3.

(6) Repeat the above steps each time a mission tasking is received. When plotting timelines and you come to 2400 hours on one CPX MX worksheet, continue the plotting at 0000 hours on the succeeding CPX MX worksheet. You will find after a little practice these procedures go very quickly and smoothly.

(7) Once the plotting is complete, it is easy to provide the response cell team chief with projected aircraft availability for each tasking period. If there are no entries on the timeline to the right of a circle, the aircraft is available for tasking beginning with the period following the one in which the circle is located.

c. Next, the availability of any needed parts shown in the database are checked using the current home unit WRSK listing. Procedures in the preceding "Aircraft Parts" section should be followed. Ensure the appropriate LRC is notified via message of parts shortages. Post the message date-time-group (DTG) to the database in the column titled

"Msg DTG" and monitor status. If an aircraft is not mission capable (NMC) because it is in "Cann" status, draw the box symbol shown in Figure B-3 on the timeline at the time the aircraft goes into NMC/Cann status.

d. From time to time you will receive Master Scenario of Events Listing (MSEL) inputs. Some of the inputs will affect your aircraft operations. When inputs are based on time, use the longer of either the MSEL input or the database fix time, when applicable. If a conflict arises about which procedures to follow, the MSEL inputs and tasking agency communications take precedence over the aircraft maintenance database. Don't confuse MSEL with MESL. The MESL is the Minimum Essential Systems List covered in Section III.

e. Database used up? If all maintenance events are used in the course of the exercise, simply start over again starting at maintenance event control number 1.

#### WORKSHEET PLOTTING IN A NUTSHELL

- Refer to Figure B-3 for sample.
- Plot launch and landing symbols at the scheduled takeoff and landing times. Connect with a straight-line (timeline).
- Post scheduled takeoff and landing times, ARCT, and duration above and below the timeline.
- Post new phase and HPO times by adding sortie duration to previous times.
- Extend timeline for inspections, if due.
- Post the aircraft T.N. to the database for the first unassigned maintenance event in the database.
- On the CPX MX Worksheet, extend the timeline plot for the fix time hours to the right of the asterisk (in the Lndg Code column) for that maintenance event.
- Post the maintenance event control number below the timeline as shown in Figure B-3.
- Extend timeline plot for the 4-hour preflight/thruflight. Post a circle at the end of the timeline.
- Check availability of needed parts in WRSK and reflect the consumption.
- Repeat above steps for each aircraft.

Figure B-4. Worksheet Plotting In a Nutshell

## VI. During the Exercise

1. Special Database Events. To enhance exercise realism, late takeoffs, and air aborts are incorporated into the structure of the database.

a. Late Takeoffs. Late takeoffs are identified in the remarks column in the Database. The amount of time the aircraft is delayed for takeoff is also identified. From this information, operations personnel will be able to determine if the aircraft can satisfactorily make its timing. If it cannot, the mission is cancelled, unless earlier provisions were made for a backup spare aircraft.

b. Air Aborts. Air aborts are also identified in the remarks column in the Database. The T/O + time of the abort is also identified. From this information, operations personnel can determine if the mission was effective. To determine the landing time of the aircraft, simply multiply the T/O + time of the abort by 2 and add that time to the original takeoff time. All other lines in the maintenance event apply upon landing.

2. Attrition. If you are informed that an aircraft has been lost, mark the time and date the aircraft was lost on the CPX MX Worksheet. Place the appropriate attrition symbol at that point on the timeline and then line out the remainder of the row for that aircraft.

3. Additional/Replacement/Transit Aircraft. If additional, replacement, or transit aircraft are received by your unit, handle them as follows.

a. Add the tail number of the additional and/or replacement aircraft on the next open line on the CPX MX Worksheet 1 in the "Acft T.N." column.

b. Determine the phase and HPO hours for each of the new aircraft by referring to Table B-2. Simply, start over at the top of the appropriate column and transcribe the hours to the CPX MX Worksheet.

c. Determine the landing condition from the next unsigned maintenance event and plot the timeline for each aircraft using the procedures in the preceding "AT STARTEX" section.

4. Flow of Events. As the exercise play progresses, keep the following in the back of your mind. When flying actual combat missions and logistically supporting those opera-



tions, few things ever go as planned. You can be sure you need to expect the unexpected. Think and talk together about the factors that influence a deployed unit's operations which go beyond the scope of this database. For example, "How much time does it take to change fuel loads? What would you do if there was not enough time? What code three discrepancies are actually flyable? Can a lost capability on one aircraft be compensated by another aircraft if flying in cell?" and so on. These are worthwhile considerations to think about in the course of the exercise.

5. Playing Multiple Locations. If you are responsible for more than one location during the exercise:

- a. Keep a separate set of CPX MX Worksheets for each location.
- b. Use a separate database for each location.
- c. Do not intermix events between locations.

## VII. At ENDEX

No aircraft maintenance database can be totally free of problems and certainly this one is no exception. Therefore, we would like your inputs on how the database worked and how you think it can be improved. Please take the time to complete the Database Evaluations. Areas for your comments may include the content and format of the Database, the CPX MX Worksheets, the procedures for using the database in the Information Guide and any suggestions you may have to improve exercise play from the logistics perspective. The

are included in this package.

ur participation and cooperation.

# Appendix C: Practice Database

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

For Use During Training Sessions Only

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A/cft Lndg Fix T.N. Code Time	SS	NSN	MAINTENANCE EVENT	CONTROL NUMBER:	QTY	HRSK	MSG DTG	REMARKS
2 4.0	SS	1680006566170FL	ROOM M022LE	1 QNC-135A/E/R	1			P/F 800H SIGNAL COIL CHECKS OPEN
2 12.0	SS	6610001553519	PILOT TUBE	51156	1			T/O+4:00 PILOT'S AIRSPEED INDICATOR U
3 12.0	\$	1650003285725	FWD R/R PUMP LN	2 QNC-135A/E/R	1			P/F HVD FLUID FOUND IN FORWARD BODY F
2 6.5	SS	6610004631865	ALTIMETER	3 QNC-135A/E/R	1			T/O+1:00 PILOT'S ALTIMETER W/N RESET
2 3.0	SS	5831005384250	CONTROL BOX	4 QNC-135A/E/R	0			P/F PILOT'S INTERPHONE YOKE AND NUSEH
2 2.0	SS	6240002839598	LIGHT	46350	0			T/O+0:10 SIGNAL COIL TEST MEYER INOPE
2 5.4	SS	6240002839598	LIGHT	5241F	0			T/O+1:00 M1 COMPASS 3 DEGREES IN ERRO
2 1.2	SS	6240002287130	LIGHT	53HAK	0			T/O+4:55 #3 ENG RPM BELOW IDLE WITH T
2 4.5	SS	5831005384250	CONTROL BOX	5 QNC-135A/E/R	1			T/O+0:15 PILOT'S INTERPHONE CUTS OUT
2 4.0	SS	6240002839598	LIGHT	44266	1			T/O+4:00 RIGHT MAIN LANDING GEAR LIGH
2 2.0	SS	6240002287130	LIGHT	44225	1			T/O+2:00 PDI CENTER HOLD LIGHT OUT ON
2 2.5	SS	6610012278781	FUEL NGHT CAPTR	6 QNC-135A/E/R	1			T/O+0:30 FSA DISPLAYED FUEL MGMT SVST
2 2.0	SS	6610011464953	FSAH CAPTR	51EAO	1			T/O+2:30 BOTH HSI HEADING SET MARKERS
2 2.0	SS	5826001345974	%LEW COUPLER	51AJ0	1			
	SS		MAINTENANCE EVENT CONTROL NUMBER:	7 QNC-135A/E/R				

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MC-135 H/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft Lndg Fix T.N. Code Time	NSN	MOUN	HUC	Qty	In HRSK	HESL	Hsg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
2 2.0	6615005350179	COUPLER	52113	1					T/O 0:45 AILERON AXIS OF AUTOPILOT W/
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER: 3 KC-135A/E/R -66750 0								
SS * 3 3.0	MAINTENANCE EVENT CONTROL NUMBER: 9 KC-135A/E/R								
2 1.0	3010007395580HS	FLEX SHAFT	42196	1					#3 ENG CSD SHAFT SHEARED
	3010007395580HS	FLEX SHAFT	42196	1					T/O 4:30 #3 GENERATOR QUIT
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER: 10 KC-135A/E/R								
2 2.0			-6822	0					P/F BOOM SIGHTING DOOR HOSE FITTING L
			5241F	0					P/F N1 COMPASS DIRECTIONAL GYRO HEADI
SS * 3 0.5	MAINTENANCE EVENT CONTROL NUMBER: 11 KC-135A/E/R								
2 3.5	6615005892532	AMPLIFIER	4215H	0					#1 GENERATOR HAS NO LOAD
2 2.5	6615005561979	CONTROLLER	52111	1					P/F AUTOPILOT AILERON AXIS ENGAGES BU
2 2.3	5939008671413	PCVR/AMPLIFIER	52134	1					T/O 0:30 ALTITUDE HOLD DOES NOT MAINT
			712H0	1					T/O 1:30 TACAN INOPERATIVE
SS 2 3.0	MAINTENANCE EVENT CONTROL NUMBER: 12 KC-135A/E/R								
			-6856	0					T/O 2:00 WHEN BOOMER TRIGGERED DISCON
									TO DISCONNECT THEN TO READY
SS * 3 46.0	MAINTENANCE EVENT CONTROL NUMBER: 13 KC-135A/E/R								
2 3.7	5826001345977	ADI	-19421	0					T/O 0:40 #2 ENG FIRELIGHT ILLUMINATED
			51HAB	1					T/O 0:10 PILOT'S RGA GAVE EXCESSIVE C
SS	MAINTENANCE EVENT CONTROL NUMBER: 14 KC-135A/E/R								

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KC-135 H/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acraft Log	Fix	T.N.	Code	Time	NSN	NOUW	MUC	In	Qty	MRSK	HESL	Hsg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
2	3.0						46850	0						T/040:50 BOOM FIRES THROUGH TO A DISC
SS														
2	8.5						23EE0	0						T/040:10 #3 THROTTLE SETTING 1 1/2 KM
2	3.0						46840	0						T/042:00 BOOM HOIST MOTOR ALLOWS BOOM
SS														
2	1.0						64112	0						T/043:00 COPLOT'S INTERPHONE SWITCH
SS														
2	0.8						44225	0						T/041:30 PDI LIGHTS FOR TELESCOPING H
2	1.0						11143	0						T/040:30 COPLOT'S #2 WINDOW MAKES WH
SS														
2	0.5						11443	0						T/041:00 HEAVY ICE BUILD-UP ON SIGHT
SS														
2	1.5						51800	1						T/040:05 COPLOT'S ANGLE OF ATTACK IN
2	4.5						72HAC	1						T/040:30 ASQ-15 SYSTEM H/N HOLD PRESS
2	10.2						4215H	1						T/040:10 ELECTRICAL POWER SURGED IN A
2	2.0						4215L	1						T/041:55 PILOT'S RIGHT BRAKE PEDAL MA
2							1368A	1						
SS														
2	0.5						11139	0						T/044:40 STUD ON CREW ENTRY HATCH BRO
2	1.0						63X00	0						P/F PILOT'S RADIO RECEPTION HAS LOU

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS. DATABASE Version 1.0

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Acft Ldg Fld F.N. Code Time	MSG	NOON	HUC	In Qty WRSK	MSG DTG	REMARKS
SS	2	1.2				
SS	2	3.0	1640003711772	21 (KC-135A/E/R)	51BEO 0	T/040:20 PILOT'S ANGLE OF ATTACK INDI
						T/040:25 #1 GENERATOR INOPERATIVE
SS	2	2.0		22 (KC-135A/E/R)	72YBO 1	T/046:30 INS 20 NM OFF COURSE AFTER 6
SS	2	2.0		23 (KC-135A/E/R)	51142 1	T/040:30 PILOT'S ATTITUDE INDICATOR 0
						T/040:30 AUTOPILOT ALTITUDE HOLD HAND
SS	2	26.0		24 (KC-135A/E/R)	52137 1	T/040:30 AUTOPILOT ELEVATOR AXIS OSCI
SS	2	1.5		25 (KC-135A/E/R)	51BEO 0	T/040:20 COPILOT'S ANGLE OF ATTACK 0A
						T/040:45 #1 ENG W/N REACH HRT AT TEMP
						T/040:45 #2 ENGINE W/N ACHIEVE HRT AT
						T/040:20 #4 THROTTLE TOO FAR AFT OF 0
						T/040:50 APN-218 DOPPLER WENT INTO ME
						T/041:00 PDI ELEVATION LIGHTS REPORTS
						T/041:00 BUBBLES IN BOOM SIGHTING WIN
SS	2	2.2		26 (KC-135A/E/R)	52124 1	T/044:45 STAB TRIM STOPPED WORKING IN

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Acft Lndg Fix T.N. Code Time	NSN	NOUN	HUC	Qty	In MRSK	MESL	Hsg DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====
SS 2 4.0	MAINTENANCE EVENT CONTROL NUMBER: 1680006566170FL	BOOH NOZZLE	27 46771	1	KC-136A/E/R			T/O+1:00 AFTER CONTACT WITH RECEIVER
SS 2 4.2	MAINTENANCE EVENT CONTROL NUMBER: 6610012278781	COMPUTER	28 51EC0	1	KC-135A/E/R			T/O+0:01 DURING CLIMBOUT FSA/CAS 1CDU
2 17.9	1650008564613	CSD	42194	1				T/O+0:45 SEVERE KMS LOAD SHAPPING NOT
2 2.0			72200	0				T/O+1:00 PADAR HEAK AND TARGET FUZZY
2 3.0			13000	0				T/O+5:00 WARNING HORN SOUNDED WITH TH
2 6.2			138A0	0				AIRCRAFT REQUIRES JACKING TO TROUBLE
SS 2 6.0	MAINTENANCE EVENT CONTROL NUMBER: 5930010853351	AIR FLOW SENSOR	29 72YK0	1	KC-135A/E/R			T/O+0:35 INS LOW AIR LIGHT ON
2 0.5			51515	0				T/O+1:00 #3 FUEL GAUGE SHOWS ERRATIC
2 1.0	6610000848695	ROU	516E0	1				T/O+0:10 FSA/CAS ROU W/N DISPLAY CLIN
2 1.0			51E00	0				T/O+1:30 FSA/CAS DATA PG 2 TRUE AIR S
2 2.0			467SS	0				T/O+1:30 BOOH TRAILED AT 33-34 DEGREE
2 1.0			51516	0				CENTER WINGS & #4 MAIN TANKS READING 1
SS 2 0.2	MAINTENANCE EVENT CONTROL NUMBER:		30 51131	0	KC-135A/E/R			FSA TRUE AIRSPEED INDICATOR REQUIRES
SS 2 33.5	MAINTENANCE EVENT CONTROL NUMBER:		31 51500	0	KC-135A/E/R			T/O+2:00 #4 MAIN TANK BURNS FASTER TH
2 7.0	6115001366617UH	GENERATOR	4215L	1				T/O+0:00 #3 GENERATOR W/N TAKE LOND F
2 2.0	16500008564613	CSD	42194	1				T/O+1:00 BOOH ACCUMULATOR DID NOT HOL
2 1.0			46810	0				T/O+0:00 PILOT'S RGA ROTATION COMM 40

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A/cft Ldg Fld T.N. Code Time	MSN	NOUN	HUC	Qty	In MRSK	MSL	Msg	DTG	REMARKS
2 1.0	5826001345977	ADI	51AB	1					T/013:00 COPILOT'S NAV LOC/APP AUTO H
SS	MAINTENANCE EVENT CONTROL NUMBER: 32 (KC-135A/E/R)								
2 2.0	6130000728567NT	PHR SUPPLY	5731C	1					T/010:05 FUEL FLOW READINGS LOW FOR A
2 4.0			632AB	0					T/010:30 #2 COMH RADIO SQUELCH SWITCH
2 6.0	5841008454243	GYRO	72240	1					T/012:00 APN-59 NAV RADAR STAB SWITCH
SS	MAINTENANCE EVENT CONTROL NUMBER: 33 (KC-135A/E/R)								
2 1.5	6620004459417	TRANSDUCER	23HAG	1					T/012:00 #3 EPR GAUGE SLOWLY BEGAN RO
SS	MAINTENANCE EVENT CONTROL NUMBER: 34 (KC-135A/E/R)								
2 3.0	2995006975995	SWITCH	23J99	1					T/012:00 #3 ENGINE LOW OIL PRESSURE L
2 1.0			469AA	0					T/013:30 FIVE SECOND DELAY OCCURED DU
2 1.0			46768	0					T/012:00 800H TRAILS AT 3 DEGREES RIG
2 0.5			63X00	0					T/012:00 #1 COMH RADIO SQUELCH CUTS O
2 1.0	5826001345981	HSI	51ABD	1					T/011:00 COURSE SELECTOR ON PILOT'S H
2 1.0	5399011341357	SWITCH	64115	1					T/011:00 HOT MIKE AT 800H STATION IN
2 4.0			51ABD	0					T/013:00 N1 & J4 READ 5 DEGREES IN ER
2 1.0	6615005350145	MOTOR	52121	1					T/012:00 AILERON AXIS OF AUTOPILOT IN
SS	MAINTENANCE EVENT CONTROL NUMBER: 35 (KC-135A/E/R)								
2 2.0			46755	0					T/010:30 800H TRAILS AT 33 DEGREE ELE
2 1.5			46771	0					T/010:30 800H NOZZLE HAS EXCESSIVE FU
2 3.0			46341	0					T/011:00 800H M/H FLY UP TO STOM POST
2 4.0			46851	0					T/010:40 A/R CONTROL CIRCUIT BREAKER
SS	MAINTENANCE EVENT CONTROL NUMBER: 36 (KC-135A/E/R)								
2 6.8	5330007024715	TRANSMITTER	23HAF	1					T/011:00 #4 ENG OIL PRESSURE GAUGE FL



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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft Logg Fix T.N. Code Time	NSN	NUUN	HUC	Qty	In WRSK	MESL	Msq	DTG	REMARKS
SS 2 15.0	MAINTENANCE EVENT CONTROL NUMBER: 5841001339183	RCVR/XMITTER	37	KC-135A/E/R	1				T/0+0:10 APN-59 RADAR PICTURE IS BLUR
SS 2 3.0	MAINTENANCE EVENT CONTROL NUMBER:		38	KC-135A/E/R	0				T/0+3:00 NAVIGATOR'S RADAR INOPERATIV
2 2.5			72000	0					T/0+3:00 RADAR TILT READS 10-15 LOW F
			72000	0					
SS 2 2.0	MAINTENANCE EVENT CONTROL NUMBER:		39	KC-135A/E/R	0				T/0+1:00 N1 & J4 COMPASSES ARE OFF BY
			52410	0					
SS 2 3.0	MAINTENANCE EVENT CONTROL NUMBER:		40	KC-135A/E/R	1				T/0+0:45 RUDDER AXIS OF AUTOPILOT DEF
2 9.0	6615005094801	AXIS RATE SENSOR	52143	1					T/0+2:30 800M OFFLOAD TOTALIZER INOPE
2 2.5	613000728567N1	PWR SUPPLY	5131C	1					T/0+0:55 AUTOPILOT ELEVATOR AXIS CAUS
2 22.0	6620006212902	800M O/L XMITTER	51911	1					T/0+4:00 RIGHT HYD SYSTEM PRESSURE RE
	6615005094801	AMPLIFIER	52143	1					
	4320009334697HS	HYD PUMP	4511E	2					
	15600007387239FL	RT HYD SYS ACCUH		1					
	1560000987239FL	800M ACCUH		1					
	1560000987239FL	RUDDER ACCUH		1					
	4330002773274	AIR FILTER	45142	1					
	4820007172679HS	AIE PRESS REGLTR	45141	1					T/0+2:30 CABIN PRESS MAINTAINED 1000
2 2.0			-11126	0					T/0+2:00 BROKEN WIRE AT PILOT'S NOSEH
2 2.0			64199	0					
SS 2 2.5	MAINTENANCE EVENT CONTROL NUMBER:		-11	KC-135A/E/R	0				T/0+0:10 THROTTLES 1 & 4 ARE 2-3 KNOB
			23N00	0					

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KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

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Acft Lndg T.N. Code Time	NSN	MOUN	HUC	Qty	In HRSK	MESL	Hsg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS 2 12.0		MAINTENANCE EVENT CONTROL NUMBER:	42	(KC-135A/E/R)					MAIN WATER TANK HAS LEAK
			23R00	0					
SS 2 3.0		MAINTENANCE EVENT CONTROL NUMBER:	43	(KC-135A/E/R)					T/O 5:00 COPILOT'S ATTITUDE WARNING A
		5826001345973	AMPLIFIER	51880	1				
SS 2 5.5		MAINTENANCE EVENT CONTROL NUMBER:	44	(KC-135A/E/R)					T/O 4:00 #1 ENG LAGS BEHIND ALL OTHER
			23H80	0					
SS 2 2.5		MAINTENANCE EVENT CONTROL NUMBER:	45	(KC-135A/E/R)					T/O 0:30 COPILOT'S ALTITUDE INDICATOR
		6615005506628	MD1 GYRO	51142	1				
SS 2 1.8		MAINTENANCE EVENT CONTROL NUMBER:	46	(KC-135A/E/R)					T/O 0:01 TACAN SELF TEST FAILED
2 4.0		582600124864	CONVERTER	71260	1				T/O 1:00 BOOM HAS LOUD DRAGGING NOISE
2 8.0		6615005269441	SYNCHRO	46775	0				T/O 0:45 AUTOPILOT AILERON AXIS MON'T
				52135	1				
SS 2 2.8		MAINTENANCE EVENT CONTROL NUMBER:	47	(KC-135A/E/R)					T/O 1:30 RECEIVER LIGHTS W/N GIVE "UP
			44225	0					
SS 2 12.0		MAINTENANCE EVENT CONTROL NUMBER:	48	(KC-135A/E/R)					T/O 0:05 (REPEAT) RUDDER PEDALS FLUTT
2 3.2		5306008892927	SERVO MOTOR	52123	1				T/O 0:05 #1 COMM RADIO HAS STATIC CLI
2 2.8		6610012173578	BSIU	63X80	0				T/O 0:30 DNS DRIFT READS 10 DEGREES R
2 10.0		6615005350155	ELEV SERVO MOTOR	51EED	1				T/O 4:15 ELEVATOR AXIS INOPERATIVE
				52123	1				

=====

KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

For Use During Training Sessions Only

=====

A/cft Lndg Fld	T.N. Code	Time	MSN	NOUN	WUC	Qty	MRSK	MSL	Msg	DTG	REMARKS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
SS	2	1.0									
			MAINTENANCE EVENT CONTROL NUMBER: -19 (KC-135A/E/R)								
					721B0	0					P/F DOPPLER W/N INITIATE DURING PREFL
SS	2	2.0									
			MAINTENANCE EVENT CONTROL NUMBER: 50 (KC-135A/E/R)								
					5321011348161	RCVR/XMITTER	632BA	1			T/0+1:00 #2 COMM RADIO WAS INTERMITTE
SS	2	0.8									
			MAINTENANCE EVENT CONTROL NUMBER: -51 (KC-135A/E/R)								
					6620000784470	TRANSDUCER	23H00	1			T/0+1:30 #1 ENG EPR GAUGE ROTATED APP
SS	2	7.5									
			MAINTENANCE EVENT CONTROL NUMBER: 52 (KC-135A/E/R)								
					5306001511414	SERVO MOTOR	52124	1			T/0+2:20 AUTOPILOT ELEVATOR AXIS WENT
SS	2	0.5									
			MAINTENANCE EVENT CONTROL NUMBER: 53 (KC-135A/E/R)								
					6615005892592	RECTIFIER	120BA	0			T/0+0:45 NAV APN-69 INOPERATIVE
							52111	2			T/0+0:30 ELEVATOR AXIS DOES NOT RESPD
SS	2	22.9									
			MAINTENANCE EVENT CONTROL NUMBER: 54 (KC-135A/E/R)								
							64110	0			T/0+0:15 INCOMING TRANSMISSIONS AND 1
SS	2	0.5									
			MAINTENANCE EVENT CONTROL NUMBER: 55 (KC-135A/E/R)								
							5131C	0			T/0+4:00 ALL FOUR FUEL FLOW XMITTERS
SS	2	7.0									
			MAINTENANCE EVENT CONTROL NUMBER: 56 (KC-135A/E/R)								
							63H00	0			#1 UHF W/N TRANSMIT
SS	2	2.5									
			MAINTENANCE EVENT CONTROL NUMBER: 57 (KC-135A/E/R)								
							72210	0			RADAR: TILT KNUB LOOSE ON CONTROL BOX

=====

KC-135 A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE Version 1.0

For Use During Training Sessions Only

=====

Aicft Lndg Fix T.N. Code Time	MSN	NOUN	HUC	Qty	In HRSK	MESL	Msg	DTG	REMARKS
SS 2 0.1			58						
			72080	0					T/O: 1:30 PILOT'S RADIO ALTIMETER LIGH
SS 2 1.5			59						
			S241F	0					T/O: 0:20 N1 COMPASS 4 DEGREES IN ERRO

[illegible]

Appendix D: CPX MX Worksheets 1 and 2

D-1

Figure D-1. CPX MX Worksheet 1 (Actual Size: 15" x 11")

Appendix D: CPX MX Worksheets 1 and 2

SECRET (WHEN FILLED IN)

STARTER DATA				AIRCRAFT MAINTENANCE AND AVAILABILITY TIMELINE																								
ACFT T.N.	ACFT NPS	Phase	NPS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

SECRET (WHEN FILLED IN)

D-1

Figure D-1. CPX MX Worksheet 1 (Actual Size: 15" x 11")



## Appendix E: Evaluation Surveys

### KC-135A/E/R AIRCRAFT MAINTENANCE LOGISTICS DATABASE

#### EVALUATION SURVEY 1

1. The KC-135A/E/R Aircraft Maintenance Logistics Database and its associated worksheets and instructions were developed to make response cell exercise play more realistic, place aircraft availability at more realistic levels, generate realistic part demands and streamline logistics play. Therefore, it is very important to have your comments and criticism on the new system and to know, in your opinion, if it is reaching the goals as stated above. To do this effectively, we would like each of you who used the database, or who would simply like to comment, to do two things.

2. First, during the mock exercise, please make comments directly on the database, worksheets and the information guides where comments apply. As you find problems or things which could be improved write them down. This is probably the best and easiest way to know how to make genuine improvements to the new system.

3. Second, we would like your comments to the statements and questions on the next two pages. (One evaluation from each person.) Please remember, it is your comments and opinions we are interested in, not what you think we would like to hear. We will refer to the Aircraft Maintenance Logistics Database as the "database".

4. You do not need to place your name anywhere on this database evaluation.

5. Using the scale shown at the top of the next two pages, please place the number which corresponds to your opinion about each statement on the line preceding each statement. Please comment as to why you feel as you do in the space provided. Your comments will be used to evaluate the effectiveness of the database and make whatever improvements may be needed. Then, on the last page, respond to the last two categorical questions.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5

1. ----- The database helped make exercise play in the response cell more realistic.  
  
Why or how?
2. ----- The database makes it easy to get the information I need to plot aircraft maintenance actions, inspections, and turn times.  
  
Why or how?
3. ----- The database makes it easy to get the information I need to determine the availability of each aircraft.  
  
Why or how?
4. ----- The database makes it easy for me to determine what repair parts I need when an aircraft lands.  
  
Why or how?
5. ----- Having the discrepancy associated with a given part requirement helped make the demands more realistic.  
  
Why or how?
6. ----- Having the noun and work unit code associated with the national stock number for a needed part helped me locate the part in the WRSK listing and more easily identify the item in message traffic.  
  
Why or how?



Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5

7. ----- Having the noun and work unit code associated with the national stock number for a needed part helped me determine whether a part was essential to fly a given mission and track cannibalizations.

Why or how?

8. ----- The CPX MX Worksheets along with the new symbols and charting technique streamlined the tracking of each aircraft's flying and maintenance requirements.

Why or how?

9. ----- Working with the practice data base and other training materials adequately prepared me for using the database during the exercise.

Why or how?

10. ----- The information guide helped me understand my job in the response cell and answered the questions I had.

Why or how?

a. What information was not provided that would have been helpful?

b. What information was provided that was not useful or helpful?

Please answer the following questions by circling the letter that best applies to the appropriate response.

11. ---- Have you, at any time in your military career, ever participated as a response cell member in a Command Post Exercise (a military exercise in which the existence and movement of combat forces are simulated)?

- A. Yes.
- B. No.
- C. Not Sure.

(Please respond to Question 12 if you answered "YES" to Question number 11)

12. ---- If your response to question 11 was "YES," what type of model do you think was used during the Command Post Exercise to simulate aircraft maintenance and other logistic functions?

- A. A historical aircraft maintenance database model SIMILAR to the one used during the mock exercise.
- B. Some other type of model (or data) NOT SIMILAR to the historical aircraft maintenance database model used during the mock exercise.
- C. Not sure whether the model used was a type of historical aircraft maintenance database model or some other type of model.

PLEASE USE THE REVERSE SIDE  
FOR YOUR ADDITIONAL COMMENTS AND OBSERVATIONS

## EVALUATION SURVEY 2

### COMPARISON BETWEEN LOGISTIC MODELS USED DURING CPX

1. This evaluation shall be completed only by those individuals who have participated in a Command Post Exercise (CPX) as a response cell member sometime during their military career.

2. The response to each question should be based on a comparison between the KC-135A/E/R Aircraft Maintenance Database Model used during the mock exercise, and aircraft maintenance data used during your previous experience(s) as a response cell member during a Command Post Exercise (CPX).

IMPORTANT NOTE: Throughout the evaluation survey, the KC-135A/E/R Aircraft Maintenance Database model shall be referred to as the 'KC-135 Database Model'; and the previous aircraft maintenance data used during your CPX experience shall be referred to as the 'Previous CPX Model.'

3. You do not need to place your name anywhere on this evaluation.

4. Using the scale shown at the top of the next two pages, please place the number which corresponds to your opinion on the line preceding each statement. Then, comment as to why you feel as you do in the space provided.

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5

1. ----- The KC-135A/E/R database model is more realistic than the previous CPX model.

Why or how?

2. ----- Aircraft maintenance data from the previous CPX model could be used to plot aircraft maintenance actions, inspections, and turn times more easily than using the KC-135 database model.

Why or how?

3. ----- Aircraft maintenance data from the previous CPX model could be used to determine aircraft availability more easily than using the KC-135 database model.

Why or how?

4. ----- Aircraft maintenance discrepancies using the previous CPX model was more realistic than using the KC-135 database model.

Why or how?

5. ----- Supply data (WUC, NSN, NOUN) for a needed part was easier to find using the previous CPX model than it was using the KC-135 database model.

Why or how?

Strongly agree	Tend to agree	Can't agree or disagree	Tend to disagree	Strongly disagree
1	2	3	4	5

6. ----- The previous CPX model made it easier to determine if a part was essential to fly a given mission than does the KC-135 database model.

Why or how?

7. ----- Aircraft flying and maintenance requirements are easier to track during exercise play using the previous CPX model than using the KC-135 database model.

Why or how?

8. ----- I was better trained on the procedures necessary to carry out my duties as a response cell member using the previous CPX model than I was using the KC-135 database model.

Why or how?

PLEASE USE THE REVERSE SIDE  
FOR YOUR ADDITIONAL COMMENTS AND OBSERVATIONS

**KC-135A/E/R AIRCRAFT MAINTENANCE DATABASE**

**PURPOSE**

**The database and associated materials are designed to help response cells maintain aircraft availability at realistic levels, generate demands for parts, and provide improved realism during command post exercises involving the KC-135A/E/R aircraft**

**Figure F-1. KC-135A/E/R Aircraft Maintenance Database Purpose**

## **PHASE INSPECTION REQUIREMENTS**

- Due every 200 +/- 20 (180 to 220) flying hours (since last phase).
- Takes 31 hours to complete.
- Use the longer of either the 31-hour phase time or the database fix time and then add the 4-hour preflight/thruflight.
- Reset the aircraft's phase hours to 0.0 hours (accumulated).
- Aircraft is flushable if less than 2 or more than 10 hours from phase start time.

Figure F-2. Phase Inspection Requirements

## **HPO INSPECTION REQUIREMENTS**

- Due every 50 +/- 5 (45 to 55) flying hours (since last HPO or phase).
- Takes two hours to complete.
- The database fix time and the 4-hour preflight/thruflight times are added to the 2-hour HPO.
- Reset HPO hours to 0.0 when:
  - An HPO inspection is completed.
  - A phase inspection is completed (HPO is an integral part of phase).

Figure F-3. HPO Inspection Requirements



## **WORKSHEET PLOTTING REQUIREMENTS**

- Refer to Figure B-3 in information guide for sample.
- Plot launch and landing symbols at the scheduled takeoff and landing times. Connect with a straightline (timeline).
- Post scheduled takeoff and landing times, ARCT, fuel load, and sortie duration above and below the timeline.
- Post new phase and HPO times by adding sortie duration to previous times.
- Extend timeline for inspection, if due.

(Continued)

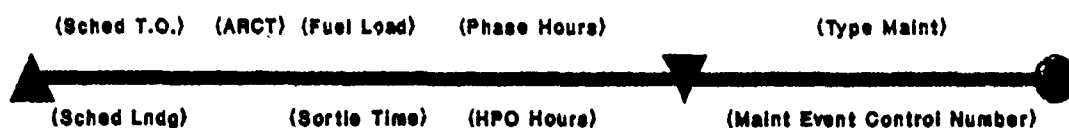
Figure F-4. Worksheet Plotting Requirements

## **WORKSHEET PLOTTING REQUIREMENTS** **(Continued)**







- Post the aircraft T.N. to the database for the first unassigned maintenance event.
- On the CPX MX Worksheet 1 and/or 2, extend the time-line plot for the number of fix hours to the right of the asterisk in the Lndg Code column.
- Post the maintenance event control number below the timeline as shown in Figure B-3.
- Extend the plot for the 4-hour preflight/thrufflight. Post a circle at the end of the timeline.
- Check the availability of needed parts in WRSK and reflect the consumption.
- Repeat above steps for each aircraft as required.

Figure F-5. Worksheet Plotting Requirements (Continued)

# KEY TO TIMELINE DOCUMENTATION



## KEY SYMBOLS

-  - Aircraft Launch
-  - Aircraft Landing
-  - Aircraft available for tasking
-  - Aircraft in NMC/ Cann Status
-  - Aircraft Attrited (Air Loss)
-  - Aircraft Attrited (Ground Loss)

## TIMELINE LENGEND

- Sched T.O. - Scheduled Takeoff Time
- Sched Lndg - Scheduled Landing Time
- ARCT - Air Refueling Control Time
- Fuel Load - Fuel Load Required for Mission
- Sortie Time - Duration of Sortie in Hours
- Phase Hrs - Phase Inspection Hrs Accum.
- HPO Hrs - Hourly Postflight Hrs Accum.
- Type Maint - Type of Maint. Being Performed
- Maint Event Control Number - (From Database)
- PF/TF - Preflight/Thruflight

Figure F-6. Key To Timeline Documentation

## **BACKGROUND**

- Improve realism in command post exercises (CPX)
- Typical models used to provide realism in CPX:
  - Percentage based models
  - Random number generator models
- The historical database model

Figure F-7. Background

## **OBJECTIVES**

- Evaluate whether the KC-135 database model provides response cell members with the needed information to:
  - maintain aircraft availability at realistic levels
  - generate realistic demand for parts
  - improve realism during CPXs
- Evaluate the utility of the Information Guide as a "stand alone" document to support the database model

Figure F-8. Objectives

## **EXERCISE SUPPORT MATERIAL**

- Information Guide
  - MESL
  - Practice Database
  - Copy of CPX MX Worksheets 1 and 2
- KC-135A/E/R Aircraft Maintenance Database
- WRSK Listing
- CPX MX Worksheets 1 and 2
- Message forms
- Task Incompletion forms

Figure F-9. Exercise Support Material

Appendix G: Mock Exercise Team Mission Tasking Orders

MISSION TASKING ORDER

TEAM 1

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)		Fuel Load
20 Apr	1	0100	0700	6	0330	0415	140K
	2	0100	0700	6	0335	0420	140K
	3	0200	0900	7	0330	0415	150K
	4	0200	0900	7	0335	0420	150K
	5	0300	1100	8	0415	0730	160K
	6	0300	1100	8	0420	0735	160K

# MISSION TASKING ORDER

. AM 1

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)	Fuel Load
21 Apr	1	0000	0500	5	0230	80K
	2	0000	0500	5	0235	80K
	3	0100	0800	7	0230 0400	120K
	4	0100	0800	7	0235 0405	120K
	5	0200	1100	9	0400 0630 0800	180K
	6	0200	1100	9	0405 0635 0835	180K



# MISSION TASKING ORDER

## TEAM 2

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)	Fuel Load
20 Apr	1	0100	0600	5	0245	80K
	2	0100	0600	5	0250	80K
	3	0200	0800	6	0400 0630	100K
	4	0200	0800	6	0405 0635	100K
	5	0300	1000	7	0715 0800	130K
	6	0300	1000	7	0720 0805	130K
	7	0400	1200	8	0715 0800 0900	180K
	8	0400	1200	8	0720 0805 0905	180K

# MISSION TASKING ORDER

TEAM 2

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)		Fuel Load
21 Apr	1	0000	0400	4	0145		70K
	2	0000	0400	4	0150		70K
	3	0100	0600	5	0255		80K
	4	0100	0600	5	0300		80K
	5	0200	0800	6	0500		100K
	6	0200	0800	6	0505		100K
	7	0300	1000	7	0600	0700	130K
	8	0300	1000	7	0605	0705	130K

# MISSION TASKING ORDER

TEAM 3

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)	Fuel Load
20 Apr	1	0100	0600	5	0250	80K
	2	0100	0600	5	0255	80K
	3	0100	0600	5	0300	80K
	4	0200	0800	6	0415 0510	120K
	5	0200	0800	6	0420 0515	120K
	6	0200	0800	6	0430 0520	120K
	7	0300	1000	7	0445 0525 0655	170K
	8	0300	1000	7	0450 0530 0700	170K
	9	0300	1000	7	0455 0535 0705	170K

# MISSION TASKING ORDER

## TEAM 3

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)			Fuel Load
21 Apr	1	0000	0600	6	0225	0310	0355	180K
	2	0000	0600	6	0230	0315	0400	180K
	3	0000	0600	6	0235	0320	0405	180K
	4	0200	0800	6	0510	0630		150K
	5	0200	0800	6	0515	0635		150K
	6	0200	0800	6	0520	0640		150K
	7	0400	1000	6	0710			120K
	8	0400	1000	6	0715			120K
	9	0400	1000	6	0720			120K

# MISSION TASKING ORDER

TEAM 4

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)			Fuel Load
20 Apr	1	0100	0500	4	0255			70K
	2	0100	0500	4	0300			70K
	3	0100	0500	4	0305			70K
	4	0200	0700	5	0410			90K
	5	0200	0700	5	0415			90K
	6	0200	0700	5	0420			90K
	7	0300	0900	6	0520	0640		150K
	8	0300	0900	6	0525	0645		150K
	9	0400	1100	7	0555	0705	0840	180K
	10	0400	1100	7	0600	0710	0845	180K

# MISSION TASKING ORDER

TEAM 4

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)	Fuel Load
21 Apr	1	0000	0600	6	0300	120K
	2	0000	0600	6	0305	120K
	3	0100	0700	6	0400	120K
	4	0100	0700	6	0405	120K
	5	0400	1000	6	0710 0805	150K
	6	0400	1000	6	0715 0810	150K
	7	0400	1000	6	0720 0815	150K
	8	0600	1200	6	0850 1000	150K
	9	0600	1200	6	0855 1005	150K
	10	0600	1200	6	0900 1110	150K

# MISSION TASKING ORDER

TEAM 5

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)			Fuel Load
20 Apr	1	0100	0500	4	0255			70K
	2	0100	0500	4	0300			70K
	3	0100	0500	4	0310			70K
	4	0200	0700	5	0420			90K
	5	0200	0700	5	0425			90K
	6	0200	0700	5	0430			90K
	7	0300	0900	6	0520	0630		140K
	8	0300	0900	6	0525	0635		140K
	9	0300	0900	6	0530	0640		140K
	10	0400	1100	7	0750	0830		150K
	11	0400	1100	7	0755	0835		150K
	12	0400	1100	7	0800	0840		150K
	13	0500	1300	8	0710	0900	1015	180K
	14	0500	1300	8	0715	0905	1020	180K

# MISSION TASKING ORDER

TEAM 5

Date	Line Nmbr	Take- Off Time	Lndg Time	Sortie Drtn	Air Refueling Control Time (ARCT)	Fuel Load
21 Apr	1	0000	0600	6	0255	100K
	2	0000	0600	6	0300	100K
	3	0200	0800	6	0455	100K
	4	0200	0800	6	0500	100K
	5	0400	1000	6	0555	100K
	6	0400	1000	6	0600	100K
	7	0600	1200	6	0925 1005	150K
	8	0600	1200	6	0930 1010	150K
	9	0600	1200	6	0935 1015	150K
	10	0800	1400	6	1100 1210	150K
	11	0800	1400	6	1105 1215	150K
	12	0800	1400	6	1110 1230	150K



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### Vita

Captain Lyndon S. Anderson was born on 1 March 1958 in Sarasota, Florida. He enlisted in the United States Air Force in March 1981 and was later assigned to F. E. Warren AFB, Wyoming, as a Missile System's Analyst for the Minuteman III Nuclear Weapon System. He worked as an Electro-mechanical Team Chief, and later as a Master Inspector/Evaluator in the Maintenance Deputate's Quality Assurance Division. He earned a Bachelor of Science Degree in Industrial Technology from Southern Illinois University in June 1983. He was commissioned through the USAF Officer Training School in March 1985. Upon graduation from the Aircraft Maintenance Officer's Course, he was assigned to Carswell AFB, Texas. Some of his duties included Officer-in-Charge (OIC) of the wing's KC-135A Tanker Branch and B-52H Bomber Branch. Following the incorporation of the Readiness Oriented Logistic System (ROLS) maintenance concept, his duties included OIC of the newly formed Specialist Branch and Bomber Maintenance Unit. He later worked as the squadron's Assistant Maintenance Supervisor until entering the School of Systems and Logistics at the Air Force Institute of Technology in June 1989. Upon graduation, he will be assigned to the Air Force Logistics Management Center at Gunter AFB, Alabama.

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13. ABSTRACT (Maximum 200 words) This study, under the sponsorship of HQ SAC/LGL, investigated a method to improve realism in Command Post Exercises (CPX) involving the KC-135A/E/R aircraft by developing a historical database model. The model is based on the premise that realistic data collected from actual war-like missions can be placed in a database for use by response cell members to provide simulated, yet realistic, logistical requirements during CPXs. European Tanker Task Force flying mission data was used as source data for the development of the model. Associated documentation was also developed to support the model. A mock exercise simulating a CPX was used to test the model and its associated documentation. Analysis of the test results lead the researcher to conclude that the model provides response cell members with a useful tool to obtain realistic logistical information they need to carry out their duties effectively. Recommendations include using the model and documentation as required by HQ SAC/LGL, and conducting further research to test the hypothesis that historical database models improves realism at the response cell level during CPXs.				
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