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MANAGEMENT INFORMATION SYSTEM ANALYSIS OF USAF  
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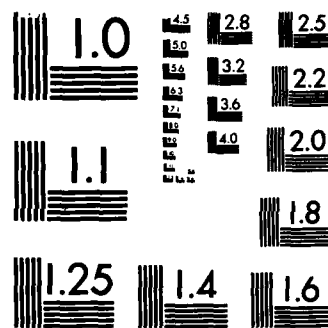
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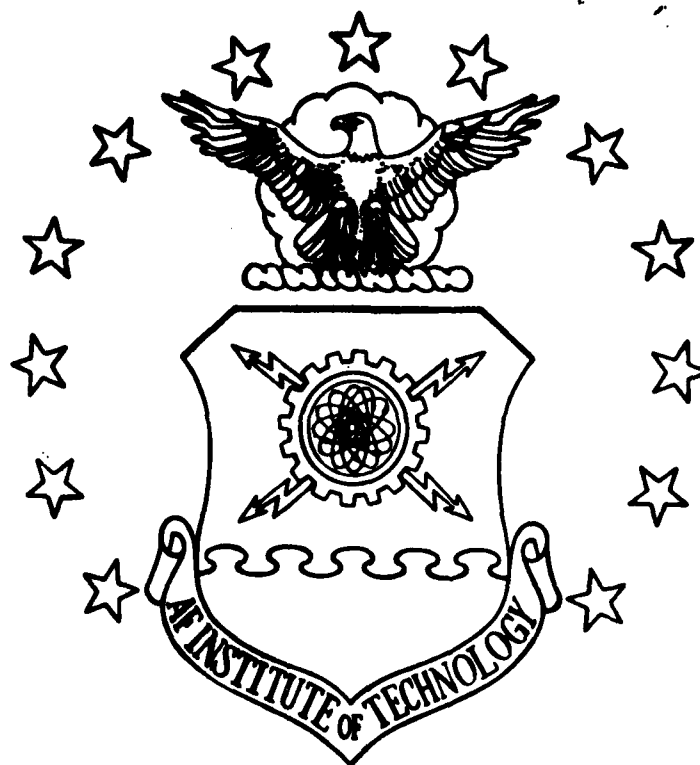
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OF USAF MUNITIONS SUPPLY FUNCTIONS

THESIS

Lynn B. Fahnestock  
Captain, USAF

AFIT/GLM/LSM/85S-23

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Wright-Patterson Air Force Base, Ohio

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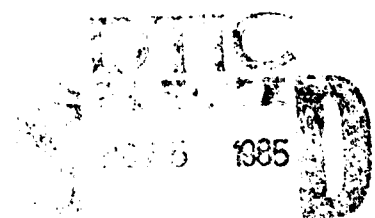
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AFIT/GLM/LSM/85S-23

MANAGEMENT INFORMATION SYSTEM ANALYSIS  
OF USAF MUNITIONS SUPPLY FUNCTIONS

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 Sciences in Logistics Management

Lynn B. Fahnestock, B.S.

Captain, USAF

September 1985

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## Preface

My interest in the automated munitions supply management system began with my assignment to the 81st TFW as a Munitions Accountable Supply Officer (MASO). I soon realized the complexity of analyzing performance data in an account which encompassed a main operational base at Bentwaters, United Kingdom and six satellite accounts located in both England and Germany. Although there was a great abundance of computer products available, little formal guidance was provided as to how to utilize the data for account management. Few computer listings appeared to yield specific, complete information without some additional data analysis. During and after this assignment, the question of the adequacy of the data being provided for management persisted.

It is my hope that the findings of this research effort will afford a better insight into the data requirements of the MASO, both to enhance the current system and to assist future system designers in identifying the management concerns of MASOs working in this field. I extend my thanks to my advisor, Patrick M. Bresnahan, committee member, Charles F. Youther, and my wife, Carolynn for their patience and guidance throughout this research endeavor.

Lynn B. Fahnestock

## Table of Contents

|                                                    | Page |
|----------------------------------------------------|------|
| Preface . . . . .                                  | ii   |
| List of Tables . . . . .                           | v    |
| Abstract . . . . .                                 | vi   |
| I. Introduction . . . . .                          | 1    |
| Problem Statement . . . . .                        | 2    |
| Specific Problem . . . . .                         | 4    |
| Literature Review . . . . .                        | 5    |
| Scope . . . . .                                    | 10   |
| Research Objectives . . . . .                      | 11   |
| Research Questions . . . . .                       | 11   |
| II. Methodology . . . . .                          | 12   |
| Introduction . . . . .                             | 12   |
| Population . . . . .                               | 14   |
| Survey Instrument . . . . .                        | 15   |
| Data Collection Plan . . . . .                     | 17   |
| Method of Analysis . . . . .                       | 18   |
| Assumptions and Limitations . . . . .              | 18   |
| III. Analysis of Findings . . . . .                | 20   |
| Introduction . . . . .                             | 20   |
| Demographic Data Findings . . . . .                | 20   |
| Survey Questionnaire Results . . . . .             | 22   |
| Analysis of Findings . . . . .                     | 33   |
| Research Questions . . . . .                       | 37   |
| IV. Conclusions and Recommendations . . . . .      | 41   |
| Conclusions . . . . .                              | 41   |
| Recommendations . . . . .                          | 43   |
| Final Note . . . . .                               | 48   |
| Appendix A: Survey Questionnaire . . . . .         | 50   |
| Appendix B: Survey Results . . . . .               | 55   |
| Appendix C: Computer Listings . . . . .            | 58   |
| Appendix D: Survey Question 17 Responses . . . . . | 60   |



|                                                      | Page |
|------------------------------------------------------|------|
| Appendix E: Listing Description and Contents . . . . | 62   |
| Appendix F: Glossary of Terms . . . . .              | 69   |
| Bibliography . . . . .                               | 71   |
| Vita . . . . .                                       | 73   |

## List of Tables

| Table                                        | Page |
|----------------------------------------------|------|
| I. Eligible Population . . . . .             | 14   |
| II. Computer Product Rankings . . . . .      | 24   |
| III. Use of Specialized Listing . . . . .    | 27   |
| IV. Management Time . . . . .                | 28   |
| V. R32 as a Management Tool . . . . .        | 29   |
| VI M25/D25 as a Management Tool . . . . .    | 30   |
| VII. Automated MIS Rating . . . . .          | 31   |
| VIII. Management Data Requirements . . . . . | 36   |

Abstract

The automated munitions supply management information system (MIS) is a subsystem of the Standard Base Supply System MIS, yet it has received little individualized analysis to determine the adequacy of data provided to the Munitions Accountable Supply Officer (MASO). This study addresses the data requirements of MASOs, aligned under maintenance organizations, operating throughout the Air Force.

A survey instrument was used to collect data from 75 current MASOs for analysis of both data received and data required for the performance of their duties. The instrument included questions on demographics, task descriptions, data adequacy, and MIS deficiencies. Analysis determined the eight most important computer data sources utilized. From these products, a data requirements list was compiled and contrasted with data currently available.

Final analysis results indicated a general satisfaction with the existing MIS; however, five major deficiencies were noted. Based on study of the five deficient areas, the author suggests several recommendations that, if implemented, could enhance the current computer products.

# MANAGEMENT INFORMATION SYSTEM ANALYSIS OF USAF MUNITIONS SUPPLY FUNCTIONS

## I. Introduction

The United States Air Force Supply System is one of the largest defense related supply systems in the world. Tasked with the accountability of millions of items dispersed throughout the world, the Air Force's need for a fast and efficient data processing system is imperative. "In the early 1960's, Air Force Commanders decided to standardize property accounting, and the implementation of electronic data processing was started on a world wide basis" (3:1). Within a decade the UNIVAC 1050-II computer system had become the heart of every base supply system in the Air Force. The UNIVAC 1050-II real time computer system was an advanced general purpose, digital computer which was capable of providing rapid response to interrogations without interrupting the input/output operations (13:1). Real time meant that whenever the system was operating in the "on line" mode, stock balances would be updated with every transaction.

Within the Air Force Supply System there are thousands of commodities that differ because of their size, use, or special handling requirements. Some differ so much that

their accountability procedures set them apart from the normal shelf item. Commodities such as medical supplies, fuels, and munitions are items which require specialized procedures and are managed separately from the normal supply items. Munitions items, because of their specialized handling, packaging, and inspection requirements, require munitions maintenance personnel for the normal stockage functions; supply personnel lack this specialized training and cannot adequately handle this requirement. When a munitions account is small and no munitions maintenance squadron is located on the base, the Chief of Supply assumes the responsibility for the munitions and munitions maintenance personnel are assigned to supply for storage and handling; however, when a munitions maintenance squadron is located on the base, the USAF Supply Manual, AFM 67-1, directs munitions supply functions to be organized under the Deputy Commander for Maintenance (9:9). Under this alignment, the accounting function is performed by supply personnel who are assigned to maintenance.

#### Problem Statement

Management of munitions supply, like base supply, is a complex task that includes many areas of both an administrative and a technical nature. In this study, munitions supply is defined as and limited to those munitions accounts which are assigned under a maintenance organization,

independent of base supply. Munitions supply units assigned under the Chief of Supply are usually characterized by smaller accounts operating in non-aircraft support roles. Although it is not the author's primary intent, the results of this study may be applicable to these accounts as well.

Under the maintenance alignment, the Munitions Accountable Supply Officer (MASO) must rely upon his own knowledge and the available management information system to account for and manage all munition items for his base as well as those of any assigned satellite accounts. Satellite accounts, as used here, refer to those small munitions activities separated geographically from the main base which are too small to justify installation of an integral Standard Base Supply System (SBSS) computer. Generally classified as Category II Satellite accounts, they are aligned under the management of the Category I accountable officer, the MASO.

Munitions supply operates much like a mini-base supply; however, the only functional connection with base supply is through the use of the base supply computer which provides the account with both automated records and a management information system (MIS). Munitions items would appear to be as critical to the training and combat mission as are the spare parts supplied by base supply, yet the top management in munitions supply is generally only a non-commissioned or junior officer. Rarely is an officer of a grade higher than

captain assigned to a base level munitions supply function. In many cases, when an officer is assigned, he or she is inexperienced in both the areas of munitions and management. Tour lengths vary, but officers generally do not serve as a MASO for longer than three to four years. Because of limited tours, particularly in the overseas commands, an effective management information system is essential. The question which forms the basis of this study is whether the management information system provided for munitions supply is adequate for proper management of this function.

#### Specific Problem

The MASO receives between 10 and 20 different management data outputs from base supply each month. These outputs, referred to as listings or products, summarize stock balances and account transactions, and provide general performance indicators for the function. Most of the available products are the same as those provided to supply managers base wide and, as such, were designed primarily for general supply use. These may not always provide the specialized data required by the munitions account and could contain extraneous data not required by the MASO for the management of his function. Research is needed to determine if the MASO is receiving adequate information through the current system and whether the data received can be improved to better meet his specialized needs.

## Literature Review

Having defined the research problem and the management question from which it evolves, the next step was to review the literature pertaining to the problem. Unfortunately, little literature addressing the MIS within base supply was available for this study and literally no material was found relating specifically to the munitions supply function. Conversely, there was a great abundance of literature on the general topic of MIS and some basic review is appropriate for this study.

Colonel John E. Dickson, Jr., in an unpublished report entitled Air Force Management Information Systems, defined an information system as:

the procedures, methodologies, organization, software, and hardware elements needed to insert and retrieve selected data as required for operating and managing a company (10:92).

Adrian M. McDonough and Leonard J. Garrett defined the management information system as "a communications process in which data are recorded and revised to support management decisions for planning, operation and controlling" (14:4). Thus, they say the MIS should accumulate, process, store, and transmit data to individual managers in the organization, thereby informing them and becoming information (14:4). Lt Col Thomas D. Clark, Jr., and Capt Douglas Blazer, in an article for the Defense Management Journal, described a management information system as "a formal system in the organization which provides management



with the necessary reports to be utilized in the decision making process" (3:44). They stress, however, that a MIS includes more than just reports; it includes information of all forms, both manual and automated, required by managers for the decision making process (3:44). A manager does, in fact, gather a great amount of information outside of the reports he receives. This collection process occurs in many ways: through daily inspections, direct observations, meetings, correspondence, briefings, and through many other vehicles of communications. Because of the magnitude of the munitions supply management information system, time is not available to conduct a complete MIS analysis in this study. Each individual manager must analyze his own informational sources and from those findings develop an informal information system. This study will concentrate specifically on the automated portion of the MASO's MIS.

Clark and Blazer point out that the key purpose of any MIS is to "provide data to the decision maker at the right time for making decisions necessary to achieve a particular goal" (3:44). Any analysis of a MIS must address two very basic questions: What information does the manager require and what information does the system provide currently? Once these questions have been answered, a direct comparison will indicate both systems deficiencies and the degree to which useless or extraneous information is being provided to the manager (3:47).

Computer technology has allowed revolutionary advances in MIS design, and the MIS incorporated in the Air Force Standard Base Supply System was noted by Clark and Blazer to be "one of the best defense management information systems of its scope and magnitude in the Air Force today" (3:48). The area of MIS is so dynamic however, that even today the base supply system is undergoing major modifications. Burch, Strater, and Grudnitski point out in their text Information Systems: Theory and Practice that "Once an information system is developed, it will require changes and improvements from time to time" (2:31-32). They further claim if one could develop an optimum information system, it would only remain "optimum for a brief moment before a change in the organization or its environment required another modification" (2:31-32). This idea clearly applies to the munitions supply/base supply MIS and underscores the value of this analysis, as well as the need for recurring analysis.

According to Leonard I. Krause (12:104), five elemental determinations are involved in the MIS design. These are:

1. Information needed for decision making.
2. Time span from organization of information to the point when it is needed for decision making.
3. Collection of data.
4. Processing requirements and business rules used to convert data into decision information.
5. Distribution of information in a form useful for decision making.

This study will analyze all of these elements with specific emphasis on the first and last items.

All automated management information systems rely on a highly structured data base. Krause, speaking of the data base approach, said:

Basically the data base methodology consists of gathering whatever data may be floating around the company and storing those data in a machine-able form . . . . Thus, at least in theory, we have on tap what ever data may be needed for management purposes. Usually the data are organized so that they can be extracted and put to almost any conceivable use. Extremely flexible data bases are then at the beck and call of all would be users (12:74).

The most important element of the management information system is the "proper selection and arrangement of information for planning and control so as to form a system of reports. . . underscoring especially the exceptions or abnormal situations" (12:11). The designers must know the needs of the managers who will utilize the information processed. The information system therefore must be more than just a compilation of raw data. No amount of electronic manipulation of simple, raw data can substitute for carefully conceived reports for management (12:13). Ideal reports should be concise and contain only the data required to meet the management need.

Burch, Stater, and Grudnitski were quick to point out "it should be understood that a computer system alone is not an information system" (2:74), but rather a tool that can increase the effectiveness of the MIS design (2:74).

Organizational decision makers are subjected to an avalanche of data. Particularly where computers are utilized, great quantities of data are collected, processed, and reported. For a given decision maker, these reports might be meaningless, or some relevant information may be found if the recipient is willing to spend the time searching for it. In the latter event, much of the recipient's time is spent searching for the information needed to make the decision, rather than evaluating it and the alternates available (2:122).

Burch outlines several methods of reducing the magnitude of data flow to useful levels. These methods are the filtering, key variable, monitoring, modeling, interrogative, and strategic decision center methods (2:123-139). Several of these methods apply directly to the MIS currently in operation in munitions supply functions. The monitoring method, like filtering, is a method of reducing the amount of data while still providing needed information to the decision maker. Data is monitored and outputs are provided on an automatic basis. According to Burch, Strater, and Grudnitski, the monitoring method can be implemented in three ways: variance reporting, programmed decision making, and automatic notification (2:126).

Variance Reporting . . . . This form of monitoring method requires that data representing actual events be compared against data representing expectations in order to establish a variance. The variance is then compared to a control value to determine whether or not the event is to be reported. The result of this procedure is that only those events or activities that significantly deviate from expectations are presented to the decision maker for action . . . also called exception reporting . . . . Variance reporting does not provide anticipatory information . . . .

Programmed Decision Making. . . . A significant part of technical decision making, and a small part of tactical decision making activities, involve routine repetitive decisions. By designing the information system to execute these routine decisions . . . human decision makers have more time to spend on less structured decisions . . . . Automatic Notification . . . . This system merely monitors a large file of data . . . automatic notifications are issued based on some predetermined criteria, but the individual decision makers must decide whether any action is required (2:126-130).

### Scope

Because of economic and time constraints, this study will be limited to analysis of only the automated portion of the munitions supply MIS. Specific attention will be given to the analysis of the two primary management reports used by munitions supply, the M25 (Monthly Munitions Management Data Report) and the R32 (Selective Readout-Item records). Substantial improvements to the base supply computer as well as the development of a separate munitions computer emphasize the importance of this study, but could constrain available data (4:6-7). Census data through surveys will be collected from munitions supply functions in the five major commands in which munitions supply is organized under the maintenance organization. These commands are Tactical Air Command (TAC), Strategic Air Command (SAC), United States Air Force Europe (USAFE), Pacific Air Forces (PACAF), and the Alaskan Air Command (AAC).

### Research Objectives

The objectives of this study will be to determine the actual MIS requirements of the MASO and contrast them to what is currently being provided through the base supply computer. The analysis should clearly identify extraneous data as well as those areas where there are information deficiencies. Results of the analysis will then be collated to formulate specific recommendations for improvements to the munitions supply MIS.

### Research Questions

Analysis of the management information system currently used in munitions supply should answer the following investigative questions:

1. What specific information does the MASO require to manage a munitions account?
2. What automated data is currently provided to the MASO?
3. Does the information provided by the current automated MIS match the MASO's requirements?
4. How can the munitions supply management information system be improved?

## II. Methodology

### Introduction

Through personal experience as a MASO for three years, the author found that sound management of an Air Force munitions supply function was dependent upon the manager's knowledge of the system, his experience level, and the adequacy of his management information system (MIS). System knowledge and experience level were generally difficult variables to define and quantify; however, the management information system, particularly the automated MIS, presented a tangible product that could be analyzed without great difficulty. The automated MIS for munitions supply operated through the Standard Base Supply System (SBSS) computer and was composed of a number of reports or outputs readily available for analysis. The purpose of this study was to analyze the information needs of the MASO and determine whether the automated MIS outputs provided adequate information to fulfill these needs. Specific answers to the investigative questions presented in the first chapter were to be determined by the following methodology:

1. Construction of a mail survey to gather data upon which answers to investigative questions 1 and 3 will be based.
2. Trial testing of mail survey and Manpower and Personnel Center (MPC) survey approval.

3. Compilation of management requirements from AFM 67-1 and analysis of current data provided by MIS automated reports.
4. Survey data collection and computer input for compilation and statistical analysis.
5. Summation of survey results and AFM 67-1 analysis results in a total requirements list.
6. Comparison of required information to provided information.
7. Analysis of findings (Step 6) to answer investigative question 3.
8. Report of findings and recommendations for MIS improvements.

AFM 67-1, Vol II, Part Two, Chapter 33 specifically addressed munitions supply procedures and outlined some of the information the MASO required to manage his account. While an analysis of this and other chapters in AFM 67-1 provided a great amount of data on the MASO's requirements, the author felt it was essential to survey MASO's in the field to obtain a complete analysis of the management requirements.



TABLE I

## Eligible Population

| <u>Command</u>   | <u>Eligible Population</u> |
|------------------|----------------------------|
| SAC              | 21                         |
| TAC              | 19                         |
| USAFE            | 21                         |
| PACAF            | 12                         |
| AAC              | <u>2</u>                   |
| Total Population | 75                         |

Population

The population of interest in this study was defined in Chapter I to be the MASOs of munitions supply functions organized under the Deputy Commander for Maintenance. This organizational alignment is directed whenever a munitions maintenance squadron is located on a base (9:9). Populations of interest were restricted by organizational function to five commands: TAC, SAC, USAFE, PACAF and AAC. A total population size of 75 was obtained by telephone inquiry of the five subject commands and mailing lists were forwarded to the author by mail. Table I shows the eligible population for the study as provided by the five commands.

An initial assumption of system uniformity was made based on the directed usage of AFM 67-1 for all munition supply functions regardless of command. It was assumed that MASOs in the CONUS commands would have like MIS requirements

to those in the overseas areas. For this reason a census data sample from TAC and SAC was initially presumed to be sufficient to provide data representative of the total population. Realizing a potential for error with this assumption, the author elected to expand the survey to both the CONUS and overseas populations. Because of the difficulty in follow-up, however, it was expected that the percentage of responses from overseas units would be less than that of the stateside units. An arbitrary goal of 95% CONUS response and 80% overseas response was established. These results were considered obtainable as the total population consisted of only 75 sample elements and telephone follow-up could be employed to enhance the overall response rates. The difference between the goals reflected the difficulty anticipated in making overseas telephone connections. Response results are reflected in Appendix B.

#### Survey Instrument

A mail survey was selected as the most efficient and practical measuring instrument because of the geographic dispersion of the population. Despite the potential of a strong bias due to non-response, this method was obviously the most cost effective and allowed the respondents time to answer the questions with greater accuracy. The survey questions were formulated to identify the general account characteristics and gather specific MIS data considered to

be required by the MASO for management. Pre-testing for survey validity was conducted at Wright-Patterson AFB utilizing three people possessing a general supply background and three people having actual munitions supply backgrounds. The final survey questions are shown in Appendix A. The first six questions were used to collect demographic data on the population. Question 1, length of duty experience, was requested to assess the general experience level of the MASOs currently working in the field while questions 2 and 3 were included to define the type of support provided by the surveyed function. These data would be used for further analysis and correlation of information as deemed necessary during final analysis. Specifically, the author wanted data available to determine if any differences in the responses might be attributed to the type of wing or support provided. Questions 4 through 6 were also used to provide descriptive data on the surveyed function. These questions helped establish the general size of the supply account and provided an indication of the complexity of the management task of a particular function. Question 7 and 8 were used to verify the uniformity and utility of the MIS output products received, both between commands and among sub-population elements. By identifying specific reports and ordering their perceived value, questions 9 through 11 were used to assess the informational requirements that each respondent felt were of primary management

value to him or her. AFM 67-1, Vol II, Part Two, Chapters 24 and 25 were utilized to identify the actual data that were provided in the reports identified by the respondents. Questions 12 through 17 were designed to identify the duty areas requiring management information and determine the perceived value of current MIS products in those identified areas. Finally, question 18 was included to provide a vehicle for the collection of additional information on requirements not otherwise identified by survey questions 9 through 12.

#### Data Collection Plan

All data gathered by the mail survey were compiled manually and input, by Command, into the Air Force Institute of Technology (AFIT) computer system utilizing the Harris 800 Statistical Package for the Social Sciences (SPSS) program package. The SPSS package is a standard statistical package capable of providing both variances and the measures of central tendencies required for this analysis (15). Computer analysis of the data graphically depicted the frequency distributions of the sample elements, by question, along with tabulated results. The two most significant indicators were considered to be the actual distributions and the measures of central tendencies. Additional data were collected through review and analysis of requirements and listing content information identified in AFM 67-1, Vol

I and II. These data were then added to the results of the survey and a composite listing was manually compiled.

### Method of Analysis

Once data were compiled, all information was subjected to a simple direct comparison. This procedure, although quite simplistic, was considered by the author to be the best way to identify the data required and not currently provided, as well as the data provided but extraneous to the needs of the MASO. The results of this comparison are identified in the next chapter and were used as a basis for recommended improvements to the existing automated MIS output products.

### Assumptions and Limitations

The following assumptions apply to the survey instrument used in the study:

1. The survey instrument was a valid measurement tool and provided reliable data.
2. All responses were independent of one another.
3. Respondents took the time to answer the survey questionnaire accurately.
4. Pertinent data not indicated from survey questions was provided by respondents through open ended question number 18 on the survey.

The limitations of the study include:

1. The inherent limitation of a strong non-response bias.

2. Conclusions of the analysis can be applied only to respondent population. Inferences from the findings cannot be made to the MASOs aligned under the Chief of Supply with any degree of reliability.

### III. Analysis of Findings

#### Introduction

The previous chapters outlined the management problem and provided the necessary background and methodology required to analyze the effectiveness of the munitions supply management information system. The discussion on the following pages reflects the results of analysis of the data findings with respect to the research questions identified in Chapter I. Each question was analyzed based on data collected from the survey instrument and requirements contained in AFM 67-1. Responses to the questionnaire are tabulated in Appendix B. The overall response rate to the survey instrument was 90% which was considered as excellent. The response rate for all CONUS commands was 100%. Response rates from overseas, while lower than anticipated, were considered acceptable for the study. The response rates for USAFE and PACAF were 81% and 75% respectively.

#### Demographic Data Findings

The first six survey questions were used to obtain demographic data which could be utilized individually or as a composite to better analyze other data provided by the questionnaire. Utilizing the SPSS Crosstabs program (15:230-245), all survey responses were analyzed as a whole and individually by demographic factors such as command,

experience, and account size. Overall analysis showed no significant differences in responses which could be attributed to the demographic factors. Therefore, the author's initial assumption of uniformity between commands, as expressed in Chapter I, was valid.

Question 1 provided an assessment of the experience level of the respondents. Collected data indicated that nearly one half (47.1%) had over three years of experience, probably reflecting the longevity of the non-commissioned officer segment of the population. Only 13.2% of the respondents had less than one year of experience. This was considered a plus for research purposes and reflects what might be attributed to average turnover within the career field.

Question 2 addressed the primary function of the respondent accounts. Aircraft support was the primary function in 55.9% of the cases with an additional 22.1% responding with more than one function. These multiple responses generally included aircraft support as well.

Question 3 requested a basic description of the wing supported in each case. Of those responding, 42.4% answered fighter wing with an additional 23.7% responding with more than one description. Nine respondents did not answer this question.

Question 4 responses indicated that 38.2% of the accounts had five or less persons assigned, 36.8% had six to ten assigned, 20.6% had eleven to fifteen, and 4.4% had over



fifteen persons assigned.

Question 5, number of satellite accounts, indicated that 61.8% of the respondents managed no satellite accounts. Of those accounts with satellites, 19 of 26 were from the overseas commands, yet two of the three accounts with more than six satellites were from TAC.

Question 6, number of monthly transactions processed, showed a wide range of responses. The mode was less than 500, however this represented only one forth of the respondents. A more significant statistic was that 70% processed 1500 or fewer transactions and only 9% processed more than 2500.

#### Survey Questionnaire Results

Question 7 and 8 were used as a measure of the uniformity and utility of computer products available through the standard base supply MIS. Question 7 results indicated that three of sixty-eight respondents received less than five listings while the remainder were nearly equally distributed over the other three response ranges. The data indicated that the majority received over ten listings each month and a significant number of accounts received more than fifteen listings; 95.6% of the respondents received five or more listings, 61.8% received over ten listings, and 29.4% received more than fifteen listings. In reviewing the listings in AFM 67-1, 25 listings were identified that could

be utilized in the management of a munitions account. This list, shown in Appendix C, was not intended to be an all exhaustive list; however, it does represent the most commonly used listings as found through the personal experience of the author.

Question 8 provided data on the utility of the listings received by the MASO. Responses were requested solely on the basis of MASO requirements and were not intended to be indicative of the total munitions supply requirements or utility. The mode was found to be four to six listings which represented 42.6% of the respondents. Of the remaining, 13.2% used one to three listings, 20.6% used seven to nine listings, and 23.5% used ten or more listings. The fact that over half of the respondents used six or fewer listings, when compared with results from question 7, indicate that the MASO, personally, does not require the information contained on many of the listings received by his or her account. Again, this does not imply that the unused data is extraneous to the needs of the account, but merely that they are not required at his or her level of management.

Question 9 attempted to assess management information requirements by ranking the importance of 13 current computer products. Specialized and other non-listed products were also possible responses and were included, as applicable, by each respondent. With the mode for utiliza-

tion being four to six listings and over half (63.2%) the accounts using six or fewer listings for management, further analysis was limited to the top six ranked listings. This appeared to be a good method of reducing the data requiring analysis and was considered a logical approach since the distinctions of importance become much less obvious the further down the list one works.

TABLE II  
Computer Product Rankings

| Rank | Listing                  | Frequency | Method of calculation                               |
|------|--------------------------|-----------|-----------------------------------------------------|
| 1.   | D06                      | 19        | (Highest #1 Frequency Count)                        |
| 2.   | Own Listing              | 25        | (Highest #1 + 2 Frequency count excluding D06.)     |
| 3.   | M25                      | 23        | (Highest #1+2+3 excluding D06 and Own Listing.)     |
| 4.   | Q13                      | 30        | (Highest #1+2+3+4 excluding D06, Own, and M25.)     |
| 5.   | D04, D25, M10<br>( Tie ) | 28        | (Highest #1+2+3+4+5 excluding previously ranked.)   |
| 8.   | R32                      | 24        | (Highest #1+2+3+4+5+6 excluding previously ranked.) |

Composite rankings are shown in Table II, with the numerical value to the left indicating the composite rank. Ranking of the listings was computed as follows: the top listing was

selected to be the listing that received the highest frequency count as the number one listing, the second by the highest sum of frequency counts for the number one and two position excluding the previously selected listing, the third by the highest sum of frequency counts for the number one, two, and three positions excluding the previously selected listings, and so forth through position six. Position five resulted in a tie between three listings so the final analysis actually included eight listings.

Once rankings were determined, the resultant data was used in conjunction with AFM 67-1, Vol II, Part 2, Chapters 23 and 24 to establish specific data the MASO requires.

Several points should be made at this time. First, the M25 is basically the same listing as the D25, the only difference being the M25 is a monthly report containing totals of the data compiled through the daily D25 program. In this context, both reports reflect the same type of data. Second, the R32 may be unrealistically rated lower than its true value. This is because the MASOs who utilize their own listings, do so in place of the R32. Specialized listings contain the same type of data as the R32; however, several deficiencies in the R32, to be discussed later, cause specialized listings to be preferred to the R32. Strong acceptance of the R32 was evident in the rank importance data. Of those respondents using the R32, 45.2% selected it as the number one report; however, the overall ranking

depreciated when analyzed with data including specialized listings. Although not directly measured by the survey instrument, responses to questions 17 and 18 clearly state that specialized listings are being used in place of the R32 because of reformed and enhanced data. The S26 listing, used by MASOs assigned to SAC, is a good example of this; however, survey data indicates that it is not used universally within the Command as a management tool. The author found that those accounts having access to a specialized program generally use it in place of the R32 because of its obvious benefits and readability.

Tabulation of the rankings indicated that the R36, M30, and R40 were perceived to have the least importance as a management product. The modes for all users of these listings were calculated as: R36, 11; M30, 12; and R40 as 13.

Question 10 was a follow-on question to the ranking data to obtain the reason for using a specialized listing. This data became more significant as a result of the number two ranking perceived by the respondents. Responses indicating more than one answer were analyzed and added to single reason responses to obtain a true indication of the reasons for usage. This is reflected in Table III. The data indicated the greatest reason for usage was because the specialized listings contained greater information.

TABLE III  
Use of Specialized Listing

| Response              | Single<br>Frequency | Multiple<br>Frequency | Totals |
|-----------------------|---------------------|-----------------------|--------|
| Contains Greater Info | 11                  | 16                    | 27     |
| Easier to Read        | 5                   | 15                    | 20     |
| More Concise          | 6                   | 8                     | 14     |
| Other                 | 1                   | 3                     | 4      |

(Total respondents = 39)

Of those using the listings, 69.2% claimed the specialized listings contained greater information than other available products, 51.3% claimed they were easier to read, and 35.9% claimed they were more concise. As specialized listings are generally used in place of standardized products, the data collected strongly suggests that current SBSS listings require improvement.

Question 11 was used to identify the areas requiring the most management attention. This data assisted in identifying the types of data required for the management function. The most significant statistic for this data was determined to be the median value because of the wide variance in SPSS skewness values over the complete set of distributions. Measures of skewness indicate both the direction and degree of departure from symmetry.

TABLE IV  
Management Time

| Survey Code | Management Area                            | Median |
|-------------|--------------------------------------------|--------|
| a.          | Surveillance of stock balances             | 10.2   |
| b.          | Surveillance of Supply Point Balances      | 10.1   |
| c.          | Inventory                                  | 10.1   |
| d.          | Issues/Turn-ins                            | 5.2    |
| e.          | Rejects                                    | .2     |
| f.          | Due In From Maintenance (DIFM)             | .4     |
| g.          | Ammunition Disposition Reports             | 4.9    |
| h.          | Shipments and Redistribution Orders (RDOs) | 4.7    |
| i.          | Special Levels                             | 4.7    |
| j.          | Allocation Forecasting                     | 9.8    |
| k.          | War Reserve Materiel Management            | 5.0    |
| l.          | Requisitions                               | 4.8    |
| m.          | Other                                      | .1     |

The measure will be zero if the distribution is symmetrical, some positive value if the distribution's tail extends in the positive values direction, and a negative value when the tail extends in the negative values direction. The magnitude of the skewness value indicated the relative degree of skewness (16:43-44). Skewness values ranged from .695 for item j to 4.196 for item m. From the data shown in Table

IV, a, b, c, and j appeared as the most important with e, f, and m of much less significance. Other than j, allocation and forecasting, the greatest area of management concerns involves inventories and asset balances. This should not be surprising as the MASO's title clearly implies his or her basic duty is that of an accountable officer. Many of the other areas, such as processing and monitoring shipments, issues and requisitions, may be viewed as more administrative in nature.

TABLE V  
R32 as a Management Tool

| Category  | Code | Absolute<br>Frequency | Relative<br>Frequency<br>(Percent) | Adjusted<br>Frequency<br>(Percent) |
|-----------|------|-----------------------|------------------------------------|------------------------------------|
| Not used  | 0    | 11                    | 16.2                               | 16.4                               |
| Very Poor | 1    | 4                     | 5.9                                | 6.0                                |
| Poor      | 2    | 7                     | 10.3                               | 10.4                               |
| Average   | 3    | 15                    | 22.1                               | 22.4                               |
| Good      | 4    | 19                    | 27.9                               | 28.4                               |
| Very Good | 5    | 11                    | 16.2                               | 16.4                               |
| No Answer | 9    | 1                     | 1.5                                | Missing                            |
| Total     |      | 68                    | 100.0                              | 100.0                              |

Mode 4 (Good) 1 Missing Value  
Mean 2.89 Median 3.27

Questions 12 and 13 indicated the perceived values of the two primary management products of the MASO, the R32 and M25. Table V indicates the survey results for the R32. Of particular note is that 32.8% rated it as poor, very poor,



or not used. The mode however was good and 44.8% rated it as good or very good. Of those rating it poor, very poor, or not used, 90.9% were those MASOs using a specialized listing in place of the R32.

TABLE VI  
M25/D25 as a Management Tool

| Category  | Code | Absolute<br>Frequency | Relative<br>Frequency<br>(Percent) | Adjusted<br>Frequency<br>(Percent) |
|-----------|------|-----------------------|------------------------------------|------------------------------------|
| Poor      | 2    | 3                     | 4.4                                | 4.4                                |
| Average   | 3    | 16                    | 23.5                               | 23.5                               |
| Good      | 4    | 27                    | 39.7                               | 39.7                               |
| Very Good | 5    | 22                    | 32.4                               | 32.4                               |
| Total     |      | 68                    | 100.0                              | 100.0                              |

Mode 4 (Good) No missing values.  
Mean 4.0 Median 4.05

Question 13 asked the same question as 12 concerning perceived value of the D25/M25. Results are shown in Table VI. In this case, only 4.4% rated it as poor and no ratings were given below poor. In contrast to the R32, 72.1% rated it as good or very good. Results of the data indicate that the D25/M25 was perceived as being significantly better as a management tool than was the R32. No data was collected to compare the M25 with the specialized listings except through the ranking question, but this data tends to support the results of the rankings provided in question 9.

One of the basic concepts of good reports is the ability of that report to identify areas where problems exist that require management attention. This is sometimes referred to as flagging and question 14 sought to determine to what extent this was being done in the current computer products. A significant percentage (60.3%) of the respondents selected b, in some cases; however, 32.4% selected seldom or never. This implies current products could possibly be improved in this area.

Question 15 indicated the degree respondents felt current listings contained extraneous information. An ideal report, to be effective, should contain little or no extraneous information. Of those responding to the question, 63.6% said, some extraneous information; 22.7%, a great amount; and 13.2%, no extraneous information. This item was marked for additional analysis.

TABLE VII

Automated MIS Rating

| Category  | Code | Absolute<br>Frequency | Relative<br>Frequency<br>(Percent) | Adjusted<br>Frequency<br>(Percent) |
|-----------|------|-----------------------|------------------------------------|------------------------------------|
| Very Poor | 1    | 7                     | 10.3                               | 10.3                               |
| Poor      | 2    | 7                     | 10.3                               | 10.3                               |
| Average   | 3    | 25                    | 36.8                               | 36.8                               |
| Good      | 4    | 23                    | 33.8                               | 33.8                               |
| Very Good | 5    | 6                     | 8.8                                | 8.8                                |
| Total     |      | 68                    | 100.0                              | 100.0                              |

Mode 3 (Average) No Missing Values  
Mean 3.2 Median 3.3

Question 16 rated the respondents present MIS. Most respondents rated the MIS as average or good as indicated in Table VII. It should be noted that several of those rating the MIS as poor or very poor indicated a general dissatisfaction resulting from current processing difficulties with the new Sperry 1100 computer system. Although the respondents expressed this concern, the problems do not appear to be widespread and are being resolved.

Question 17 was an open question soliciting any management data that is required by the MASO but is unavailable through the current SBSS products. Comments received are listed in Appendix D. Certain trends can readily be seen from the inputs provided. First, there are a number of data problems addressing the R32. Several respondents stated that the lack of spacing between stock numbers made the R32 exceptionally difficult to read. Additionally, complaints focused on data respondents felt were important but were not included on the R32. Interchangeable and substitute group (I&S Group) data, locations, and date of last inventory (DOLI) were reported by more than one respondent as required but not provided on the R32. Second, lot numbers are required and not available on current listings. Lot numbers are very important to account inventory, storage, and accountability, yet this data can only be found on manual records kept by the munitions storage personnel. Third, extraneous data such as demand data and effectiveness data

should be deleted as this is not required for munitions accounts. The D25/M25 contain a full page of effectiveness data which is of no value to the MASO. Finally, data such as lot numbers, condition codes, alternate warehouse locations, locations by lot number, transaction history capability, and complete round capability were mentioned as required data that is not currently provided.

Question 18 data provided descriptive information on the content of specialized listings used in the field. This information varied and is referenced later in the chapter.

#### Analysis of Findings

Data collected in survey question 9 was analyzed to determine specific information requirements of the MASO population. AFM 67-1 was utilized to determine the data that is provided from each of the listings selected. This data is listed in Appendix E along with a brief description and purpose of each listing.

The eight listings selected as the most important were broken down into two functional classifications, those that contain specialized information (D06, D04, M10, and Q13) and those that contain overall or general management data (D25, M25, R32, and specialized listings). Listings from the first category are all used for a specific management function. The D06 contains transaction information and is utilized as an audit trail and for determining the accuracy

of the transactions processed through the account. It is generally reviewed on a daily basis by the MASO to review transactions made the prior day. Through this listing, the MASO keeps informed of the transactions occurring in his or her account and identifies transaction errors that require correction and management action. The D04, like the D06, focuses on the account transactions and is monitored on a daily basis. This listing provides a method for reviewing customer's transactions and also reflects some internal organizational transactions such as authorization changes (FSPs) that do not appear on the D06. Additionally, the D04 program produces document control cards which are used for quality control of account documents. The M10 focuses on the adjustments made to stock record levels resulting from inventory discrepancies and asset identity changes. It identifies specific items and quantities of all stock records being adjusted. The M10 enables the MASO to initiate research action to determine the cause of each discrepancy and insure corrective action is taken to resolve the problem. The Q13 provides a quick method to review supply point details to insure the account is providing adequate supply point support. All supply points are listed separately on the Q13 with authorizations, on-hand quantities, due-out status, and other pertinent data reflected for each munition item authorized or possessed by the unit. The Q13 is the primary listing for supply point surveillance and is used to identify supply point shortages or excesses.

The second category of listings include the D25, M25, R32, and specialized listings. These listings provide data for overall surveillance and management of the munitions account. The D25 and M25 contain basically the same type data and are of particular value in performing trend analysis and workload volume studies. Many management areas are reported on these listings; however, specific problem items are not identified. Information on transactions, inventory accuracy, repair cycle data, item records, detail records, special levels, and war reserve materiel are all reported on the D25 and M25. The R32 and the specialized listings are important both from an operational and management perspective. Both listings provide data utilized for account surveillance as well as data reflecting current asset balances, locations, and general status. Additionally, much of what is on the item and detail records are accessible through these listings. This eliminates the need to use several listings or computer inquiries for much of the desired data.

Table VIII presents a composite list of management data requirements as compiled from survey responses and AFM 67-1. Because of the quantity of data elements presented by the listings analyzed, some data types were consolidated into type groupings. A complete list of data elements are shown in Appendix E.

Table VIII  
Management Data Requirements

|                                |                          |
|--------------------------------|--------------------------|
| Account code                   | Date of last demand      |
| System Designator              | Date of last transaction |
| National stock number          | Date of last inventory   |
| Nomenclature                   | Stock authorization      |
| Unit of issue                  | Stock balance            |
| Unit price                     | Type details             |
| ERRCD                          | Detail data              |
| Routing identifier             | Transaction data         |
| I & S Group                    | Priority data            |
| Application code               | Demand data              |
| Source of supply               | Document data            |
| Budget code                    | Packaging data           |
| Controlled item code           | Special levels           |
| Financial account code         | WRM data                 |
| Warehouse location             | Repair cycle data        |
| Exception codes (T,I,R,S)      | Inventory data           |
| Shelf life                     | Other item record data   |
| Lot number records*            | Maintenance status*      |
| Locations by lot numbers*      | Transaction histories*   |
| Complete round data*           | DOT marking data*        |
| Alternate warehouse locations* |                          |

\* Note: Requirements for which data is not currently provided by the automated MIS.

The data elements presented here reflect the data most desired by the surveyed population and is not intended to be a complete listing of all data requirements of the munitions account. As the author indicated earlier, there are at least 25 different listings available to munitions supply as well as the capability for numerous specialized utility listings. It should also be understood that some MASOs will require data that others will not. MASOs of smaller accounts, for example, may be more involved at the day to day technician level and require data that is on one or more of the listings not highlighted in this study. For the most part, the data elements contained in the analysis appear to be representative of the most important data requirements.

#### Research Questions

Analysis of the automated MIS system employed by USAF munition supply functions was based on four research questions proposed in Chapter I. Having reviewed the collected data, answers to these questions can now be addressed.

Question 1 asked what specific information the MASO requires to manage a munitions account. Results from survey question 11 indicated that primary management emphasis required surveillance of stock balances, supply point balances, inventory, and allocation and forecasting. The results of survey question 9 supported this finding as the listings chosen to be most important for management were



listings that provided data in support of these areas. The M10, for example is used specifically for inventory, the Q13 for supply point surveillance, and the remaining listings for stock balance and authorization surveillance. Specific data requirements were identified and listed in Table VIII and Appendix E.

Research question 2 sought to determine what automated data is currently provided to the MASO for account management. As study emphasis was placed on listings selected by the respondent population, analysis of these listings provided a summary of listings currently available (Appendix C) and specific data contained on the most important listings as shown in Table II and Appendix E.

Research question 3 asked if the information provided by the current automated MIS satisfied the needs of the MASO. Generally the answer to this question was found to be yes; however, there were several exceptions that should be noted. First, no data is available to the MASO to allow management of munitions by lot number. This represents a significant shortfall in the munitions MIS as all munitions are inspected, maintained, and stored by lot number. Currently this procedure is being performed manually using the Airmunitions Serviceability and Location Record, AFTO Form 15, which is very time consuming. Inspection intervals, shelf life, and other maintenance related requirements are tracked not only by stock number but by the lot

number. Additionally, suspended munition items are specifically identified by lot numbers. Despite the importance of lot number accounting, the automated MIS does not currently maintain any lot number data. Secondly, the automated MIS does not provide automated transaction history capability. Transaction histories are required as a part of any inventory discrepancy research. Currently this is being done manually utilizing the D06 and consolidated transaction registers. Tracing transaction histories is a tedious process of tracking backwards, transaction by transaction, through the registers utilizing the date of last transactions as route markers. Thirdly, no capability is available to inform the MASO of his or her complete round capability. Complete rounds refer to those munitions which require two or more individual components to make a single usable munition item. Bombs are a prime example of this idea as a complete round can consist of as many as 15 different components (i.e. bomb body, fin assembly, delay element, clips, and arming wire) and some components have several options such as high and low drag fins, and various fuzing and delay options. Currently the only method for determining the complete round availability of a specific munition item is by manually screening applicable asset balances and calculating the total by determining the component which has the smallest quantity on-hand. This procedure becomes more complex when one must determine the

available complete rounds for several munition items that utilize common components. Fourth, the flagging of areas requiring management attention was not prominent on the products observed. Careful analysis of the current listings will identify areas requiring attention; however, it is the author's opinion that the inexperienced MASO will often find the task difficult and frustrating. The best example of this might be on the M25 which identifies the area of concern but not the items specifically causing the problem. To identify the actual discrepancy, the manager must search through the R32, item by item, until the stock record is located. The M10 and some specialized listing do flag specific problem stock records; however, analysis of the available listings and responses to survey question 14 indicate that flagging is not as refined as desired by the respondents. Finally, as noted previously, the R32 has several significant deficiencies, the most notable of which is the absence of some data elements such as date of last inventory and interchangeable and substitute group (I&SG) data as well as deficiencies in overall readability.

The final research question asked how the munitions supply MIS could be improved. This question will be addressed specifically in the Chapter IV, Conclusions and Recommendations.

#### IV. Conclusions and Recommendations

##### Conclusions

The USAF munitions supply management information system (MIS) operates as a subsystem of the Air Force Standard Base Supply System MIS. The first large scale computerized MIS for supply was established in the 1960s utilizing the UNIVAC 1050-II computer. This system brought about significant gains in available management information for the munitions function; however, the system tended to address the needs of the MASO as generalized supply needs rather than as specialized needs. As a result, computer listings produced for munitions supply were stepchildren of general supply listings and in some cases did not supply all the data required for munitions supply management. In the previous chapter five such deficiencies were discussed: lot number data, automated transaction history data, complete round data, flagging of problem areas, and R32 data and readability problems.

Today, the UNIVAC 1050-II computer, used for so long as a mainstay, has been upgraded to the Sperry 1100 computer; but reports and listings produced by the new system have not changed. While some program difficulties were noted by survey respondents, no significant or universal problems appeared and therefore transition problems were not addressed in this study.

Data collected from the survey instrument used in this study represented 90% of the total population of MASOs operating under a maintenance organization. Although the data indicated a general satisfaction with the current automated MIS (reference survey response, question 16), significant dissatisfaction was also noted.

Analysis of the munitions supply automated MIS was based on the four research questions proposed in Chapter I. The first question addressed the specific informational needs of the MASO. This question directed the compilation of the data requirements list. Eight listings were analyzed to determine the data requirements for management and from this analysis, a data requirements list was formulated which represented specific needs of the MASOs. Analysis of the eight most important listings utilizing AFM 67-1, Vol II, Part Two, Chapters 23, 24, and 25 also provided the data in response to question 2, what data was currently available to the MASO. The third question requested a comparison of the data required to the data currently available. Analysis indicated that most data requirements were being met through the current MIS, but also indicated that some specific data requirements, as noted previously, were not being supplied with the current system.

This chapter addresses the final research question:  
How can the munitions supply MIS be improved?

As a sideline to the primary research effort, the author found that the new Combat Ammunition System (CAS) eliminates most of the current MIS deficiencies; however, because the CAS system will not be in the field until the spring of 1987 (1), intermediate recommendations and actions are warranted.

### Recommendations

The following recommendations are based on analysis of the survey results along with a thorough study of listing contents and capabilities as provided in AFM 67-1. Specifically, recommendations focus on the five data deficiencies discovered during the analysis phase of the study. Additionally, a recommendation will be advanced concerning extraneous data discovered during the study.

Of the five data deficiencies discovered in the study, there were two which involved data not maintained, in any form, by the current automated MIS. These were complete round and lot number data. Manual systems employed to maintain and report this data, by their very nature, were found to be both time consuming and tedious for management. As no data files were currently available in the SBSS MIS system addressing this data, automated relief through the SBSS did not appear practical, particularly in light of the pending CAS program implementation in 1987. Programs to alleviate these deficiencies have been written by CAS design

personnel at Gunter AFS and implementation of these programs will greatly enhance lot number accountability and complete round reporting.

A third deficiency highlighted in Chapter III was the lack of transaction history reporting capability. This problem also was addressed by the the design team at Gunter AFS and a program was developed that allows automated transaction histories to be reported on any loaded stock record for periods up to one year. This will greatly enhance the research capability for inventory adjustments as well as the tracing of previous transactions. The author recommends additional study in this area to determine the feasibility of adopting the CAS program to current SBSS software programs. Unlike the previous deficiencies, transaction data are compiled in the SBSS computer and modification to permit transaction history reporting may be possible. Such reporting would be beneficial to both the munitions account as well as other supply managers.

Flagging is a procedure of identifying errors or problems such that the manager has rapid, clear visibility of areas requiring management attention. Flagging within the munitions supply MIS was found to be limited. Flagging was done on the M10 report by reporting specific items which were adjusted because of "out of balance" conditions. The author noted that some specialized listings also flagged "out of balance" situations by printing clear text messages

to that effect. The value to such flagging is obvious and greatly reduces the time managers must spend for account surveillance. At the heart of programs that flag discrepancies is a simple procedure of comparison. Current SBSS listings were found to be programed more to simple reporting of cumulative raw data than to comparison of data with subsequent reporting. An exception noted was the D25 and M25 which made comparisons and indicated specific outcomes based on those comparisons. The D25 and M25, however, fall short of the ideal by not identifying the specific items at fault. Data reported such as "item record past due inventory" print out totals of all records past due inventory which is helpful; however, specific past due records are not identified. The manager is clearly alerted to a problem, but he must then use a search and find technique in some other listing to identify the actual assets past due inventory. Specialized listings circumvent this program deficiency by permitting the MASO to write his own program to include comparison and reporting sub-programs. These are referred to as utility programs and can be written and implemented at any base with SBSS computer support personnel. Recommendations in this area are two-fold. First, additional study of the D25 and M25 programs is recommended to determine the feasibility of holding discrepancy data in a temporary file for subsequent retrieval and reporting. The second recommendation, which



will be addressed further in the next paragraph, is the inclusion of comparisons in a utility management surveillance program with discrepancy identification and flagging output.

The fifth recommendation concerns the problems identified with the Selective Readout Listing, R32. Two problem areas were addressed in this study. The first concerned the lack of certain data elements felt essential to management by the survey respondents. Paramount among the data missing were the date of last inventory (DOLI) and interchangeable and substitute group (I&SG) data. These appeared to be the greatest areas of complaint, and analysis of AFM 67-1, Vol II, Part Two, Chapter 23 revealed that this data was not a normal output on the R32 listing. The second concern was that of readability. Through inspection of sample R32 listings, the author found that it was difficult to read. The basic problem encountered was with the spacing or rather lack of spacing between stock numbers. As data reported contained long strings of single spaced alpha-numeric data, reading clearly is a justifiable concern. It is therefore recommended that additional analysis of this program be undertaken to add needed data elements and make the output product more readable for the user. An alternative recommendation, which the author feels is warranted, is to adopt or design a specialized listing to be used in place of the R32. The author suggests that a study group, comprised

of representatives of the five applicable commands, review all currently used specialized programs. From this study, the author foresees that the best program could be adopted and quickly be made available to all accounts throughout the Air Force. With a concensus between commands on the data to be displayed and with the ability to compare and flag discrepancies, such a standardized program would be of great value to all MASOs, particularly those who do not have such a program currently. Adoption costs for this recommendation would be very minimal as many programs are currently available in the field and could be implemented easily at any base using the utility program capability.

Finally, analysis of listings in this study suggested that the subject of extraneous data should be addressed. Three items were found to be extraneous to the needs of the MASOs responding to the survey instrument. Understanding that the needs of individual MASOs vary depending on specific management concerns, additional analysis of all data elements is required prior to deletion of any data from current listings; however, supply effectiveness information, demand data, and financial accounting data were found to be of no apparent management value at the base level. While it may not be cost effective to rewrite existing programs with the advent of the CAS system so near, it does point out the need for a periodic review of all MIS programs. The examples found during this study are not believed to be the

only elements of extraneous data in the current listings. Many data elements were observed to be repeated on the various listings studied, but whether they should be considered extraneous on any one or more of the listings was not verified. What should be noted is that extraneous data can be expensive not only in management time, but in computer time and output costs as well. With this note, the author also recommends a periodic review of all present and future programs to insure the removal of extraneous data as well as the inclusion of required data.

#### Final Note

The munitions supply automated MIS has operated under the umbrella of the SBSS computer for two decades and yet deficiencies identified in this study surely were not new to the system. This, in part, could be attributed to the fact that the munitions supply population is very small (75) in relation to the overall supply community, thereby commanding less attention than other supply users. Whatever the reason, with the advent of the CAS system in 1987, munitions supply will soon operate under its own system, one specifically designed for the munitions function.

The CAS system was originally designed as a command level system, but was later expanded to include base level munition functions. The primary purpose of the base level function, denoted CAS-B, was to provide base level

munitions personnel with an independent automated data system, MIS if you will, for combat posturing and prehostility force posturing (1). The fallout of this system will be a dynamic peacetime MIS.

While capabilities of the new system are dramatically improved, review of CAS programs in June 1985 indicated no evidence of an overall management surveillance program having been developed to date. In light of this, the final recommendation of this research effort is for the design and implementation of a single, composite management review listing that would display account discrepancies in clear text. This would involve a lengthy series of comparison sub-programs, but would greatly enhance the MASO's (experienced or otherwise) ability to manage his or her account.

Whatever changes or improvements are made to the munitions supply MIS, a continual process of review as well as maintenance of a utility program capability should be an integral part of the MIS design.

## Appendix A: Survey Questionnaire

This survey questionnaire is designed for the MASO or in his or her absence the senior designated representative of the account. All answers should be provided with respect to the over-all management of your CONVENTIONAL munitions account and not to submanagement areas.

Your Position in account(MASO,Superintendent,NCOIC) \_\_\_\_\_  
Your Command \_\_\_\_\_  
Your account number(SRAN) \_\_\_\_\_

Select the most appropriate answer or answers by circling the desired letter or number response in each question.

1. How long have you performed as a manager in a munitions supply function?
  - a. less than a year.
  - b. 1-2 years.
  - c. 2-3 years.
  - d. Over 3 years.
2. The primary function of your account would be described as:
  - a. Storage.
  - b. Aircraft support.
  - c. Missile support.
  - d. Non-aircraft support.
  - e. Other (Specify). \_\_\_\_\_
3. If you support an aircraft wing, which description best applies to your wing? ( Select one or more as applicable).
  - a. Fighter aircraft.
  - b. Transport aircraft.
  - c. Bomber aircraft.
  - d. Refueling aircraft.
  - e. Rescue aircraft.
  - f. Other (specify). \_\_\_\_\_

4. How many personnel are assigned to your munitions supply function?
- a. 5 or less.
  - b. 6-10.
  - c. 11-15.
  - d. More than 15.
5. How many satellite accounts do you manage?
- a. 1-2.
  - b. 3-4.
  - c. 5-6.
  - d. More than 6.
  - e. None.
6. How many transactions are processed by your account on a monthly basis?
- a. Less than 500.
  - b. 500-999.
  - c. 1000-1499.
  - d. 1500-1999.
  - e. 2000-2499.
  - f. 2500 or more.
7. How many different computer listings do you receive monthly for account management and surveillance? (ie. D02,D04,D25,M30,etc.)
- a. Less than 5.
  - b. 5-10.
  - c. 11-15.
  - d. More than 15.
8. Of the listings referenced in question 7, how many do you personally use for account management?
- a. 1-3.
  - b. 4-6.
  - c. 7-9.
  - d. 10 or more.
  - e. None.
9. Rank order the following listings as to their importance to you as a management tool. One should be the most important, two the next, and so forth. If you do not personally use a given listing place a dash in the answer space.

- |        |       |                            |       |
|--------|-------|----------------------------|-------|
| a. D02 | _____ | h. Q13                     | _____ |
| b. D04 | _____ | i. R26                     | _____ |
| c. D06 | _____ | j. R32                     | _____ |
| d. D25 | _____ | k. R36                     | _____ |
| e. M10 | _____ | l. R40                     | _____ |
| f. M14 | _____ | m. M30                     | _____ |
| g. M25 | _____ | n. Own specialized listing | _____ |
|        |       | o. Other (Specify)         | _____ |

10. If a specialized listing/program is utilized for account management, why is it used?

- a. Contains greater information than available products.
- b. Easier to read than other available products.
- c. More concise than other available products.
- d. Not used.
- e. Other (Specify) \_\_\_\_\_

11. In increments of 5% how much of your time spent in MASO duties is devoted to the following areas? If less than 5% place a dash in the response area. Percentages need not total 100%, but in total should not exceed 100%.

- |                                           |       |
|-------------------------------------------|-------|
| a. Surveillance of stock balances.        | _____ |
| b. Surveillance of supply point balances. | _____ |
| c. Inventory.                             | _____ |
| d. Issues/Turn-ins.                       | _____ |
| e. Rejects.                               | _____ |
| f. DIFM                                   | _____ |
| g. Ammunition Disposition Reports.        | _____ |
| h. Shipments and RDOs.                    | _____ |
| i. Special levels.                        | _____ |
| j. Allocation Forecasting.                | _____ |
| k. WRM Management.                        | _____ |
| l. Requisitioning.                        | _____ |
| m. Other (Specify)                        | _____ |

12. How would you best describe the R32 as a management tool?

| Not Used | Very Poor | Poor | Average | Good | Very Good |
|----------|-----------|------|---------|------|-----------|
| 0        | 1         | 2    | 3       | 4    | 5         |

13. How would you best describe the D25/M25 as a management tool?

| Not Used | Very Poor | Poor | Average | Good | Very Good |
|----------|-----------|------|---------|------|-----------|
| 0        | 1         | 2    | 3       | 4    | 5         |

14. How often do standard supply listings/products flag areas requiring management?

- a. In all cases.
- b. In some cases.
- c. Seldom.
- d. Never.

15. Do present supply listings you receive contain extraneous information?

- a. Yes, some extraneous information.
- b. Yes, A great amount of extraneous information.
- c. No extraneous information is contained in the listings.

16. How would you rate your present automated management information system?

| Very Poor | Poor | Average | Good | Very Good |
|-----------|------|---------|------|-----------|
| 1         | 2    | 3       | 4    | 5         |

17. Briefly describe any management data that you need and is not available on current supply listings/products.

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18. If you use a specialized listing for your account management, describe its general content and how it is used.

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REMARKS:

## Appendix B: Survey Results

1. a. 9 b. 18 c. 9 d. 32
2. a. 4 b. 38 c. 5 d. 2 e. 4 More than one 15
3. a. 25 b. 1 c. 7 d. 1 e. 2 f. 9  
More than one 14 No response 14
4. a. 26 b. 25 c. 14 d. 3
5. a. 11 b. 6 c. 6 d. 3 e. 42
6. a. 17 b. 14 c. 16 d. 9 e. 5 f. 6 No Response 1
7. a. 3 b. 23 c. 22 d. 20
8. a. 9 b. 29 c. 14 d. 16

| 9.  | Positions |    |    |   |    |   |   |    |    |    |    |    |    |    |    |
|-----|-----------|----|----|---|----|---|---|----|----|----|----|----|----|----|----|
|     | 1         | 2  | 3  | 4 | 5  | 6 | 7 | 8  | 9  | 10 | 11 | 12 | 13 | 14 | NR |
| D02 | 1         | 3  | 2  | 2 | 5  | 6 | 5 | 3  | 3  | 7  | 5  | 3  | 5  | 0  | 16 |
| D04 | 2         | 6  | 6  | 7 | 7  | 8 | 4 | 3  | 3  | 3  | 2  | 4  | 2  | 1  | 8  |
| D06 | 19        | 18 | 11 | 7 | 7  | 2 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 2  |
| D25 | 3         | 5  | 7  | 6 | 7  | 8 | 4 | 1  | 3  | 3  | 2  | 5  | 4  | 2  | 6  |
| M10 | 2         | 3  | 4  | 9 | 10 | 6 | 5 | 7  | 5  | 3  | 2  | 1  | 1  | 1  | 7  |
| M14 | 0         | 1  | 2  | 4 | 1  | 2 | 9 | 9  | 7  | 7  | 7  | 3  | 2  | 1  | 11 |
| M25 | 9         | 4  | 11 | 8 | 8  | 5 | 9 | 4  | 1  | 1  | 4  | 1  | 0  | 0  | 1  |
| Q13 | 0         | 11 | 12 | 7 | 8  | 6 | 5 | 10 | 3  | 2  | 0  | 0  | 0  | 0  | 2  |
| R26 | 1         | 3  | 5  | 9 | 4  | 6 | 9 | 8  | 5  | 3  | 3  | 2  | 0  | 0  | 8  |
| R32 | 14        | 3  | 3  | 2 | 2  | 3 | 1 | 1  | 0  | 0  | 0  | 0  | 1  | 1  | 35 |
| R36 | 0         | 0  | 0  | 0 | 1  | 1 | 5 | 2  | 11 | 8  | 11 | 5  | 0  | 0  | 22 |
| R40 | 0         | 0  | 0  | 0 | 0  | 1 | 2 | 4  | 5  | 9  | 7  | 7  | 11 | 0  | 20 |
| M30 | 0         | 0  | 1  | 0 | 1  | 3 | 2 | 6  | 9  | 5  | 4  | 10 | 6  | 0  | 19 |
| OWN | 16        | 9  | 3  | 1 | 1  | 0 | 0 | 0  | 1  | 1  | 0  | 1  | 2  | 0  | 31 |

Other 0 0 0 2 2 3 0 0 0 1 1 0 1 0 56

\* Two respondents did not answer. NR = No Rating

10. a. 11 b. 5 c. 6 d. 24 e. 1 More than one 24  
No Response 5

11.

|    | Percentage of Time |    |    |    |    |    |    |    |    |    |    |
|----|--------------------|----|----|----|----|----|----|----|----|----|----|
|    | 0                  | 5  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| a. | 3                  | 17 | 17 | 10 | 11 | 3  | 1  | 0  | 1  | 0  | 0  |
| b. | 6                  | 14 | 20 | 13 | 5  | 4  | 0  | 0  | 0  | 0  | 1  |
| c. | 1                  | 15 | 26 | 7  | 5  | 5  | 3  | 0  | 0  | 0  | 1  |
| d. | 13                 | 25 | 16 | 4  | 2  | 0  | 2  | 1  | 0  | 0  | 0  |
| e. | 48                 | 14 | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| f. | 34                 | 20 | 9  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| g. | 18                 | 31 | 11 | 2  | 0  | 1  | 0  | 0  | 0  | 0  | 0  |
| h. | 28                 | 22 | 9  | 3  | 0  | 1  | 0  | 0  | 0  | 0  | 0  |
| i. | 27                 | 25 | 7  | 3  | 1  | 0  | 0  | 0  | 0  | 0  | 0  |
| j. | 9                  | 17 | 18 | 8  | 9  | 0  | 2  | 0  | 0  | 0  | 0  |
| k. | 19                 | 26 | 10 | 1  | 3  | 3  | 1  | 0  | 0  | 0  | 0  |
| l. | 23                 | 25 | 11 | 3  | 1  | 0  | 0  | 0  | 0  | 0  | 0  |
| m. | 53                 | 3  | 4  | 1  | 0  | 1  | 0  | 0  | 1  | 0  | 0  |

\* Five respondents did not answer.

12. 0. 11 1. 4 2. 7 3. 15 4. 19 5. 11  
No Response 1

13. 0. 0 1. 0 2. 3 3. 16 4. 27 5. 22

14. a. 5 b. 41 c. 17 d. 5

15. a. 42 b. 15 c. 9 No Response 2

16. 1. 7 2. 7 3. 25 4. 23 5. 6

17. Provided Response 35 No Response 33

18 Provided Response 30 No Response 38

## Appendix C: Computer Listings

|     |                                                     |
|-----|-----------------------------------------------------|
| D02 | Daily Reject Listing                                |
| D04 | Daily Document Register                             |
| D06 | Daily Transaction Register                          |
| D15 | USAF Ammunition Transaction Report                  |
| D18 | Priority Monitor Report                             |
| D20 | Base Supply Surveillance Report                     |
| D25 | Daily Munitions Management Report                   |
| M10 | Consolidated Inventory Adjustment Document Register |
| M13 | Munitions Stock Scan                                |
| M14 | Stock Number Directory                              |
| M25 | Monthly Munitions Management Data Report            |
| M30 | Due-Out Validation                                  |
| Q13 | Supply Point Listing                                |
| A03 | Arms Reconciliation                                 |
| R02 | Interchangeable and Substitute Listing              |
| R03 | Exception Phrase Listing                            |
| R07 | WCDO/BLSS Report                                    |
| R12 | Inventory Count Card                                |
| R26 | DIFM Listing                                        |
| R28 | Due-In Receipt Listing                              |
| R31 | Due-Out Status Listing                              |
| R32 | Selective Readout - Item Records                    |

- R35      Special Level Review
- R36      Warehouse Location Validation
- R40      Delinquent Shipment Listing

## Appendix D: Survey Question 17 Responses

Integrate Lot numbers in item record.

DOT markings on shipments.

Larger position sector for complete item nomenclature.

TLOS locations are not on R32.

Consolidate data; frequently you must look at multiple listings to get all needed information.

Incorporation of lot numbers in R32.

Capability to pull past transactions on a particular stock number over a period of one year.

R07 WRM listing does not provide other asset data (i.e. Supply Point, due-in).

Available condition codes in base supply computer do not match munition condition code.

Locations on R32 should be included.

R32 should be modified to allow a space between stock numbers.

A more thorough R32 that can be used without trying to find more complete analysis.

M25/D25 contains useless information.

Munitions data i.e. lot numbers, condition codes, separate locations by lot number.

Complete round information and expanded visibility of due-in property/status.

Weapon status report accuracy rates overseas.

D25/M25 needs to provide readout and not just stats. Should show item and history.

R32 should be doublespaced and easier to read.

R32 does not contain Date of Last Inventory (DOLI).

Demand level not necessary for our items.

ISG Linkage Number, Demil Code, and DOLI.

Maintenance Data (Various stages of Repair)

R32 does not have I&S groupings.

ISG Linkage number.

Master and interchangeable information on S26.

Repetitious information now provided.

Supply effectiveness data is of no value on the M25.

Listing such as M25 provide data but you must research R32 to identify actual problem. (Consolidate)

I&SG number in place of DOLD on R32.

Transaction histories automatically.

Complete round build-up capability.

Replace number of demands with DOLI on R32.



## Appendix E: Listing Description and Contents

1. D06 Daily Transaction Register - Listing provides an auditable record of transactions of previous day. Its primary use is as an audit trail for determining the accuracy and completeness of transactions processed by the account. It should be checked daily for obvious errors and as a review of transactions processed (7:29).

Information provided includes:

|                            |                          |
|----------------------------|--------------------------|
| Stock number               | Status and advise code   |
| Unit of issue              | Output remote function # |
| Application code           | Supplemental address     |
| Document number            | Stock number requested   |
| Budget code                | Issue priority           |
| Nomenclature               | Date of last demand      |
| Type account code          | Source of supply code    |
| Transaction date           | Transaction ID code      |
| Transaction serial number  | Mark for information     |
| ERRCD designator           | Transaction phrase code  |
| Stockage priority code     | Financial account code   |
| Transaction exception code | File indicator           |
| Routing identifier         | Extended cost            |
| Demand code                | Date of last transaction |
| Action quantity            | System designator        |
| Ending balance             | Reason why code          |

2. Own Specialized listings - Generally a specialized listing is a selective item and detail record readout that supplements or replaces the R32. This report is used to provide current data on all account assets and is used as a management review tool to monitor asset balances and account operations. Flagging and problem area identification are features of some such listings.

Information provided includes (typical):

|                         |                          |
|-------------------------|--------------------------|
| Stock number            | Controlled item code     |
| System designator       | Date of last transaction |
| Unit of issue           | Demand level             |
| Unit price              | Date of last inventory   |
| Budget code             | Date of last demand      |
| Routing identifier code | I&S Group                |
| ERRCD                   | Packaging code           |
| Nomenclature            | Type detail              |
| Warehouse location      | Table of allowance       |
| Serviceable balance     | Exception codes          |
| Due-In and Due-out data | Document number          |
| Authorized levels       | Budget code              |
| Excess identification   | Out of balance details   |
| Shortages               | Shelf life               |

3. M25 Monthly Munitions Management Data Report - The M25 "provides monthly totals for supply effectiveness and selected transactions to insure effective management. The

report facilitates surveillance and management at all levels" (7:253). Trend analysis, workload volume, excesses, due-in status, and other management indicators are all measured with this product (7:253).

Information provided includes:

|                              |                        |
|------------------------------|------------------------|
| Supply effectiveness ratings | Due-In status          |
| Transaction summaries        | Inventory control data |
| Inventory accuracy data      | Excess data            |

Repair cycle control data

Item record data (totals)

Total item records

Past due inventory

Warehouse balance no warehouse location

Item records past due inventory

Item records annotated critical

Item records with special level indicators

Item records with exception codes

Item records with excess codes

Item records with zero serviceable balance

Item records with no demands

Item records with zero demand level

Item records with date of last demand greater than 365 days

Misc Detail Record Data

Number of DIFM details

Number of due-in details

Number of due-out details

Number of predirected (Auth F)  
 Number of predirected on hand (K)  
 Number of special level details  
 Number of supply point details  
 Number of supply point details with balance  
 Number of unservicable details  
 Number of WRM details  
 Number of WRM units authorized  
 Number of WRM details with balance  
 Number of WRM details with no units on-hand  
 WRM details with on-hand bal greater than authorized  
 WRM details with authorized greater than on-hand

4. Q13 Supply Point Listing - Provides a listing of supply point details by individual supply point containing the quantity on-hand, authorized, and due-out to each detail. It is used for supply point surveillance to insure proper supply point support, correct authorizations, and to identify shortages and excesses (7:370A).

Information provided includes:

|                          |                      |
|--------------------------|----------------------|
| Item number              | Due-out document no. |
| Stock number             | Demand               |
| Nomenclature             | Shelf life code      |
| Date of last transaction | Application code     |
| Part number              | Control item code    |
| ERRCD                    | Account code         |

|                                |                    |
|--------------------------------|--------------------|
| Unit cost                      | Supplemental data  |
| Unit of issue                  | Special level      |
| Quantities authorized          | Due-out quantities |
| Quantities on-hand             | Due-out mark for   |
| Transportation packaging order |                    |

5. D04 Daily Document Register - Provides a list of all transactions processed and produces Document Control Cards for use in controlling auditable transactions. Provides a clear text listing of transactions as a means of daily review (7:24A).

Information provided includes:

|                                         |                          |
|-----------------------------------------|--------------------------|
| Stock number                            | Budget code              |
| ERRCD                                   | Type transaction code    |
| Financial account code                  | Date of last demand      |
| Issue priority                          | Ending balance           |
| Routing identifier                      | Transaction date         |
| Unit of issue                           | Transaction serial no.   |
| Nomenclature                            | Date of last transaction |
| Action Quantity                         | Status of advice code    |
| Extended cost                           | Output remote function # |
| Application code                        | Stock no. requested      |
| Supplemental Address                    | Mark for                 |
| Document number                         | File indicator           |
| Trans identification code               | Reason why code          |
| Material category/source of supply code |                          |

6. D25 Daily Munitions Management Report - Used like the M25. This report contains same type of data as the monthly report but reflects only daily management data.

See M25

7. M10 Consolidated Inventory Adjustment Document Register  
Provides a consolidated listing of adjustments to asset record balances and assists in evaluation of account accuracy. The M10 identifies specific items, areas, and quantities involved in adjustments being made (7:201).

Information provided includes:

|                    |                              |
|--------------------|------------------------------|
| Stock number       | Controlled item code         |
| ERRCD              | Type transaction phrase code |
| Unit of issue      | Type authorization code      |
| Document number    | Transaction exception code   |
| Transaction number | Budget code                  |
| Action quantity    | Warehouse location           |
| Extended cost      | Nomenclature                 |
| System designator  | Type adjustment              |

Adjustment category (Complete, Special, Identity change)

Line items over

Units over

Dollar value overages

Line items short

Units short  
Dollar value shortages  
Inventory adjustments summary  
Cumulative adjustment summary  
Inventory analysis summary  
Inventory accuracy

8. R32 Selective Readout - Item record - Provides the capability to selectively retrieve item and detail record data for management review. The R32 provides an abundance of data and is utilized as a general data source for daily use and account surveillance (6:31).

|                            |                        |
|----------------------------|------------------------|
| Stock number               | Serviceable balance    |
| System designator          | Application code       |
| Unit of issue              | Stockage priority code |
| Unit price                 | Controlled item code   |
| Budget code                | Number of demands      |
| Routing identifier         | Date of last demand    |
| ERRCD                      | Warehouse location     |
| Transaction exception code | Freeze code            |
| Requisition exception code | Shelf life             |
| Shipment exception code    | Serviceable balance    |
| Issue exception code       | Other asset indicator  |
| Excess exception code      | Detail data            |
| Nomenclature               |                        |

## Appendix F: Glossary of Terms

Budget Code - used on item record to determine centrally procured, investment, or stock funded items.

DIFM (Due-In From Maintenance) - refers to recoverable items flowing through maintenance from time of removal to actual turn-in.

Due-In - quantity of unsupplied items on requests submitted by unit.

Due-Out - an obligation assumed by a supply agency to issue at a subsequent date a requested item which was not immediately available.

Exception Codes - indicates the type of exception.

|   |             |
|---|-------------|
| E | Excess      |
| I | Issue       |
| R | Requisition |
| S | Shipment    |
| T | Transaction |

ERRCD - Expendability/Recoverability/Reparability/  
Category Designator

Freeze Code - added to the item record to restrict computer processing until removed.

I&S Group (Interchangeability and Substitution Group) - grouping of items which possesses such characteristics as to provide comparable functional performance.

RDO (Redistribution Order) - order directing release and shipment of materiel from one accountable base to another similar activity to satisfy a specific demand.

Repair Cycle Control Data - field on transaction history record that contains the number of days item has been on DIFM.

Special Level - quantity of an item required to be on-hand or on order for a specific purpose or level set by management of a requisitioning objective.

SRD (Standard Reporting Designator) - identifies the type of aircraft, major end item, or system.



Stockage Priority Code - used on item record for economic order quantity items.

WRM (War Reserve Materiel) - materiel required to augment peacetime assets to support forces, missions, and activities reflected in USAF war plans.

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## VITA

Captain Lynn B. Fahnestock was born on 25 July 1945 in Chambersburg, Pennsylvania. He graduated from high school in Chambersburg in 1963 and attended two years at Pennsylvania State University prior to enlisting in the United States Air Force in November 1965. Continuing his education while serving in the missile career field, Captain Fahnestock received the degree of Bachelor of Arts in General Studies from Eastern Illinois University in July 1976. Captain Fahnestock received his commission in the USAF through OTS on 21 December 1979. Upon commissioning, he was assigned as a Supply Officer at McQuire AFB, New Jersey prior to duty overseas as a Munitions Accountable Supply Officer at RAF Bentwaters, UK from 1980 till 1984. Captain Fahnestock entered the School of Logistics, Air Force Institute of Technology, in June 1984.

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## REPORT DOCUMENTATION PAGE

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| PROGRAM<br>ELEMENT NO.                                                                                                                                                                                                                                                                             | PROJECT<br>NO. | TASK<br>NO.                                                                                                                                       | WORK UNIT<br>NO.                                                                                             |                                       |                             |                        |                |             |                  |
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| 05                                                                                                                                                                                                                                                                                                 | 02             |                                                                                                                                                   |                                                                                                              |                                       |                             |                        |                |             |                  |
|                                                                                                                                                                                                                                                                                                    |                |                                                                                                                                                   |                                                                                                              |                                       |                             |                        |                |             |                  |
| 19. ABSTRACT (Continue on reverse if necessary and identify by block number)                                                                                                                                                                                                                       |                |                                                                                                                                                   |                                                                                                              |                                       |                             |                        |                |             |                  |
| <b>Title: MANAGEMENT INFORMATION SYSTEM ANALYSIS OF<br/>USAF MUNITIONS SUPPLY FUNCTIONS</b><br><br><b>Thesis Chairman: Patrick M. Bresnahan, GM-13</b><br><b>Assistant Professor of Logistics Management</b>                                                                                       |                |                                                                                                                                                   |                                                                                                              |                                       |                             |                        |                |             |                  |
| <div style="text-align: right;"> <i>Approved for public release: IAW AFR 190-1.</i><br/> <b>LYNN E. WOLAYER</b> <i>11 Sept 85</i><br/> <b>Dean for Research and Professional Development</b><br/> <b>Air Force Institute of Technology (AFIT)</b><br/> <b>Wright-Patterson AFB OH 45433</b> </div> |                |                                                                                                                                                   |                                                                                                              |                                       |                             |                        |                |             |                  |
| 20. DISTRIBUTION/AVAILABILITY OF ABSTRACT<br><b>UNCLASSIFIED/UNLIMITED</b> <input checked="" type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS <input type="checkbox"/>                                                                                                           |                |                                                                                                                                                   | 21. ABSTRACT SECURITY CLASSIFICATION<br><b>UNCLASSIFIED</b>                                                  |                                       |                             |                        |                |             |                  |
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The automated munitions supply management information system (MIS) is a subsystem of the Standard Base Supply System MIS, yet it has received little individualized analysis to determine the adequacy of data provided to the Munitions Accountable Supply Officer (MASO). This study addresses the data requirements of MASOs, aligned under maintenance organizations, operating throughout the Air Force.

A survey instrument was used to collect data from 75 current MASOs for analysis of both data received and data required for the performance of their duties. The instrument included questions on demographics, task descriptions, data adequacy, and MIS deficiencies. Analysis determined the eight most important computer data sources utilized. From these products, a data requirements list was compiled and contrasted with data currently available.

Final analysis results indicated a general satisfaction with the existing MIS; however, five major deficiencies were noted. Based on study of the five deficient areas, the author suggests several recommendations that, if implemented, could enhance the current computer products.

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