

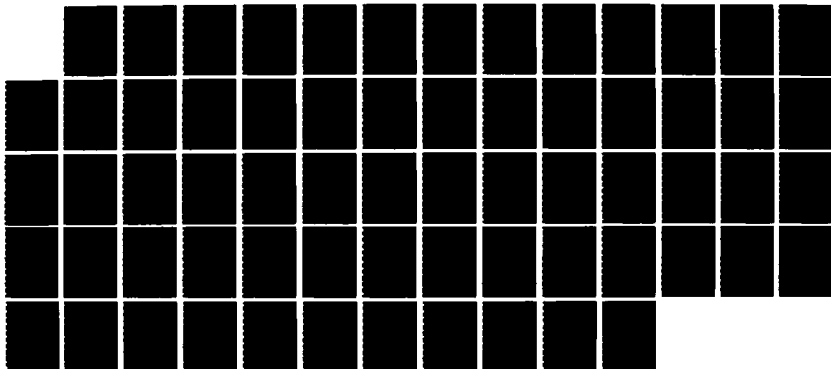
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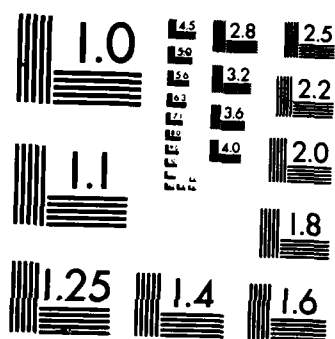
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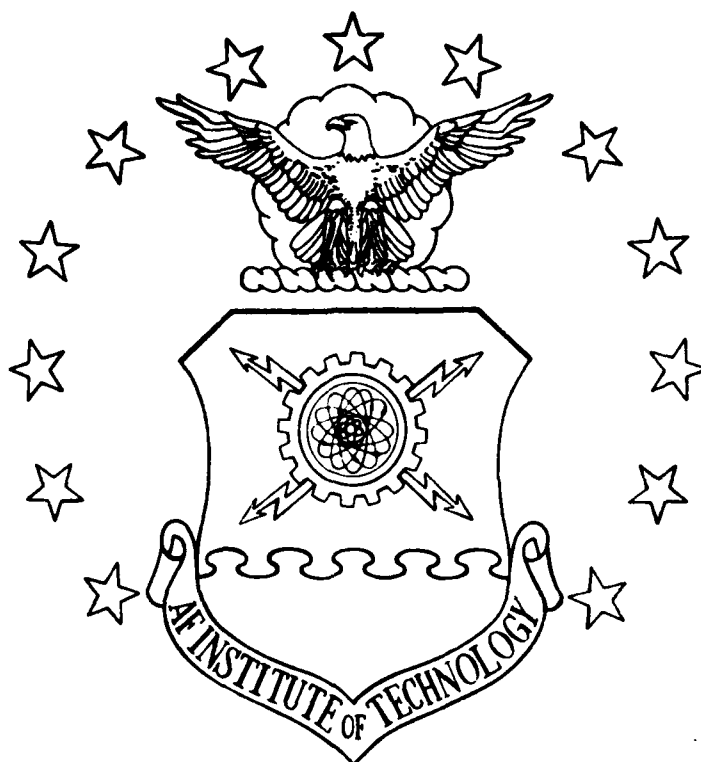
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CASE STUDY OF THE APPLICATION
OF THE WEAPON SYSTEM WARRANTY
ON THE C-130 PROGRAM

THESIS

Jiley E. McNease
Captain, USAF

AFIT/GLM/LSP/B6S-51

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CASE STUDY OF THE APPLICATION OF THE
WEAPON SYSTEM WARRANTY ON THE C-130 PROGRAM

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

Jiley E. McNease, B. S.

Captain, USAF

September 1986

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Jiley E. McNease

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Abstract

→ This study examined what government imposed changes and/or modifications to the C-130 during the past five year period would have voided a weapon system warranty, had one been in effect (in accordance with current public laws) from the contractor's viewpoint. Specifically, it analyzed: (1) what criteria should be used to determine if a proposed change and/or modification has the potential to void the system level warranty, (2) whether performance guarantees would have been workable for the C-130, or would hostile and other actions have voided such a warranty, and (3) how the present weapon system warranty clauses should be designed to preclude contractor avoidance and still protect the government's interest.

Literature review addressed the Federal Acquisition Regulation, which covered warranties in general terms prior to the requirement of a weapon system warranty; the Weapon Systems Warranty Act (Public Law 98-212); and the Weapon Systems Warranty Act modifications (Public Law 98-525). ←

Findings were gathered using an unstructured personal interview approach from the contractor personnel.

Analysis revealed that designing of the weapon system warranties to preclude contractor avoidance and still protect the government's interest can work.

This study recommends that the Department of Defense use the Air Force Contract Law Center's suggested systems level warranty clauses, perhaps as modified because of additional study and experience, when designing future weapon system warranties.

CASE STUDY OF THE APPLICATION OF THE WEAPON SYSTEM WARRANTY ON THE C-130 PROGRAM

I. Introduction

General Issue

Since the middle 1970's, warranty requirements have been viewed by Congress and the Department and Defense as a significant way to decrease life cycle costs on weapon system acquisitions. The Weapon System Warranty Act (Public Law 98-212), a part of the Department of Defense Appropriations Act of 1984, required that written guarantees be obtained in connection with the procurement of weapon systems. Further refinement of the Weapon System Warranty Act appeared in the Department of Defense Appropriations Act of 1985. The question of what issues could complicate the application and/or management of a weapon system warranty has surfaced during the Department of Defense's attempts to comply with these statutory warranty requirements.

Specific Problem

Specifically, the past five years of the C-130 Weapon System's life was analyzed from the contractor's viewpoint to address the question of what government imposed changes and/or modifications to the C-130 during the five year

period would have voided a weapon system warranty, had one been in effect (in accordance with current directives).

Research Objective

The objective of the research was to provide recommendations to the Department of Defense concerning the designing of future weapon system warranties.

Research Questions

1. What criteria should be used to determine if a proposed change or modification has the potential to void the system level warranty (as written)?

2. Would performance guarantees have been workable for the C-130, or would hostile and other actions have voided such a warranty? (Example - Special C-130s modified for the Iran escape attempt.)

3. How should the present weapon system warranty clauses be designed to preclude contractor avoidance and still protect the government's interest?

Scope and Limitation

The scope of this research was limited to the past five years of the C-130 Weapon System's life. The scope was also limited to the past five years of all relevant data including any legal cases relating to weapon system warranties.

Operational Definitions

1. "Weapon system" refers to items used directly by the armed forces to carry out combat missions and that cost

more than \$100,000 or will have a total procurement cost of more than \$10,000,000. Commerical items sold in substantial quantities to the general public are not considered to be a weapon system (4:36).

2. "Warranty" refers to a promise or affirmation provided by a contractor to the Government concerning the nature, usefulness, or condition of the supplies or performance services furnished specified under the contract (6:46-9).

3. "Component" refers to a single element of a weapon system (4:36).

4. "Prime contractor" refers to a party that enters into a contract with the government to provide part or all of a weapon system (4:36).

Background

In order to provide a thorough background and understanding of weapon system warranties, a review of the Federal Acquisition Regulation (FAR), which covered warranties in general terms prior to the requirement of a weapon system warranty, was accomplished. Next, a review of the Weapon Systems Warranty Act (WSWA), which was included as Public Law 98-212 of the Department of Defense Appropriations Act of 1984, was completed. Finally, a review of the modifications to the WSWA, which was included as Public Law 98-525 of the Department of Defense Authorization Act of 1985, was accomplished.

Federal Acquisition Regulation Warranty Requirements.

The regulation used to guide warranty use prior to the WSWA was the Federal Acquisition Regulation (FAR). Under the FAR, the individual components of the weapon system were warranted by many contractors. Field personnel use FAR for guidance and direction in structuring component warranties (6:46-9).

Criteria for the Use of Warranties. When determining whether a warranty is appropriate for a specific acquisition, the FAR instructs a contracting officer to consider the following factors: the nature and intended use of the end item, associated costs, ease of administration and enforcement, trade practice, and reduced quality assurance requirement (6:46-9).

Limitations on Warranty Use. The FAR states that the contracting officer shall not include warranties in cost-reimbursement contracts for components of a weapon system. In addition, the FAR states that the warranty clauses shall not limit the government's rights under an inspection clause in relation to latent defects, fraud, or gross mistakes that amount to fraud (6:46-9).

Warranty Terms and Conditions. For successful contract pricing and enforcement of warranties, the contracting officer shall ensure that warranties clearly state the following:

- (1) Exact nature of the item and its components and characteristics that the contractor warrants;

(2) Extent of the contractor's warranty including all of the contractor's obligations to the government for breach of warranty;

(3) Specific remedies available to the government; and

(4) Scope and duration of the warranty. (6:46-9,10)

Authority for Use of Warranties. The FAR states that the use of a warranty in a specific acquisition is not mandatory, but shall be approved in accordance with agency procedures (6:46-9). However, the WSWA does not allow agencies the discretion to decide if weapon system warranties will be used for acquisition of weapon systems. Requirements of the WSWA will be discussed below (5).

Public Law 98-212 Requirements. As stated above, warranties included under the guidance of the FAR were limited to the materials and workmanship of the individual components, primarily because the contractors were often required to use designs and specifications supplied or controlled by the government (3:1). However, the opinion that the whole weapon systems should be warranted was gaining interest during the middle 1970's, particularly among Congressmen who were becoming extremely sensitive to well-publicized failures like the Army's M-1 Abrams tank, which had a "super sleek design, state-of-the-art electronics, and an engine that tends to jam." (2:26) Therefore, Congress passed the Weapon Systems Warranty Act (Public Law 98-212), popularly known as the Andrews amendment, as part of the Department of Defense

Appropriation Act of 1984. Due to its brevity, it is stated in full below:

Sec. 794.(a) Except as otherwise provided in this section, none of the funds appropriated by this or any other Act may be obligated or expended for the procurement of a weapon system unless the prime contractor or other contractors for such system provides the United States with written guarantees--

(1) that the system and each component thereof were designed and manufactured so as to conform to the Government's performance requirements as specifically delineated (A) in the production contract, or (B) in any other agreement relating to the production of such system entered into by the United States and the contractor.

(2) that the system and each component thereof, at the time they are provided to the United States, are free from all defects (in materials and workmanship) which would cause the system to fail to conform to the Government's performance requirements as specifically delineated (A) in the production contract, or (B) in any other agreement relating to the production of such system entered into by the United States and the contractor, and

(3) that, in the event of a failure of the weapon system or a component to meet the conditions specified in clauses (1) and (2)--

(A) the contractor will bear the cost of all work promptly to repair or replace such parts as are necessary to achieve the required performance requirements; or

(B) if the contractor fails to repair or replace such parts promptly, as determined by the Secretary of Defense, the contractor will pay the costs incurred by the United States in procuring such parts from another source.

(b) A written guarantee provided pursuant to subsection (A) shall not apply in the case of any weapon system or component thereof which has been furnished by the Government to a contractor.

(c) The Secretary of Defense may waive the requirements of subsection (a) in the case of weapon system if the Secretary--

(1) determines that the waiver is necessary in the interest of the national defense or would not be cost-effective; and

(2) notifies the Committees on Armed Services and Appropriation of the Senate and House of Representatives in writing of his intention to waive such requirements with respect to such weapon system and includes in the notice an explanation of the reasons for the waiver.

(d) The requirements for written guarantees provided in subsection (a) hereof shall apply only to contracts which are awarded after the date of enactment of this Act and shall not cover combat damage. (5)

The initial impact of the WSWA (Public Law 98-212) was that it made weapon systems warranties a statutory requirement rather than an option on all weapon systems contracts including not only those designed by contractors, but also on those designed and/or controlled by the Government. Although the government's capability to waive or limit the contractor's liability, or to exclude the weapon system from warranty coverage when such coverage is not beneficial to the government, was included in the WSWA, this still represented a significant departure from past procedures (4).

Another area of impact was that the prime contractor had overall responsibility for warranting materials, workmanship, and performance (5). Again, this represents quite a departure from FAR, which held the specific contractor of the component to be liable for defective

components, and which focused primarily on warranties for component materials and workmanship (6:46-9,10).

Because of these impacts, there was a storm of protests from government contractors, officials of the Department of Defense, and several members of Congress. Often for different reasons, each feared the shift of quality and performance risks of government-furnished and/or government-controlled designs from the government to weapon systems prime contractors. It was thought that such a shift of responsibility would result in an uncertain impact on costs. In addition, some aspects of the Weapon System Warranty Act (Public Law 98-212) were confusing to both contractors and the government. As a result of these concerns, Congress passed the Defense Procurement Reform Act (Public Law 98-525) as part of the Department of Defense Appropriations Act of 1985 (3:1).

Public Law 98-525 Requirements. The Defense Procurement Reform Act (Public Law 98-525), while it substantially modified the WSWA, still maintained the original intent of the previous law. Weapon system warranties are still mandatory and must include coverage for materials, workmanship, and performance. The prime contractor is still the party held liable for defects. However, the Defense Procurement Reform Act is more specific regarding when the weapon systems warranty applies and when Congress is to be notified of waivers. In addition, the definitions of several key terms have been clarified to

prevent confusion. For example, the essential performance requirements are "the operating capabilities or maintenance and reliability characteristics that the Secretary of Defense determines are necessary for the system to fulfill the military requirements for which it is designed." The Act also provided "mandates to Department of Defense to be flexible and to negotiate the terms of a warranty so that it is cost effective and practical." (4:34-36)

Summary

Under the FAR, each of the weapon system's many components were being warranted for materials and workmanship by many contractors. Now under WSWA, the whole system is warranted for materials, workmanship, and performance by the prime contractor. The Defense Procurement Reform Act further clarified the WSWA.

Congress believes that by implementing WSWA, as modified by the Defense Procurement Reform Act of 1985, future acquired weapon systems will have higher quality and increased reliability, resulting in lower life cycle costs on weapon systems. However, the impact of shifting the quality and performance risks from the government to the weapon system contractor has not been assessed. Neither has it been determined what government imposed changes and/or modifications to a weapon system would void a weapon system warranty (3:9).

II. Research Methodology

Overview

The previous chapter provided a background of weapon system warranties. This chapter describes the methodology used for this research effort. It also describes the population of interest and explains the data collection plan. Finally, it explains the procedure used in analyzing the data collected in the research.

Justification

An unstructured personal interview approach was selected to accomplish the research objective of establishing an information base. This approach was selected because it allowed the greatest depth and detail of information that could be obtained (1:160).

Population

The population of interest for this study was Lockheed's Warranty Coordinator and Assistant Warranty Coordinator for the C-130 system warranties. The Warranty Coordinator who was interviewed had approximately 30 years experience in the warranty business and was the Deputy Manager of Engineering Technical Contracts. The Assistant Warranty Coordinator who was interviewed had approximately five years in the warranty business and was the C-130 Aircraft Specialist Engineer.

Data Collection Plan

The data collection consisted of unstructured personal interviews with the population described above. This effort by far was the most significant hurdle of this research. Lockheed's C-130 weapon system warranty personnel were interviewed to gather the necessary data to be able to answer the three research questions. As a means to obtain candid and sincere information from the individuals, the researcher used a nonattribution policy.

Data Analysis Plan

The data analysis procedure used in this case study did not lend itself to any statistical testing. Therefore, no statistical analysis was required. However, an appropriate analysis was accomplished by the researcher on the data collected from the interviews. This review assessed the significance of the data collected. From the researcher's review, recommendations were derived for designing weapon system warranties to preclude contractor avoidance and still protect the government's interest.

III. Findings and Analysis of Findings

Overview

Interviews were conducted with the two individuals described in Chapter II. The findings from these interviews are presented in this chapter. Also, the researcher's analysis of the findings are presented in this chapter. The contractor's responses were analyzed to determine the significance of the data collected so that recommendations for designing weapon system warranties could be derived and these are enumerated in Chapter IV. The interviews focused primarily on the three research questions stated in Chapter I. The first and second research questions were further sub-divided into sub-areas related to the research questions. The third research question was used as an opportunity for the respondents to "think aloud" to present possible new ideas. Also, follow-up interviews with respondents were accomplished when clarification was necessary. This was accomplished to insure accurate reporting of the opinions of those interviewed.

Research Question One

What criteria should be used to determine if a proposed change or modification has the potential to void the system level warranty (as written)?

Research Question One Sub-area (a). From an organizational viewpoint, what channels would the contractor

go through to evaluate the impact of changes and/or modifications to the C-130 configuration etc... on a system level warranty for design/manufacturing and/or performance parameters conformance?

Contractor's Response to Research Question One

Sub-area (a). The contractor's engineering department would review the changes or modifications to determine if a proposed change or modification has the potential for voiding the system level warranty.

Researcher's Analysis of Finding to Research

Question One Sub-area (a). The engineering department would be the most appropriate department. Engineering has the expertise needed to determine whether such a change and/or modification will change the original design and/or performance parameters of the weapon system and/or components.

Research Question One Sub-area (b). What factors would the contractor consider when evaluating whether a system level warranty would be affected by the proposed change and/or modification?

Contractor's Response to Research Question One

Sub-area (b). The contractor would use the same factors used to establish the system level warranty. These factors are the original design and performance parameters. If any change or modification impacts these factors, the original weapon system warranty is voided.

Researcher's Analysis of Finding to Research

Question One Sub-area (b). The contractor's response is partially accurate regarding this question. If the government changes and/or modifies a weapon system to the point that it negatively impacts the original design and performance parameters, the weapon system warranty would potentially be voided. However, if the government changes and/or modifies a weapon system to the point that it improves the original design and performance parameters such as stretching the C-141, then the weapon system warranty should not be voided.

Research Question One Sub-area (c). What changes and/or modifications in the past five years of the C-130 would have had the potential for allowing Lockheed to void a system level warranty had one been in effect such as the Air Force Contract Law Center's recommended clause (Appendix A)?

Contractor's Response to Research Question One Sub-area (c). According to the contractor, every change and/or modification would have the potential for allowing Lockheed to void a system level warranty. Specifically, the Air Force "blue foam" requirement, which required Lockheed to produce C-130s with blue foam filler in the wing fuel tanks, is an example of such a change and/or modification. This "blue foam" requirement was designed to eliminate sparks generated from small arms fire punctures to the wing fuel tanks, which would improve the survivability of C-130s from small arms fire. Any defects in the wing fuel tanks

resulting from the "blue foam" requirements would have been unrecoverable because the "blue foam" requirements had the potential for allowing Lockheed to void a system level warranty.

Researcher's Analysis of Finding to Research

Question One Sub-area (c). The contractor determines whether any change and/or modification will void the warranty per the "Limitations and Exclusions" part of the warranty clause in Appendix C, which states:

(2) The said warranties do not apply to any failures or defects caused by negligence or failure of Government personnel to operate and maintain aircraft delivered hereunder in accordance with procedures contained in the applicable technical manuals, or by changes made or equipment installed without Contractor's written agreement that such change or installation will not impair its warranty obligations. (Appendix C)

If the government could not obtain the contractor's written agreement that such change and/or modification will not void the warranty obligations, then the government would have the burden to prove that failures or defects were not caused by the change and/or modification.

Research Question One Sub-area (d). Has product testing changed for the C-130 in the past five years to an extent that additional burdens of risk have been levied on the contractor?

Contractor's Response to Research Question One Sub-area (d). The product testing has stayed basically the

same. However, the contractor's burden of risk has been reduced because the products are more reliable.

Researcher's Analysis of Finding to Research

Question One Sub-area (d). The contractor has less risk as the production of a weapon system matures as in the C-130 Program. However, when significant engineering changes and/or modifications occur, the risk increases for both the government and the contractor. The risk increases for the contractor because this is usually the first time the change and/or modification is attempted. If the contractor makes changes and/or modifications exactly according to the government's specifications, then the burden of risk is shifted entirely to the government.

Research Question One Sub-area (e). During the past five years of the life of the C-130 production contract, are you aware of any claims by Lockheed that any defect (s) existed in either Supplies, Services or Government Furnished Property/Equipment (GFP/GFE) related to the C-130?

Contractor's Response to Research Question One Sub-area (e). Yes, in general, the use of GFP/GFE creates problems because the GFP/GFE are sometimes unsuitable for the purpose and other times the GFP/GFE are older stock parts, which fail to operate during the life of the warranty. These are cases where warranty avoidance has been allowed by the government in the past.

Researcher's Analysis of Finding to Research

Question One Sub-area (e). The use of GFP/GFE is in the

best interest of the Government from an economic standpoint. However, where GFP/GFE are integrated into the weapon system, problems may arise when defects or failures occur on the weapon system. The contractor has the burden to prove that the subject GFP/GFE did cause the defect or failure.

Research Question One Sub-area (f). Have "interim repairs or replacements" ever been necessary for the C-130 to allow continued weapon system operation in the past five years?

Contractor's Response to Research Question One Sub-area (f). Yes, but only one time in the past five years. This case involved newly designed flap skins made of aluminum. The newly designed flap skins replaced the older designed flap skins which had been made of titanium, a much stronger metal. The change of metal from titanium to aluminum was necessary because there was a shortage of titanium. The "interim repairs and replacements" consisted of users repairing the flaps in-house with stainless steel patches and Lockheed reskinning the flaps with stainless steel.

Researcher's Analysis of Finding to Research Question One Sub-area (f). The contractor had to repair and replace flap skins at the contractor's expense because the contractor failed to manufacture the newly designed aluminum flap skins to the thickness specified by the government. If the contractor had manufactured the newly designed aluminum flap skins according to the design specifications, then the

contractor would not have been held responsible for the failures.

Research Question One Sub-area (g). What type of warranties are currently in effect for the C-130 and have any rights ever been invoked on these warranties for claims?

Contractor's Response to Research Question One Sub-area (g). There are currently three separate warranties provided for C-130s by the contractor. The first warranty (Appendix B) is applicable for Coast Guard and Foreign Military Sales C-130s manufactured after 21 November 1985. This warranty guarantees that C-130s will be free from defects in contractor furnished material and workmanship and will conform with all specifications and requirements. The second warranty (Appendix C) is applicable for all C-130s manufactured after 21 November 1985 except Coast Guard, Foreign Military Sales, and Combat Talon C-130s. This warranty guarantees that C-130s will be free from defects in contractor furnished material and workmanship, will conform to the design and manufacturing requirements specified, and will conform to the essential performance requirements specified. The last warranty (Appendix D), is the only warranty applicable for Combat Talon C-130s. This warranty guarantees that all subcontractor warranties will be available to, and for the benefit of the government for the lifetime of the warranties. The duration of the first two warranties is limited to six months except for latent

defects. The duration of the last warranty depends upon the individual subcontractor warranties.

According to the contractor, there have been warranty claims by the government, which the contractor felt were not true warranty claims. However, for good will, the contractor depending upon the circumstances usually corrects any alleged defects and/or failures even when the warranty period had expired.

Researcher's Analysis of Finding to Research
Question One Sub-area (g). The current warranties consist of three different types of warranties. The first warranty (Appendix B) discussed is basically the standard warranty, which is required by the Federal Acquisition Regulation (FAR). The FAR requires that the material and workmanship of the individual components be warranted. The second warranty guarantees material and workmanship of the individual components, plus essential performance requirements of the weapon system, which are required by the Weapons System Warranty Act (Public Law 98-212). The last warranty includes material and workmanship of the individual components, which are provided by subcontractors.

Rights have been invoked on all three warranties for claims. Normally, the third warranty, which covers the Combat Talon C-130s expires before the government receives the C-130 because the basic C-130 is modified by another prime contractor to make it a Combat Talon C-130. However, as mention earlier, the contractor depending on the

circumstances usually honors claims on these aircraft even though the warranty period has expired.

Research Question One Sub-area (h). Do current AF maintenance policies and procedures provide a possible area for the contractor to claim "non-acceptable" practices and thereby void a subsequent warranty claim?

Contractor's Response to Research Question One Sub-area (h). Yes, current AF maintenance policies provide the potential for claim avoidance. The current perceived maintenance policy is to reduce the time that the aircraft is not mission capable by correcting all defects as soon as possible. Thus, the government field maintenance personnel will make every effort possible to correct the alleged defect, in the interest of reducing down time, rather than send it back to the contractor for warranty repair. Consequently, the contractor usually receives an item for warranty repair after the government field maintenance personnel has attempted to correct the alleged defect of an item, which the warranty does not allow for the government to tamper with the alleged defected item. Also, the contractor receives alleged defected items after the government field maintenance personnel has fail to maintain the item in accordance with applicable technical manuals.

Thus, current AF procedures provide for claim avoidance because the contractor does not have access or control over the government's maintenance procedures.

Researcher's Analysis of Finding to Research

Question One Sub-area (h). The contractor believes that any tampering with an individual component and/or components of the weapon system, legally allows the contractor to avoid that portion of the warranty. In my opinion, that is not an accurate assessment. If the government can prove that the government's maintenance personnel adhered to the technical manuals, the warranty remains in force. Even though the contractor stated this view on tampering with components, the contractor depending on the circumstances usually honors the warranty regardless of the tampering. The reason the contractor honors the warranty is because it is in the best interest of the contractor to encourage the government maintenance personnel to attempt to repair the defective item rather than send all defective items back to the contractor for repair and/or replacement.

The contractor does not have complete access or control over the government's maintenance procedures, but the contractor does have joint responsibility with the government to determine the correct procedures to use. As long as the contractor, mutual agrees to the maintenance procedures, which are established jointly by the contractor and the government, the contractor cannot avoid the warranty if the government fully adheres to the procedures.

Research Question One Sub-area (i). Have there been any claims under the "changes clause" for the C-130 production contract during the past five years.

Contractor's Response to Research Question One

Sub-area (i). No, there have not been any claims under the "changes clause" because the contractor has a good will policy concerning government claims as mentioned earlier.

Researcher's Analysis of Finding to Research

Question One Sub-area (i). There have not been any claims under the "changes clause" basically because the contractor's has a goodwill policy, which makes a positive effort to avoid any major disputes with their customer. However, the potential for a claim under the "changes clauses" is legally always present.

Research Question Two

Would performance guarantees have been workable for the C-130, or would hostile and other actions have voided such a warranty? (Example - Special C-130s modified for the Iran escape attempt.)

Research Question Two Sub-area (a). Does the C-130 production contract have what you would classify as the "potential" for a performance warranty?

Contractor's Response to Research Question Two

Sub-area (a). Yes, the C-130 has the "potential" for performance guarantees. However, it would not be worth the cost to make such a warranty workable for the C-130 because every flight would have to be recorded to document that stated parameters have not been exceeded, which could void the performance warranty. Also, the cost for the contractor to

provide such a warranty would be paid for by the government and then the government would also have additional administrative costs to administer such a warranty.

Researcher's Analysis of Finding to Research

Question Two Sub-area (a). The contractor's assessment of this subject is not totally accurate. Many warranty claims can be validated without a lot of effort. However, the cost to the government for validating some warranty claims would be too expensive. Because the government would have to go to great lengths to document all aircraft flights in order to prove that a major failure of a critical performance requirement was not the fault of the government from exceeding specified flight parameters. A note of interest is that the warranty for all C-130s except Coast Guard, Foreign Military Sales, and Combat Talon C-130s currently have essential performance requirements for flight testing of the aircraft only. These performance requirements were not new, just restated.

Research Question Two Sub-area (b). In an hostile operational environment (example - Project Fury in Grenada) could performance guarantees have been enforceable?

Contractor's Response to Research Question Two Sub-area (b). Yes, as long as the defects were not caused by operating the aircraft outside of design and/or performance parameters and/or were not caused by combat related damage. This sounds like a simple answer. However, there must be adequate evidence to support such a claim.

Researcher's Analysis of Finding to Research

Question Two Sub-area (b). Again, the contractor's assessment is accurate. As long as the weapon system is operated within specified design and/or performance parameters and the defect and/or failure is not combat related, the warranty should not be voided.

Research Question Two Sub-area (c). Given that the C-130 has a system level warranty, how do you feel advances in aircraft threats (example - improved AAA and SAMs) impact the combat related damage exemption for systems warranties?

Contractor's Response to Research Question Two Sub-area (c). Advances in aircraft threats doesn't impact warranty coverage. The loss of an aircraft as a result of an new improved anti-aircraft missile is not the responsibility of the contractor.

Researcher's Analysis of Finding to Research Question Two Sub-area (c). The loss of an aircraft as a result of being shot down by a missile would not be applicable for a performance warranty.

Research Question Two Sub-area (d). Given that damages are sustained in a hostile environment, and given that it is determined that damages were not combat related and/or were not a result of exceeding the original design and/or performance parameters, how should the Government's organization react to exercise the Government's rights under the warranty clause?

Contractor's Response to Research Question Two

Sub-area (d). The government's organization (System Program Office) should exercise the Government's rights in the usual manner as claims are currently being handled.

Researcher's Analysis of Finding to Research

Question Two Sub-area (d). The contractor did not perceive any real difference between exercising warranty claims in peacetime or wartime. However, the response time should be quicker during wartime after the contractor increases his support capability for the war effort. If a dispute arises, which could delay correcting the defect and/or failure of a component and/or performance requirement, the government should issue a change order to the contractor. By issuing a change order, the contractor has to correct the alleged defect and/or failure immediately, and at a later time it will be decided if the government had a valid warranty claim or not.

Research Question Three

How should weapon system warranty clauses be designed to preclude contractor avoidance and still protect the government's interest?

Contractor's Response to Research Question Three. The contractor stated that weapon system warranty clauses could not be designed in such a way to preclude contractor avoidance and still protect the government's interest. However, the contractor suggested things that could be done

to make the warranty more cost effective for the government, in his opinion. The contractor suggested that the government reduce the duration of the warranty, reduce the penalty imposed by the warranty, and reduce the scope of coverage for the C-130. The contractor stated that presently the warranties are counter-productive for a mature program such as the C-130 and thus, not cost effective. The primary reason the present warranty coverage is counter-productive is the same as stated earlier, in the interest of high mission readiness, the government field maintenance personnel will correct a warranty defect in lieu of sending the item back to the contractor. The final suggestion was to have Lockheed be the contractor responsible for Depot Maintenance since the government is currently used Lockheed as a repair facility for supposedly invalid warranty claims anyway.

Researcher's Analysis of Finding to Research Question

Three. Research has shown that weapon system warranty clauses can be designed to preclude contractor avoidance and still protect the government's interest. For example, the C-17 weapon system warranty clauses are designed primarily using performance requirements, which can be quantified and measured. This shifts more risk upon the contractor and thus, precludes contractor avoidance and protects the government's interest. The suggestions the contractor made regarding making the use of warranty more cost effective for the government are not totally accurate for a mature program

such as the C-130, where the risk is already very low. All weapon systems still should have essential performance guarantees, however the cost for a mature program should be significantly less than a new program such as the C-17. The final suggestion from the contractor would be useful if the weapon system was a new system such as the B-1 where the risk is very high and the government initially does not have the maintenance capability, which is required.

IV. Conclusions and Recommendations

Overview

In this chapter, the researcher discusses the conclusions and recommendations derived from the researcher's literature review and field research. My conclusions are discussed in general terms regarding the designing of weapon system warranties. Also, my recommendations are discussed in a broad manner so they may be applicable to other weapon system programs. In addition, areas for future research are mentioned.

Conclusions

My overall conclusion is that designing of the weapon system warranties to preclude contractor avoidance and still protect the government's interest can work. The Air Force Contract Law Center's suggested systems level warranty clauses attached as Appendix A is a good initial effort. Also, the government must design the weapon system warranty using quantifiable and measurable performance requirements. The government with or without the contractor's cooperation must include flexibility in the weapon system warranty to ensure coverage for future changes and/or modifications to the weapon system. Specific criteria, which support these conclusions are:

- a. Changes and/or modifications, which improve the original design and/or performance requirements of the

weapon system should not void the warranty even though the original article has been significantly changed and/or modified.

b. Usually, the contractor's and government's financial risk decreases significantly when a weapon system program matures. This is evident in the C-130, which has been in production for over 30 years. However, for a new weapon system program such as the C-17, the financial risk is high for the contractor and/or government because of the many unknowns. Who has the most financial risk depends upon who has the most responsibility for the testing/production and/or guarantee of performance of the weapon system. Thus, having the contractor guarantee performance requirements and testing during initial design reduces risk up front and lowers life-cycle cost for the government. These actions will cause the contractor to be more careful about designing and producing a quality product.

c. The integration of GFP/GFE in a weapon system creates warranty problems for the prime contractor and the government. Too often the GFP/GFE is not suitable for use because of over age and so forth. However, it has to be used in order to prevent stopping the production process. To make the weapon system warranties work, the government must be more careful about providing suitable GFP/GFE.

d. If approved by the government without sufficient integration of warranty provisions, some contractor

recommended weapon system design changes and/or modifications could void the weapon system warranty.

e. Performance requirements which cannot be validated because they are too difficult to quantify and/or measure should not be included in the weapon system warranty.

Recommendations

It is recommended that the Department of Defense should design future weapon system warranties which provide the maximum benefit for the government and also preclude unreasonable avoidance of the weapon system warranty. The Air Force Contract Law Center's suggested systems level warranty clauses attached as Appendix A is a good initial effort to accomplish these objectives. Therefore, it is also recommended that the Department of Defense use these clauses, perhaps as modified because of additional study and experience, when designing future weapon system warranties. Specific criteria, which support these recommendations are:

a. Design the "Limitation and Exclusions" part of the warranty clause in Appendix C where changes made or equipment installed to a weapon system does not require the contractor's written agreement that such change or installation will not void its warranty.

b. Performance requirements and testing of new weapon systems should be heavily emphasized and fully guaranteed by a weapon system warranty during the aircraft design phase.

This establishes warranty requirements early on instead of after the fact. Therefore, weapon system quality is incorporated during early design, which can be adhered to during the production of the weapon system.

c. The weapon system warranty should include provisions which require that GFP/GFE shall be thoroughly inspected jointly by government and contractor personnel in advance to ensure suitability for use, including age of items, to prevent defect and/or failure of any part of the weapon system during the warranty period.

d. The government should design weapon system warranty provisions, which can be added to the original weapon system warranty to incorporate contractor recommended weapon system changes and/or modifications that may be needed.

e. Only include performance requirements, which are quantifiable and measureable in the weapon system warranty.

Areas for Future Research

a. A study of the initial effect of the weapon system warranty on the quality of a new major USAF weapon system acquisition such as the C-17, which has performance requirements primarily in lieu of design requirements.

b. A study to derive a computer based method to accomplish a cost-benefit analysis on weapon system warranties.

c. A study of the effects of the weapon system warranty on the prime contractor's subcontracting policies

when the weapons system warranty requires the prime contractor to be responsible for the subcontractors work.

Appendix A: Air Force Contract Law Center Suggested Systems
Level Warranty Clauses

WARRANTY OF WEAPON SYSTEMS UNDER 10 U.S.C. SS2403 (JAN 1985)

(a) Definitions.

"Acceptance," as used in this clause, means the execution of an official document (e.g., DD Form 250) by an authorized representative of the Government by which the Government assumes for itself, or as an agent of another, ownership of existing and identified supplies, or approves specific services rendered, as partial or complete performance of the contract.

"Correction," as used in this clause, means the elimination of a defect.

"Defect," as used in this clause, means any condition or characteristic, in any supplies or services furnished by the Contractor under the contract, that is not in compliance with the requirements of the contract.

"Supplies," as used in this clause, means the end items furnished by the Contractor and related services requirements under this contract. Except when this contract includes the clause entitled "Warranty of Technical Data", supplies also means "data."

(b) Specific Warranties. The contractor hereby warrants--

(1) Design/Manufacturing Conformance Warranty.

For*....., that line items(s), will conform to all design and manufacturing requirements specifically delineated in this contract (including but not limited to all specifications and statements of work), and in any amendments thereto. Design and manufacturing requirements include, but are not limited to, all structural and engineering plans and manufacturing particulars, including, but not limited to, precise measurements, tolerance, materials, processes and finished product tests for the item being produced.

[*Specify time periods(s) for duration of warranty.]

(2) Material and Workmanship Warranty.

For*....., that line item(s), at the time of delivery, are free from all defects in materials and workmanship.

[* Specify time period(s) for duration of warranty.]

(3) Essential Performance Warranty

For*....., that line item(s) will conform to the essential performance requirements for such item(s) as specifically delineated in this contract and in any amendments thereto. For purposes of this warranty, the essential performance requirements are delineated as follows:

For line item :
[delineate performance requirements]
For line item :
[delineate performance requirements]

[*Specify time period(s) for duration of warranty. If line item has no essential performance requirements (e.g., pure build-to-print), delete this paragraph.]

(4) Other Performance Warranty:

For*....., that line item(s) and each component thereof conform to all other performance requirements for such items delineated in this contract and any modifications thereto.

[Specify time period(s) for duration of warranty. If a warranty is not desired on the other performance requirements, delete this paragraph.]

(c) Contractor's obligations.

(1) The Contractor's warranties under this clause shall apply only to those defects discovered by either the Government or the Contractor during the period specified (as applicable) in (b)(1), (b)(2), (b)(3), and/or (b)(4) above.

(2) If the Contractor becomes aware at any time before acceptance by the Government (whether before or after tender to the Government) that a defect exists in any supplies or services, the Contractor shall (i) promptly correct the defect or (ii) promptly notify the Contracting Officer, in writing, of the defect, using the same procedures prescribed in paragraph (c)(3) of this clause.

(3) If the Contracting Officer determines that a defect exists in any of the supplies or services accepted by the Government under this contract, the Contracting Officer shall promptly notify the Contractor of the defect, in writing within [Contracting Officer shall insert the specific period of time in which notice shall be given to the Contractor; e.g., "30 days after delivery of the nonconforming supplies;" "90 days of the last delivery under this contract;" or "90 days after discovery of the defect."]

Upon timely notification of the existence of a defect in accepted supplies or services, the Contractor shall submit to the Contracting Officer, in writing within....[Contracting Officer shall insert period of time] a recommendation for corrective actions, together with supporting information in sufficient detail for the Contracting Officer to determine what corrective action, if any, shall be undertaken. When, pending completion of corrective action to eliminate a defect, the Contracting Officer determines that an interim repair or replacement is necessary to maintain continued weapon system operation, the Contracting Officer may direct the Contractor, in addition to and concurrent with the development of recommendation and corrective action, to provide immediate interim repairs or replacements as necessary to allow continued weapon system operation.

(4) The Contractor, notwithstanding any disagreement regarding the existence of, or responsibility for, a defect, shall promptly comply with any timely written direction from the Contracting Officer to correct or partially correct a defect, at no increase in the contract price. If it is later determined that an alleged defect is not a defect subject to these warranties, the contract price will be equitably adjusted.

(5) The Contractor shall also prepare and furnish to the Contracting Officer data and reports applicable to any correction required under this clause (including revision and updating of all other affected data called for under this contract at no increase in the contract price).

(6) In the event of timely notice of a decision not to correct or only to partially correct, the Contractor shall submit a technical and cost proposal within....[Contracting Officer shall insert period of time] to amend the contract to permit acceptance of the nonconforming supplies or services in accordance with the revised requirement, and an equitable reduction in the contract price shall promptly be negotiated by the parties and be reflected in a supplemental agreement to this contract.

(7) Any supplies or parts thereof corrected or furnished in replacement and any services reperformed shall also be subject to the conditions of this clause to the same extent as supplies or services initially accepted. The warranties, with respect to these supplies, parts, or services, shall be equal in duration to those set forth in

paragraph (b) of this clause, and shall run from the date of delivery of the corrected or replaced supplies.

(8) If the Government returns supplies to the Contractor for correction or replacement under this clause, the Contractor shall be liable for transportation charges up to an amount equal to the costs of transportation by the usual commercial method of shipment from the place of delivery specified in this contract (irrespective of the f.o.b. point or the point of acceptance) to the Contractor's plant and return to the place of delivery specified in this contract. The Contractor shall also bear responsibility for the supplies while in transit.

(d) Remedies available to the Government.

(1) The rights and remedies of the Government provided in this clause--

(i) Shall not be affected in any way by any terms or conditions, of this contract, concerning the conclusiveness of inspection and acceptance;

(ii) Are in addition to, and do not limit, any rights afforded to the Government by any other clause of this contract; and

(iii) Shall survive final payment.

(2) Within.... [Contracting Officer shall insert period of time] after receipt of the Contractor's recommendations for corrective action and adequate supporting information, the Contracting Officer, using sole discretion, shall give the Contractor written notice not to correct any defect, or to correct or partially correct any defect within a reasonable time at [Contracting Officer shall insert locations where corrections may be performed].

(3) In no event shall the Government be responsible for any extension or delays in the scheduled deliveries or periods of performance under this contract as a result of the Contractor's obligations to correct defects, nor shall there be any adjustment of the delivery schedule or period of performance as a result of the correction of defects unless provided by a supplemental agreement with adequate consideration.

(4) This clause shall not be construed as obligating the Government to increase the contract price.

(5) (i) The Contracting Officer shall give the Contractor a written notice as required in paragraph (d)(5) (ii) below, specifying any failure or refusal of the Contractor to - -

(A) Present a detailed recommendation for a corrective action as required by paragraph (c)(3) of this clause;

(B) Correct defects as directed under paragraph (c)(4) of this clause; or

(C) Prepare and furnish data and reports as required by paragraph (c)(5) of this clause.

(ii) The notice shall specify a period of time following receipt of the notice by the Contractor in which the Contractor must remedy the failure or refusal specified in the notice.

(6) If the Contractor does not promptly comply with the Contracting Officer's written notice in paragraph (d)(5)(i) of this clause or if the Contracting Officer elects not require the Contractor to take full corrective action under (d)(2) above, the Contracting Officer may by contract or otherwise--

(i) Correct the supplies or services; or

(ii) Replace the supplies or services, and if the Contractor fails to furnish timely disposition, instructions, the Contracting Officer may dispose of the nonconforming supplies for the Contractor's account in a reasonable manner, in which case the Government is entitled to reimbursement from the Contractor, or from the proceeds, for the reasonable expenses of care and disposition as well as for excess costs incurred or to be incurred;

(iii) Obtain applicable data and reports; and

(iv) Charge the Contractor for the costs reasonably incurred by the Government.

(7) The Contractor shall be liable for the reasonable cost of disassembly and/or reassembly of larger items when it is necessary to remove the supplies to be inspected and/or returned for correction or replacement.

(e) Exclusions.

(1) The Contractor shall not be responsible under this clause for the correction of defects in Government-furnished property, except for defects in installation, unless the Contractor performs, or is obligated to perform, any modifications or other work on such property. In that event, the Contractor shall be responsible for correction of defects that result from the modifications or other work on such property.

(2) Except as otherwise specified in this contract, combat damage is not covered by these warranties to the extent the defect in the question is proximately caused by such combat damage.

(f) Limitations.

(1) These warranties will not, in any way, be voided by any Government performed repair accomplished in

accordance with standard Military Service maintenance procedures, of any item, or component thereof, covered by these warranties.

(2) The warranty provisions of this clause do not cover liability for loss, damage, or injury to third parties, nor do they cover consequential damages.

(3) All implied warranties of merchantability and "fitness for a particular purpose" are excluded from any obligation under this contract.

(g) Price of Warranties.*

(1) It is agreed that, with respect to the following line items the amounts indicated represent the portion of the contract price attributable to warranties under this clause:

Line Item	Total Price of All Warranties Under This Clause	Portion Attributable To Design Manufacturing Warranty	Portion Attributable To Material/Workmanship Warranty	Portion Attributable To Essential Performance Warranty	Portion Attributable To Other Performance Warranty
....	\$	\$	\$	\$	\$

(2) In the event any amendments or other changes to this contract affect Contractor's costs of warranty compliance, the contract price, and price reflected in (g) (1) above, will be equitably adjusted, upward or downward, in accordance with the "changes" clause of this contract.

[* This paragraph may be used when the warranty is not a separately priced line item]

(h) Resolution of Conflicts.

In the event a requirement under the Design/Manufacturing Conformance Warranty conflicts with a warranted performance requirement, the Contractor shall promptly inform the Contracting Officer of such conflict and, at no increase in contract price, provide the Contracting Officer with any design/manufacturing or other changes necessary to ensure compliance with warranted performance requirements. Upon Contracting Officer approval of such proposed changes, they shall, unless otherwise directed by the Contracting Officer, be implemented, at no increase in contract price, for all affected supplies or services purchases under this contract.

[This optional paragraph is appropriate for use where the contractor has responsibility for item design.]

(End of Clause)

ALTERNATE I (JAN 1985). For those contracts in which it is not desired to specifically identify all Design/Manufacturing Requirements and/or all Essential Performance requirements. Either one or both of the following alternatives to paragraphs (b)(1) and (b)(3) may be used.

(1) Design/Manufacturing Conformance Warranty.

For*....., that line items....will conform to all design and manufacturing requirements specifically delineated in this contract and in any amendments thereto. Such specifically delineated design and manufacturing requirements shall be deemed to include all such requirements specified in the Statement of Work, specifications and other provisions of this contract and any amendments thereto, but do not include any design or manufacturing provisions expressly stated to be a goal or objective, provided that, unless the word "goal" or "objective" is expressly used in connection therewith, it shall be deemed a requirement subject to this clause. Design and manufacturing requirements include, but are not limited to, all structural and engineering plans and manufacturing particulars, including but not limited to, precise measurements, tolerances, materials, processes and finished product tests for the items being produced. [* Specify time period(s) for duration of warranty.]

(3) Essential Performance Warranty.

For*.....that line items.....will conform to the essential performance requirements for such item(s) as specifically delineated in this contract and in amendments thereto. For the purposes of the essential performance warranty, the "essential performance requirements" referred to are all those performance requirements delineated in the Statement of Work, specifications and other provisions of this contract and amendments thereto. Such "essential performance requirements" do not, however, include any performance provision expressly stated to be a goal or objective, provided that, unless the word "goal" or "objective" is expressly used in connection therewith, it shall be deemed a requirement subject to this clause.

[Specify time period(s) for duration of warranty.]

ALTERNATE II (JAN 1985). IF a fixed-price incentive contract is contemplated, add a paragraph substantially the same as the following paragraph (d)(8) to the basic clause:

"(8) All costs incurred or estimated to be incurred by the Contractor in complying with this clause shall be considered when negotiating the total final price under the Incentive Price Revision Clause of this contract. After establishment of the total final price, Contractor complies with this clause shall be at no increase in the total final price. Any equitable adjustments made under paragraph (c)(6) of this clause shall be governed by the paragraph entitled "Equitable Adjustments Under Other Clauses" in the Incentive Price Revision Clause of this Contract."

Appendix B: Original C-130 Warranty Clause(s) (Prior to 21 November 1985 and Still Applicable for Coast Guard and Foreign Military Sales Aircraft after 21 November 1985)

552M. WARRANTY OF SUPPLIES

(a) Definitions.

(1) Acceptance: The work "acceptance" as used herein means the execution of the Acceptance Block and signing of a Form DD 250 by the authorized Government representative.

(2) Supplies: The work "supplies" as used herein means the end item furnished by the Contractor and any related services required under this contract. The work does not include technical data.

(b) Warranty. The Contractor warrants that at the time of acceptance all supplies furnished under this contract will be free from defects in material and workmanship and will conform with the specifications and all other requirements of this contract; provided, however, that with respect to Government-furnished property, the Contractor's warranty shall extend only to its proper installation, unless the Contractor performs some modification or other work on such property, in which case the Contractor's warranty shall extend to such modification or other work.

(c) Remedies.

(1) Right to Corrective or Replacement Action. In the event of a breach of the Contractor's Warranty in paragraph (b) above, the Government may, at no increase in contract price, (A) require the Contractor, at the place of delivery specified in the contract (irrespective of the f.o.b. point or the point of acceptance) or at the Contractor's plant, to repair or replace, at the Contractor's election, defective or nonconforming supplies, or (B) require the Contractor to furnish at the Contractor's plant such materials or parts and installation instructions as maybe required to successfully accomplish the required correction. The Contractor shall also prepare and furnish to the Government data and reports applicable to any correction required under this clause (including revision and updating of all affected data called for under this contract) at no increase in the contract price. When correction or replacement is required, and transportation of supplies in connection with such correction or replacement is necessary, transportation

charges and responsibility for such supplies in transit shall be borne by the Government.

(2) Right to Equitable Adjustment. If the Government does not require correction or replacement of defective or nonconforming supplies or the Contractor is not obligated to correct or replace by reason of paragraph (f) below, the Government shall be entitled to an equitable reduction in the price of such supplies.

(d) Notification. Except as the notification period may be extended by paragraph (e), the Contractor shall be notified in writing of any breach of the warranty in paragraph (b) above within six (6) months after acceptance of nonconforming supplies. Within forty-five (45) days thereafter, the Contractor shall submit to the Contracting Officer a written recommendation as to the corrective action required to remedy the breach. After the notice of breach, but not later than forty-five (45) days after receipt of the Contractor's recommendation for corrective action, the Contracting Officer may in writing direct correction or replacement as set forth in paragraph (c) above, and the Contractor shall, notwithstanding any disagreement regarding the existence of a breach of warranty comply with such direction. In the event it is later determined that the Contractor did not breach the warranty in paragraph (b) above, the contract price will be equitably adjusted.

(e) Corrected or Replaced Supplies.

(1) Any supplies or parts thereof corrected or furnished in replacement pursuant to this clause shall also be subject to all provisions of this clause to the same extent as supplies initially delivered. The warranty with respect to such supplies or parts thereof shall be equal in duration to that set forth in (b) above and shall run from the date of delivery of such corrected or replaced supplies.

(2) With respect to such supplies, the period for notification of a breach of the Contractor's Warranty in paragraph (d) shall be six (6) months from the furnishing or return by the Contractor to the Government of the corrected or replaced supplies or parts thereof, or, in correction or replacement is effected by the Contractor at a Government or other activity, for six (6) months thereafter.

(f) Inability to Correct. The Contractor shall not be obligated to correct or replace supplies if the facilities, tooling, drawing, or other equipment or supplies necessary to accomplish such correction or replacement have been made unavailable to the Contractor by action of the Government. In the event that correction or replacement has been

directed, the Contractor shall promptly notify the Contracting Officer in writing of such non-availability.

(g) All implied warranties of merchantability and "fitness for particular purpose" are hereby excluded from any obligation contained in this contract.

(h) The rights and remedies of the Government provided in this clause are in addition to and do not limit any rights afforded to the Government by any other clause of the contract.

(DAR 7-105.7(b) and ASP/PMI, 1 Oct 81

Appendix C: Current C-130 Warranty Clause (Excluding Combat Talon, Foreign Military Sales, and Coast Guard Aircraft) after 21 November 1985

"40. SELECTION OF WARRANTY PROVISIONS

At such time as the Government considers peculiar conditions related to each individual option buy as stated in Special Provision 2, OPTIONS, subparagraph (g), the Government may select or not select and negotiate an equitable adjustment for one of the following warranty provisions:

a. For FMS and U.S. Coast Guard -- Special Provision 552M, "Warranty of Supplies" or

b. For DOD Weapons Systems (i.e., U.S. Air Force, U.S. Air National Guard/Air Reserve Forces, U.S. Marine Corps), the following provision:

WARRANTY OF WEAPON SYSTEMS UNDER 10 U.S.C. 2403 (JAN 1985)

(a) Definitions

(1) Acceptance: The word "acceptance" as used herein means the execution of the Acceptance Block and signing of a Form DD 250 by the authorized Government representative.

(2) Supplies: The work "supplies" as used herein means the end item furnished by the Contractor and any related services required under this contract. The work does not include technical data.

(b) Warranty

The Contractor warrants that at the time of acceptance all supplies furnished under this contract will be free from defects in material and workmanship, will conform to the design and manufacturing requirements specifically delineated in paragraph (b) (i) hereof (or in any amendment to this contract), and will conform to the essential performance requirements specifically delineated in paragraph (b) (ii) hereof (or in any amendment to this contract) provided, however, that with respect to Government-furnished property, the Contractor's warranty shall extend only to its proper installation, unless the Contractor performs some modification or other work on such property, in which case the Contractor's warranty shall extend to such modification or other work.

(i) Design and Manufacturing Requirements

Such requirements are those specified in Detail Specification ER/S-7103M dated 2 April 1984, as amended by Lockheed letter L84H1131 dated 15 May 1984, and, with the exception of the following Essential Performance Requirements under paragraph (ii), below, do not include any design or manufacturing characteristic expressly stated to be estimated, a goal, an objective, or a guide. Manufacturing requirements do not include "how to" information.

(ii) Essential Performance Requirements

Guaranteed performance of the airplane at 155,000 pounds, take-off gross weight with an operating weight 76,419 pounds on a standard day as defined in MIL-C-5011A shall be as follows:

- | | |
|--|---------------|
| (a) Take-off over 50 foot obstacle,
sea level | 5,500 Feet |
| (b) Take-off ground roll, sea level | 4,000 Feet |
| (c) Landing over 50 foot obstacle, at
130,000 pounds landing weight, sea
level | 2,550 Feet |
| (d) Landing ground roll at 130,000
pounds landing weight, sea level | 1,500 Feet |
| (e) Rate of climb at sea level with
maximum continuous power, 4 engines,
155,000 pounds, landing gear and
flaps retracted | 1,800 Ft/Min |
| (f) Service ceiling, maximum continuous
power 4-engines 147,000 pounds | 27,500 Feet |
| (g) Rate of climb at sea level with
one engine inoperative, maximum
continuous power, 3-engines,
147,000 pounds | 1,050 Ft/Min |
| (h) Service ceiling with one engine
inoperative, maximum continuous
power, 147,000 pounds | 19,000 Feet |
| (i) Power off stalling speed at 150,000
pounds weight in the take-off
configuration, U ST | 113 Knots EAS |

- (j) Power off stalling speed at 130,000 pounds weight in the landing configuration U SL 98 Knots EAS
- (k) Cruising speed at a weight of 100,000 pounds at 25,000 feet with maximum continuous power 330 Knots IAS
- (l) Maximum range with 45,858 pounds of fuel and 32,723 lbs. of payload at long range cruise at the maximum continuous power cruise ceiling, 4,382 pounds MIL-C-5011 reserve fuel 2,750 N. Mi.

(c) Remedies

(1) Right to Corrective or Replacement Action.

In the event of a breach of the Contractor's Warranty in paragraph (b) above, the Government may, at no increase in contract price, (a) require the Contractor, at the place of delivery specified in the contract (irrespective of the f.o.b. point or the point of acceptance) or at the Contractor's plant, to repair or replace, at the Contractor's election, defective or nonconforming supplies, or (b) require the Contractor to furnish at the Contractor's plant such materials or parts and installation instructions as may be required to successfully accomplish the required correction. The Contractor shall also prepare and furnish to the Government data and reports applicable to any correction required under this clause (including revision and updating of all affected data called for under this contract) at no increase in the contract price. When correction or replacement is required, and transportation of supplies in connection with such correction or replacement is necessary, transportation charges and responsibility for such supplies in transit shall be borne by the Government.

(2) Right to Equitable Adjustment.

Except as provided in (f) below, if the Government does not require correction or replacement of defective or nonconforming supplies, the Government shall be entitled to an equitable reduction in the price of such supplies.

(d) Notification.

Except as the notification period may be extended by paragraph (e), the Contractor shall be notified in writing of any breach of the warranty in paragraph (b) above within six (6) months after acceptance of nonconforming supplies.

Within forty-five (45) days thereafter, the Contractor shall submit to the Contracting Officer a written recommendation as to the corrective action required to remedy the breach. After the notice of breach, but not later than forty-five (45) days after receipt of the Contractor's recommendation for corrective action, the Contracting Officer may in writing direct correction or replacement as set forth in paragraph (c) above, and the Contractor shall, notwithstanding any disagreement regarding the existence of a breach of warranty comply with such direction. In the event it is later determined that the Contractor did not breach the warranty in paragraph (b) above, the contract price and any other affected provisions of this contract will be equitably adjusted.

(e) Corrected or Replaced Supplies.

(1) Any supplies or parts thereof corrected or furnished in replacement pursuant to this clause shall also be subject to all the provisions of this clause to the same extent as supplies initially delivered. The warranty with respect to such supplies or parts thereof shall be equal in duration to that set forth in (d) above and shall run from the date of delivery of such corrected or replaced supplies.

(2) With respect to such supplies, the period for notification of a breach of Contractor's Warranty in paragraph (d) shall be six (6) months from the furnishing/return by the Contractor to the Government of the corrected or replaced supplies or parts thereof, or, if correction or replacement is effected by the Contractor at a Government or other activity for six (6) months thereafter.

(f) Inability to Correct.

The Contractor shall not be obligated to correct or replace supplies if the facilities, tooling, drawings, or other equipment or supplies necessary to accomplish such correction or replacement have been made unavailable to the Contractor by action of the Government unless such facilities, tooling, drawings, or other equipment or supplies are made available within a reasonable period of time. In the event that correction or replacement has been directed, the Contractor shall promptly notify the Contracting Officer in writing of such non-availability.

(g) Limitations and Exclusions

(1) The warranties set forth in (b) above do not apply to combat damage, acts of God, or acquisition for FMS, U.S. Coast Guard or NASA, nor shall the Contractor be liable for loss, damage or injury to third parties.

(2) The said warranties do not apply to any failures or defects caused by negligence or failure of Government personnel to operate and maintain aircraft delivered hereunder in accordance with procedures contained in the applicable technical manuals or by changes made or equipment installed without Contractor's written agreement that such change or installation will not impair its warranty obligations.

(3) The said warranties will not be subject to demonstration prior to delivery and acceptance of any aircraft ordered hereunder unless such demonstration is authorized and funded under the clause hereof entitled "Changes".

(h) Revision of Warranties

The Essential Performance requirements set forth in (b)(ii) above are for the baseline C-130H, version code 18B identified in (b)(i) above, as adjusted in the configuration peculiars order to reflect model variation as follows:

* (To be filled in as a result of peculiars negotiation)

(i) In no event shall Contractor's liability to the Government under this clause exceed * (to be completed as a result of peculiars negotiation).

(j) All implied warranties of merchantability and "fitness for a particular purpose" are hereby excluded from any obligation contained in this contract.

(k) The rights and remedies of the Government provided in this clause are in addition to and do not limit any rights afforded to the Government by any other clause of the contract.

* NOTE: If implemented, sub-paragraphs (h) and (i) above will be completed in the definitive configuration peculiars orders.

Appendix D: C-130 Warranty Clause Applicable for Combat
Talon Aircraft

28. SUBCONTRACTOR WARRANTIES

In addition to any other warranty rights and remedies provided by this contract, the contractor shall (i) assure that all subcontractor warranties/guaranties, expressed or implied, applicable to the accessories, equipment and parts installed in or provided as a part of the (end item) purchased under this contract are fully available to, and for the benefit of, the Government for the lifetime of such warranties and (ii) promptly notify the PCO in writing upon acquisition of such warranties specifying the details thereof, such as the type of warranty, equipment warranted and duration thereof. Upon notification by the PCO the contractor shall enforce these warranties on behalf of the Government consistent with the PCO's direction and the terms of the applicable warranty so long as such warranties shall remain in effect.

The rights and remedies of the Government provided in this clause are in addition to and do not limit any rights afforded to the Government by any other clause of the contract. The Government specifically retains its rights under the "Correction of Deficiencies" and "Inspection" clauses hereof and this clause shall in no way abrogate the Government's rights thereunder.

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Captain Jiley Earl McNease was born 27 October 1955 in Colquitt, Georgia. He graduated from Jordan High School, Columbus, Georgia, in 1973. He received a bachelor of science degree from Troy State University, Troy, Alabama, in 1978. Following graduation, he was commissioned in the USAF through the Air Force Reserve Officer Training Corps program. He was assigned to the Base Contracting Division at Langley AFB, Virginia, where he served as an acquisition officer and later as chief of the Contract Repair Branch. In 1982, he was reassigned to the Air Force Plant Representative Office at Lockheed Georgia Company, Marietta, Georgia, where he served as a price analyst/negotiator and later as program manager of the C-141 Program. He remained at the Air Force Plant Representative Office until entering the School of Systems and Logistics, Air Force Institute of Technology, in 1985.

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This study examined what government imposed changes and/or modifications to the C-130 during the past five year period would have voided a weapon system warranty, had one been in effect (in accordance with current public laws) from the contractor's viewpoint. Specifically, it analyzed: (1) what criteria should be used to determine if a proposed change and/or modification has the potential to void the system level warranty, (2) whether performance guarantees would have been workable for the C-130, or would hostile and other actions have voided such a warranty, and (3) how the present weapon system warranty clauses should be designed to preclude contractor avoidance and still protect the government's interest.

Literature review addressed the Federal Acquisition Regulation, which covered warranties in general terms prior to the requirement of a weapon system warranty; the Weapon Systems Warranty Act (Public Law 98-212); and the Weapon Systems Warranty Act modifications (Public Law 98-525).

Findings were gathered using an unstructured personal interview approach from the contractor personnel.

Analysis revealed that designing of the weapon system warranties to preclude contractor avoidance and still protect the government's interest can work.

This study recommends that the Department of Defense use the Air Force Contract Law Center's suggested systems level warranty clauses, perhaps as modified because of additional study and experience, when designing future weapon system warranties.

END

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