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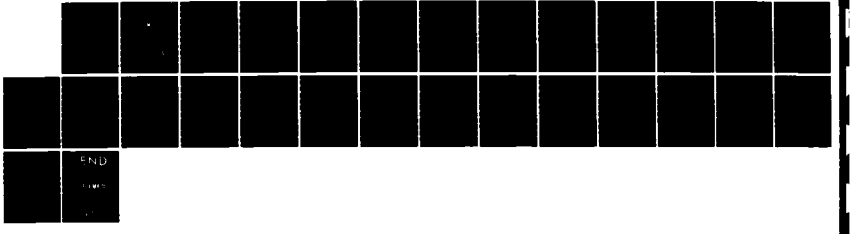

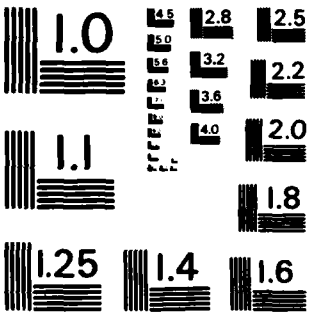

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AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

EVALUATION OF FAULT REPORTING/
FAULT ISOLATION FOR F-15 AIRCRAFT

Major Charles A. Mussari 85-1955

"insights into tomorrow"

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TITLE EVALUATION OF FAULT REPORTING AND FAULT ISOLATION FOR F-15 AIRCRAFT

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The F-15 Fault Reporting (FR) and Fault Isolation (FI) manuals were developed and fielded as debriefing and troubleshooting aids. The FR/FI manual system is generally not being used in the field. The purpose of this study is to determine if the accuracy of the FR/FI system is a factor in their non-use.

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PREFACE

The Air Force fielded a new technical data system which has not been fully accepted by maintenance personnel. This study specifically focuses on the accuracy of the systems technician manuals as they relate to acceptance of the system.

Although many people graciously provided time from their busy schedules to help and advise me, several persons deserve special recognition. First, I want to thank Colonel George B. Schmoyer, 33rd TFW, Deputy Commander for Maintenance, Eglin AFB, Florida for his kindness in allowing me the use of his facilities and people to conduct this study. MSgt Albert King and SSgt Paul Hay, 58th AMU Debriefing for willingly providing their time and service to assist me in the debriefing function. SSgt Richard Mascolo, 33rd Quality Assurance, who took the time and effort to help me gather the data to conduct this study. MSgt Horst Walters, 58th AMU Production Supervisor for Flightline Maintenance who allowed me time from his very busy day, to observe operations and interview his maintenance technicians.

A special thanks goes to Mr. Charles Weaver, Wright-Patterson AFB, Ohio for suggestions and help in providing historical data. Finally, my thanks and appreciation go to Mr. Robert Hagar, Branch Manager, Support Data Engineering, McDonnell Aircraft Company, for help in locating background material used in this study.

This analysis, although limited in scope, provides a basis upon which senior Air Force managers can develop an approach to solving the problem. Recommendations presented should not be considered all-inclusive. Additional analyses will be required to adequately address the entire problem and derive a total solution.

ABOUT THE AUTHOR

Major Charles A. Mussari is a career aircraft maintenance officer with extensive experience in flightline operations.

His experience levels include duty as a Flightline Maintenance Officer, Section OIC, and Job Control Officer at Bitburg AB, FRG. He was a Field Maintenance Supervisor and Maintenance Control Officer at Aviano AB, Italy. Prior to attending the Air Command and Staff College, he served a three year tour at HQ TAC, Langley AFB, VA. Initially assigned as an action officer in the Fighter Division, he was later moved to the Avionics Division, serving as a branch chief. He holds a Bachelor of Science degree from the University of Nebraska with a major in Business Management. He earned a Master of Science degree in Business Management from Troy State University. Additionally, he has completed the Staff Maintenance Officers Course and the Munitions Crossover Course. Major Mussari's professional military education includes Squadron Officers School in residence and Air Command and Staff College by correspondence.

ABSTRACT

We set out to see if the accuracy of the FR/FI manuals is a factor in their non-use. Accuracy of the manuals was determined by analyzing actual reported inflight discrepancies. Fault code accuracy was obtained by comparing each discrepancy as written on the TAC Form 122 (Debriefing Record) with the discrepancy depicted in the FR manual. Accuracy of repair actions was obtained by tracking the repair action recommended by the fault isolation manual and comparing it with that shown on the TAC Form 122.

Our analysis revealed the F-15 fault reporting manual can accurately represent a random inflight malfunction 83.8% of the time, and these malfunctions can be accurately isolated in the fault isolation manual 77.7% of the time. These accuracy levels are acceptable and not a major factor in the non-use of the manuals. Observation of the debriefing and maintenance process, and interviews with aircrews and maintenance technicians, revealed a general lack of understanding and confidence in the FR/FI system. This lack of understanding and confidence, exhibited by both aircrews and maintenance personnel is the primary reason for the system's non-use.

We recommend actions to show the effectiveness of using the system as designed.

EXECUTIVE SUMMARY

For years maintenance technicians have complained about difficulty in comprehending technical manuals. This problem has worsened as more sophisticated technology is incorporated in our modern aircraft. The Air Force conducted earlier studies of the technical manual system to determine how the usability of technical manuals could be improved.

A new technical order specification, MIL-M-83495, was published by USAF in 1977. This specification contained requirements designed to resolve the usability problems. Fault reporting (FR) and fault isolation (FI) manuals were produced as part of MIL-M-83495. The FR/FI manuals are concerned with improving inflight malfunction reporting and troubleshooting. However, a continuing problem of high cannot duplicate (CND), repeat and recurring write-ups, coupled with large shop backlogs, indicates serious problems still exist in debriefing, troubleshooting, and repairing the F-15 aircraft. During recent visits to several TAC F-15 bases, we observed the FR/FI manuals are generally not being used. Contacts with HQ TAC and other MAJCOMs confirmed poor use of the manuals.

The purpose of this study was to ascertain if the accuracy of the FR/FI manuals was a factor in their non-use. Accuracy of the manuals was determined by analyzing actual reported inflight discrepancies. Fault code accuracy was obtained by comparing each discrepancy as written on the TAC Form 122 (Debriefing Record) with the discrepancy depicted in the FR manual. Accuracy of repair actions was obtained by tracking the repair action recommended by the fault isolation manual and comparing it with that shown on the TAC Form 122.

The results of this analysis revealed that the F-15 fault reporting manual can accurately represent inflight malfunctions 83.8% of the time, and these malfunctions can be accurately isolated in the fault isolation manual 77.7% of the time. These accuracy levels are considered acceptable and should not be a major factor in the non-use of the manuals. Observation of the debriefing and maintenance process, and interviews with aircrews and maintenance technicians, revealed a general lack of understanding and confidence in the FR/FI system. This lack of understanding and confidence, exhibited by both aircrews and maintenance personnel is the primary reason for the system's non-use.

We recommend actions to show the effectiveness of using the system as designed.

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CHAPTER ONE

HISTORY

Aircraft Maintenance technical orders (TOs) serve as the maintenance information link between engineers and technicians. Since they have a direct effect on every aspect of the Air Force flying mission, it is essential these manuals be clear, logical, and understandable.

Over the years, maintenance technicians have frequently expressed their dissatisfaction with maintenance TOs. A common complaint has been the technical orders are difficult to understand and use. This problem of comprehension has been made even more difficult with the increasing complexity of our military aircraft resulting in a greater degree of complexity in the technical orders. The unfortunate result is that while the need for technical manuals has increased, their usability has decreased.

The Air Force has been aware of this TO problem for many years. As early as 1962 the Air Force began an effort to empirically analyze the basis for maintenance technician complaints. A formal study, conducted by the Aerospace Medical Research Laboratories (August 1962), examined all phases of the TO system. The purpose was to gain insight into how the technical manuals and their usability could be improved.

The study involved use of a questionnaire to measure attitudes and opinions of maintenance technicians. Other issues of concern were the readability, usability, acceptability, and frequency of use of TOs. The questionnaire was administered to 2,300 technicians in 19 Air Force organizations. The basic findings were: (a) TOs were used as a primary training text, and (b) TOs should be reorganized and/or restructured to be more comprehensive and useful. The study suggested such a reorganization could be accomplished by using step-by-step instructions, detailed illustrations, and proceduralized formats, in contrast to conventional TO formats which present technical data in long paragraphs with few supporting illustrations (1:5).

A second study was conducted in 1975 by the Air Force Human Resources Laboratory, Advanced Systems Division, Wright-Patterson AFB, Ohio. The major questions addressed in this study were:

a. Have the problems with TOs changed or remained the same as in 1962?

b. What, if any, improvements have occurred in TOs since 1962?

c. How can TOs be improved?

The study included 248 flightline and shop maintenance technicians assigned to maintain C-141 aircraft at Charleston AFB, SC and Norton AFB, CA. The subjects were representative of typical Air Force wing aircraft maintenance units in terms of AFSC, grade level, and experience level. The 1975 study employed the same questionnaire and procedures used in the 1962 study. The only major modification was the use of a smaller and more restricted sample.

The overall results of the 1962 and 1975 surveys were similar; for many questions, the results were almost identical (2-2).

These findings are significant as they indicate little change in attitude toward TOs from 1962 to 1975. Several aspects of the data suggested TOs were not fulfilling important and vital maintenance functions, such as maintenance troubleshooting. For example, 51% of the maintenance personnel surveyed in 1962 indicated TOs were adequate for troubleshooting, while only 37% so indicated by 1975. Also, estimates of TOs use in troubleshooting tasks declined by 10% to 15%. This was accompanied by an increase in the judged need for TO improvement from 66% in 1962 to 79% in 1975. Overall, the opinions of maintenance personnel indicated TOs had not improved over the past 13 years. In fact, TOs had deteriorated (2-4). In an attempt to develop clearer, more understandable TOs, a new specification (MIL-M-83495 - Manuals, Technical, Organizational Maintenance Manual Set) was published. It was dated 1 May 1977, and all new aircraft maintenance repair manuals published thereafter were to comply with this new specification (2:4-7). The new specification contained requirements designed to resolve complaints uncovered in the 1962 and 1975 studies.

MIL-M-83495 arranges maintenance data into broad categories, which when put together, create an "organizational maintenance manual set" required for aircraft maintenance. Seven distinct types of manuals result from this arrangement: general vehicle manual, general systems manuals, fault reporting manual, fault isolation manuals, schematic diagram manuals, wiring data manuals, and job guide manuals (3:5).

The fault reporting and fault isolation manuals published for the F-15 aircraft are the focus of this analysis. The fault reporting (FR) and fault isolation (FI) manuals are concerned with improving inflight malfunction reporting, improvement of operations/maintenance communications, and improved troubleshooting of reported discrepancies. MIL-M-83495 placed great emphasis on the benefits of thorough problem analysis. The fault manuals placed emphasis on the debriefing function. The purpose of these manuals was to help both the pilot and the maintenance debriefer more clearly define aircraft malfunctions that occurred during flight.

Because of its role in the communications process, the FR manual is of major concern to the pilot and the maintenance debriefer. The FR manual helps the aircrew and debriefer define the aircraft malfunction and develop a "fault code." Careful development of the fault code during a comprehensive and conscientious debriefing process ensures the inflight malfunction is properly identified. This fault code is the key to the efficient operation of the FR/FI system. The F-15 FR manual has a three-part master symptom index which correlates malfunctions to "fault description" tables. All three indexes lead directly to the heart of the FR manual, i.e., the fault description tables. When the pilot and the debriefer, using any of the three indexes, identify the system that is malfunctioning, they turn to the identified fault description table. The fault description table contains statements which direct them to additional pilot observations to help pinpoint the fault. With this accomplished, the second step in the procedure begins. This involves the maintenance technician and the fault isolation manuals. There is one FI manual provided for each major aircraft system. The technician works with the

fault code developed by the pilot and debriefer. The fault code directs the technician to a specific "yes/no" logic tree. By following the logic tree, the technician can troubleshoot the system and pinpoint the specific item causing the malfunction (4:2).

From inception, it was believed, if the above procedures were followed, the F-15 FR/FI system would result in a more structured pilot-debriefer interface for fault description. This, in turn, would provide a more accurate assessment of the malfunction, which would result in improved troubleshooting. Improved troubleshooting leads to less maintenance repair time, better use of spare parts, quicker aircraft turn-around, and greater sortie rates. The new F-15 technical orders, conforming to MIL-M-83495, were delivered to the USAF on 15 Sep 81 and were implemented 1 Nov 81 (4:1).

A continuing problem of high cannot duplicate (CND), repeat and recurring write-ups, retest OK (RTOK) rates, coupled with large shop backlogs indicated deficiencies still existed in the debriefing, troubleshooting, and repair of aircraft weapons systems. As a result, four people assigned to the Air Force Logistics Management Center (AFLMC) visited seven TAC F-15 and F-16 bases to determine the problem. The team observed that FR/FI manuals were generally not being used. Subsequent contact with HQ TAC and other MAJCOMs confirmed the F-15 FR/FI manuals were poorly used throughout the Air Force.

CHAPTER TWO

STUDY METHOD

The data source used in this report consists of 198 inflight discrepancies recorded on TAC Forms 122 over a 30-day period. The sample represents 13 of the 19 F-15 aircraft systems listed in TO 1F-15A-2-00 FR-00-1. The 33rd Tactical Fighter Wing, Eglin AFB, Florida was selected because of its close proximity to the Air Command and Staff College, Maxwell AFB, Alabama. The analysis process is described in this chapter.

FR/FI manuals were analyzed to determine if the manuals properly identified malfunctions described and repair actions taken. This was accomplished by comparing the inflight discrepancy entries and corrective repair entries made on the TAC Form 122 with those given in the manuals. The fault reporting manual was analyzed first (see Table 1). The analysis began by checking the aircraft discrepancy entered on the TAC Form 122 against the fault reporting manual to ensure it was accurately represented, and the proper fault code was applied. If a problem was found in either the accuracy of the discrepancy representation in the FR manual or fault code designation, it was recorded and is shown in the results as either "Improper Fault Code Applied - Code Available," or "Improper Fault Code Applied - Code Not Available." If no fault code was used or a general system code was used, i.e., coded ZZZX as the last four designators, and no adequate fault code could be found in the fault reporting manual, it is recorded in the results as "Not Coded - Code Not Available." (A complete explanation of Fault Code designators is at Appendix A). If a fault code was not applied but a proper fault code was found in the FR manual, it will be seen in the results as "Not Coded - Code Available." Discrepancies accurately represented and properly coded are shown in the results as "Accurate Discrepancies." The FR manual accuracy is represented by the percentage of those discrepancies accurately represented and properly coded in addition to those improperly coded or not coded but proper code available.

The FI manual's accuracy was analyzed by comparing the action taken to repair the discrepancies as depicted on the TAC Form 122 to the repair action suggested in the FI manuals. Of 198 total discrepancies, 130 were correctly coded from the FR manual and were reviewed (see Table 2). Those discrepancies improperly coded/described could not be analyzed for corrective action accuracy. The reason for this is, if the discrepancy was improperly described, it could not be found in the manuals. If the discrepancy was improperly coded, either the code could not be found in the manuals, or the code used was not associated with the discrepancy described. If the corrective action taken on the TAC Form 122 coincided with the repair action suggested by the FI manual, it is shown in the results as "action taken agrees." If the action taken on the TAC Form 122 differed from that listed in the FI manual it is shown as "action taken does not agree" in the results. Overall accuracy of the FI manuals is represented by the number of "action taken agrees" occurrences found from those discrepancies properly coded and represented in the FR analysis. A further breakdown of those discrepancies in the categories of: Improper Fault Code Applied - Code Available, Not Coded - Code Available, Improper Fault Code Applied - Code Not Available, and Not

Coded - Code Not Available, was accomplished to determine the number of repeats and recurrences. The results of this analysis is shown in Tables 2 through 6.

CHAPTER THREE

STUDY RESULTS

As mentioned in Chapter Two, the FR manual was analyzed first, followed by the FI manuals. The results are displayed on Tables 1 through 6. Percentage figures for the FR manual are based on the 198 TAC Forms 122 used for the analysis. Percent figures for the FI manuals are based on 130 of the 198 TAC Forms 122 that could be traced through the FR manual.

Problems and limitations encountered in the analysis will be discussed in Chapter Four.

The overall accuracy of the FR manual was 83.8%; 166 of the 198 discrepancies reported were found in the FR manual. There were 130 discrepancies analyzed for the FI manual; 101 (77.7%) of these contained corrective action that agreed with that recommended in the FI manual. The other 29 (22.3%) contained corrective action that differed from that recommended in the FI manual.

Tables 3 through 6 contain a breakout by aircraft system of those discrepancies either improperly coded or not coded. The tables also include the number of repeat and recur instances for each group.

Analysis revealed of the 101 disrepancies for which corrective action matched that shown in the FI Manual, only 11 (10.9%) were repeat/recur write-ups. On the other hand, of the 29 discrepancies for which corrective action did not match that of the FI manual, there were 8 (27.6%) repeat/recur write-ups.

Repeats and recurs tended to be higher in those cases where either an improper fault code or no fault code was applied. They also tended to be higher where the corrective action taken to repair the malfunction differed from that recommended in the FI manual.

TABLE 1
Fault Reporting Manual Results

FR Manual Results Based on 198 Actual Inflight Discrepancies Taken from TAC Form 122.

	Number of Occurrences	Percentage
a. Accurate Discrepancy	130	65.7%
b. Improper FC Applied - Code Available	25	12.6%
c. Not Coded - Code Available	11	5.5%
d. Improper FC Applied - Code Not Available	12	6.6%
e. Not Coded - Code Not Available	20	10.1%
Overall Accuracy of Fault Reporting Manual (a + b + c)	166	83.8%

NOTE: Overall accuracy is based on the total number of accurate discrepancies, plus those discrepancies that could have been coded properly, i.e., discrepancies that had an improper code applied but a proper code was available, plus those discrepancies that had no code applied but a code was available. This overall accuracy figure is even more impressive in light of the fact the FR manual is not always properly used in debriefing. The majority of the 166 discrepancies were coded by the maintenance debriefer after the formal debriefing was complete and the pilot had departed. It is possible this figure would be much higher had the manual been used as designed in the debriefing process.

TABLE 2
Fault Isolation Manual Results

FI Manual Results Based on 130 Accurate Discrepancies Taken From the 198 Original Inflight Discrepancies analyzed.

	Number of Occurrences	Percentage	Number of Repeat/Recur	%
Action Taken on TAC Form 122 Agrees With FI Manual	101	77.7%	11	10.9
Action Taken of TAC Form 122 Does Not Agree With FI Manual	29	22.3%	8	27.6
Totals	130		19	

NOTE: Of the 29 discrepancies in which the action taken on the TAC Form 122 did not agree with the fault isolation manual, 8 were repeat/recur. Of the 101 discrepancies whose corrective action taken agreed with that recommended in the FI manual, there were 11 occurrences of repeat/recur discrepancies.

TABLE 3

Breakout of Discrepancies With Improper Fault Code Applied - Good Code Available.

AIRCRAFT SYSTEM (System Number)	NUMBER OF OCCURRENCES	No. of Repeat/ Recur
Hydraulic System (2930)	2	
Flight Controls (2210)	1	
Weapons Control Radar (9471)	1	1 Rcr
AMAD (8320)	3	2 Rpt
Aircraft Engines (7100)	4	1 Rpt
Electrical (2400)	1	
Fuel System (2800)	2	1 Rpt
Fuel Quantity (2840)	2	
UHF Communication (2321)	3	1 Rpt
JFS (8011)	1	1 Rpt
Pitot Static System (3410)	1	
Inertial Navigation System (3440)	3	1 Rcr
ICMS	1	—
Totals	25	8

NOTE: These inflight discrepancies were improperly coded in maintenance debriefing; however, these discrepancies were accurately described in the FR manual, and proper fault codes were available. Of the 25 discrepancies in this category, there were 6 repeats and 2 recurring for a total of 8 (32%).

Table 4

Breakout of Discrepancies Not Coded - Code Available.

AIRCRAFT SYSTEM (System Number)	NUMBER OF OCCURRENCES	No. of Repeat/ Recur
Crew Escape (9520)	1	
Engine Augmentation (7100)	1	
Aircraft Engine (7100)	2	1 Rcr
Landing Gear System (3200)	2	1 Rpt
Fuel Quantity System (2840)	2	
IFF Transponder (3453)	1	
Hydraulic System (2930)	1	
Weapons Control Radar (9471)	1	—
Totals	11	2

NOTE: These discrepancies were not coded in maintenance debriefing, but upon analysis, were found to be accurately depicted in the FR manual, i.e., accurate fault codes were available. Of the 11 discrepancies in this category, there was 1 repeat and 1 recurring for a total of 2 (18%).

TABLE 5

Breakout of Discrepancies With Improper Fault Code Applied - Code Not Available.

AIRCRAFT SYSTEM (System Number)	NUMBER OF OCCURRENCES	No. of Repeat/ Recur
Jet Fuel Starter (8011)	4	1 Rpt
Landing Gear System (3200)	2	
Aircraft Engine (7100)	2	
Weapons Control Radar (9471)	1	1 Rpt
Fuel Quantity (2840)	1	
IFF Transponder (3453)	1	
Hydraulic System (2930)	1	
Air Conditioning/Pressurization (2130)	1	1 Rpt
Totals	13	3

NOTE: The inflight discrepancy described on the TAC Form 122 was not accurately described in the FR manual. Of the 13 discrepancies in this category, there were 3 repeats for a total of 23%.

TABLE 6

Breakout of Discrepancies Not Coded or General Code Used - Code Not Available.

AIRCRAFT SYSTEM (System Number)	NUMBER OF OCCURRENCES	No. of Repeat/ Recur
Landing Gear System (3200)	5	
Hydraulic System (3200)	7	1 Rpt
Flight Controls (2210)	2	
UHF Communications (2310)	1	
Fuel System (2800)	3	1 Rpt
Fuel Quantity (2840)	1	
Air Conditioning/Pressurization (2130)	1	—
Totals	20	2

NOTE: These discrepancies were not coded in maintenance debriefing. Analysis revealed the discrepancy was not contained in the FR manual. Of the 20 discrepancies in this category, there were 2 (10%) repeats.

CHAPTER FOUR

LIMITATIONS

The maintenance debriefing process is a dynamic face-to-face interchange. Much of the information passed between the pilot and debriefer is not transcribed to the debriefing forms. In the process of comparing the description of the discrepancy on the TAC Form 122 with those contained in the FR manual, it was frequently necessary to rely on judgment and experience. If the description of the fault on the TAC Form 122 was similar to that contained in the FR manual, it was counted as accurately represented. If the description on the TAC Form 122 differed substantially from that contained in the FR manual, it was classified as improperly coded. It is therefore acknowledged that a small margin of error may exist in the numbers and percentages shown in the properly and improperly coded categories.

A limitation existed in that the complete set of aircraft historical records were not available for this analysis. Discrepancies could not be traced to determine if the corrective action shown on the forms, whether or not in agreement with the FI manuals, effectively repaired the aircraft. Some repeat and recur write-ups were able to be traced in this limited file and they are shown in the tables at Chapter Three.

Problems and limitations not withstanding, and despite the small size, we feel confident our sample is representative of the total population. A total of 210 discrepancies were reviewed for this analysis. Twelve of these were removed because they did not fall into the category of inflight discrepancies. These were such things as broken, cracked or missing hardware. All other reported discrepancies were included in the study. During the course of this study other factors were observed that also contributed to the problem of non-use of the FR/FI manuals by pilots and maintenance technicians. These factors are discussed in the next chapter.

CHAPTER FIVE

CONCLUSIONS AND COMMENTS

This analysis revealed that the F-15 FR manual accurately represented an inflight malfunction 83.8% of the time. Further these inflight malfunctions could be accurately isolated in the FI manual 77.7% of the time. These accuracy levels are acceptable and should not be considered a major factor in their non-use. In fact, these percentages could possibly be increased if the system were used properly. This analysis also shows that use of the system could reduce repeat/recur discrepancy occurences. In this limited sample, a 53% reduction in repeat/recur discrepancies could have been realized had the FR/FI system been used properly. For example, of the 34 total repeat/recur occurences found in this survey, 18 were generated because personnel did not follow the book.

Based on the results of our study, accuracy of the manuals should not be the cause for the FR/FI system's non-use. However, there are other factors we believe are causal. While conducting this study, several pilots and maintenance technicians were interviewed regarding their opinions on the effectiveness of the FR/FI system. The pilots ranged in rank from lieutenant to colonel, the maintenance people from A1C to CMSgt.

Interviews with pilots revealed the following:

a. Most were unfamiliar with the system.

b. Most thought use of the FR manual for debriefing required an excessive amount of time. The standard debriefing process was still conducted as always; they were now expected to research inflight discrepancies in the FR manual.

c. Most thought using the FR manual added extra burden rather than benefit.

Maintenance interviews revealed the following:

a. The FI manuals did not cover a sufficient number of malfunctions.

b. Procedures for troubleshooting outlined in the FI manuals were excessively long and required too much time to complete.

c. Reliance on mechanic experience and system knowledge produced faster and better results.

d. Technicians expressed a general lack of confidence in the FI system.

Other factors uncovered which lead to the lack of confidence include:

1. Systems that have a built-in-test capability have fault indicators (like "latches" or lights) to indicate a possible system malfunction. To develop fault codes for these malfunctions, an AFTO Form 241 (BIT Fault Record) must

be correctly filled out. The aircrew is required to record (on the front of the form) the INS data, radar BIT matrix readouts, and any cockpit light indications. The crew chief completes the other side of the form during postflight inspection. The aircrew makes sure the debriefer gets the completed form. Debriefing observations over a two-day period produced only two occasions when this form was properly filled out and brought to debriefing by the pilot (3:1-2).

2. A review of 100 AFTO Forms 781A (Maintenance Discrepancy and Repair Forms) was conducted. Only 55 of these discrepancies contained a fault code entered on the form as part of the discrepancy.

Conclusions:

Users' perceptions of wasted time, additional burden, and doubt as to system capability, has created a lack of confidence in the FR/FI system.

Users have little confidence that credible benefits can be derived from using the system properly. The primary reason for non-use of the system lies in the lack of confidence and understanding in the system by both operations and maintenance personnel, not the accuracy of the manuals.

CHAPTER SIX

RECOMMENDATIONS

Lack of confidence and knowledge about the system, as displayed by personnel during the study is a prime cause for the FR/FI manuals non-use. The following recommendations are based on this premise.

In order to solve the non-use problem, action must be taken to establish confidence in the FR/FI system. If maintenance technicians can be shown the benefits derived from using the FR/FI system properly, the system will be accepted and used. To prove the system's benefits and establish its credibility, the following actions could be taken:

a. The NGB/LG and the AFLMC have agreed to conduct a controlled test of the FR/FI system at an F-15 unit. The test should be conducted, and the Operational Ready (OR), abort, cannibalization, repeat, and recur rates should be compared with those of a comparable F-15 unit. (OPR: NGB/LG) (OCR: AFLCM/CC)

b. Publish the results derived from using the FR/FI system through Air Force media and ensure wide dissemination. (OPR: AFLMC/CC)

c. Review the training programs for aircrews and maintenance personnel on use and value of the FR/FI system. Include the results of the test in these training programs. (OPR: HQ TAC/LG)

d. Advise TAC F-15 units of the potential results documented in this report.

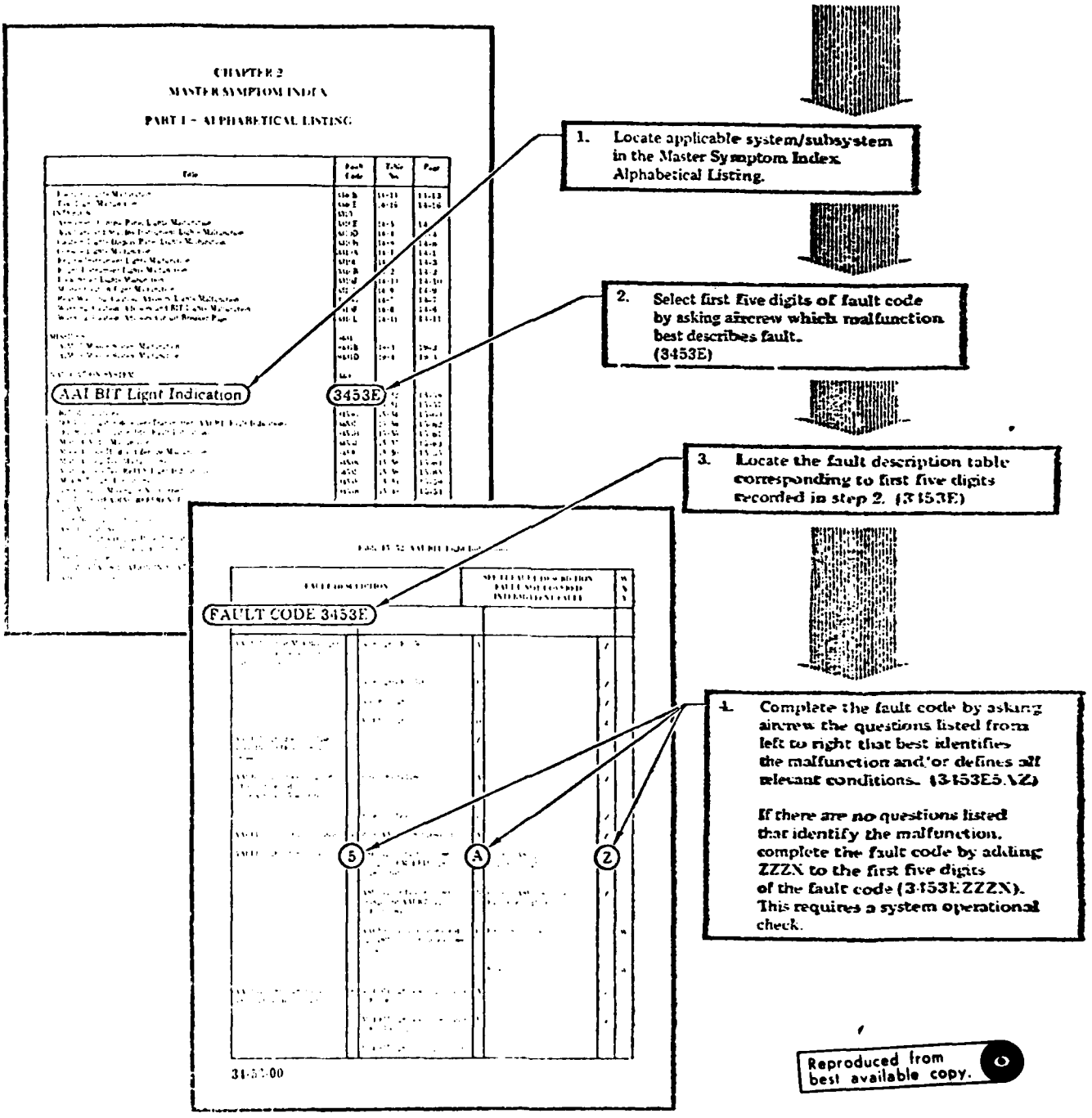
(1) Prepare an easy-to-understand summary. (OPR: AFLMC/LGM)

(2) Distribute the summary to operational and maintenance units within the TAC. (OPR: HQ TAC/LG)

A severe lack of confidence and understanding of the FR/FI system has negated the benefits this system was expected to produce. These recommendations will establish the confidence and understanding necessary to bring the system to full use, and achieve higher aircraft availability rates.

HOW TO DEVELOP FAULT CODES

IF MALFUNCTION CAN BE IDENTIFIED TO AN AIRCRAFT SYSTEM/SUBSYSTEM..... *Do This*



1. Locate applicable system/subsystem in the Master Symptom Index Alphabetical Listing.

2. Select first five digits of fault code by asking aircrew which malfunction best describes fault. (3453E)

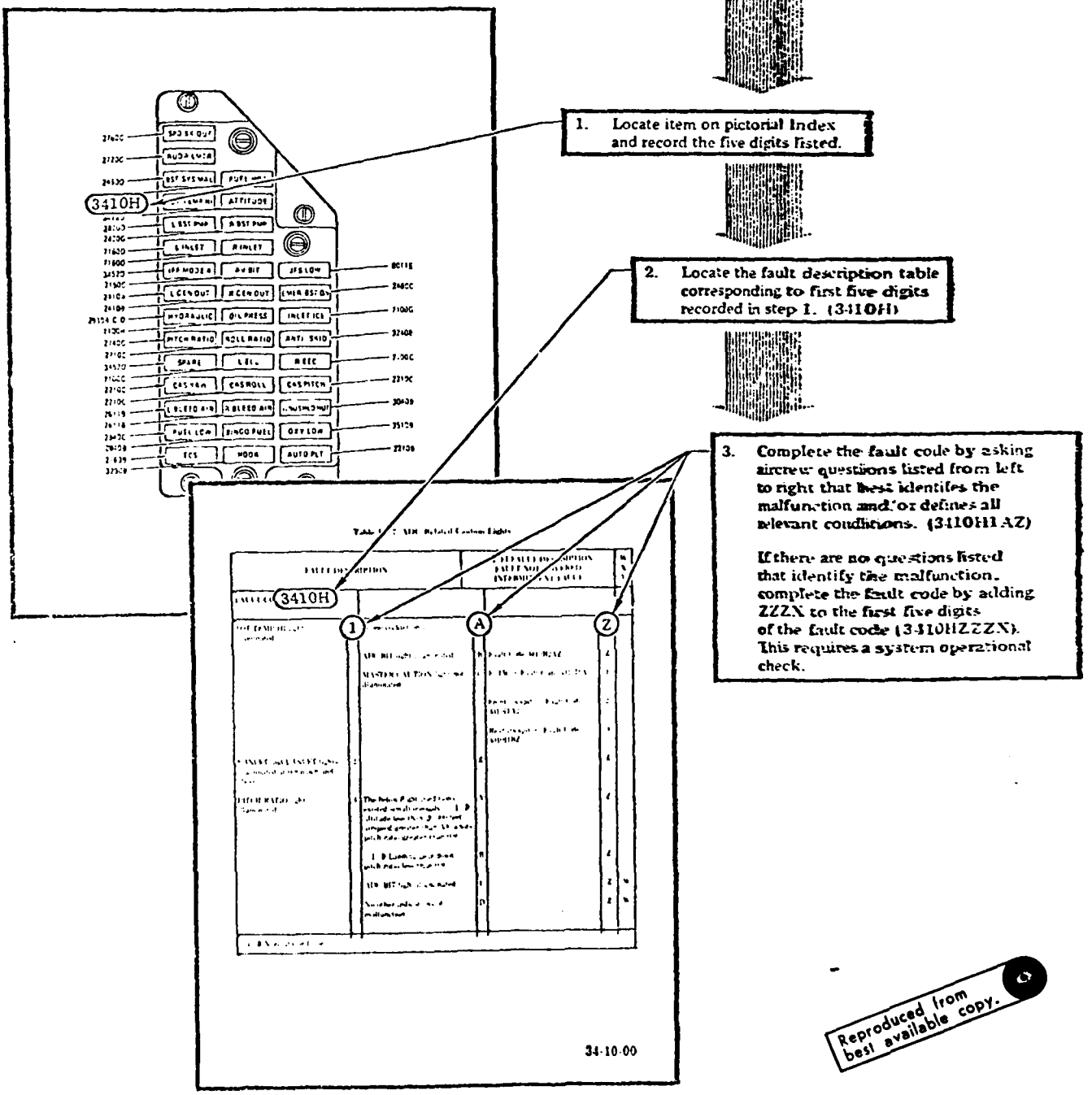
3. Locate the fault description table corresponding to first five digits recorded in step 2. (3453E)

4. Complete the fault code by asking aircrew the questions listed from left to right that best identifies the malfunction and/or defines all relevant conditions. (3453E5AZ)

   If there are no questions listed that identify the malfunction, complete the fault code by adding ZZZN to the first five digits of the fault code (3453EZZZN). This requires a system operational check.

HOW TO DEVELOP FAULT CODES

IF MALFUNCTION CAN NOT BE IDENTIFIED TO AN AIRCRAFT SYSTEM/SUBSYSTEM.....*Do This*



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