

ESD-TR-75-99

RSD ACCESSION LIST

XRRRI Call No. 83455

Copy No. 1 of 2 cys.

**AUTOMATED FRAUDULENT ENLISTMENT DETECTION SYSTEM
A STUDY OF THE FRAUDULENT ENLISTMENT PROBLEM**

October 1975

Approved for Public Release;
Distribution Unlimited.

Prepared for

AUTOMATED AFES SYSTEM PROGRAM OFFICE
ELECTRONIC SYSTEMS DIVISION
HANSCOM AIR FORCE BASE, MA 01731



ADA 016354

LEGAL NOTICE

When U.S. Government drawings, specifications or other data are used for any purpose other than a definitely related government procurement operation, the government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

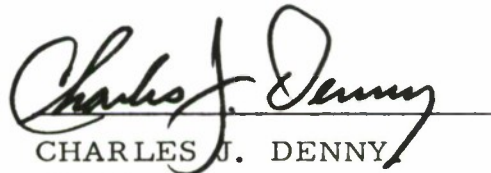
OTHER NOTICES

Do not return this copy. Retain or destroy.

"This technical report has been reviewed and is approved for publication.



ROBERT G. BERGDOLL
1Lt USAF
Task Manager



CHARLES J. DENNY
GS-12
Task Member

FOR THE COMMANDER



DONALD H. L'HEUREUX
LTC USAF

Program Manager, Automated AFES System Program Office

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ESD-TR-75-99	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Automated Fraudulent Enlistment Detection System A Study of the Fraudulent Enlistment Problem		5. TYPE OF REPORT & PERIOD COVERED Final
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Robert G. Bergdoll, 1st Lt., USAF Charles J. Denny		8. CONTRACT OR GRANT NUMBER(s) IN-HOUSE
9. PERFORMING ORGANIZATION NAME AND ADDRESS Automated AFEES System Program Office Electronic Systems Division, Hanscom AFB, MA 01731		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Electronic Systems Division Hanscom AFB, MA 01731		12. REPORT DATE 15 October 1975
		13. NUMBER OF PAGES 49
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Armed Forces Examining and Entrance Station (AFEES) Fraudulent enlistments into the Armed Forces Automated Fraudulent Enlistment Detection (FED) system		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) In recent years, increases in military pay compensation and benefits have made the Armed Forces a lucrative job opportunity for individuals of enlistment age. Some individuals, who are found to be unfit for military service at one Armed Forces Examining and Entrance Station (AFEES), go to another AFEES and attempt to enlist in the Armed Forces by concealing the source of their previous disqualification; these individuals are referred to as fraudulent		

20. Continued
enlistees.

The U.S. Army Recruiting Command (USAREC) is responsible for managing the AFEES system, and neither USAREC nor the AFEESs have the means to readily identify these fraudulent enlistees. Hq USAREC estimates that nearly 3000 individuals attempt to fraudulently enlist each year at an overall cost to the Armed Forces between \$120 thousand and \$9 million. This study proposes the development and implementation of an automated detection system, referred to as the Automated FED system, to resolve this problem.

The Automated FED system consists of a centralized, tape-based computer system located at Hq USAREC which is linked to each AFEES by remote communication terminals. The system has been designed to incorporate the existing hardware and operational procedures of USAREC's AFEES Reporting System (ARS), and provides each AFEES with the capability to query a data base located at Hq USAREC so that fraudulent enlistees may be detected and their processing terminated. The data base consists of records for all applicants processed in the AFEES system within the previous year but not enlisted. The data records contain only that information required to sufficiently identify the fraudulent enlistee and disqualification reason(s).

The study recommends that the design concepts of the Automated FED system be incorporated into the implementation plans associated with the proposed upgrade of Hq USAREC's present computer system. Such action would provide USAREC with the means to efficiently identify fraudulent enlistees and effectively reduce the costs associated with the problem.

SUMMARY

In recent years, increases in military pay compensation and benefits have made the Armed Forces a lucrative job opportunity for individuals of enlistment age. Some individuals, who are found to be unfit for military service at one Armed Forces Examining and Entrance Station (AFEES), go to another AFEES and attempt to enlist in the Armed Forces by concealing the source of their previous disqualification; these individuals are referred to as fraudulent enlistees.

The U.S. Army Recruiting Command (USAREC) is responsible for managing the AFEES system, and neither USAREC nor the AFEESs have the means to readily identify these fraudulent enlistees. Hq USAREC estimates that nearly 3000 individuals attempt to fraudulently enlist each year at an overall cost to the Armed Forces between \$120 thousand and \$9 million. This study proposes the development and implementation of an automated detection system, referred to as the Automated FED system, to resolve this problem.

The Automated FED system consists of a centralized, tape-based computer system located at Hq USAREC which is linked to each AFEES by remote communication terminals. The system has been designed to incorporate the existing hardware and operational procedures of USAREC's AFEES Reporting System (ARS), and provides each AFEES with the capability to query a data base located at Hq USAREC so that fraudulent enlistees may be detected and their processing terminated. The data base consists of records for all applicants processed in the AFEES system within the previous year but not enlisted. The data records contain only that information required to sufficiently identify the fraudulent enlistee and disqualification reason(s).

The study recommends that the design concepts of the Automated FED system be incorporated into the implementation plans associated with the proposed upgrade of Hq USAREC's present computer system. Such action would provide USAREC with the means to efficiently identify fraudulent enlistees and effectively reduce the costs associated with the problem.

TABLE OF CONTENTS

Summary	1
List of Illustrations	5
I. Introduction	7
Background	7
Scope	7
Limitations of the Study	8
Inherent Constraints	8
Existing Hardware/Operational Procedures	9
Hq USAREC's ADPE	9
Armed Forces Examining and Entrance Station (AFEES)	10
Mission	10
AFEES Operations	10
AFEES Reporting System	11
II. Automated Fraudulent Enlistment Detection System	13
Missions	13
Operational Concept	13
AFEES Functional Areas	13
Hq USAREC Functional Areas	17
System Criteria	19
Interface Requirements	19
Processing Requirements	20
Data Base Requirements	21
Hardware Requirements	24
III. Conclusions	27
IV. Recommendations	31
References	33
Appendix A - Geographical Locations of AFEESs	35
Appendix B - DD Form 1966 Worksheet	37
Appendix C - Unit Identification Code (UIC)	39

TABLE OF CONTENTS (Continued)

Appendix D - PULHES Code	41
Appendix E - Work Identification Code	43
Appendix F - Status Code	45
Glossary of Terms	47
List of Abbreviations, Acronyms, and Symbols	49

LIST OF ILLUSTRATIONS

<u>Figure</u>	<u>Page</u>
1. System Diagram	14
2. Results Transmission Example	16
3. Data Record Design	22
4. Record Identifier Ordering and Placement	23

INTRODUCTION

. Background

The U.S. Army Recruiting Command (USAREC) is responsible for processing qualified applicants into the four armed services. This mission is accomplished by sixty-six (66) Armed Forces Examining and Entrance Stations (AFEES) which are geographically located throughout the United States to serve national requirements (see Appendix A).

In July of 1972, as a response to a Program Memorandum from the Office of the Secretary of Defense (OSD), Hq USAF issued a Program Management Directive to establish the Automated AFEES (AAFEES) Engineering Development Program. The objective of this program was to introduce the benefits of automation to the AFEES. In addition, the AAFEES System Program Office was directed to conduct in-house engineering studies into the overall AFEESs' operations and make recommendations, where applicable, for tying the AFEESs into an integrated management information system.

Each year nearly one million applicants are examined by the AFEESs to determine their qualification for entry into the Armed Forces. Some applicants, who have previously been disqualified by one AFEES for a physical and/or mental defect, attempt to enlist in the Armed Forces by going to another AFEES and concealing the source of their previous disqualification. Such acts are termed fraudulent enlistments.

Presently, neither Hq USAREC nor the individual AFEES have the capability to ascertain whether or not an applicant, referred to as a fraudulent enlistee, is attempting to fraudulently enlist.

Scope

Approximately one-fourth of the one million applicants that are examined yearly are disqualified by the AFEESs for medical, mental, and/or moral reasons. In accordance with AR 40-501 and AR

601-270, an applicant who has been medically disqualified at an AFEES may not be processed at another AFEES and enlisted into the Armed Forces within twelve (12) months of the previous examination without obtaining a waiver. Hq USAREC estimates that each year at least 3000 fraudulent enlistments are attempted by applicants who have been previously disqualified at another AFEES.

Costs incurred as a result of fraudulent enlistments vary significantly depending upon the length of time before identifying the fraudulent enlistee. On the average, the AFEES incurs \$40.00 in costs to fully process one applicant, regardless of whether he enlists. Assuming a fraudulent enlistee is enlisted and completes basic training prior to being identified, an additional \$3000.00 in costs will be incurred. Based on these figures, the total cost to the Armed Forces lies between \$120 thousand and \$9 million per year.

The extent of the fraudulent enlistment problem warrants the design and implementation of a detection system which efficiently detects the fraudulent enlistee and effectively reduces the costs associated with the problem. This study investigates the problem of fraudulent enlistments and recommends methods for the automated detection of fraudulent enlistees through the use of state-of-the-art management information and computer technology.

Limitations of the Study

There are three basic limitations of the study which affect its conclusions. The first is derived from constraints inherent to the fraudulent enlistment problem. Next, the concept of utilizing existing hardware and operational procedures imposes a limitation. Finally, the study assumes Hq USAREC's automatic data processing equipment (ADPE) will be upgraded as requested.

Inherent Constraints

Due to the nature of the problem, several constraints are apparent. First, the problem is nationwide, rather than regional,

requiring the data base to be centralized for interrogation. Next, nearly 4000 applicants per day will be checked against the data base, and the response time is critical to the effective reduction of the costs associated with the problem; to this extent, maximum response time has been assumed to be no greater than one (1) hour. Third, due to the validity period for medical examination results, the data base record for a disqualified applicant must be retained for one (1) year; this constraint necessitates the requirement for a storage medium capable of storing large amounts of data (nearly 250,000 records) and, yet, provide for ease of accessibility and maintainability. Finally, USAREC has requested that the data base be maintained by Hq USAREC and the AFEESs given "read only" access to preserve its integrity.

Existing Hardware/Operational Procedures

To simplify the implementation of an automated detection system, the study assumes that existing hardware (exclusive of Hq USAREC's ADPE) and operational procedures will be utilized to the maximum extent possible. Currently, each AFEES has two-way, remote, communication terminals which transmit data to and from Hq USAREC under USAREC's AFEES Reporting System (ARS). This system provides Hq USAREC with the data for all applicants processed in the AFEES system for each day. To preclude the introduction of new terminals and operational procedures, these two (2) facets of the AFEESs' operations will be integrated into the study's proposed detection system.

Hq USAREC's ADPE

The most important limitation of the study is the assumption that Hq USAREC's ADPE will be upgraded from the present IBM 7040 computer system; Hq USAREC has requested that two (2) UNIVAC 1108 computers be installed to upgrade the ARS. Currently, Hq USAREC is limited to off-line, serial processing by the IBM 7040 computer. The proposed detection system requires an on-line computer system

at Hq USAREC capable of multiprogramming to readily process queries to a data base. The UNIVAC 1108 computer system would give Hq USAREC the capability to meet the requirements of an automated detection system (see Hardware Requirements).

Armed Forces Examining and Entrance Station (AFEES)

Mission

The AFEES has as its mission the determination of the medical, mental, and moral qualifications of most armed service applicants in order to enlist only those who meet prescribed standards. Also, the AFEES is tasked with administering physicals to applicants for other government agencies; examples of these are the Reserves, FBI, VISTA, and the National Guard.

AFEES Operations

The daily workload of each AFEES differs significantly due to their various geographical locations, demographic characteristics, and other factors of demand. However, independent of the number of applicants processed are the functions performed by each AFEES to determine an applicant's qualification for entry into the Armed Forces.

Upon arrival at the AFEES, the applicant is given a briefing on that day's processing and receives a packet of forms to be filled out by himself and the test administrators. The applicant then takes mental tests, if these have not been accomplished prior to his arrival at the AFEES, and medical tests to determine his physical and mental qualification for the branch of service he wants to enter. Upon completion of testing, acceptable applicants are sworn into the Delayed Enlistment Program (DEP) of the branch of service the applicant desires, and disqualified applicants are returned to the Career Counselors, who either initiate procedures for retests or send the applicant home. At a later, predetermined date, those applicants sworn into the DEP return to the AFEES for

processing into active duty and shipment to the appropriate duty station/reception center.

AFEES Reporting System

The AFEES Reporting System (ARS) is a management information system which has been designed to collect, edit, and process data required to maintain a computerized data base on all applicants and enlistments accomplished by the AFEESs. The ARS is composed of a centralized computer system (presently, IBM 7040s) located at Hq USAREC, communication links from Hq USAREC to each AFEES, and IBM Magnetic Card Selectric Typewriters (MCSTs) at each AFEES.

At the completion of the day's processing activities, each AFEES transmits data on all applicants processed that day to Hq USAREC via the ARS. Utilizing the MCSTs located within each AFEES, data from each applicant's DD Form 1966 Worksheet (see Appendix B) is transcribed onto magnetic cards. At a time designated by Hq USAREC, each AFEES is polled for this information, and the data is automatically transmitted via WATS lines. The procedures for data transcription and transmission are specified in USAREC Regulation 680-1, dated 1 October 1975.

AUTOMATED FRAUDULENT ENLISTMENT DETECTION SYSTEM

Missions

The missions of the Automated Fraudulent Enlistment Detection (FED) system are to retain for a period of one (1) year, or until subsequent enlistment, a data base record for each applicant who has been examined by an AFEES and not enlisted into the U.S. Armed Forces, query the data base to ascertain whether an applicant is attempting to fraudulently enlist, and readily identify fraudulent enlistees so their processing may be terminated and appropriate actions taken.

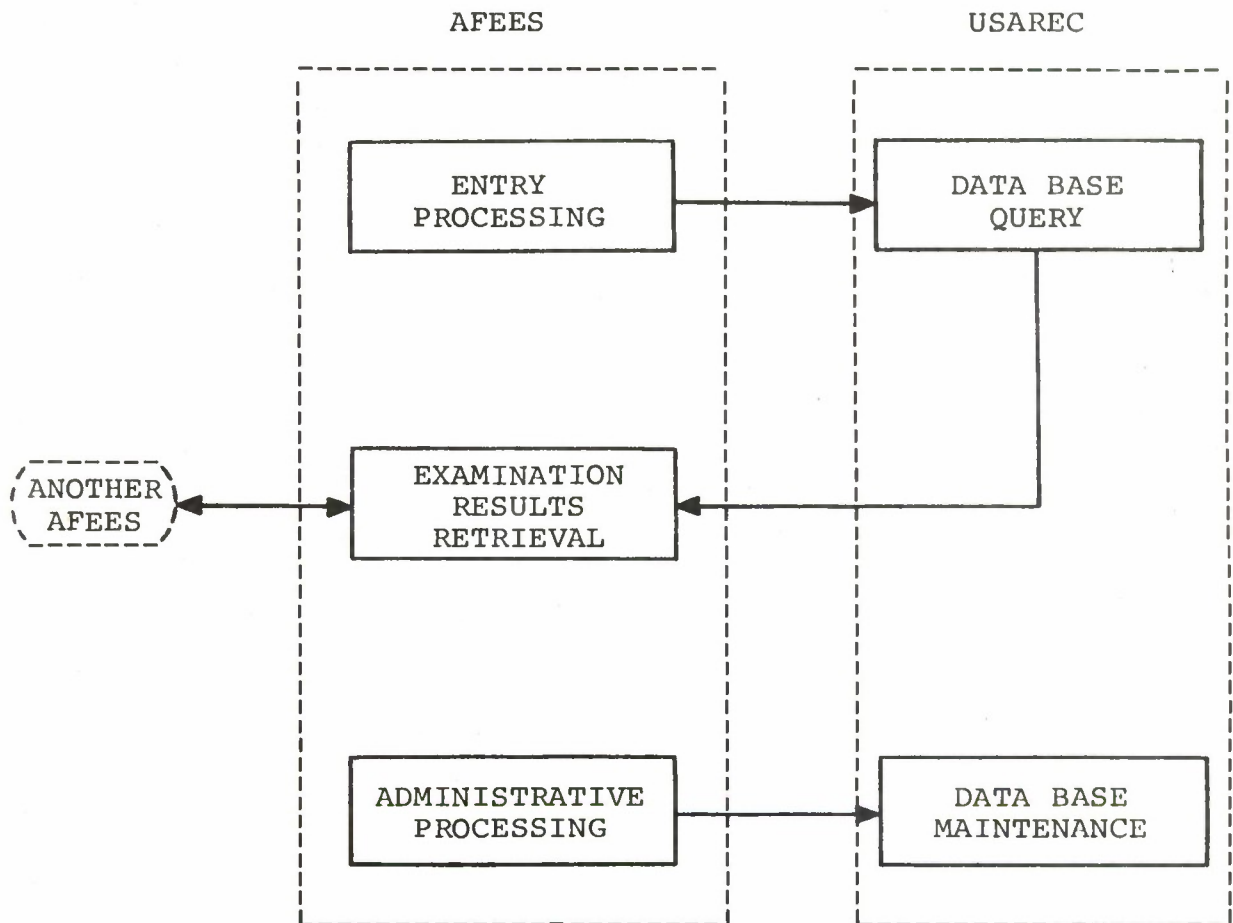
Operational Concept

The Automated FED system consists of a tape-based computer system located at Hq USAREC which is linked to each AFEES by the AFEES Reporting System; in addition, each AFEES is linked to the other AFEESs by their IBM MCSTs. The operational concept of the Automated FED system requires five (5) functions to be performed. These are entry processing, data base query, examination results retrieval, administrative processing, and data base maintenance. The system diagram, which depicts information flow between the functional areas, is shown in Figure 1.

AFEES Functional Areas

Each AFEES will be responsible for conducting the activities in three (3) functional areas of the Automated FED system (see Figure 1). The functional areas are entry processing, examination results retrieval, and administrative processing.

1. Entry Processing. At the conclusion of the reception and orientation phase of AFEESs' operations each morning, each AFEES shall compile a list of Social Security Account Numbers (SSANs)



Legend:

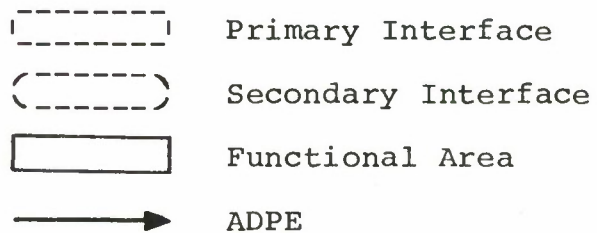


Figure 1. System Diagram

for those applicants being processed. Utilizing the MCST, the list will be transcribed onto magnetic cards. At a time designated by Hq USAREC, the AFEES will be polled for this information, and the SSAN list will be transmitted to Hq USAREC via the ARS. The SSAN list transcription and transmission procedures should be similar to those specified in USAREC Regulation 680-1. Heavy workloads at an AFEES may necessitate more than one (1) polling each day. The lists will be checked against the data base under Hq USAREC's data base query function.

2. Examination Results Retrieval. At the completion of the data base query function for each region, the results pertaining to each SSAN list will be transmitted to the appropriate AFEES via the ARS. If the SSAN was not found in the data base, an "Applicant Not Found" message will be transmitted corresponding to the SSAN. If the data base query yields a match, the following information will be transmitted corresponding to the SSAN (see Figure 2):

- a. Applicant's full name.
- b. AFEES of previous examination.
- c. Date of determination for previous examination.
- d. Work Identification code (see Appendix E).
- e. Mental test results (Test ID and Score).
- f. Physical profile, or PULHES code (see Appendix D).
- g. Status code (see Appendix F).

The retrieval of previous examination results will occur only if an applicant is identified as a fraudulent enlistee and the conditions warrant such action. Several means of retrieving the previous examination results are available to the AFEES:

- a. The AFEES may request and obtain hardcopy results of the examination via MCST-to-MCST communication.
- b. The AFEES may request and obtain verbal examination results via the telephone (AUTOVON or WATS).
- c. The AFEES may reschedule the applicant and request

○									○
○	BALTIMORE MD'S FED RESULTS ...								○
○									○
○	<u>SSAN</u>								○
○	081-50-5240	APPLICANT NOT FOUND							○
○	081-51-1328	LACORN TIMOTHY J			BOSTON MA				○
○		25 MARCH	A100	2B-070	000000		E		○
○	081-52-6748	APPLICANT NOT FOUND							○
○	081-52-7656	APPLICANT NOT FOUND							○
○	081-52-7756	APPLICANT NOT FOUND							○
○	081-52-8756	TOLLE RICHARD E			FT HAMILTON NY				○
○		2 DECEMBER	A113	5A-073	111421		B		○
○	081-52-8873	APPLICANT NOT FOUND							○

○	081-66-1276	APPLICANT NOT FOUND							○
○	081-66-2690	APPLICANT NOT FOUND							○
○	585-46-7585	DE CORSO ANTHONY J JR			SALT LAKE CITY UT				○
○		6 JUNE	A113	00-090	111111		A		○
○	// END OF TRANSMISSION //								○

Figure 2. Results Transmission Example

the examination results be mimeographed and mailed.

The utilization of any of the alternatives will be dependent upon not only the characteristics of each case but also the direction of Hq USAREC; however, the fraudulent enlistee will have been identified and his processing terminated pending further action.

3. Administrative Processing. The transmission of a daily report to Hq USAREC, accomplished by the AFEES's administrative processing function, shall serve as the input for Hq USAREC's data base maintenance function of the Automated FED system. Each AFEES currently accomplishes this function, and no modifications to the present ARS procedures are necessary.

Hq USAREC Functional Areas

Hq USAREC will be responsible for conducting the activities in the remaining two (2) functional areas of the Automated FED system (see Figure 1). The functional areas are data base query and data base maintenance.

1. Data Base Query. After all the AFEESs in a region have been polled for their SSAN lists, the SSANs will be numerically sorted for a more efficient data base query. Concurrently, a twelve-digit data item will be formed composed of the nine-digit SSAN and its Unit Identification Code, or UIC (see Appendix C). The UIC will be taken from a header field of the data transmission (i.e., similar to the header field prescribed for MCST transmission in USAREC Regulation 680-1). After the SSANs for each region have been sorted, the data base tape will be searched for a SSAN match with the first nine (9) digits of each data item. If a SSAN match is encountered, the data base record will be extracted, and the match will be noted. Following the data base search for all the SSANs of the region, the data items will be resorted by the UICs, and the results corresponding to each AFEES's SSAN list will be compiled for subsequent transmission to the appropriate AFEES.

2. Data Base Maintenance. At the completion of each workday, each AFEES is polled by Hq USAREC for the data from all applicants' DD Form 1966 Worksheet (see Administrative Processing). When this data has been received from all the AFEESs, a data extraction and data base updating process will be accomplished by Hq USAREC based on the Work Identification code in each DD Form 1966 data set.

If the Work Identification code indicates that the applicant was enlisted into either the DEP or active duty (see Appendix E), only the applicant's SSAN will be extracted from the DD Form 1966 data set and used in the data base updating process. However, if the code indicates any other type of processing, the following data items will be extracted from the data set (see Appendix B):

- a. Unit Identification code (UIC).
- b. Applicant's full name and SSAN.
- c. Mental test results (Test ID and Score).
- d. Physical profile, or PULHES code.
- e. Work Identification code.
- f. Date of determination (Julian date).
- g. Status code.

The data base updating process will consist of purging, or deleting, certain data records while merging, or adding, new data records onto the data base tape. Data records found to be greater than twelve (12) months old and the records of those applicants enlisted into either the DEP or active duty will be purged from the data base. Concurrently, the data records of those applicants processed that day, but not enlisted (for whatever reason), will be merged onto the data base tape in the appropriate numerical sequence; these data records will supersede data records presently maintained in the data base for the same applicant (i.e., the SSANs match).

The end result of the data base maintenance function will be a complete and current data base which is stored on tape and ready for the next day's operations. This data base will contain records for all applicants processed in the AFEES system within the past

year, but not enlisted into either the DEP or active duty.

System Criteria

Interface Requirements

As depicted in Figure 1, the Automated FED system requires both primary and secondary interfaces for its overall operations. The interfaces between Hq USAREC and each AFEES are required to satisfy the purpose of the system - the detection of fraudulent enlistees; therefore, the interfaces are classified as the primary interfaces of the system. Those between the AFEESs, classified as secondary interfaces, are used merely to augment the information provided by the primary interface.

1. Hq USAREC-AFEES Interface. Hq USAREC is responsible for the overall administration of the Automated FED system; it receives inputs from the AFEESs, processes the data, and transmits results to the AFEESs. The system requires Hq USAREC and each AFEES to maintain an interactive interface for the following:

a. The transmission from the AFEES to Hq USAREC of the SSANs on all applicants being processed; this transmission is to occur at the beginning of each workday immediately following entry processing at the AFEES.

b. The transmission from Hq USAREC to the AFEES of the results from the data base query corresponding to that AFEES's SSAN list; this transmission is to occur no later than one (1) hour following the receipt of the SSAN list.

c. The transmission from the AFEES to Hq USAREC of the DD Form 1966 data on all applicants processed at the AFEES; this transmission is currently accomplished under the ARS.

2. AFEES-AFEES Interface. The Automated FED system requires the AFEESs to maintain interactive interfaces via their MCSTs. This interface is used to augment the information provided by the

data base query results when specific details of the fraudulent enlistee's previous examination are required.

Processing Requirements

The Automated FED system performs two (2) types of processing. First, the system processes SSANs in the entry processing, data base query, and examination results retrieval functional areas. Second, it processes applicant data from the DD Form 1966 in the administrative processing and data base maintenance functional areas.

1. SSAN Processing. The system must be capable of processing at least 4000 applicants' SSANs per day. Due to the response time constraint of one (1) hour, the processing is conducted by regions which are to be designated by Hq USAREC. Once the SSANs from a region have been received, they will be processed for data base query (i.e., data item creation and sorting). While this is being accomplished, the next region's AFEESSs will be polled for their SSAN lists. After data base query has been completed for the first region, the results compilation and transmission will occur. At this time, the second region's SSANs will be processed for data base query, and a third region's AFEESSs will be polled for their SSAN lists. Therefore, the system requires different region's data to be processed in different stages of SSAN processing at the same time.

2. Record Processing. The system must be able to process at least 4000 applicants' records, or DD Form 1966 data, each day. The transmission of this data is currently accomplished by the ARS, and no modifications to ARS procedures are required. However, once the data is collected at Hq USAREC, the system must be capable of extracting certain information from the data sets and creating data records where applicable. The system must also be able to update the data base tape by merging new records and purging those that are no longer required. There is no specific time constraint for

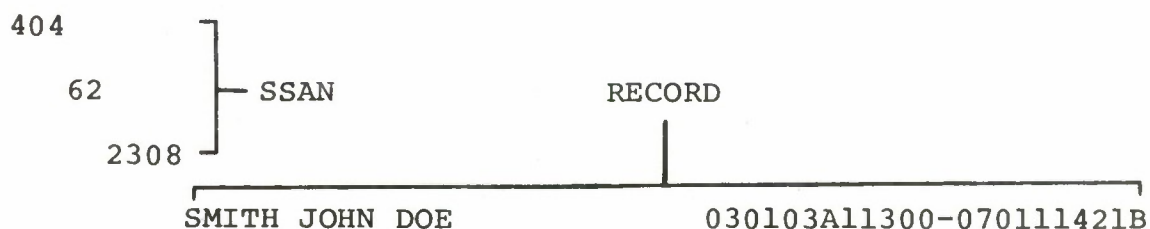
this processing, except that the data base must be updated prior to the next workday.

Data Base Requirements

Each month, nearly 18,000 records will be added to the data base. After one (1) year of operation, the size of the data base should stabilize at approximately 250,000 records. Accordingly, the data base has been designed and structured for efficiency in data manipulation.

1. Data Record Design. Each data record is a fixed length of 50 characters, excluding the record identifier (see Figure 3); this provides for ease of processing in retrieving/deleting records and data manipulation. Each record contains the minimum information required to identify the fraudulent enlistee and facts pertinent to his disqualification; this information includes his name, the date of the examination, the AFEEs where the processing occurred, the processing accomplished, mental test results, physical profile, and the applicant's status. Each item of information in the data record retains its identical format and length as prescribed for the DD Form 1966 in USAREC Regulation 680-1.

2. Data Base Structure. The applicant's SSAN is used as the identifier for his data record. Instead of using unique nine-digit identifiers for each record, the SSAN is separated into three (3) parts so that records may be grouped together under similar levels; this eliminates identifier redundancy, and enables entire blocks of data records to be bypassed during tape search. The first three (3) digits of the SSAN will form the first-level identifier; the fourth and fifth digits are the second-level identifier; and the remaining four (4) digits will be the third-level, and final, identifier (see Figure 4). Each level of identifiers will appear on the tape in a numerical, ascending order with the actual data record located at the fourth level; the numerical ordering of identifiers and sorting of SSANs in ascending order reduces the time required to search the



where:

- 404 - the first three (3) digits of the SSAN used as the first-level identifier.
- 62 - the fourth and fifth digits of the SSAN used as the second-level identifier.
- 2308 - the last four (4) digits of the SSAN used as the third-level identifier.
- SMITH JOHN DOE - the applicant's full name (27 characters).
- 030 - the date of determination expressed in Julian format.
- 103 - the AFEEES Unit Identification Code.
- A113 - the Work Identification Code.
- 00-070 - the mental test results (Test ID-Score).
- 111421 - the physical profile (PULHES).
- B - the Status Code.

Figure 3. Data Record Design

1st Level:	001	002		898	899
	$\wedge$		$\wedge$		$\wedge$
2nd Level:	00	99	00	99	 00 99 00 99
3rd Level:	0000	9999	0000	9999	... 0000 9999 0000 9999

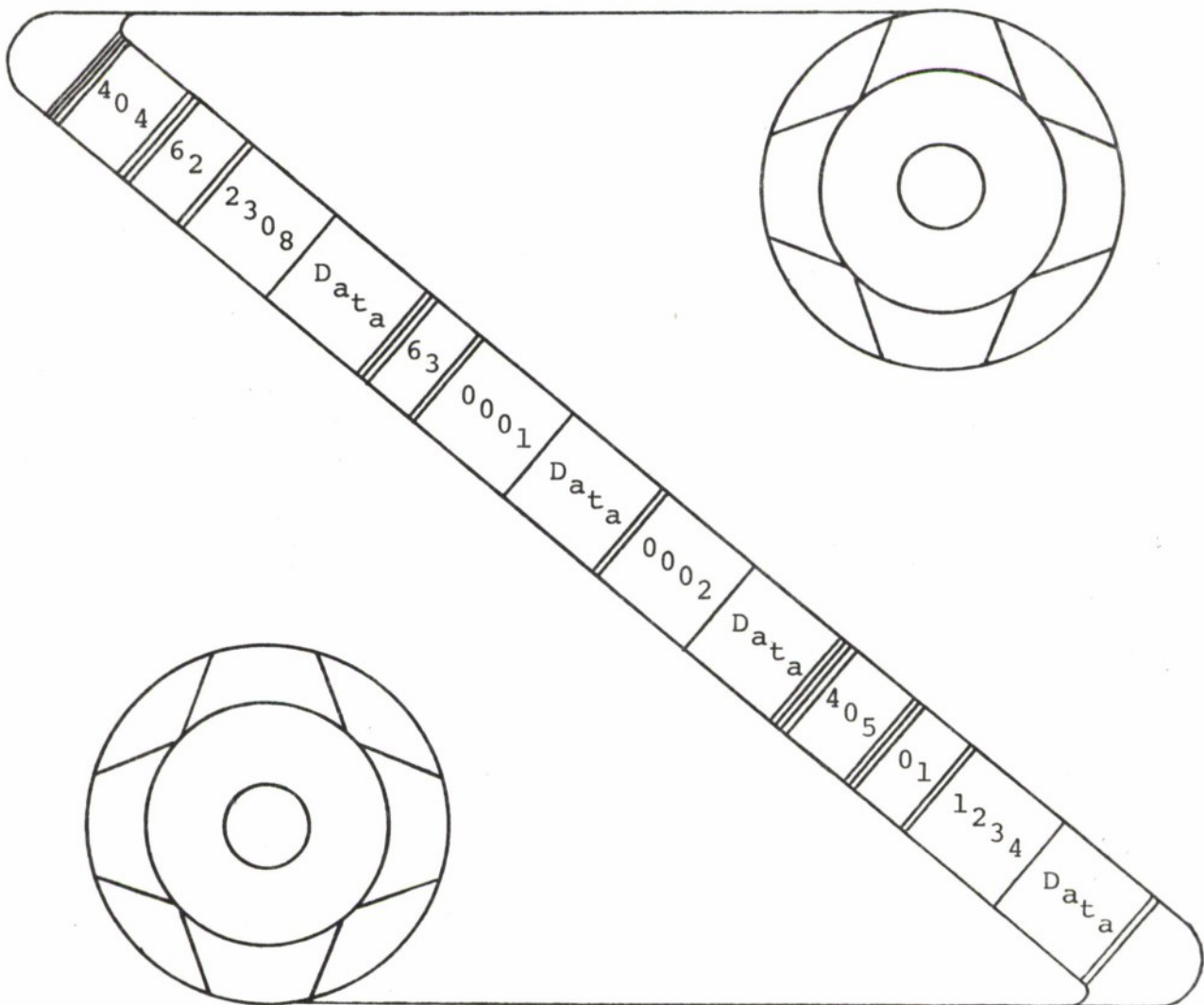


Figure 4. Record Identifier Ordering and Placement

data base during each region's data base query function.

Hardware Requirements

The hardware, or ADPE, required for the Automated FED system may be divided into two (2) categories - mainframe and peripheral ADPE. The mainframe ADPE consists of the central processing unit (CPU), main memory, and magnetic tape controllers/drives. The peripheral ADPE consists of the remote communication terminals (MCSTs) and their associated communication modems. Overall, the system must be capable of:

- a. Two-way communication (i.e., MCST-to-CPU and vice-versa).
- b. Sorting and compiling data in main memory, merging data from main memory onto tape, and purging data from tape.
- c. Storing approximately 250,000 records on tape for a period of one (1) year; at fifty (50) characters per record, this equates to 12,500,000 characters.

1. Mainframe ADPE Specifications. The mainframe ADPE, which is defined as the CPU, main memory, and magnetic tape controllers/drives, must meet the following standard specifications:

- a. Have a two-tape system with a forward tape speed of at least 75 inches per second (ips).
- b. Have at least 16K words of main memory.
- c. Have a nine-track tape, 2400 feet in length, with at least an 800 bit per inch tape density.

2. Peripheral ADPE Specifications. The peripheral ADPE, which is defined as the remote communication terminals (MCSTs) and their associated communication modems (Bell 103A2s), is currently being utilized by the AFEES under the ARS. The following delineates the specifications for this equipment:

- a. The MCST card contains fifty (50) tracks per card

with a capacity of 100 characters per track maximum (i.e., 5000 characters per card).

b. The MCST permits two-way transmission with a data transfer rate of 135 bits per second (baud) maximum; this equates to a maximum transfer rate of fifteen (15) characters per second.

c. The Bell 103A2 communication modem is capable of handling a maximum transfer rate of 300 baud.

CONCLUSIONS

The scope of the fraudulent enlistment problem warrants the design and implementation of an automated detection system. The Automated FED system will provide each AFEES with the means to readily identify fraudulent enlistees so their processing may be terminated and appropriate action may be taken.

The Automated FED system consists of a tape-based computer system located at Hq USAREC which is linked to each AFEES via their MCSTs. This configuration not only satisfies the nationwide aspects of the problem, but also allows for ease of implementation by utilizing the existing hardware and operational procedures of the ARS. The tape-based computer system provides an efficient means of storing large amounts of data for an extended period of time (i.e., at least one year).

The data base resides on tape with data records identified by the applicant's SSAN; this provides a unique identifier for each record and is consistent with present means of identification. The records are fixed-length (50 characters) for ease of maintenance, and contain only the information required to sufficiently identify the fraudulent enlistee (i.e., full name, AFEES where processing occurred, date of determination, work identification code, mental test results, physical profile, and the status code). The records are placed on the tape in numerical order with the SSAN divided into three (3) identifier levels (i.e., XXX-YY-ZZZZ) for ease of interrogation.

The operational concept of the Automated FED system centers around the following functions being performed:

- a. Applicant SSANs are transcribed onto magnetic cards for subsequent transmission from each AFEES to Hq USAREC via the MCST; no more than one (1) magnetic card per AFEES would be required.

- b. The AFEESs are polled on a regional basis for their SSAN lists using procedures similar to those employed by the present ARS; this would be accomplished each morning by Hq USAREC; based

on MCST specifications, the time required to transmit 100 SSANs would be approximately 80 seconds.

c. The SSANs are numerically sorted and annotated for AFEES prior to data base search; subsequent to data base search, they are resorted by UIC for results transmission to the appropriate AFEES; the regional polling concept would permit the simultaneous processing of three (3) regions' SSANs in the different stages of the data base query function (i.e., receipt and sort by SSAN, data base search, and resort by UIC and results transmission).

d. The results of data base query are transmitted to the appropriate AFEES; SSAN matches and non-matches are annotated for quality control with SSAN matches delineating the data contained in the data base record.

e. The fraudulent enlistment data base is created from the data currently received by Hq USAREC under the ARS (DD Form 1966) by merging new records onto the tape and deleting those no longer required; this would be accomplished each evening after all AFEESs had completed their ARS transmissions.

The only limitation to the implementation of the Automated FED system is Hq USAREC's ADPE. The operational procedures and hardware utilized by the ARS satisfy the specifications set forth for the Automated FED system; however, Hq USAREC's present ADPE configuration consists of IBM 7040 computers which do not satisfy these specifications. Hq USAREC has requested two (2) UNIVAC 1108 computers to upgrade its ADPE, and this acquisition would provide them with the capability to implement the Automated FED system. If this ADPE upgrade is not accomplished, the costs associated with the fraudulent enlistment problem warrant the acquisition of a tape-based minicomputer system dedicated to the operations of the Automated FED system. In either case, the acquisition of upgraded ADPE at Hq USAREC would allow for the implementation of the Automated FED system and result in a significant reduction of the costs associated with the problem.

The costs of implementing the proposed Automated FED system are minimal. This is due mainly to the fact that the system has

been designed around current operations. The system specifies the use of MCST communication devices and transmission lines which are currently utilized; it assumes the use of polling procedures similar to those currently utilized under the ARS; and, it uses the data currently collected by Hq USAREC under the ARS for its data base creation. The only costs associated with implementing the Automated FED system would be those resulting from: (1) the procedures involved in querying the data base; (2) the procedures involved in maintaining/updating the data base; and, (3) the upgrading of Hq USAREC's ADPE.

The automated detection system proposed by this study will provide USAREC with the means to efficiently resolve this problem without major changes to USAREC/AFEES operations. The costs of implementing the proposed system are minimal when compared to the costs incurred as a result of fraudulent enlistments. In all, the Automated FED system will provide USAREC with a management tool that will effectively identify fraudulent enlistees and insure the applicants enlisted into the Armed Forces meet the prescribed mental, medical, and moral standards.

RECOMMENDATIONS

The automated detection system presented in this study should be implemented under the direction of Hq USAREC's Director of Management Information Systems/ADP. The implementation of this system will provide Hq USAREC with the means to resolve the costly and continuing problem of fraudulent enlistments.

It is recommended that the computer system be maintained by Hq USAREC's ADP section and linked to each AFEES via the present ARS transmission lines. Further, the following design concepts of the Automated FED system are recommended for implementation:

a. The data base should reside on tape with each data record addressed, or identified, by the applicant's SSAN; the data records should be placed on the tape in numerical order.

b. The data record should be fixed-length and contain only that information required to sufficiently identify the individual.

c. The AFEESs should be polled by region at least once each day with the sort, search, resort procedures of data base query accomplished sequentially for each region's data.

d. Data base query results should specify both SSAN matches and non-matches; the results should be transmitted to the AFEESs within one (1) hour from receipt of the region's SSAN lists.

e. FED data records should be created for those applicants disqualified by an AFEES or processed but not enlisted into either the DEP or active duty.

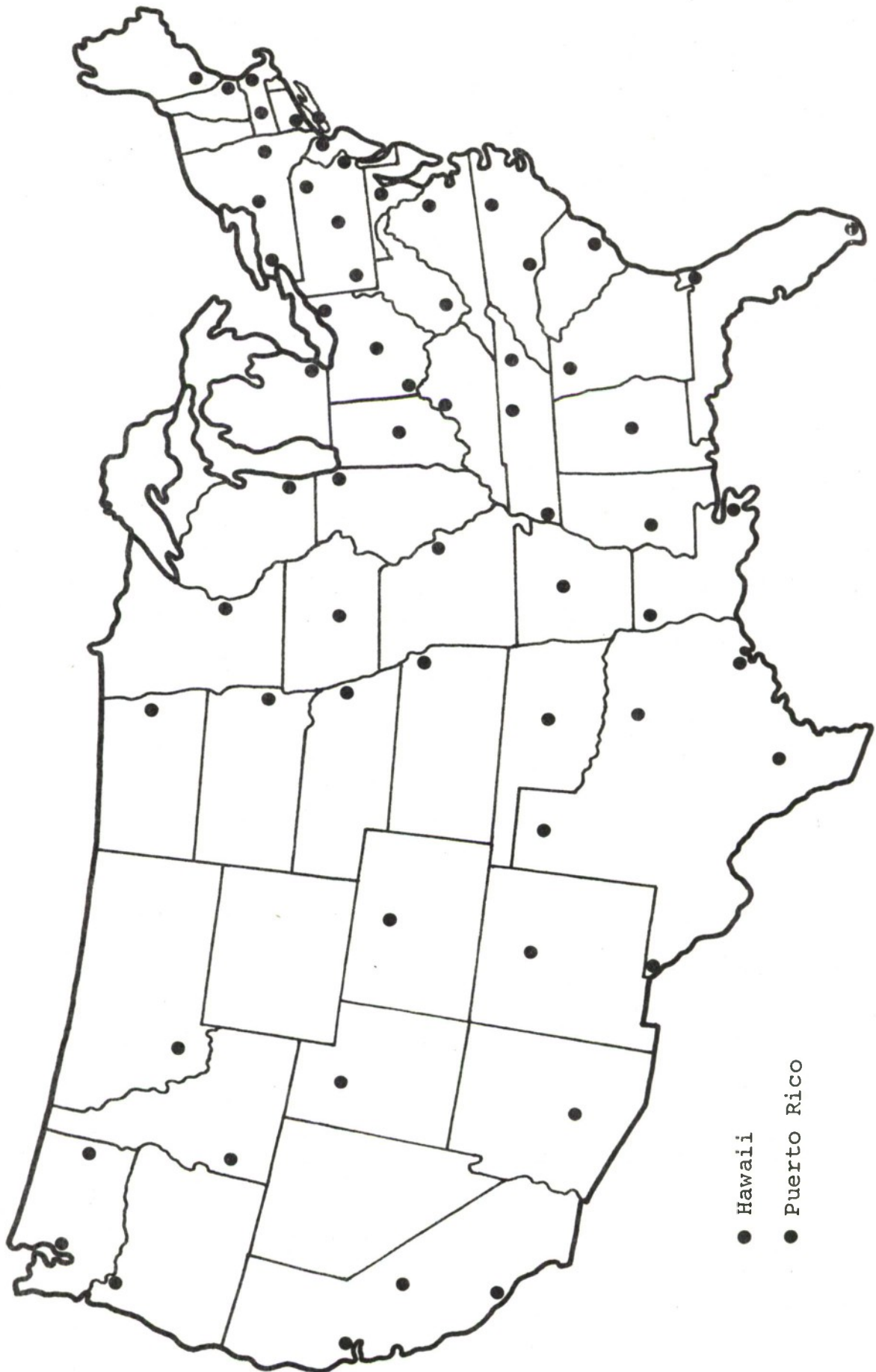
f. The data base should be maintained by Hq USAREC and the AFEESs given "read only" access to the information it contains.

Further, it is recommended that the design concepts of the Automated FED system be incorporated into the implementation plans associated with the upgrade of Hq USAREC's ADPE. At the same time, the procedures and operational requirements for initiation of the system should be developed and formalized so that a full-scale implementation may be accomplished as soon as possible.

REFERENCES

<u>Document</u>	<u>Title</u>	<u>Date</u>
AR 40-501	Standards of Medical Fitness	15 Jan 1961
AR 601-270	Personnel Procurement - Armed Forces Examining and Entrance Stations	1 Feb 1974
USAREC Reg 680-1	USAREC AFEES Reporting System	1 Oct 1975

APPENDIX A - GEOGRAPHICAL LOCATIONS OF AFESS



APPENDIX C - UNIT IDENTIFICATION CODE (UIC)

Definition. The UIC is a three-character, numerical code found in Block 1 of the DD Form 1966 which delineates the AFEES where the applicant's processing occurred.

<u>AFEES</u>	<u>UIC</u>	<u>AFEES</u>	<u>UIC</u>
Albany NY	101	Albuquerque NM	402
Baltimore MD	103	Amarillo TX	403
Beckley WV	105	Dallas TX	404
Boston MA	106	El Paso TX	405
Buffalo NY	107	Houston TX	406
Cincinnati OH	108	Little Rock AR	407
Cleveland OH	109	New Orleans LA	408
Columbus OH	110	Oklahoma City OK	409
Harrisburg PA	112	San Antonio TX	410
Louisville KY	113	Shreveport LA	411
Manchester NH	114	Chicago IL	501
Newark NJ	115	Denver CO	502
New Haven CT	116	Des Moines IA	503
Philadelphia PA	118	Detroit MI	504
Pittsburg PA	119	Fargo ND	505
Portland ME	120	Indianapolis IN	506
Richmond VA	122	Kansas City MO	507
Springfield MA	124	Milwaukee WI	508
Syracuse NY	125	Minneapolis MN	509
Wilkes-Barre PA	126	Omaha NE	510
Ft Hamilton NY	127	Sioux Falls SD	511
Atlanta GA	301	St Louis MO	512
Charlotte NC	302	Boise ID	601
Coral Gables FL	303	Butte MT	602
Ft Jackson SC	304	Salt Lake City UT	603
Jackson MS	305	Fresno CA	604
Jacksonville FL	306	Los Angeles CA	605
Knoxville TN	307	Oakland CA	606
Memphis TN	308	Phoenix AZ	607
Montgomery AL	309	Portland OR	608
Nashville TN	310	Seattle WA	609
Raleigh NC	311	Spokane WA	610
San Juan PR	313	Honolulu HA	613

APPENDIX D - PULHES CODE

Definition. The PULHES code is a six-character, numerical code found in Block 18a of the DD Form 1966 which delineates the applicant's level of fitness with respect to the medical standards established for six (6) categories of his examination:

- P - Physical capacity or stamina.
- U - Upper extremities.
- L - Lower extremities.
- H - Hearing and ear.
- E - Eyes.
- S - Psychiatric.

The following numbers specify the applicant's fitness with respect to each of the six (6) categories:

<u>Level</u>	<u>Statement of Fitness</u>
1	High level of fitness.
2	Meets standards, but may possess job limitations.
3	Not acceptable during peacetime.
4	Below standards.

APPENDIX E - WORK IDENTIFICATION CODE

Definition. The Work Identification code is a four-character, alpha-numerical code found in Block 22a of the DD Form 1966 which delineates the examination type, medical processing accomplished, mental processing accomplished, and the administrative processing accomplished.

Type Character

A - B - C	... Initial, 1st return, 2nd return to AFEEs.
D - E - F - G	... Initial, initial in-house, 1st return, 2nd return to MET site.
H	... Medical consultation return.
I	... Return with letter from physician.
J	... Papers only evaluation.

Medical Character

0	... No processing accomplished.
1	... Complete processing, assignment of physical profile, and determination.
2	... Partial processing.
3	... Inspection only.
4	... Papers evaluation only.

Mental Character

0	... No processing accomplished.
1	... Complete processing including determination.
2	... ACB-73 Test Booklet #1 or AFQT only.
3	... ACB-73 Test Booklet #2 only.
4	... Special test.
5	... Two or more special tests.
6	... Complete qualification test plus special test(s).
7	... Retest.
8	... Immediate retest.

APPENDIX E - WORK IDENTIFICATION CODE (Continued)

Administrative Character

- 0 ... No administrative processing accomplished.
- 1 ... Completely processed and enlisted into active duty.
- 2 ... Completely processed and enlisted into DEP.
- 3 ... Completely processed and not enlisted.
- 4 ... DEP-out and enlisted into active duty.
- 5 ... DEP-out and not enlisted (refusal).
- 6 ... DEP-out and not enlisted (disqualified).
- 7 ... Enlisted only (processing occurred previously).
- 8 ... Paper review.

APPENDIX F - STATUS CODE

Definition. The Status code is a one-character, alphabetic code found in Block 22b of the DD Form 1966 which delineates the applicant's status subsequent to processing at the AFEES.

<u>Code</u>	<u>Statement of Applicant Status</u>
A	Fully qualified.
B	Disqualified.
C	Returned to recruiting service with no determination made.
D	Medical hold.
E	Eloper from the AFEES.
F	Not acceptable; enlistment option was not acceptable to the applicant.
G	Eloper from recruiting service.

GLOSSARY OF TERMS

AFEES Reporting System	- A system designed to collect, edit, and process data required to maintain a data base on the examinations and enlistments accomplished by the AFEESs.
Applicant	- An individual applying for entry into the Armed Forces of the United States.
Automated AFEES System	- An engineering-development program established by OSD to introduce the benefits of automation to the AFEESs.
Career Counselor	- A member of the liaison recruiting staff who counsels applicants on the factors concerning his job specialty, commitments, etc..
Date of Determination	- The date determination was made as to qualification or disqualification of an applicant for the service which he was examined.
Delayed Enlistment Program	- A program whereby an applicant found qualified is sworn into the inactive reserve for a specified time (no more than 270 days) and later enlisted into active duty.
Fraudulent Enlistee	- An individual who attempts to enlist in the Armed Forces within twelve (12) months of an examination at another AFEES by concealing the source of his previous disqualification.
Mainframe ADPE	- The ADPE located at Hq USAREC which consists of the CPU, main memory, and associated tape controllers/drives.
Peripheral ADPE	- The ADPE located at each AFEES which consists of remote terminals (MCSTs) and their associated communication modems (Bell 103A2s).
Physical Profile Code	- A six-digit code which specifies the results of the applicant's medical examination (see Appendix D).
Primary Interface	- Those interfaces of the Automated FED system which provide the information required to sufficiently identify a fraudulent enlistee.
Record Identifier	- A unique, nine-digit number used to address each data record; the SSAN of an applicant.

GLOSSARY OF TERMS (Continued)

- | | |
|--------------------------|--|
| Secondary Interface | - Those interfaces of the Automated FED system which provide only secondary information to augment that provided by the system's primary interfaces. |
| Status Code | - A one-character code which specifies the applicant's status subsequent to AFEES processing (see Appendix F). |
| Work Identification Code | - A four-character code which specifies the processing accomplished by an AFEES on each applicant (see Appendix E). |
| Unit Identification Code | - A three-character code which specifies the AFEES where the processing occurred (see Appendix C). |

LIST OF ABBREVIATIONS, ACRONYMS, AND SYMBOLS

AAFEES	- Automated Armed Forces Examining and Entrance Station engineering-development program.
ADPE	- Automatic Data Processing Equipment.
AFEES	- Armed Forces Examining and Entrance Station.
AR	- Army Regulation.
ARS	- AFEES Reporting System.
AUTOVON	- Automatic Voice Network.
baud	- Bits per second.
CPU	- Central Processing Unit.
DD	- Department of Defense.
DD Form 1966	- Application for Enlistment-Armed Forces of the United States.
DEP	- Delayed Enlistment Program.
FBI	- Federal Bureau of Investigation.
FED	- Fraudulent Enlistment Detection system.
Hq	- Headquarters.
IBM	- International Business Machines Corporation.
ips	- Inches per second.
MCST	- Magnetic Card Selectric Typewriter.
MET	- Mobile Examination Team.
OSD	- Office of the Secretary of Defense.
PULHES	- Physical capacity (P), upper extremities (U), lower extremities (L), hearing and ear (H), eyes (E), and psychiatric (S).
SSAN	- Social Security Account Number.
UIC	- Unit Identification Code.
USAF	- U.S. Air Force.
USAREC	- U.S. Army Recruiting Command.
VISTA	- Volunteers In Service To America.
WATS	- Wide Area Telephone Service.