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ADVANCED DEGREE REQUIREMENTS INFORMATION SYSTEM. (U)
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ADVANCED DEGREE REQUIREMENTS
INFORMATION SYSTEM

THESIS

GCS/MA/77M-3

Matthew B. Waldron
Capt USAF

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ADVANCED DEGREE REQUIREMENTS
INFORMATION SYSTEM

THESIS

Presented to the Faculty of the School of Engineering
of the Air Force Institute of Technology
Air University
in Partial Fulfillment of the
Requirements for the Degree of
Master of Science

by

Matthew B. Waldron, B.S.
Capt USAF
Graduate Computer Systems

March 1977

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Preface

The Advanced Degree Requirements Information System (ADRIS) is an information and management tool that will see wide use at the Air Force Institute of Technology (AFIT) on behalf of faculty and students. The Advanced Academic Degree (AAD) Inventory and Requirements information available from ADRIS can lead to AFIT curricula development to better meet Air Force needs. A secondary, but important use of ADRIS is the help it can provide to AFIT students looking for graduation assignments.

This thesis provided the satisfaction of finally applying classroom academic learning to a practical problem. Making ADRIS suitable for AFIT's needs made me aware of the importance of good communication between system developers and implementors and expectant users. Finally, there is the reward of seeing one's thesis work provide a useful service to the AFIT community.

I would like to thank Capt Thomas E. Reeves, thesis advisor, for his patience, understanding, and outstanding support during this endeavor. Capt Reeves knew instinctively when to guide and when to listen to my frustrations. My other committee members, Dr. Charles J. Bridgman and Mr. Richard H. Lee, provided helpful counsel and many useful comments in their roles as ADRIS "users". Professor Charles W. Richard gave freely of his time in assisting me through the program optimization effort.

Capt John E. Carmack, the original ADRIS developer, answered countless questions over the telephone. Mr. John E. Gates provided invaluable assistance during this project: supplying test data bases for the validation effort, obtaining test results, and supplying current AAD policy and data. Mr. Gates was extremely patient in answering my endless questions over the telephone.

My wife, Belinda, gave me the support, encouragement, and understanding necessary to sustain this effort from beginning to end.

Matthew B. Waldron

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Glossary of Acronyms

AAD	Advanced Academic Degree
AADMS	Advanced Academic Degree Management System
ADRIS	Advanced Degree Requirements Information System
AFDSC	Air Force Data Services Center
AFERB	Air Force Education Requirements Board
AFIT	Air Force Institute of Technology
AFMPC	Air Force Military Personnel Center
AFSC	Air Force Specialty Code
ASC	Academic Specialty Code
CBPO	Consolidated Base Personnel Office
CDC	Control Data Corporation
CYBER 74	CDC Computer Model
DAR	Data Automation Requirement
DMND	Program that builds Requirements data base
MDS	Manpower Data System
INTERCOM	Interactive Terminal System
PDS	Personnel Data System
HQ USAF/DPPE	Education Division, Director of Personnel Programs, Deputy Chief of Staff for Personnel
SPLY	Program that builds Inventory data base

Abstract

The Advanced Degree Requirements Information System (ADRIS), an interactive computer-based data retrieval system, was updated, validated, optimized, and documented. The developmental ADRIS software designed for the Honeywell 6060 at Gunter AFS, Alabama, was converted for use on the Control Data CYBER 74 at Wright-Patterson AFB, Ohio. ADRIS was implemented for use by noncomputer oriented Air Force Institute of Technology faculty and staff at time-sharing terminals. The ADRIS Inventory and Requirements data bases can be queried for information about Air Force graduate degree officers and Advanced Academic Degree job positions. The ADRIS system was analyzed, tested, and altered to insure correct operation and reliable output reports. A successful validation effort was conducted with the Air Force Data Services Center using two separately developed computer programs to compare results. A new feature was added to ADRIS to process user queries involving Aggregate Academic Specialty Codes--groupings of related ASCs attached to validated job positions. ADRIS was improved through optimization techniques that reduced data base processing time by over 70% and the resultant user response time by 50%. System User's and Maintainer's Guides are provided.

ADVANCED DEGREE REQUIREMENTS

INFORMATION SYSTEM

1. Introduction

The Air Force is a large, diverse, and complex organization in terms of the mix of people and jobs required to accomplish the aerospace defense mission. Successful and cost-effective mission accomplishment is dependent on matching the knowledge and skills required by jobs to the qualifications of Air Force people. The Air Force Advanced Academic Degree Management System (AADMS) was implemented to:

(1) Identify jobs requiring graduate level academic backgrounds.

(2) Make the best use of the available Advanced Academic Degree (AAD) inventory of Air Force officers.

(3) Control the future size, composition, and quality of the AAD force to meet the Air Force's needs.

Information about the inventory of Air Force AAD officers and the AAD job requirements is stored in data bases on file at the Air Force Military Personnel Center (AFMPC), Randolph AFB, Texas. In the past, this information could only be accessed through noninteractive computer programs that were rather inflexible and unresponsive in a typical batch-processing environment. The results were often voluminous and required some effort at interpretation.

In 1974, at Gunter AFS, Alabama, Capt John Carmack developed an experimental interactive computer program called the Advanced Degree Requirements Information System (ADRIS) for use by Air University education planners. The program prompted the user to make responses at a computer terminal; therefore, it could be used by anyone taught the simple procedures to operate a terminal. (These instructions were available in a user's manual (Ref 1).) Inventory and Requirements data bases could then be searched to provide specific AAD personnel and position information in an easily understood format.

The Air Force Institute of Technology's (AFIT) School of Engineering was a primary user of ADRIS (via AUTOVON connection) until the ADRIS interactive program was deactivated in 1975, upon Capt Carmack's transfer to the AFMPC. The School of Engineering obtained magnetic tape copies of the program and latest data bases and submitted a Data Acquisition Requirement (DAR) on 28 May 1976, to activate ADRIS at Wright-Patterson AFB. Conversion of ADRIS to the Control Data Corporation (CDC) CYBER 74 computer was then begun as a thesis project. The DAR was approved in September 1976.

Problem Statement

The initial thesis objective was to bring the ADRIS programs and data bases on-line for interactive use by AFIT faculty and staff. A continuing objective was to gain a

systems-oriented grasp of the ADRIS programs' structure and logic to facilitate changes necessary to:

(1) Conform to current Air Force AAD policy.

(2) Meet AFIT's specific requirements for ADRIS.

An important goal of this thesis was to verify proper program operation and to validate the results obtained from data base searches. No previous validation was known to have been done. A final thesis objective was to insure the efficient and economic use of AFIT computer resources.

Results

The first successful execution of the ADRIS interactive program with the on-line data bases occurred in early November 1976. The ADRIS programs and data files were updated to reflect current AADMS policy in the use of the Academic Specialty Code (ASC). Also, the traditional single ASC was joined by the new Aggregate ASC and this feature was incorporated into the ADRIS program.

Output of the ADRIS interactive program was verified to be the same as results obtained when ADRIS was operational at Gunter AFS. An additional ADRIS validation effort was successfully accomplished by joint tests conducted with the Air Force Data Services Center (AFDSC) at the Pentagon. ADRIS and AFDSC programs were independently developed; however, test case results were identical.

The final ADRIS system turned over to the AFIT School of Engineering Office of Academic Support for administrative

control in March 1977, showed extensive savings in computer resource use. Program execution times were reduced by more than 70%, terminal response times were halved, and memory utilization for programs and data bases was improved. The use and maintainability of ADRIS has been enhanced and documented in program listings and User's and Maintainer's Guides (Appendices A and B).

Organization

The nontechnical reader primarily interested in an overview of ADRIS and its proper use is directed to the following chapters and sections:

(1) Chapter II explains the elements of the AADMS, from section supervisors to the Air Force Education Requirements Board (AFERB). Job positions can be validated as authorized AAD requirements only after a review and approval cycle at unit, major command, and Air Force levels. Chapter II also defines the Education Level and 4-character ASC used to classify every AAD.

(2) The importance of ADRIS to AFIT is discussed in the first section of Chapter III. The second section describes the basic concept of ADRIS operation and explains the types of information products available.

(3) The first part of Chapter V explains AADMS policy changes that resulted in modifications to the data bases and programs. The generalization of most authorized AAD position ASCs, and the new Aggregate ASCs are discussed.

(4) Chapter VI should be skimmed to understand the type of testing conducted to validate ADRIS. The correction of several logical problems with the original ADRIS programs is explained.

(5) The Conclusion, Chapter VIII, presents a short summary, recommendations, and comments on software transportability.

(6) Appendix A, User's Guide, is a complete guide to program operation for the inexperienced ADRIS user.

Technical readers may be more interested in the program and data structures, conversion procedures, and the programming and optimization techniques contained in the last sections of Chapter III and Chapters IV, V, and VII.

The first section of Appendix B, Maintainer's Guide, is a nontechnical guide to bringing new data bases on-line, while the rest of the Appendix is written for the Computer Operations staff monitor for ADRIS.

II. Advanced Academic Degree Management System

The AADMS specifies policies and procedures for the identification, validation, and filling of Air Force AAD requirements. Operation of the system is explained in Air Force Manual (AFM) 36-19, Advanced Academic Degree Management System. This manual is applicable to all Air Force active duty line officer positions for full colonels and below, with the exception of the Judge Advocate General. Advanced Academic Degree requirements are identified by rank, education level, Air Force Specialty Code (AFSC), and the ASC desired for the position.

Validating AAD Requirements

The primary objective of the AADMS is to insure that academically qualified officers are available, at all times, to solve Air Force managerial and technical problems. Cost-effective management of the Air Force's AAD officers and the funding needed to add officers to the AAD inventory necessitates the validation of AAD requirements. Maintenance of an AAD Inventory and Requirements data base enables Air Force functional managers and assignment personnel to make the best use of graduate degree officers. The cyclic nature of the AADMS is represented in Fig. 1. The AADMS is operated through the efforts of Air Force supervisors at every organizational level, area functional managers at major command and HQ USAF levels, the AFERB, and the Education Division,

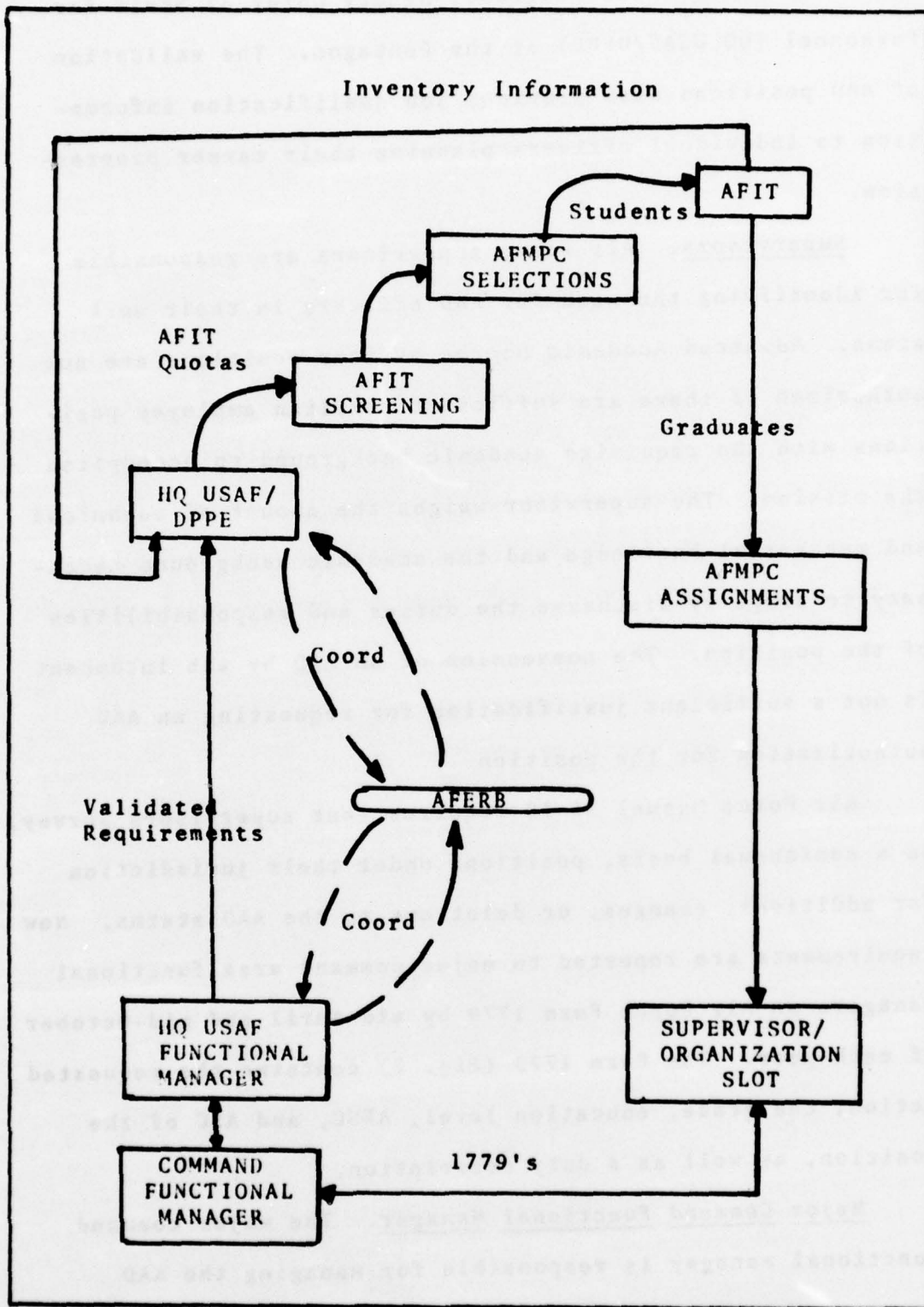


Fig. 1. AADMS Cycle

Director of Personnel Programs, Deputy Chief of Staff for Personnel (HQ USAF/DPPE) at the Pentagon. The validation of AAD positions also provides job qualification information to individual officers planning their career progression.

Supervisors. Air Force supervisors are responsible for identifying the need for AAD officers in their work areas. Advanced Academic Degree officer positions are not authorized if there are sufficient civilian employee positions with the requisite academic background to accomplish the mission. The supervisor weighs the amount of technical and managerial knowledge and the academic background necessary to properly discharge the duties and responsibilities of the position. The possession of an AAD by the incumbent is not a sufficient justification for requesting an AAD authorization for the position.

Air Force Manual 36-19 requires that supervisors survey, on a semiannual basis, positions under their jurisdiction for additions, changes, or deletions to the AAD status. New requirements are reported to major command area functional managers on Air Force Form 1779 by mid-April and mid-October of each year. The Form 1779 (Fig. 2) contains the requested action, the grade, education level, AFSC, and ASC of the position, as well as a duty description.

Major Command Functional Manager. The major command functional manager is responsible for managing the AAD

REQUEST TO ESTABLISH/CHANGE ADVANCED ACADEMIC DEGREE POSITION				REPORT CONTROL SYMBOL
1. MAJOR COMMAND ATC	2. UNIT 3510th Flying Training Wing, Randolph AFB TX	3. CONTROL NUMBER DP-1	HAF-DPP (SA) 7127	
4. ORGANIZATIONAL STRUCTURE IDENT DPXG	5. FUNCTIONAL ACCOUNT CODE 160000	6. AFSC C7316	7. GRADE Major	8. RATED POSITION ID NA
10. DUTY TITLE Chief, Consolidated Base Personnel Office				
11. CHANGE REQUESTED				
X ADDITION				
DELETION				
14. EFFECTIVE DATE 1 Oct 73				
15. NUMBER OF POSITIONS 1				
12. ACADEMIC LEVEL Personnel Management IACY				
13. ACADEMIC SPECIALTY REQUIRED				
16. DUTIES AND RESPONSIBILITIES Describe what the individual does in sufficient detail to permit evaluation by personnel not intimately familiar with the exact duties and responsibilities of the position or organization. This section must be completed for all requests for additions, changes, and deletions to existing requirements.				
17. SPECIFIC JUSTIFICATION FOR AN ADVANCED ACADEMIC DEGREE This section must explain why the incumbent is required to have an advanced academic degree. The approval/disapproval of your request is normally contingent upon the information provided in this section. Be as specific as possible. Provide information regarding impact of civilians where appropriate. The appropriate figure in Part Two should be used as a guideline for completing this section. Insure specific justification is provided as required. Requests to delete an existing advanced academic degree requirement for a position which is otherwise unchanged must be thoroughly justified.				

Fig. 2. Sample Page 1 of Air Force Form 1779.

18. ORIGINATING OFFICIAL		19. REVIEWING OFFICIAL	
TYPED NAME, GRADE, TITLE, AND OFFICE SYMBOL		TYPED NAME, GRADE, TITLE, AND OFFICE SYMBOL	
DATE	SIGNATURE	DATE	SIGNATURE
FOR MAJCOM/HQ USAF USE			
FROM:		TO:	
FROM:		TO:	
COMMENTS/REASON FOR DISAPPROVAL			
MAJCOM FUNCTIONAL MANAGER		USAF FUNCTIONAL MANAGER REPRESENTATIVE	
TYPED NAME, GRADE, TITLE, AND OFFICE SYMBOL		TYPED NAME, GRADE, TITLE, AND OFFICE SYMBOL	
SIGNATURE		SIGNATURE	
RECOMMENDATION		HQ USAF FUNCTIONAL MANAGER	
DATE	APPROVED	DATE	DISAPPROVED
			APPROVED FOR ENTRY ON MANPOWER DOCUMENT

program for the command in his area. Air Force Manual 36-19 contains a description of the different areas and their constituent Air Force Specialty Codes (AFSCs). The area functional manager is responsible for insuring uniformity throughout the command in determining the types of positions requiring AAD officers. The functional manager is also responsible for the early identification of new requirements brought about by mission changes.

The command functional manager may disapprove and return the Air Force Form 1779 to the originating unit. Other command-approved 1779s are consolidated and forwarded to HQ USAF functional managers for consideration.

When AAD-approved requirements are returned to major commands, the functional manager is responsible for the accurate entry of the data into the Manpower Data System (MDS). Manpower and Organization offices are required to enter the data into the MDS within one month of receipt from the major command functional manager. The data consists of the grade, education level, AFSC, ASC, base, and major command for each authorized position.

HQ USAF. Air Staff functional managers at HQ USAF review, and approve or disapprove, Air Force Forms 1779s on a semiannual basis to validate AAD requirements necessary to meet the Air Force mission in their area. Overall quantitative and qualitative control over the Air Force's AAD program is set by the 10-member Air Force Education Requirements

Board (AFERB). HQ USAF/DPPE acts as the AFERB's executive agent and the overall Air Staff focal point for AAD matters.

Air Force Forms 1779s approved by HQ USAF functional managers become validated Air Force requirements. Functional managers must be able to defend their area AAD authorizations to the AFERB and can call a meeting of the AFERB to raise the ceiling of authorized AAD positions in their area.

The AFERB determines current and future line officer AAD position ceilings Air Force wide and determines the Air Force posture on AAD needs and programs. The board is chaired by the Director of Personnel Programs, DCS/Personnel. Board members are taken from various Air Staff agencies. The Board meets at least every two years and must approve any functional manager request to increase the maximum AAD operating ceiling for a particular area.

The Air Force conducted a position-by-position review of AAD requirements in fiscal years 1971 and 1972 to standardize and validate AAD position needs. The results were approved by the AFERB and returned to Major Commands for entry into the MDS effective 1 July 1972. AFERB approval of the review established the authorized ceilings for each career area. Subsequent changes to the ceilings have been made only as approved or directed by the AFERB.

Within the guidelines provided by the AFERB, HQ USAF/DPPE establishes policies and procedures to assist area functional managers in identifying and validating AAD

requirements. Based on the ASCs of validated positions, HQ USAF/DPPE personnel plan graduate programs for AFIT. In order to maintain a sufficient inventory of Air Force officers with AADs, HQ USAF/DPPE issues quotas to AFIT for AAD education. Quotas are chosen to maintain the proper ratio of AAD officers to the number of authorized AAD positions-- this ratio is set by HQ USAF/DPPE for each ASC. The current graduate degree ratios are 1.3 for masters and 1.2 for doctors.

Air Force personnel staff agencies support the AADMS by programming the academic quotas, budgeting the required resources, selecting the most qualified personnel to fill the requirements, and allocating qualified graduates to major commands.

Classification of Advanced Academic Degrees

The classification of AADs is described in AFM 35-25, Educational Assistance and Coding Practices. Advanced Academic Degree information on Air Force personnel is maintained and updated in the Personnel Data System (PDS) only by the AFIT Admissions Directorate (AFIT/RR). Advanced Academic Degree holders are classified by education level and ASC.

Academic Education Level. The education level is a measure of how far an individual has progressed in his academic education. It is coded in the PDS as follows:

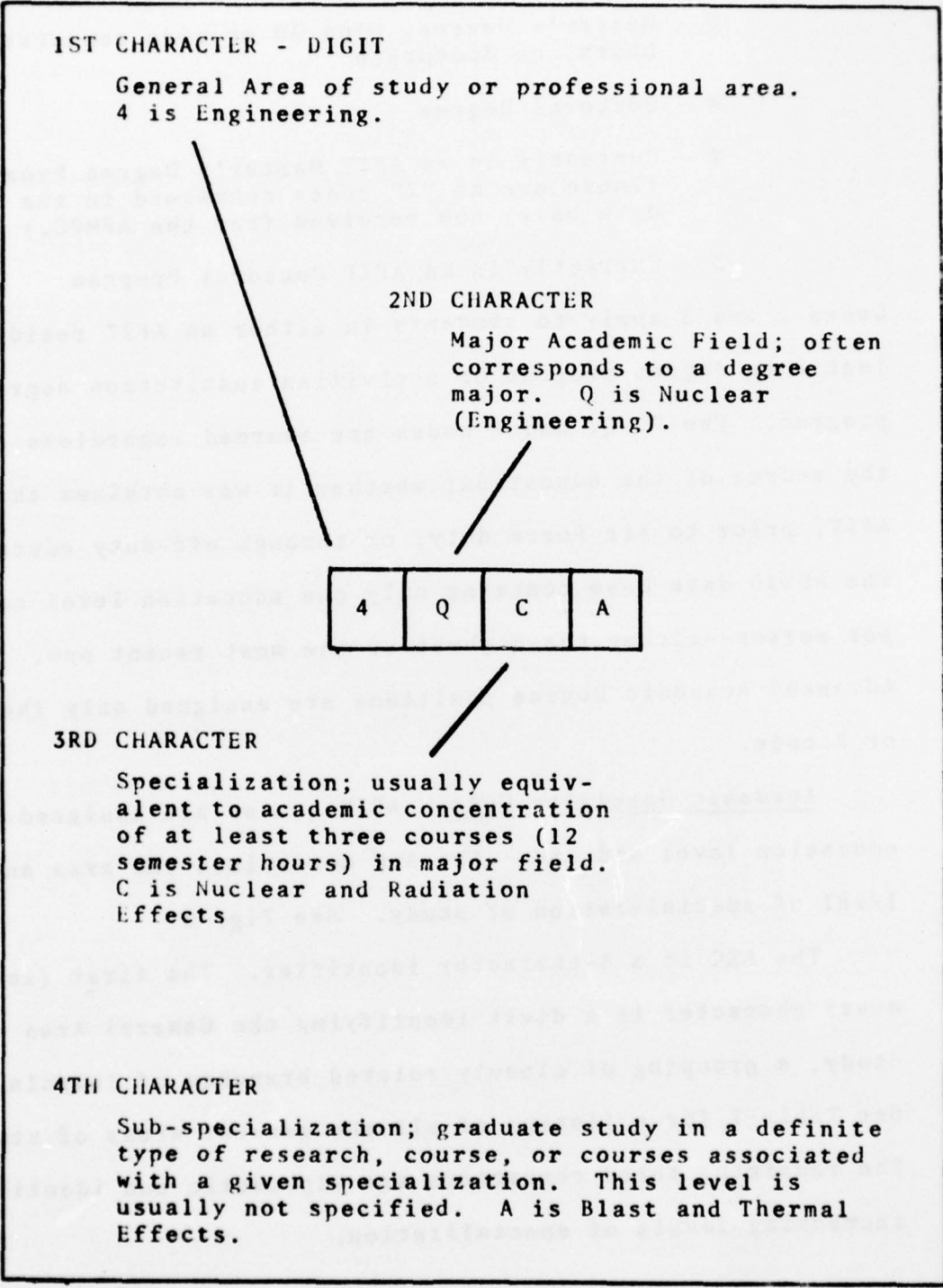


Fig. 3. Academic Specialty Code Description

- P - Master's Degree, less than 30 post-graduate hours
- Q - Master's Degree, plus 30 or more semester hours, no doctorate
- R - Doctoral Degree
- 2 - Currently in an AFIT Master's Degree Program (There are no "2" codes contained in the data bases now received from the AFMPC.)
- 3 - Currently in an AFIT Doctoral Program

Codes 2 and 3 apply to students in either an AFIT resident Institute degree program or a civilian institution degree program. The P, Q, and R codes are awarded regardless of the source of the education; whether it was obtained through AFIT, prior to Air Force duty, or through off-duty education. The ADRIS data base contains only one education level code per person--either the highest or the most recent one. Advanced Academic Degree positions are assigned only the P or R code.

Academic Specialty Code. AFIT quotas are assigned by education level and ASC. The ASC determines the area and level of specialization of study. See Fig. 3.

The ASC is a 4-character identifier. The first (left-most) character is a digit identifying the General Area of Study, a grouping of closely related branches of learning. See Table I for a listing of all the general areas of study. The remaining three characters are alphabetic and identify increasing levels of specialization.

Table I

ASC General Areas of Study

<u>First Character ASC</u>	<u>Description</u>
0	Inter-Area (Interdisciplinary)
1	Administration, Management, and Military Science
2	Arts, Humanities, and Education
3	Biological and Agricultural Science
4	Engineering
5	Civil Law
6	Mathematics
7	Medical Sciences (not included in the ADRIS data bases)
8	Physical Sciences
9	Social Sciences

As an example, consider the ASC 4AGB. The first character, the digit 4 identifies the general area of study, Engineering. The second character represents the major academic field, one of the major subdivisions of the general area of study. This category usually corresponds to a degree major. The A in 4AGB represents the subdivision Aeronautical Engineering.

The third character designates a specialization, equivalent to an academic concentration of at least three courses (12 semester hours) within a major field. This is usually

the lowest category with which a person's academic background can be associated, except in graduate studies with specific areas of emphasis. The G in 4AGB represents the specialization of Structures.

The fourth and last character designates the sub-specialization, a group of courses or on-the-job professional experience associated with a given specialization. This level is usually not reported, except in cases of graduate study or research in specific areas. The B in 4AGB represents Aircraft Structures.

A "Y" is used in any position to indicate no specialization or not applicable. Interdisciplinary or inter-area specialization are indicated by a first digit of zero. These represent specializations common to two or more major academic fields. For example, OYBY represents the inter-area specialization of Biochemistry.

III. The ADRIS Computer Program

The interactive ADRIS computer program is an information and management tool. The speed of the computer enables a user to extract, within a few seconds, detailed information from two data bases containing identifiers describing approximately 10,000 AAD authorized positions and 28,000 officers (as of January 1977). The basic ADRIS product is a tally, by grade, of AAD officers (Inventory) and AAD positions (Requirements). The tally is based on six parameters: education level, ASC, AFSC(s), grade(s), base(s), and major command(s).

Capt Carmack's original interactive program contained a main control program and three subroutines--RETRIEVE, FORECAST, and CHANGE. The AFIT DAR granted approval for use of the RETRIEVE module only. The other modules, used to forecast future training requirements, duplicated other computer products available from HQ USAF/DPPE.

The RETRIEVE module was broken into several functional subroutines for easier understanding. The new structure allowed the ADRIS program to be executed with an overlay composition which reduced central memory storage requirements.

Need for ADRIS

According to the original ADRIS User's Handbook, "The major objective of ADRIS is to place in the hands of the

information user, the power of the computer to manipulate and massage the data base and to display only the information actually needed in a useful form (Ref 1)." Air Force Institute of Technology administrators, faculty, and students will use the ADRIS interactive program for a variety of purposes. New AFIT quotas can be queried against the data base to find the location of authorized positions. Bases and units can then be contacted to determine precise detail about the programs and courses needed for new students. AFIT will also be able to communicate with units and agencies that receive graduates to evaluate the effectiveness of AFIT educational programs.

Long term trends in different academic areas can be tracked with the ADRIS program. As the Air Force's needs for particular ASCs increases or decreases, AFIT can be ready to adjust its programs and faculty accordingly. As AFIT's contacts with users of graduates expands, the emphasis in AFIT courses can more accurately reflect the special research, development, and logistical subjects and problem areas that are currently important to the Air Force. Seminar or short courses can be offered to satisfy the special needs of field units.

The interactive nature of ADRIS becomes paramount when the data base must be searched for a large number of cases. For example, an AFIT yearly quota of 400 students may involve as many as 100 different AFSC-ASC combinations.

Interpretation of ADRIS outputs usually leads to more refined inquiries to track down a trend or figure. The interactive nature of ADRIS is essential for this type of program-user interplay. It would not be practical to frame such questions for another organization to answer.

The ADRIS program will also become a valuable tool for AFIT students looking for duty assignments. Students can determine where requirements exist for their individual AFSCs and ASCs in order to make informal contacts and request realistic assignments. The interactive nature of the program will permit several hundred graduates a year to conveniently use the program.

Concept of Operations

The ADRIS program extracts information from two data bases--one containing AAD Inventory data and the other containing AAD Requirements data. Each AAD officer in the Inventory data base and each AAD position in the Requirements data base is identified by six descriptors. These six descriptors are: education level, ASC, AFSC, grade, base, and major command.

The program user at a time-sharing terminal is "prompted" to enter values for the six descriptors. The program searches both the Inventory and Requirements data bases to find officers and positions that have matching descriptors. These matching "records", the data base values for the six descriptors, are used to provide the user with three types of

information products:

(1) An Inventory and Requirements tally of the matching records.

(2) A listing of all matching records.

(3) Five varieties of summaries of the matched records.

Descriptor Values. The user enters values for the descriptors as prompted by the terminal. An asterisk (*) may be entered to indicate either all of a descriptor category or no preference for the element(s) of a category. Codes for ASCs, AFSC career areas, bases, and major commands have been extracted from AFM 300-4 and listed in the User's Guide, Appendix A.

A single or Aggregate ASC may be entered. An Aggregate ASC identifies a position that can be filled by one of several different ASCs. For example, Aggregate code AAAY is composed of ASCs 4AYY, 4BYY, 4EYY, and 4KYY. Aggregate ASCs are further explained in Chapter V. An "*" indicates all data base ASCs except Aggregate ASCs from the Requirements data base.

A "Y" character in a single ASC means no specialty. Thus, the ASC 4ACY has no subspecialization. If an ASC contains one or more "Ys" an option exists to examine only that ASC (e.g., 4ACY) or both that ASC and all of its specialties (e.g., 4ACA, 4ACB, etc.).

P, Q, R, 2, or 3 (defined in Chapter II) may be entered for the education level. An asterisk will result in matching any record having a P, Q, or R educational level (any graduate degree).

Either one or a list of AFSCs may be designated. A range of AFSCs may be indicated by an "X" in the last position or last two positions of the AFSC. For example, 51XX indicates AFSCs 5100 through 5199. Alphabetical area codes may also be entered, as defined in AFM 36-19. For example, INTE, for intelligence, matches the AFSCs 0910, 57XX, and 80XX. An asterisk indicates that all AFSCs are to be considered.

Single or multiple grades may be entered. An asterisk indicates grades second lieutenant through colonel. General officers are not included in the tallies, since only second lieutenants through lieutenant colonels are eligible for AFIT programs. Colonels are tallied as a matter of information.

A 2-character Consolidated Base Personnel Office (CBPO) code is entered for each base desired. An asterisk indicates no restriction on bases.

Major commands are indicated by a 1-character code; single or multiple entries are permitted. An asterisk indicates no preference or restriction.

Inventory and Requirements Tally. Given the above descriptors as input, the program prints as output a tally,

by grade, of the number of AAD positions and number of AAD officers that match the user's criteria. The quotient of this Inventory to Requirements is also shown. Figure 4 is an example of both input and output for ASC OCDY, numerical methods in data processing.

List of Records. If requested by the user, a listing of all records found during the Inventory and Requirements search will be printed. Figure 5 shows such a list for the example of Fig. 4.

Data Summaries. The records found during the Inventory and Requirements search can be used to print summaries by ASC, AFSC, base, or major command.

The base and major command summaries print the Inventory and Requirements totals, by grade, and by base or major command. Figure 6 shows a major command summary for the example of Fig. 4.

The ASC summary prints Inventory and Requirements, by grade, and by ASC. The "level of specificity" of the ASC is chosen by the user. For example, if the original ASC was OCYY, and the user entered 3 for level of specificity, the ASC summary would show tallies for OCAY, OCBY, OCCY, etc. For a level of specificity of 4, subspecialty divisions would be shown--OCAA, OCAB, ...; OCBA, OCBB, ...; etc. The AFSC summary also permits level of specificity designations. See Figs. 7 and 8 for two AFSC summaries with different levels of specificity (based on Fig. 4 criteria).

EDLEV=R

ABC=OCDY

ENTER 1 TO DESIGNATE ONLY THIS SPECIFIC ASC
2 TO SUMMARIZE THIS ASC + ALL ITS SUB-SPECIALTIES

= 2

AFSC=51XX

GRADE=4,5

CBPO=*

MAJCOM=*

CLOCK TIME START: 18.56.12.
TIME FOR DATA BASE SEARCH: .357
CLOCK TIME FINISH: 18.56.28.

GRADE	PHD REQ	INV
04	1	4
05	2	3
TOTALS	3	7
INV/REQ		2.3

Fig. 4. Inventory and Requirements Tally (Jan 1977).

The Major Command Special Summary requests level of specificity ASC information from the user. The summary then prints Inventory and Requirements tallies by major command, by ASC and by grade (only for nonzero Requirements ASCs).

Program Structure

The ADRIS computer software at AFIT consists of three programs: the interactive ADRIS program and the two data

LEVEL	ASC	AFSC	GRADE	CBPO	MAJCOM
*** REQUIREMENTS ***					
R	OCDY	5116	5	EP	OH
R	OCDY	5135B	4	KV	03
R	OCDY	5116	5	KH	3V
*** INVENTORY ***					
R	OCDB	5116	5	HH	3V
R	OCDY	5116	5	KV	OH
R	OCDY	5116	4	WE	OF
R	OCDY	5116	5	KV	OH
R	OCDY	5116	4	HH	ON
R	OCDY	T5125C	4	US	OB
R	OCDY	V5135A	4	US	OB

Fig. 5. List of Records (Jan 1977).

		01	02	03	04	05	TOTAL	06
H	INV	0	0	0	0	2	2	0
	REQ	0	0	0	0	1	1	0
3	INV	0	0	0	0	0	0	0
	REQ	0	0	0	1	0	1	0
V	INV	0	0	0	0	1	1	0
	REQ	0	0	0	0	1	1	0
F	INV	0	0	0	1	0	1	0
	REQ	0	0	0	0	0	0	0
N	INV	0	0	0	1	0	1	0
	REQ	0	0	0	0	0	0	0
B	INV	0	0	0	2	0	2	0
	REQ	0	0	0	0	0	0	0

Fig. 6. Major Command Summary (Jan 1977).

		01	02	03	04	05	TOTAL	06
5116	INV	0	0	0	2	3	5	0
	REQ	0	0	0	0	2	2	0
5135	INV	0	0	0	1	0	1	0
	REQ	0	0	0	1	0	1	0
5125	INV	0	0	0	1	0	1	0
	REQ	0	0	0	0	0	0	0

Fig. 7. AFSC Summary: Level of Specificity 4 (Jan 1977).

		01	02	03	04	05	TOTAL	06
5XXX	INV	0	0	0	4	3	7	0
	REQ	0	0	0	1	2	3	0

Fig. 8. AFSC Summary: Level of Specificity 1 (Jan 1977).

base builder programs, SPLY (Inventory) and DMND (Requirements).

SPLY and DMND. SPLY and DMND build the data bases from the magnetic tapes supplied by the AFMPC. See Figs. 9 and 10 for module structure charts.

Records are read, one-by-one, from the magnetic tapes. Corrections are made to out-of-date ASCs by the modules shown below the main programs in Figs. 9 and 10. These modules, new to the build programs, are explained in Chapter V. Each record is temporarily sorted into a file, based on the ASC digit (first character) which specifies the general area of study. After all records are processed from the

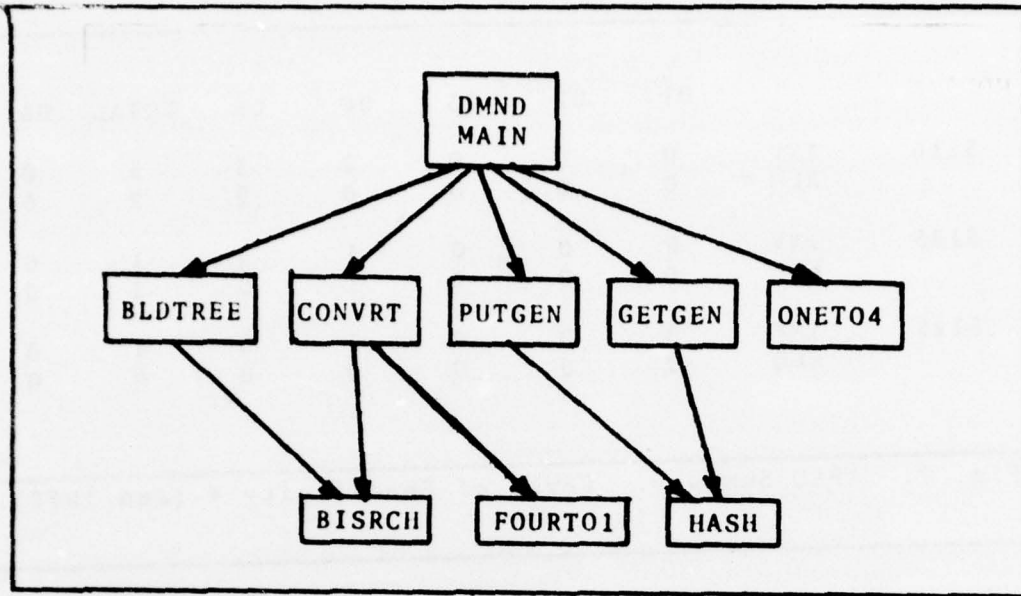


Fig. 9. DMND Program Structure

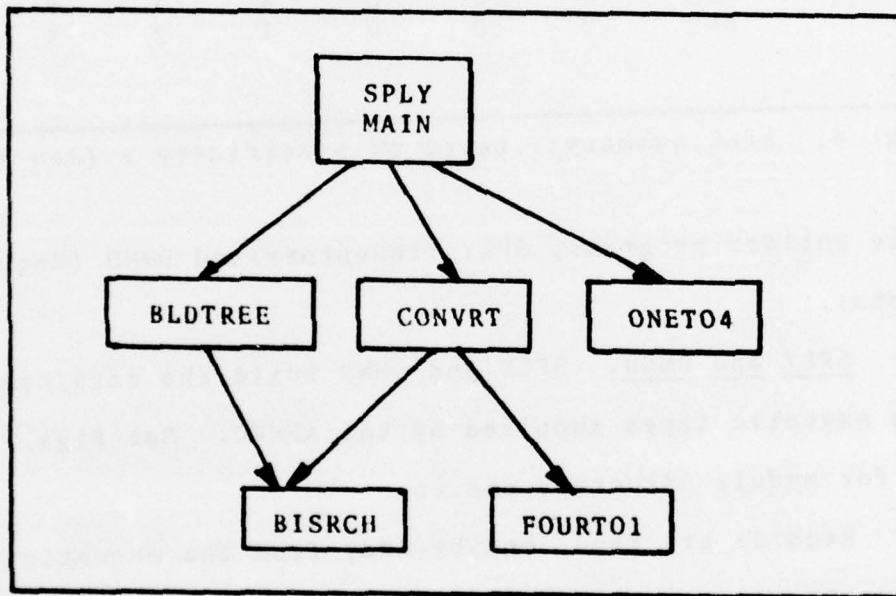


Fig. 10. SPLY Program Structure.

magnetic tape, the separate files, each containing all the records for a particular ASC general area of study, are sequentially merged together. The starting and ending points of each area are saved, to simplify searches conducted by the interactive ADRIS program.

For example, records 1 through 1,124 could constitute area "0" (interdisciplinary); records 1,125 through 4,999 could constitute area "1" (administrative and management); etc.

When the merged records are stored on mass storage (disc) they are packed together, 100 records to a group, to save space. Both data bases are created in this manner; they are then accessible to the ADRIS interactive program.

Program ADRIS. Program organization is shown by the module structure chart in Fig. 11. The original ADRIS program grouped GTPARAM, SRCII, and DOSUM into a single large subroutine. The new structure provides a more functional division and permits an overlay structure to reduce program memory requirements.

Brief module descriptions follow:

DRIVER. The DRIVER module controls program flow. The DRIVER activates the data bases and briefly explains the program's purpose and the format of the responses expected from the user. The DRIVER passes control to the DOBASIC and DOSUM modules and terminates the program when the user is done.

Subroutine DOBASIC. The DOBASIC module is a short control subroutine which sequentially passes control to three modules which perform the basic Inventory and Requirements tally.

Subroutine GTPARAM. The GTPARAM module queries the user for AAD descriptors and stores the values for use in the data base search. The GETAFSC, GTGRD, GETCMD, GETCBPO, AGGREG, and DCIPIIR subroutines gather and store user-entered AFSC(s), grade(s), education level, base(s), command(s), and Aggregate or single ASCs. GTFCT processes area AFSCs and SAVE stores AFSCs. ILLEGAL prints out a pointer to an illegal character if an incorrectly-formatted entry is made. CONCAT concatenates characters from separate computer words into a single word. This is required to place descriptor values into the proper format for matching. User descriptor values are stored left-justified and blank-filled, except for AFSCs and grades, which are stored in integer format, right-justified and zero-filled.

Subroutine SRCH. The SRCH module extracts records from the applicable data base for comparison against the user's descriptor values. When a match occurs, grade-tally totals are incremented and the record is temporarily stored for later use. The search is confined to that part of the data base containing the same general area ASCs as the user-entered ASC. This prevents a time-consuming search of the entire data bases, unless the user enters an asterisk

for ASC. For example, if the user's ASC is 4AGY, only the "4's" in the data bases must be searched. When Aggregate ASCs are entered it may be necessary to search several areas of the data bases. Descriptors are provided to the SRCH subroutine by the NXTREC module. The NXTREC subroutine reads groups of 100 records into memory and unpacks the records one-at-a-time for matching against the user's criteria.

Subroutine PRINTIT. The PRINTIT module calculates the Inventory to Requirements ratio, prints appropriate header information, and prints the Inventory and Requirements tally and ratio. A tally for full colonels is printed but not included in the totals used to calculate the Inventory to Requirements ratio.

Subroutine DOSUM. The DOSUM module calculates and prints results for the five types of summaries and list of records products optionally available after completion of the Inventory and Requirements tally.

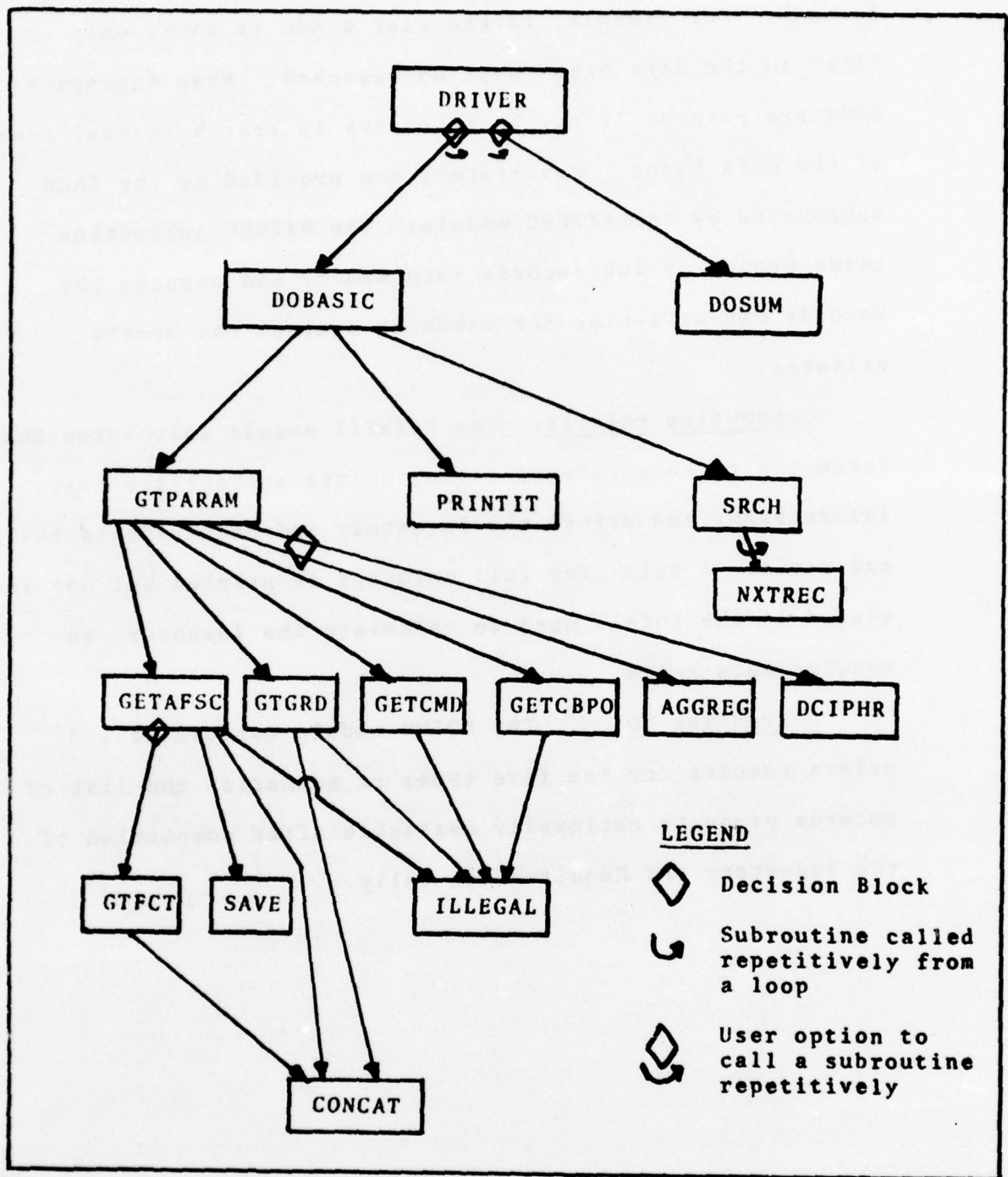


Fig. 11. ADRIS Program Structure.

IV. Program and Data Conversion

ADRIS was developed and initially operated on Honeywell 6060 computer equipment at Gunter AFS, Alabama. The ADRIS programs and the April 1975 data bases were made available to the AFIT School of Engineering on magnetic tapes produced by the Honeywell 6060 at Gunter. Moving ADRIS to the CDC CYBER 74 computer required a character set and character code conversion. The ADRIS source code was written with nonstandard American National Standards Institute (ANSI) FORTRAN, which included FORTRAN features unavailable to the CYBER users. Different Honeywell and CYBER procedures for creating and using random files required changes in ADRIS data base construction and use.

Character and Record Conversion

Program editing and compilation and data base use could not be attempted until the magnetic tapes were converted to CYBER format. The Honeywell 6060, with a word size of 36 bits, gives users a choice of two character sets: 7-bit ASCII (USA Standard Code for Information Interchange) or 6-bit BCD (Binary Coded Decimal). The CDC CYBER 74, on the other hand, uses 60-bit words, with each character represented by a 6-bit "display code". The Honeywell program tape was coded in ASCII while the two data tapes were coded in BCD.

The source programs and data tapes were both created in block format: blocks consisted of multiple lines (records) of source code or multiple data entries (records) run together on a single tape record of information. The block was the smallest piece of information that could be read from the tape since no system routines were available to translate either ASCII or BCD.

Source Code. Program TAPE1 was written to translate the source code magnetic tape into card image records (lines of code) composed of display-coded characters. Translation required character isolation, character conversion, and card isolation.

When the magnetic tape was read into memory, characters streamed in side-by-side, filling up consecutive words. Twenty 9-bit Honeywell characters filled up three CDC words in the repetitive pattern shown in Fig. 12. Each of the

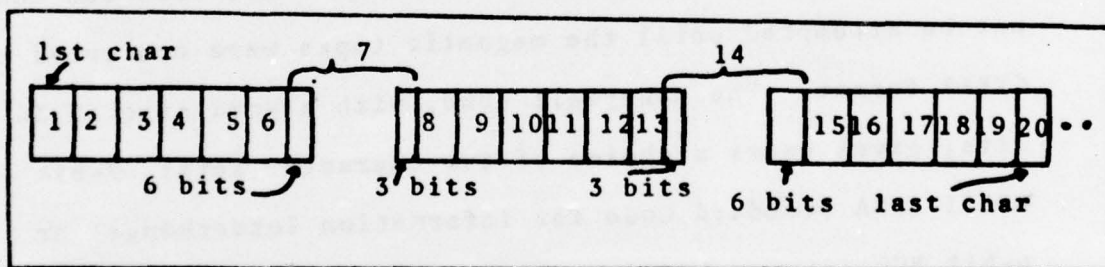


Fig. 12. Repetitive ASCII Character Pattern

20 characters was isolated into a single word by the use of bit shifts and masks. The isolation FORTRAN code was placed in a loop that advanced three memory words at a time until the entire block brought in from tape was processed.

Each isolated character was stored right-justified and zero-filled in a word. The integer value of this word was used as a subscript into a dimensioned array that contained the equivalent CDC display code bit pattern. The Honeywell character was then replaced with its equivalent CDC character pattern.

After character isolation and conversion, card images were isolated from the block by the detection of the Honeywell end-of-line character.

Data Tapes. A "look-up" table was also used to convert the 6-bit BCD data characters into CDC display code in program TAPE2. The converted data bases were stored on local magnetic tapes so that data base entries could be read directly from the tapes as individual records with FORTRAN formatted input statements. The two original data tapes containing Inventory and Requirements information for April 1975 were used to verify the ADRIS program's operation. Data bases for June 1976 were furnished by the AFDSC at the Pentagon in late 1976 to continue program validation on more current data bases.

Source Code Alteration

The CYBER INTERCOM interactive terminal system was used to alter the ADRIS programs. The INTERCOM text editor considerably simplified the task of adding, changing, and deleting hundreds of lines of code. These alterations were

necessary to make the program's syntax and FORTRAN statement repertoire consistent with the conventions and language statements acceptable to the CYBER FORTRAN compiler.

For example, the Honeywell source code contained sequence numbers in the first four columns of every card image and source statements began in column 10. The sequence numbers were moved to begin in column 73 and the source statements moved to begin in column seven or later. The Honeywell convention for a continuation line was the placement of an ampersand (&) in column five, immediately after the sequence numbers. This was corrected by removing the ampersands and placing any character other than a blank or zero (usually a "+") in column six. All list-directed prints and reads required changing: for example--READ, ANS to READ*, ANS. A Honeywell FORTRAN manual was used as a reference guide for all language differences (Ref 2).

A number of FORTRAN statement features not available to the CYBER user required code alterations. Several examples follow:

- (1) The use of real variables and constants, as well as expressions in DO loops.
- (2) The inclusion of a statement label number in an input or output statement for transfer when an end-of-file occurs.
- (3) The existence of CHARACTER type declation statements for the automatic assignment of the proper number

of computer words to hold alphanumeric strings.

(4) The use of a Honeywell system routine to set the reflexive read character sent to a terminal to request input.

Capt Carmack described the ADRIS code as developmental and the programs as "experimental". Thus, there were sections of "dead code" that were never executed, as well as unused variables and arrays throughout the program. Approximately 2,000 words of code and data were deleted. Also, the subroutines FORECAST and CHANGE were eliminated, since their use by AFIT was not authorized.

The original ADRIS program contained sparse explanatory comments. Comments were found, if at all, at the beginning of main programs and subroutines. This lack of documentation made it necessary to study the source code line-for-line to understand and verify program operation. The new ADRIS source code programs have been more fully documented.

Data Management

The original interactive ADRIS program used data from four files to accomplish the data base searches. The two large files containing the data bases were structured as random files for quick access to individual records. A significant change in data base structure was required to use the CDC random file routines.

Data Files. Three data files are used in the data base searches; the Inventory data base file, the Requirements

data base file, and a data base pointer file. The pointer file contains the starting record number for each group of area ASCs. The pointer file records for the April 1975 data bases are shown in Table II below. These starting record numbers are used by the interactive ADRIS program to restrict data base searches to the applicable ASC general area of study.

Table II

Pointer File Entries

I	P(1)=1	R		
N	P(2)=1794	E	P(1)=1	Inter-area
V	P(3)=10065	Q	P(2)=1094	Admin, Mgt, Mil Sci
E	P(4)=12678	U	P(3)=5288	Arts, Hum, Ed
N	P(5)=12878	I	P(4)=5876	Biol, Agri Sci
T	P(6)=18204	R	P(5)=5848	Engin
O	P(7)=18718	E	P(6)=8961	Math
R	P(8)=20146	M	P(7)=9109	Phys Sci
Y	P(9)=23398	E	P(8)=10275	Soc Sci
	P(10)=23407	N	P(9)=10929	No Area Spec.(YYYY)
		T	P(10)=11693	Last Record + 1
		S		

A fourth data file, referred to as the AFSC Area data file, is used by the GTFCT ADRIS module to obtain the specific AFSCs that make up the AFSC areas. A table of the areas, their computer codes and constituent AFSCs is contained in the User's Guide in Appendix A.

Random File Creation and Access. Use of CYBER random file routines require the user to declare a dimensioned index array in his program to hold the addresses of all records stored in the random file. The Honeywell 6060 automatically

kept track of these addresses without requiring the user to allow space in his program for their storage. Since the Inventory and Requirements data bases hold a total of nearly 40,000 records, a 40,000-word array would have to be carried in the program. This large array would exceed the maximum program size allowed for execution at INTERCOM. Therefore, the program could not be run interactively at a terminal.

The index array was reduced to an acceptable size by changing the data base build programs to store 100 of the "old" records (information on 100 AAD positions or officers) as a single CYBER random record. This reduced the size of the index arrays from 40,000 to 400.

The pointer file still contains the number of the beginning "old" record in each general area of study. In order to access the correct CYBER random record from mass storage and locate the correct "old" record within, two conversion formulas were developed for the interactive ADRIS program. The correct CYBER random record is calculated by Eq (1).

$$\text{CYBER RECORD} = \frac{\text{"OLD" RECORD} - 1}{100} + 1 \quad (1)$$

The "+1" part of the expression is due to the truncation effect of integer division (e.g., $256/100 = 2$). Thus, all "old" records from 1 through 100 convert to CYBER random record 1 while all "old" records 101 through 200 convert to CYBER random record 2.

Once the correct CYBER record is read into memory, the relative location of the "old" record is as shown by Eq (2).

$$\text{LOC} = \text{Remainder of} \left(\frac{\text{"OLD" RECORD} - 1}{100} \right) + 1 \quad (2)$$

For example, if the "old" record number is 8,768 then the relative location within the 100 records is: Remainder of $(8767/100) + 1 = 68$.

V. ADRS Enhancements

The ADRS interactive program and the two data base build programs were changed to reflect current Air Force AAD policy. Also, additional changes were made to the programs to meet AFIT needs.

Program changes were necessary to process the new Aggregate ASCs and to relax the specialization required for most AAD positions. Two new data files were added to the ADRS software: one containing data necessary to relax the specificity of ASC Requirements and the other containing Aggregate ASC information. Two existing data files were brought up-to-date: area AFSCs and obsolete or old ASCs and their replacements. A new procedure was implemented to convert obsolete ASCs to their replacement values.

Mr. John Gates, AFDSC, provided the policy guidance and tables of data necessary for these changes (Ref 3). Mr. Gates currently develops and manages computer programs used to provide AADMS Inventory and Requirements information to HQ USAF/DPPE.

The primary AFIT ADRS user during implementation of the programs on the CYBER 74 was the School of Engineering Director of Academic Support, Mr. Dick Lee. Mr. Lee was consulted throughout the enhancement period to insure that ADRS would satisfy AFIT's needs. He authorized changes suggested by the author and Mr. Gates, suggested additional improvements to the program and evaluated

the program's ease of use and correct operation over a long test period.

Management of the ASC

The importance of the ASC is central to the AADMS. AAD positions are requested and authorized for a specific ASC; AFIT quotas and programs are aimed at insuring that there are enough AAD officers to fill these authorized positions.

In 1975, Air University and HQ USAF/DPPE officials became aware of the problem of overspecification in the ASCs aligned with many AAD positions. It was often difficult to find available personnel in the inventory with an ASC matching a position requiring a specific subspecialty in the fourth character position. Also, many AAD officers possessed ASCs specific only to the specialty level (third character of the ASC).

HQ USAF/DPPE made the determination that Air Force requirements were such that only a small number of ASCs warranted identification of the subspecialty in the fourth character position of the ASC. Only 157 ASCs were identified as requiring the fourth character specificity. All other ASCs attached to AAD positions would have their fourth character generalized to "Y".

HQ USAF/DPPE also decided that requirements specifying an "X" for Other in character positions three and four of

the ASC would be treated as requirements for general or no subspecialty, with the exception of 12 Physics ASCs: 8HXA to 8HXL. For example, 4ICX became 4ICY and 4IXY became 4IYY.

Often, officers with different ASCs could satisfactorily fill an AAD position. However, it was impossible for supervisors to indicate this variability on Air Force Form 1779 since the form only permitted entry of a single ASC. The Aggregate ASC was introduced in 1975 to identify a position that could be filled by more than one ASC. An example is the Aggregate code AABY (Basic Sciences); the ASCs that will satisfy an AABY position are: 6YYY (Mathematics), 8CYY (Chemistry), and 8HYY (Physics). A list of the Aggregate codes, their descriptions and constituent ASCs is contained in the User's Guide in Appendix A.

Over time, a number of ASCs became obsolete as the Air Force modified its ASC classification scheme. A current table of obsolete ASCs and their replacements was provided by AFDSC. The table was incorporated into the two data base build programs to convert all obsolete ASCs to their current values. Nineteen of the 23 obsolete ASCs are converted to the "0" or interdisciplinary general area of study. The old and replacement ASCs are shown in the User's Guide in Appendix A.

As a result of the preceding policy and data changes the following program changes were made.

ASC Generalization. Generalization of the third or fourth ASC characters to "Y" was accomplished in the DMND build program. A look-up table was built to hold the 157 ASCs which were specific to the fourth character and 57 ASCs whose last two characters were "XY". Each of these 212 ASCs was tagged with an integer code, "0" for ASCs not requiring generalization and "2" for "XY" ASCs. When the Requirements data base is built, each ASC read from the magnetic tape is checked against the generalization table. If a match is found, the integer code is extracted to determine whether the ASC is to be passed on unchanged or generalized in the third character position. If there is no table match, the last character of the ASC is generalized to "Y".

Subroutine PUTGEN (see Fig. 9) creates the generalization table by using the ASCs to be stored in the table to hash to a word in an array dimensioned 4,096. The algorithm shown in Eq (3) produced a unique hash function for all but four of the 212 ASCs entered into the table.

$$\text{DIMENSION INDEX} = \text{RT-MOST 12 BITS OF } \sqrt{\text{ASC REPRESENTED AS A REAL NUMBER}} \quad (3)$$

Two of these four ASCs hashed to one index while the other two hashed to another index. The array size was chosen to hold the maximum 12-bit number, 4095. No other hashing function could be found which could hash to 12 or fewer bits without resulting in one or more instances of three or more ASCs hashing to the same index. Larger arrays (2^{13} , 2^{14} ,

etc.) were considered too costly in terms of increased program core requirements. Moreover, two ASCs and their codes could be packed into a single computer word.

General ASCs are read into memory and stored in an array as shown in Fig. 13.

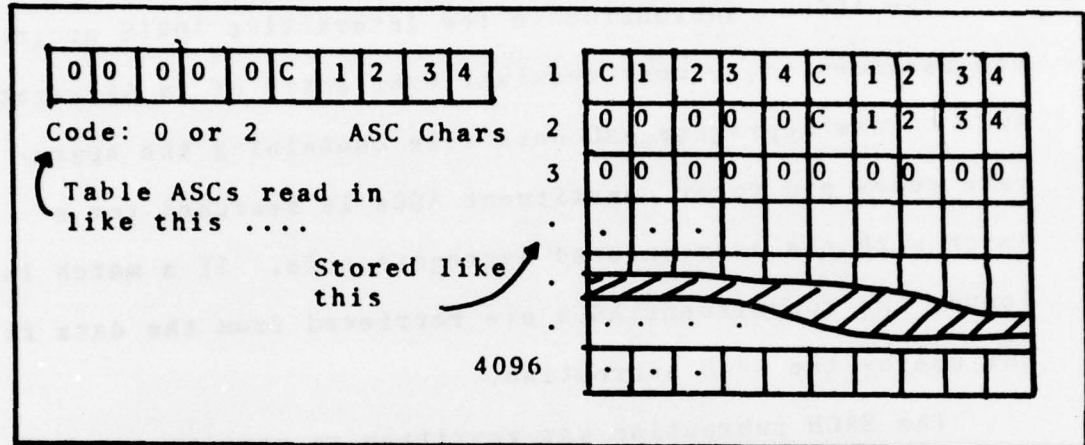


Fig. 13. Generalization Table Format.

After the table is prepared, ASCs are read off the magnetic tape for processing. The ASC is hashed to a table index and then compared to the ASC stored in the right half of the word first and the left half second. If a match occurs the integer code is extracted from the word to see whether the ASC must be generalized in the third character. If there is no match the last character of the ASC is generalized.

New ASCs may be added to the table in the future, if they hash to unfilled or half-filled words. If there are triple hashes a new hashing function or checking algorithm must be found.

Aggregate ASCs. Aggregate ASCs are only found in the Requirements data base. At the present time there are very few positions identified as such; however, as new AAD positions are classified and old positions reclassified, the Aggregate code is expected to see wider use.

The AGGREG subroutine in the interactive ADRIS program was designed to process terminal user entry of an Aggregate ASC. A new Aggregate ASC data file containing the aggregate codes and their constituent ASCs is searched for a match with the user-entered aggregate code. If a match is found, the constituent ASCs are retrieved from the data file for use by the SRCH subroutine.

The SRCH subroutine was rewritten to permit searches for multiple ASCs. Figure 14 shows a flowchart of the new program structure which permits searches for multiple ASCs.

The outer loop can be traversed from one to five times during the Inventory search, depending on the number of different ASC areas included in the Aggregate ASC chosen. The outer loop is traversed only once to search the Requirements data base--all aggregate codes are segregated together to minimize the search time. If the user enters a single normal ASC the outer loop is traversed once each for the Inventory and Requirements data bases.

Converting Obsolete ASCs. Obsolete ASCs are converted to replacement ASCs when building both the Inventory and Requirements data bases. The procedure used to check and

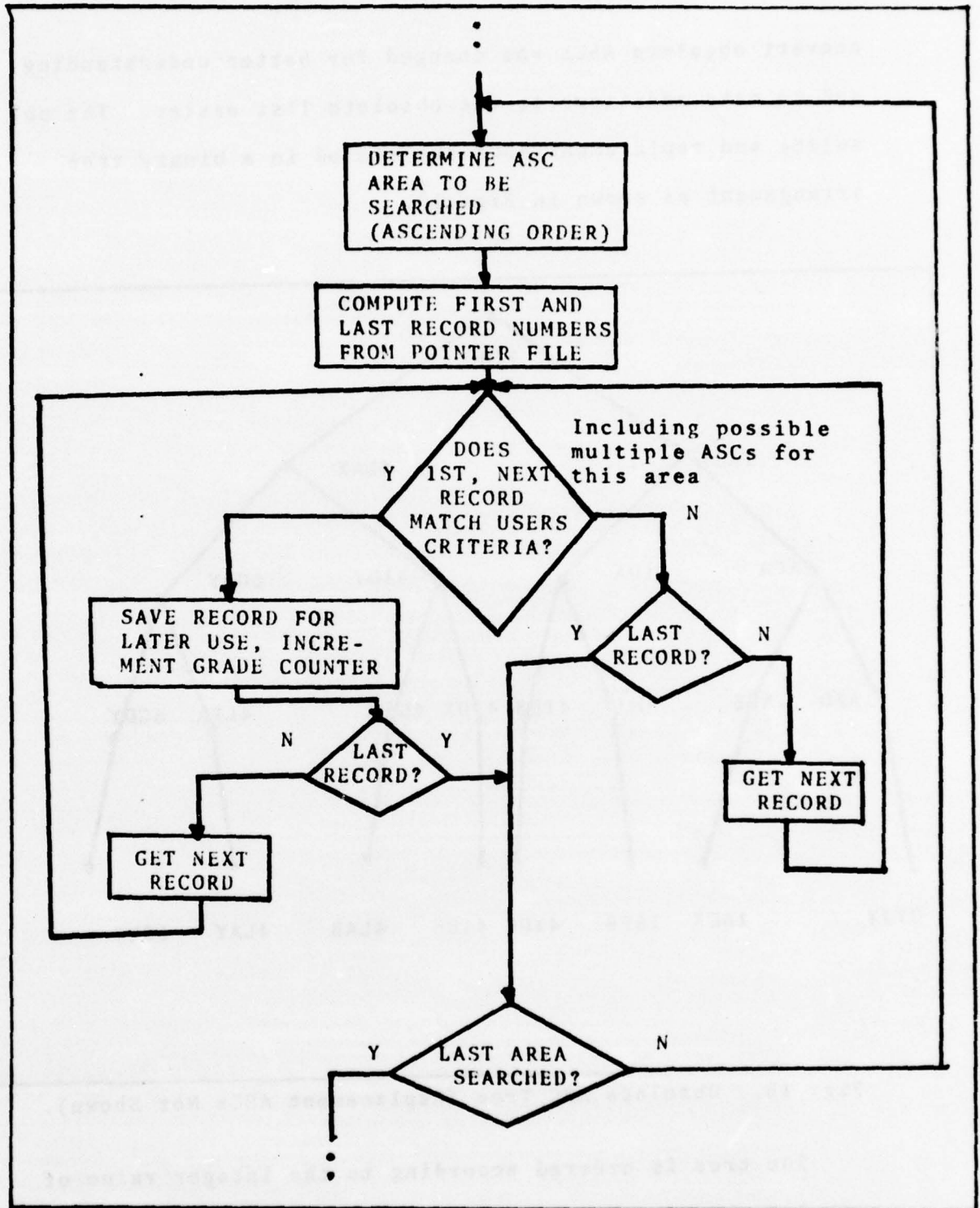


Fig. 14. Search and Match Logic.

convert obsolete ASCs was changed for better understanding and to make additions to the obsolete list easier. The obsolete and replacement ASCs are stored in a binary tree arrangement as shown in Fig. 15.

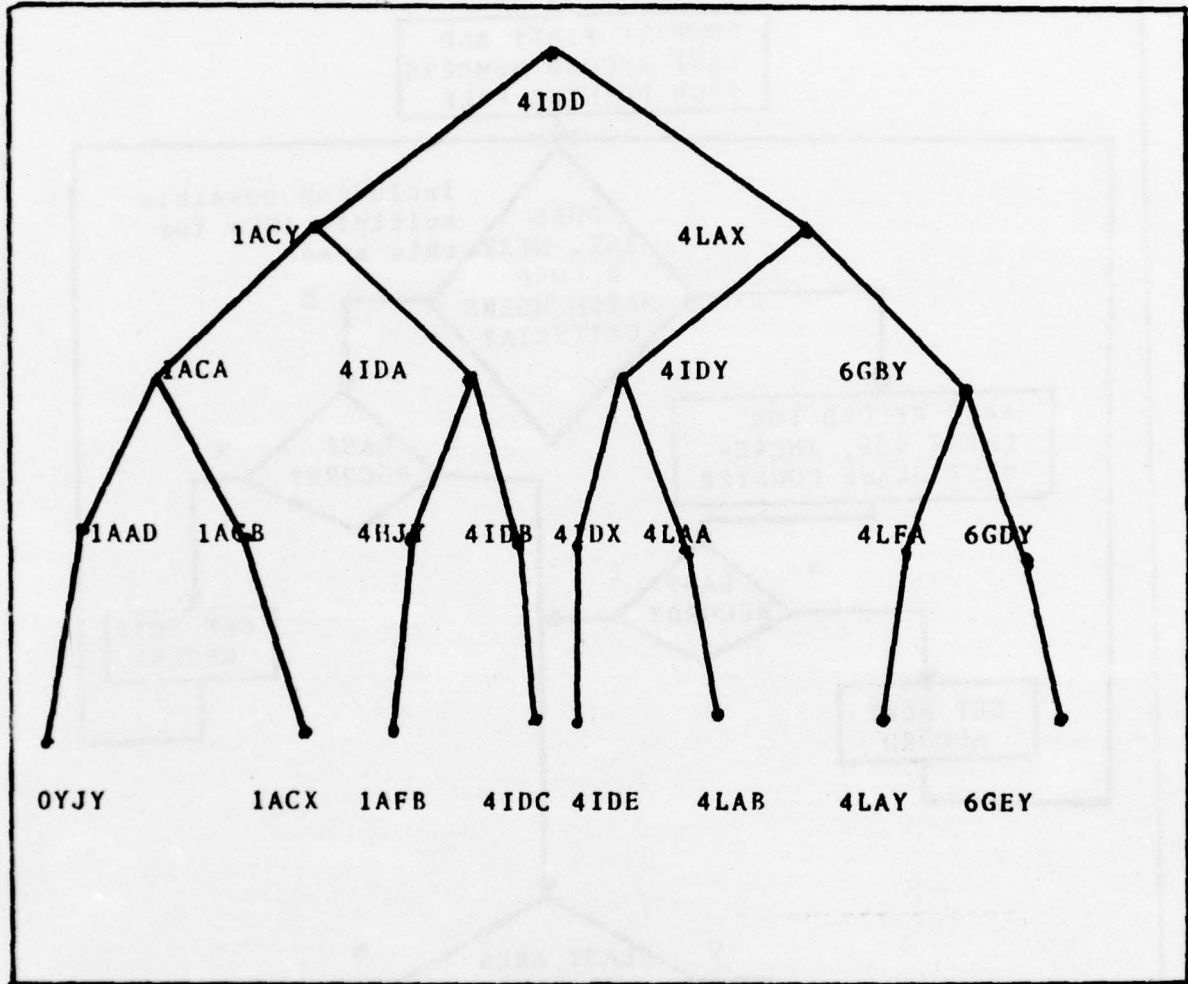


Fig. 15. Obsolete ASC Tree (Replacement ASCs Not Shown).

The tree is ordered according to the integer value of each ASC character string (display code numeric values right justified in a computer word). The left branch below each

node leads to a smaller ASC integer value while the right branch leads to a larger ASC integer value. Each ASC read from the magnetic tape is compared to the "root" ASC (4IDD) in the tree. If the ASC is less than 4IDD the left branch is taken; if the ASC is larger than 4IDD the right branch is taken. Comparison continues until a match is found or the tree is exhausted. If a match is found, the obsolete ASC is replaced with its current value.

This structure was chosen to balance the tree and minimize the number of comparisons necessary to determine if an ASC is obsolete or not. Five comparisons are required to pass through the tree if there is no match. The tree structure can be modified if additional obsolete ASCs must be added.

The BLDTREE subroutine constructs and loads the tree prior to ASC processing, while the BISRCH and CONVRT subroutines check ASCs against the tree entries and convert obsolete ASCs. See Figs. 9 and 10. Subroutines FOURTO1 and ONETO4 format ASCs read from magnetic tape from four words to one word or one word to four words as required by the build programs.

AFDSC Compatibility. The general area of Law was added to the data bases since some Law ASCs were associated with AADs. Most Law ASCs are associated with professional degrees, as are medical ASCs, and are not considered by the AADMS or contained in data tapes received from the AFMPC.

The build programs were extended to segregate Law ASCs. Also, the DMND build program was altered to segregate Aggregate ASCs. The pointer file was extended to include these additions.

There is no classified information contained on the magnetic tapes provided by the AFMPC. However, some AAD officers and positions are involved with classified work. In this case, the unit involved (not put into the ADRIS data bases), is replaced with asterisks on the magnetic tape. The original build programs processed the unit-asterisked entries from the Inventory magnetic tape but not from the Requirements tape. Both build programs now process all records from the magnetic tapes.

Possible errors in ASC coding on the magnetic tapes are corrected by "digit conversion" code in the build programs. If a letter "O" or a letter "I" is found in the first ASC character position it is converted to a zero or one, respectively. In character positions two through four, zeroes and ones are converted to letters "O" and "I".

Improvements for AFIT Use

The interactive messages printed at a time-sharing terminal by the program to prompt the user were largely rewritten in response to user comments during the ADRIS test phase. For example, users familiar with ADRIS are offered a fast parameter entry option without explanatory messages to speed program use.

Example ADRIS Modifications. One user discovered that the program would not process an "X" used as the last character in the AFSC (i.e., 514X, meaning 5140 through 5149) though the program would process a double "X" (i.e., 51XX, meaning 5100-5199). Code was added to the GETAFSC and SRCH subroutines to handle this case.

Another user found it annoying that no further summaries could be requested after a special Major Command summary. The user had to first reenter all search criteria and wait for the search to be completed. Program code was altered to permit unlimited summaries until the user explicitly terminated the DOSUM module.

An addition was made to the SPLY program to simplify program updating. The current data base date printed by ADRIS could only be changed by altering the interactive program's source code. This would require source code editing and recompiling every time new data bases were received. The SPLY build program was changed to read the current date off a computer card and store it on the pointer file saved on auxiliary storage, when the new data bases are built. This date is read and printed during ADRIS execution.

Build Test Features. Optional test segments were added to each build program to process any number of magnetic tape records into a reduced data base and then print the pointer file and all records. During normal data base building, the pointer file is also printed so that the program maintainer

can keep track of the increase or decrease in the size of the data bases. Any records processed from the magnetic tape with illegal ASC first characters or illegal data in other fields are printed.

VI. Validation

Verification of the correct operation of the ADRIS programs and validation of the results obtained from the data base retrievals were important efforts needed to increase user confidence. Because of the experimental nature of ADRIS' development, thorough testing had not been accomplished. Nor were program results known to be correct.

Testing was conducted during successive stages of the thesis effort. The data base build programs were tested by examining the entries stored in the data bases and insuring that the pointer file values were correct. The subroutines that gather and store user parameters were tested with a variety of legal and illegal parameters. After the ADRIS interactive program was executing, it was tested on a series of user requests which had been run while ADRIS was operational at Gunter AFS, Alabama. Results were identical; therefore, the conversion to the CYBER 74 was deemed successful.

However, continued testing on the original data bases revealed problems. Master's tallies were not including AADs with a Q education level (Master's Degree plus 30 or more semester hours). A second problem, excessive PHD tallies occurring when an asterisk was entered for education level, was traced to the existence of AAD general officers in the Inventory data base.

The ADRIS program was put on-line for test use by several key users for a one-month period. A variety of

minor problems were uncovered and debugged during this period.

A final validation test was conducted on the June 1976 data bases. The results of a number of test cases separately run on ADRIS and the batch computer programs maintained by AFDSC for HQ USAF/DPPE were compared. The results were identical, number for number (Ref 4). The AFIT and AFDSC programs had been separately designed and developed--one designed for interactive use and the other for batch use. Identical results obtained for a variety of test cases and information products typically used by AFIT faculty and staff certainly increases user confidence in ADRIS results.

The testing and validation efforts have uncovered and corrected problems in the programs and shown that a finite number of test cases generated identical results on two different ADRIS programs. However, these results do not prove the correctness of the programs or show the absence of errors. It can be claimed that the probability of correct results has been increased.

Build Data Bases

Data base building was verified by using 500 records from each magnetic tape to build mini data bases. The test sections of the build programs were used to print the records stored in the data bases and the pointer values. The 1,000 records (500 from each magnetic tape) were separately read and printed for comparison. Segregation of the records by

ASC, correct transferral of record fields, and correct pointer file values could then be independently checked. After correct results were obtained on the mini data bases, the full data bases were built.

Gather User Parameters

Correct gathering and storing of user parameters was confirmed by unit testing of the GETAFSC, GTGRD, GETCMD, GETCBPO, GTFCT, and AGGREG modules. The modules were driven with legal and illegal parameters to test proper operation and error handling. Proper internal storage was verified by printing out the contents of the storage variables.

Parameter error handling is not exhaustive. For example, parameters are checked for proper number of characters but not always for proper alphanumeric content. The DCIPHR module will detect an error in the ASC OBCYY and ask the user to reenter; however, the DCIPHR module will accept the ASC 12B4. It should be noted that there is a natural check to the entry of such an illegal parameter. The data base search will report "no Requirements or Inventory" for the user's criteria. Specific details on correct parameter formatting is contained in the User's Guide in Appendix A.

Test Data Bases

The first step in attempting to show correct program operation was the comparison of ADRIS Inventory and Requirements tallies obtained while the program was operational at

Gunter AFS, Alabama, with results obtained from the same user criteria on the CYBER 74 program. A representative sample taken from 28 available cases tested out identically.

A problem was discovered in the SRCH subroutine code which accepted or rejected records based on the education level. Data base searches for Master's Degrees were rejecting Q education levels. The AFDSC included Q records in Master's Degree reports and this change was approved by the AFIT Director of Academic Support. The result for the original data base is shown in Table III (Search criteria: all asterisks except P for Education Level).

Table III

Results of Q Educational Level Included
in Master's Tallies

	REQ	INV	INCREASE
01	0	536	+1
02	333	1289	+33
03	3075	8218	+155
04	2685	5578	+174
05	2890	4030	+153
06	1764	2037	+72

A second problem was noticed when retrieving all records with a "2" education level (students enrolled in AFIT Master's programs). The Inventory and Requirements tally showed non-zero results for the PHD Inventory in grades 01-04. The erroneous result was caused by the Master's and PHD grade

arrays being dimensioned only six. General officers possessing AADS were stored in the data base. If the user did not specify a grade parameter, general officers could satisfy the user's criteria and spill over from the Master's grade array into the adjacent PHD grade array. The result is shown in Table IV, for a user's criteria of all asterisked entries. The problem was corrected by dimensioning the grade

Table IV

Effect of General Officers Not Being Considered

	REQ	INV	REQ	INV	
01	0	535	3	117	(109 07s)
02	333	1256	78	148	(80 08s)
03	3075	8063	251	214	(14 09s)
04	2685	5404	295	338	(2 010s)
05	2890	3877	235	281	
06	1764	1965	83	150	

arrays 10. The general officer problem surfaced again in the user's test period, in the DOSUM module, where the same array spillover effect was causing erroneous results. The AFIT Director of Academic Support approved the future elimination of general officers from the Inventory data base. (There are no requirements for AAD general officers.)

Validate with AFDSC Programs

The test cases shown in Table V were run on ADRIS and AFDSC programs. The test cases were chosen as being representative of criteria and products that would be used by

AFIT staff and faculty. The product codes are as follows:

- (1) Inventory and Requirements tally.
- (2) List of Records.
- (3) Special Major Command Summary.
- (4) Base Summary.
- (5) AFSC Summary.

Test cases ran the gamut from specific ASCs to full data base searches (ASC=*) for Master's and PHD education levels. Aggregate ASCs and area AFSCs were tested. In every test case, the results were identical.

Aggregate ASCs and area AFSCs were independently checked by doing Inventory and Requirements runs on the constituent ASCs or AFSCs and summing the totals. This internal check showed that these portions of the program were working.

It should be noted that the AFDSC data bases included several medical AADs. The ADRIS data bases do not include medical ASCs. When the AFDSC medical ASCs appeared in results they were subtracted to maintain the equality of the data bases for testing.

Table V

Validation Test Cases

<u>CASE</u>	<u>ED LEV</u>	<u>ASC</u>	<u>AFSC</u>	<u>RANK</u>	<u>CBPO</u>	<u>MAJCOM</u>	<u>PRODUCT</u>
1	P	4IJY	*	*	*	*	1,2
2	*	4QYY	*	*	*	*	1,3,4
3	P	4THY	*	*	*	*	1,3,4
4	P	4YYY	*	*	*	*	1,3
5	*	2FCY	*	*	*	*	1,3,4,5
6	*	9HYY	*	*	*	*	1,3,4,5
7	*	9EYY	*	*	*	*	1,3,4,5
8	*	8FYY	*	*	*	*	1,2
9	P	9CYY	*	*	*	*	1,2
10	P	4ECY	*	*	*	*	1,3,4,5
11	P	*	2821C 2825C	*	*	*	1,3,4
12	P	*	2845	*	*	*	1,3,4
13	*	8HMY	*	*	*	*	1,2
14	*	*	OPER	*	*	*	1
15	Q	*	*	*	*	*	1
16	3	*	*	*	*	*	1
17	*	AAAY	*	*	*	*	1
18	*	AAHY	*	*	*	*	1
19	*	*	LOGI	*	*	*	1

VII. Improving Resource Usage

AFIT shares the CYBER 74 with other organizations in the sense that if AFIT uses more than its portion of computer resources, AFIT jobs receive a lower priority than other jobs in the system. Batch and INTERCOM jobs are counted towards determining how many computer resources AFIT is using. The net result for excessive use of resources is a slowdown in AFIT's throughput of jobs.

Use of resources is calculated in terms of Computer Resource Units (CRUs); a job's CRUs are determined by the use of central processor time (CPU), tape channel and disk access time (IO), and the number of central memory words (CM). A suggested job cost is calculated, for informational purposes, by multiplying CRUs by a cost factor (currently about 6¢ a CRU) (Ref 5:10).

Another AFIT limitation is the use of secondary storage on disc for permanent storage of information. AFIT is currently allocated 2,200 record blocks of storage (RBS), with 3,584 words per RBS.

Because of AFIT's competition for scarce computer resources, a goal of this thesis was the minimization of ADRIS interference with other AFIT computer activities. Efforts were directed at reducing the secondary storage required for permanently holding the data bases and reducing the CRUs used by ADRIS programs.

The reduction of CRUs in the interactive program was accomplished by code alterations to that part of the program which searched the data base for records meeting the user's criteria. This part of the program was responsible for large CRU usage.

A major corollary problem was that program response time (user wait time) could take as long as 4-5 minutes for an extensive search. This was established as a problem area by ADRIS users and it detracted from the quick response, interactive nature of the system.

Data Base Storage

The original ADRIS build programs stored each field or subfield extracted from the magnetic tape in a single computer word. Eighteen words were used to store a Requirements record while 13 words were used to store an Inventory record. Using the June 1976 data base with 26,540 Inventory and 11,243 Requirements records, this would require almost 550,000 words of disc storage. Since Honeywell word size is 36 bits while CDC word size is 60 bits, CDC storage would be almost twice that required by Honeywell. Storage for 550,000 words would require approximately 6% of AFIT's disc allocation, a high figure considering other AFIT disc requirements.

Number of Parameters. AFIT's use of the interactive ADRIS program required only six parameters from the Inventory and Requirements data bases: education level, ASC, AFSC

(including prefix and suffix), grade, CBPO and major command. These parameters required only 11 words of storage. Thus, the data base could be reduced to $(26,540 + 11,243) \times 11 = 416,000$ words, a 24% savings.

Record Packing. To further reduce storage requirements the 11 words required for each record were packed into two words. Thus, $(26,540 + 11,243) \times 2 = 75,566$ words of storage were required. This is only about 14% of the original requirement. For coding simplicity, packing in the build programs and unpacking in the interactive programs was initially done with FORTRAN ENCODE and DECODE statements respectively.

Build Programs

The ADRIS build programs, modified to pack and group 100 tape records into a single CYBER random record, were found to be extremely expensive. See Table VI for a comparison of resource usage before and after two modifications.

Record Sorting. Each build program sorts records by the ASC general area of study (a digit between 0 and 9 inclusive) in order to group data base records by ASC.

The original build programs were quite inefficient in sorting records by ASC. The sort scheme began by sequentially reading records off the magnetic tape and sequentially storing processed records on a single scratch file. The scratch file would then be reread, from beginning to end, for each ASC general area of study. For the SPLY program, with 11 different

Table VI

Build Program Improvements

	<u>Version</u> ¹	<u>No. Records</u> ²	<u>CP</u> ³	<u>IO</u> ³	<u>CRUs</u>	<u>Cost</u>	<u>% CRUs</u> ⁴
S	Original	23,407	355	371	461	\$27.63	100
P	New Sort	23,407	133	185	194	\$11.64	42
L	Updates ⁵	26,541	157	205	224	\$13.42	49
Y	Min Param	26,541	100	215	171	\$10.61	38
	Final	27,679	108	141	142	\$8.52	26
D	Original	11,693	238	277	328	\$19.64	100
M	New Sort	11,693	82	144	142	\$8.54	43
N	Updates ⁴	11,243	82	147	159	\$9.56	48
D	Min Param	11,243	43	94	86	\$5.15	26
	Final	10,232	40	52	56	\$3.35	20

- Notes:
- 1 Each succeeding version shows change from previous version
 - 2 No. records stored into data base
 - 3 Units are seconds
 - 4 % CRUs = Original CRUs/New Version CRUs (new version CRUs proportionately corrected for differing number of records)
 - 5 Update changes: digit and ASC conversions/generalizations (as applicable)

ASC types, this would be (26,541 records) x 11 = almost 292,000 separate reads and character comparisons.

The new sort eliminated all of these scratch file reads by sorting the records into eleven separate files, by ASC, as the records were read from magnetic tape. Table VI shows a CP savings of more than 60% and an IO savings of almost 50%.

Number of Parameters. Parameter reduction to those actually needed has been mentioned. The effect on resource usage was most noticeable for the DMND program in which the required parameters could be read from magnetic tape into 11 rather than 18 computer words. See "Min Param" versions in Table VI.

The packed data structure created by both build programs is as shown in Fig. 16, with the six parameters stored in two computer words.

This data structure was chosen to simplify and limit the execution time of the unpacking code (replaced DECODE statement) found in the interactive program. All fields are character display code except AFSC and GR which are stored in binary integer representation to preclude time-consuming conversion in the interactive program. Since the largest AFSC integer value is 9,999, 14 bits ($2^{14} - 1 = 16,383$) are sufficient and the AFSC is stored in a three character field (18 bits). The GR integer value easily fits into a single character (6 bits).

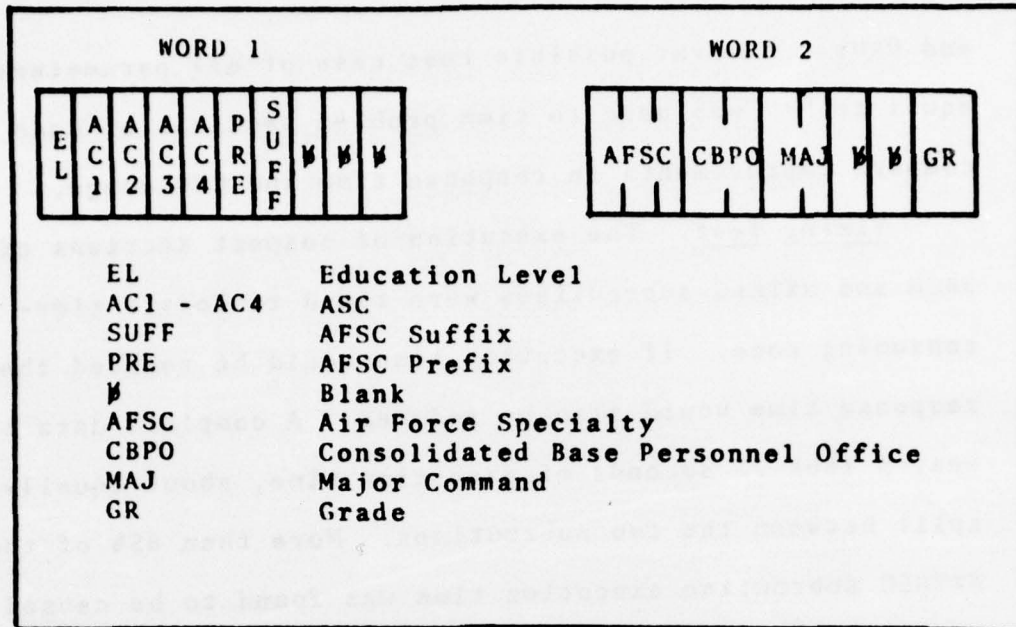


Fig. 16. Packed Data Structure.

Final. The final version represents a considerable savings in input processing time. This is due to buffering blocks of 25 records at a time from the AFMPC magnetic tapes. Earlier versions of the build programs processed unblocked magnetic tapes one record at a time.

Interactive ADRIS Program

After the interactive program was executing, the most noticeable shortcoming was the long user wait time for data base searches. This poor program response time was particularly aggravating for searches of the whole data base (ASC=*). The response time also became worse during periods of heavy INTERCOM use by other system users. An effort was made to reduce the user wait time by improving the efficiency of the search which would also reduce resource usage

and CRUs. A worst possible test case of all parameters equal to "*" was used to time problem sections of code and compare improvements in response time and CRU usage.

Timing Test. The execution of suspect sections of the SRCH and NXTREC subroutines were timed to locate time-consuming code. If execution time could be reduced then response time would also be reduced. A complete data base search took 73 seconds of execution time, about equally split between the two subroutines. More than 85% of the NXTREC subroutine execution time was found to be caused by the FORTRAN DECODE statement originally used to unpack the parameters. More than 90% of the SRCH subroutine execution time was due to the output (saving) of matched records onto scratch files.

These results indicated that execution time would be primarily affected by:

(1) The number of records that needed to be unpacked for a search, i.e., the size of an ASC general area of study or the entire data base if ASC=*

(2) The number of records found during the search which matched the user's criteria and would be written to a scratch file.

Record Unpacking. The DECODE statement was replaced with in-line code which used shifts and masks to extract the fields and place them in the proper format in separate words. This improvement, along with reducing the number of

variables, reduced the execution time by more than 30 seconds for a full data base search, only 56% of the original execution time of 73 seconds.

Input/Output. The FORTRAN "formatted" write statements that saved the matched records were replaced with "unformatted" writes to eliminate the formatting execution time. The information could then be read back in by other program segments with unformatted reads. This change resulted in a savings of 20 seconds so that record unpacking and output changes together reduced a full data base search to 21 seconds or 29% of the original execution time.

Different scratch file buffer sizes were tried to find a buffer size that could handle movement of records to the scratch files without delaying execution and also minimize IO channel time. A buffer size of 2002 octal resulted in a 20% reduction of IO channel time from a buffer half as big. The response time was found to be just slightly improved by the 2002 buffer. Larger buffers had negligible effect on IO channel time or response time.

Overlay. The program was overlaid to reduce memory requirements, allow for future program growth in the INTERCOM environment (INTERCOM limited to 60K octal), and reduce resource usage and response time. The overlay consisted of two primary sections: the DOBASIC and DOSUM components shown previously in Fig. 11. Central memory use for the overlays is approximately 43K, down from just under 60K octal initially.

Results. Resource usage and response time improvements are shown in Table VII for a data base search with all parameters equal to "*".

Table VII

Response and Resource Results

<u>Version</u>	<u>Exec. Time</u>	<u>Mem</u>	<u>IO</u>	<u>CRUs</u>	<u>Cost</u>	<u>Response</u>
Original ¹	73	54600 ²	77	98	\$5.85	3-5 min
Min param, DECODE replaced	41	50600	52	60	\$3.59	1.8-3 min
Unformatted I/O	21	50700	68	59	\$3.53	1.2-2 min
Overlay 2002 Buffer	21	43000	56	48	\$2.90	1-1.7 min

- Notes: 1 Each succeeding version shows improvement from previous version
- 2 Dead code and unused arrays were removed

Response time improvement was quite variable; however, an average reduction of 50% is estimated. This improvement was noted on both the worst case search and smaller, more average searches. Computer Resource Unit savings averaged 50% for large and small searches.

The reduction in parameters reduced the IO time from 77 to 52 seconds since fewer fields had to be written to the scratch files. An increase from 52 to 68 seconds occurred with the change to unformatted Input/Output because

the entire word holding each parameter was transferred to the scratch file as a record rather than the packed record created by a formatted write statement. The effect of the 2002 octal buffer is seen in the final reduction of IO from 68 down to 56 seconds due to less channel activity.

During repeated tests of response time only minor improvements were noticed with the Input/Output changes: response time was affected most by the reduction in execution time.

VIII. Conclusion

ADRS is operational and its use is under the control of the AFIT School of Engineering's Director of Academic Support. The interactive program has already seen a steady rise in service among School of Engineering faculty, staff, and students. Use should continue to increase as all of the resident AFIT schools are briefed on the availability of ADRS.

Summary

The accomplishments of this thesis can be briefly summarized:

(1) Honeywell character-coding, formatting, and nonstandard FORTRAN capabilities were obstacles that were overcome to convert ADRS to CDC CYBER 74 usage.

(2) ADRS data base processing and interactive program operation were altered to conform to current AADMS policy. Policy and data were provided by the AFDSC which supports the computer information needs of HQ USAF/DPPE. ADRS was altered or updated in the areas of:

- (a) AFSC areas.
- (b) Obsolete ASCs.
- (c) Less specificity in ASCs attached to authorized AAD positions.
- (d) New Aggregate ASCs for authorized AAD positions.

(3) The code of the ADRIS programs was checked to verify correct and consistent data base construction and correct retrieval and storage of information from the data bases. This was done to provide user understanding and confidence in ADRIS products. To provide further assurances of ADRIS' correct operation, a validation effort was conducted with the AFDSC at the Pentagon. Nineteen test cases were run on the ADRIS interactive program and on AFDSC batch programs developed and written without knowledge of ADRIS' development. Results were identical.

(4) During the course of this thesis a continuing effort was made to adapt ADRIS to the needs of the AFIT community. Comments from two primary users resulted in numerous changes to improve program-user communication and program operation. A Maintainer's Manual (Appendix B) was written to explain all the necessary procedures to maintain ADRIS and place new data bases on-line as they are received from the AFMPC.

(5) ADRIS was implemented to make its use as economical and efficient as possible. Techniques used included storing the minimum amount of information needed by the interactive ADRIS program into a packed (condensed) data base structure and building the data base with a much-improved sorting procedure. Optimization changes made to the interactive program reduced the user wait time for a data base search by more than half on the average and also reduced search resource use by some 50%.

Software Transportability

This thesis project was instructive to the author in several areas concerned with the transportability and conversion of computer programs from one installation to another.

(1) The importance of determining the magnetic tape processing capabilities of an installation before preparing program and data tapes is critical. Neither of the original magnetic tapes could be directly processed because their character codes could not be translated by CYBER System routines. A second example was the receipt of the first data tapes from the AFMPC blocked in excess of the number of characters processable by CYBER Record Manager. This type of problem was not even suspect, but it nevertheless caused an unforeseen delay.

(2) Different computer manufacturers and models have dissimilar source language compilers. Some of the FORTRAN syntax and statements found in ADRIS were at odds with the syntax and language expectations of the CYBER. Time-consuming conversions were necessary. The lesson is that a standardized subset of a language (ANSI, for example) should be used if program transportability is ever expected.

(3) Different systems have different basic purposes and organizations: Honeywell is more oriented to character manipulation and record transactions while CDC is designed for scientific calculations. This different orientation resulted in more cumbersome and inefficient

random record processing (a central program component) for the CYBER.

(4) Good documentation can be extremely helpful in understanding an alien program. The scarcity of ADRIS documentation and its developmental nature required a time-consuming study of code for proper understanding. It is hoped that the Maintainer's Guide and new source code comments will be helpful to future users or modifiers.

Recommendations

The following recommendations are made to keep ADRIS a reliable tool and improve its versatility and ease of use.

(1) Contact should be maintained with HQ USAF/DPPE and the AFDSC to insure that ADRIS reflects current AADMS policy and data. Consistency of results between AFDSC programs and ADRIS should be periodically checked.

(2) ADRIS should be modified to present base and command mnemonics that can be read directly instead of the one and two character codes now used.

(3) A module should be added to accept multiple ASCs from the user. The School of Engineering Office of Academic Support recommended this improvement but time was not available to implement the change. This capability would permit the data base to be combed for a related group of ASCs (in Operation Research, for example) in a single search. This would relieve the user from entering parameters and

waiting through several searches before manually adding the results.

(4) Additional information could be stored in the data bases for retrieval and presentation. An example is the unit or organization of an AAD position or officer. All the information available from the magnetic tapes is shown in the Maintainer's Guide, Appendix B.

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Vita

Matthew Barron Waldron was born in Boston, Massachusetts, on June 3, 1946. He received his Bachelor of Science Degree in Mathematics at the United States Air Force Academy in June 1969. Upon graduation, Second Lieutenant Waldron served his initial tour of duty as an Information Officer at the Air Force Flight Test Center, Edwards AFB, California. In September 1972, Capt Waldron was transferred to the 21st Composite Wing at Elmendorf AFB, Alaska. There he served briefly as Wing Ground Safety Officer before becoming the Wing Information Officer. Capt Waldron entered the Air Force Institute of Technology at Wright-Patterson AFB, Ohio, in September 1975 to begin study toward a Master's Degree in Computer Systems.

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Appendix A

Advanced Degree Requirements

Information System

(ADRS)

User's Guide

1 March 1977

1. Purpose of ADRIS

The purpose of ADRIS is to use the speed and flexibility of an interactive computer program to provide detailed and summary information about the inventory of Air Force officers possessing Advanced Academic Degrees (AADs) and the job positions that require these AAD officers. AAD information is contained in two data bases built from magnetic tapes updated quarterly by the Air Force Military Personnel Center (AFMPC). The two tapes are extracts from the Manpower Authorization and the Uniform Officer Record files maintained at Randolph AFB, Texas. The Requirements data base contains the Education Level, Academic Specialty Code (ASC), Air Force Specialty Code (AFSC), grade, base, and major command for each AAD position while the Inventory data base contains the same information for each AAD officer.

The primary product of ADRIS is an Inventory and Requirements count of officers and positions satisfying the criteria selected by the ADRIS user. The criteria consist of values chosen by the ADRIS user for the six parameters: Education Level, ASC, AFSC, grade, base and major command. The ADRIS user may optionally obtain more detailed summaries of the data base entries matching his or her criteria. Summaries by ASC, AFSC, base, and command may be printed as well as the data base entries themselves.

2. Using ADRIS

The ADRIS program and data bases reside on the Control Data Corporation (CDC) 74 computer at Wright-Patterson AFB, Ohio. ADRIS is accessible anytime the INTERCOM (interactive terminal) system is in operation. Normal operation hours are 8:30 a.m. to midnight, Monday through Saturday. Terminals are most readily available and program response time the quickest early in the morning or after 4 p.m.

No special computer knowledge is required to run the ADRIS program. The program prints instructions to the user as it proceeds and will notify the user of syntactically illegal responses. Terminal operation instructions are contained in Section 3.

Login and Starting the Program. The ADRIS user must first login to the INTERCOM system. Users unfamiliar with the use of the terminal should now read Section 3. The ADRIS problem number is T770008 and ADRIS passwords are ENR3 and ENR4. The login line should be entered as:

```
LOGIN,T770008,ENR3,(or ENR4),(terminal ID)
```

The terminal ID is usually printed on a tag on the terminal. After the terminal prints a few lines of login information (system name, messages, date, time and user ID), it will print:

```
COMMAND-
```

To activate the ADRIS program, the user must then enter:

```
BEGIN,AFIT,(codeword)
```

and depress the RETURN or CR (carriage return) key. The codeword may be obtained from the AFIT School of Engineering Director of Academic Support.

Interacting with the Program. Program-user interaction is largely self-explanatory with the terminal printing instructions as necessary and then printing an equals sign (=) followed by a pause when a response from the user is needed. The "=" is a cue to the user to type in the requested information. Blanks are never entered between user entries or after the "=".

Once the user has typed a response he must depress the RETURN or CR key to transmit the response. If a syntactical error is detected ADRIS will direct the user to reenter. Logical or miskeyed errors cannot be retracted after the RETURN key has been struck. The user must wait until the data base search is complete and the program has recycled back to the point where the error was made.

If the user detects an error before the line has been transmitted, the error may be corrected by depressing the CTRL key on the terminal and hitting the H key to backspace to a point where the entry may be corrected by typing over the faulty letter(s).

The initial program request is for the user to identify himself as an old or new user. Old users receive abbreviated instructions so that they may quickly enter their data base search criteria.

Stopping ADRIS. The program may be terminated during printing by pressing the ESC key, followed by the % key, and then the A key. To stop the program during a pause, use %A. If the user desires to restart the program he must enter AADMS after the terminal aborts the program and prints COMMAND-. Normal program termination is directed by entering "D" when the terminal prints OPTION. After the terminal asks for the next COMMAND-, type LOGOUT and disconnect the telephone.

Search Criteria. The user is asked to enter values for the six search parameters. The data base is then searched to find Inventory and Requirements entries which match the user's search criteria. A tally of the results is then printed at the terminal as well as the ratio of Inventory to Requirements.

The parameters and rules governing the entry of their values follow. An asterisk (*) should be entered to indicate all possible parameter values.

- (a) Education Level = The user enters "P" for Master's Degree or "R" for PHD. An "*" will result in a separate tally for each. ("Q" - Master's Degree plus 30 or more semester hours; "2" - AFIT Master's Students (not included in AFMPC data bases); and "3" - AFIT PHD Students are

other allowable entries.) Only one value may be entered.

(b) ASC = The user must enter a single ASC as identified in Addendum A-1 or a single Aggregate ASC as explained and identified in Addendum A-2. A "Y" in a character position of the ASC denotes no academic specialization for that component of the ASC. If an entry contains a "Y" the user will be asked to specify whether he means that specific ASC or all ASCs with any allowable character in the "Y" position(s). Most Requirement ASCs are specific only to the first three characters. See Addendum A-3 for exceptions. Addendum A-4 contains a list of obsolete ASCs and their replacements. Data base searches with ASC=* take the longest (could take 1-2 minutes if INTERCOM is slow).

(c) AFSC = A single or multiple value(s) separated by a comma(s) are permitted. Ranges of values are permitted, such as 26XX-29XX or 513X-514X. The "X" character must be used to show the digit(s) over which the range extends. Career area descriptors for common AFSC groups may be entered as defined in Addendum A-5. Any combination of the above entries

is allowable so long as the total entry fits on a single line.

- (d) GRADE = The user must enter a number between one and six inclusive. Multiple entries are permitted. General officers are not included in the data base. Full colonels are included for information only since there are not any 0-6 quotas for AFIT education.
- (e) CBPO = The user must enter a single or multiple 2-character code(s) as defined in Addendum A-6.
- (f) MAJCOM = The user must enter a single or multiple 1-character code(s) as defined in Addendum A-7.

EXAMPLES:

EDUCATION LEVEL = P
ACADEMIC SPECIALTY CODE = OCYY
ENTER 1 TO DESIGNATE ONLY THIS ASC
2 TO SUMMARIZE THIS ASC + ALL ITS SUB-SPECIALTIES
= 2
AFSC = 51XX
GRADE = 3,4
CBPO = *
MAJCOM = K

This would result in the Inventory vs. Requirements status of all CAPTs and MAJORS assigned to Air University with a 51XX AFSC and a Master's Degree in Computer Technology

EDUCATION LEVEL = P
ACADEMIC SPECIALTY CODE = YYYY
ENTER 1 TO DESIGNATE ONLY THIS ASC
2 TO SUMMARIZE THIS ASC + ALL ITS SUB-SPECIALTIES
= 2
AFSC = *
GRADE = *
CBPO = *
MAJCOM = *

This would result in the Inventory vs. Requirements status for all PHDs in the USAF.

Summaries. The user may request additional summary reports, based on the criteria already entered. The program will offer the user his choice of five summaries: ASC, AFSC, CBPO, Major Command, or Special Major Command. The AFSC Summary will print each different AFSC and the tally by grade for Inventory and Requirements. The other summaries are similar. The Special Major Command Summary prints ASCs, for each command, by grade, for Inventory and Requirement.

The AFSC, ASC, and Special Major Command Summaries require the user to indicate the degree of character specificity. For example, assume that the original ASC parameter value was OCYY, with all subspecialties requested. Then an ASC summary with degree of specificity of 3 would result in a report with tallies for OCA Y, OCB Y etc. An ASC summary with degree of specificity 4 would result in a report with tallies for OCAA, OCAB, ...; OCBA, OCBB, ...; etc.

3. Terminal Operation Instructions

Most terminals are designed with flexibility to allow use with different types of systems. This flexibility is

expressed in the form of switches whose settings must be correct for proper operation. AFIT's terminals should be set properly, but here's a quick guide: the terminal power should be on; mode should be on-line rather than local speed or baud rate set at 300; duplex at half; and parity at mach or 1. If there seems to be a switch-setting problem, get help.

The connection of the terminal to the computer is done by telephone lines, and by dialing the telephone number of the computer. The correct number to dial is the one for Computer System B (CSB), 300 baud--the number should be on a tag attached to the terminal. This number will connect you to the first free line into the CYBER 74.

Communication of keyboard characters to the computer is done by conversion of these characters into sequences of tones which can be sent over the telephone line. The piece of hardware which does this conversion is called a dataset or modem (for modulator-demodulator); there must be one modem at the terminal and another at the computer. Two types of modems are in common use: those directly attached to the telephone line and those which are acoustically coupled by placing the telephone handpiece physically into the modem. The directly-attached devices normally come with a special telephone set which has a row of buttons; one of these buttons must be depressed in order to get a dial tone to start the call. In contrast, the acoustic coupler is designed to work with an ordinary telephone.

AD-A038 911

AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCH--ETC F/G 5/2
ADVANCED DEGREE REQUIREMENTS INFORMATION SYSTEM.(U)
MAR 77 M B WALDRON

UNCLASSIFIED

AFIT/6CS/MA/77M-3

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2 OF 2
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END

DATE
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5-77

After dialing the correct telephone number, you should hear one or two rings (if you hear a busy signal, redial), and then the computer will answer. The next step is to complete an electronic handshake sequence. The computer starts the sequence after it answers by placing a tone which you can hear on the telephone line. You should then press the data button on the modem telephone, if the modem is directly attached, or else insert the telephone handpiece into the acoustic coupler.

The computer should then print some identification information and request you to LOGIN. Refer back to Section 2 to obtain the login command and how to start ADRIS.

The preceding discussion was synthesized from the MULTICS Programmer's Manual, Chapter 3 (Ref 6:3-1 to 3-3). A terminal trouble shooting guide is also found in Chapter 3.

Addendum A-1

Academic Specialty Codes (ASCs)

The listing of ASCs beginning on the next page is reproduced from AFM 300-4, Vol II.

1 Title Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section A

5 Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
YVYV	NO ACADEMIC SPECIALTY APPLICABLE	QYAE	Cereals and Carbohydrates
	INTER-AREA SPECIALIZATIONS	QYAF	Fertilizers, Plant Growth Regulators
QCYV	1. Major Academic Field: COMPUTER TECHNOLOGY	QYAG	Food and Feed Additives
QCAV	Spec.--Data Processing (Business Administration and/or Management concentration)	QYAH	Fruits, Vegetables, Juices
	Sub-Spec.	QYAI	Meat, Fish, Dairy and Poultry Products
QCAA	Electronic Data Processing (Accounting)	QYAJ	Nonalcoholic Beverages
QCAD	Automated Data Processing Systems (Electronic Data Processing Systems)	QYAK	Nonfood Crop Products
QCAC	Mechanical Data Processing systems (PCAR)	QYAL	Pesticides
QCAD	Business Statistics and Quantitative Methods	QYAX	Other
QCAI	Business Administration and/or Management ADP/EDP, other	QYBY	Spec.--Biochemistry
QCBY	Spec.--Electronic Computation (Electrical Engineering concentration)		Sub-Spec.--
	Sub-Spec.	QYBA	Amino Acids, Peptides, Proteins
QCBA	Analogue Computation	QYBB	Antimetabolites
QCBB	Digital Computer Design	QYBC	Biochemical Mechanisms
QCBC	Digital Data Systems	QYBD	Biochemorphology
QCBD	Information Storage and Retrieval	QYBE	Carbohydrates
QCBE	Man-Machine Translation	QYBF	Clinical Biochemistry
QCBX	Electronic Computation, other	QYBG	Cyto-Histo-Chemistry
QCCY	Spec.--Applied Electronic Data Processing (Industrial Engineering concentration)	QYBH	Endocrine Biochemistry
	Sub-Spec.	QYBI	Enzyme, Co-enzyme
QCCA	Applications of Data Processing	QYBJ	Immunochemistry
QCCB	Computer Theory	QYBK	Intermediary Metabolism, Biosynthesis
QCCC	Data Processing in Operations Research		Lipids
ECCX	Applied Data Processing, other	QYBL	Microbiological Chemistry
QCDY	Spec.--Numerical Methods and Computation in Data Processing (Mathematics concentration)	QYBM	Natural Pigments
	Sub-Spec.	QYBN	Neurochemistry
QCDA	Analogue System, Coding and Programming	QYBO	Nucleic Acids
QCDB	Digital Computers, Coding and Programming	QYBP	Oncology, Carcinogenesis
QCDC	Digital Computers, Logic and Design	QYBQ	Physical Biochemistry
QCDX	Numerical Methods & Computation in Data Processing other	QYBR	Radiation Biochemistry
QYAV	Spec.--Agriculture and Food Chemistry	QYBS	Steroids
	Sub-Spec.--	QYBT	Technology, Methodology
QYAA	Alcoholic Beverages	QYBU	Other
QYAB	Animal and Vegetable Fats and Oils	QYBX	Spec.--Biogeography
QYAC	Animal Feeds	QYCY	Sub-Spec.--
QYAD	Bakery and Confectionery Products		Medical Geography
		QYCA	Phytogeography
		QYCB	Zoogeography
		QYCC	Other
		QYCX	Spec.--Biophysical Specialties
		QYDY	Sub-Spec.--
		QYDA	Bioacoustics and Transmission
		QYDB	Biochemical Physics
		QYDC	Bioelectricity and Transmission
		QYDD	Bioelectronics
		QYDE	Bionics
		QYDF	Bio-optics, Physical and Geometric
		QYDG	Bio-systems, Control, Communications
		QYDH	Biothermics and Bioenergetics
		QYDI	Biotransport and Membrane Physics
		QYDJ	Cellular Biophysics
		QYDK	Electron Microscopy
		QYDL	Fluid Biomechanics

1. Title: Academic Speciality, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section A (Continued)

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
0YDR	Health Physics	1VYY	General Area of Study: ADMINISTRATION, MANAGEMENT AND MILITARY SCIENCE
0YDN	Mathematical Biophysics	1AVY	1. Major Academic Field--BUSINESS ADMINISTRATION AND/OR MANAGEMENT
0YDO	Methodology, Instrumentation and Measurement	1AAV	Spec.--Accounting
0YDP	Molecular Biophysics	1AAA	Sub-Spec.--
0YDQ	Radiation Biology	1AAB	Auditing
0YDR	Solid Biomechanics	1AAC	Budgeting
0YDX	Other	1AAC	Cost Accounting
0YDY	Spec.--Operations Research	1AAE	Fiscal Procedures
0YDY	Sub-Spec.--None	1AAF	Government Accounting
0YFY	Spec.--Paleontology	1AAG	Tax Accounting
0YFA	Sub-Spec.--	1AAX	Other
0YFB	Micropaleontology	1ABY	Spec.--Applied Comptrollership
0YFC	Paleobotany	1ADY	Sub-Spec.--None
0YFD	Paleozoology	1ADA	Spec.--Business Economics
0YFE	Polynology	1AEB	Sub-Spec.--
0YFX	Other	1ADB	Business Cycles
0YGV	Spec.--Psychometrics	1ADC	Comparative Economic Systems
0YGV	Sub-Spec.--None	1ADD	Economic Geography
0YHY	Spec.--Social Psychology	1ADE	Economics of Natural Resources
0YHY	Sub-Spec.--None	1ADF	International Trade
0YIV	Spec.--Soil Science	1ADG	Labor Economics
0YIA	Sub-Spec.--	1ADH	Other
0YIB	Soil and Water Management	1AEX	Spec.--Business Law
0YIC	Soil Chemistry	1AEA	Sub-Spec.--
0YIC	Soil Fertility, Fertilizers, Plant Nutrition	1AEB	Agency Law
0YID	Soil Genesis, Morphology and Classification	1AEC	Business Organization and Regulation Law
0YIE	Soil Microbiology	1AED	Contracts Law
0YIF	Soil Mineralogy	1AEE	Labor Law
0YIG	Soil Physics	1AEF	Negotiable Instruments Law
0YIX	Other	1AEG	Sales Law
0YJY	Spec.--Systems Analysis	1AEX	Other
0YJY	Sub-Spec.--None	1AFY	Spec.--Business Statistics & Quantitative Methods
0YKY	Spec.--Systems Management	1AFA	Sub-Spec.--
0YKY	Sub-Spec.--None	1AFB	Advanced Statistics
0YLY	Spec.--Area Specialist	1AFD	Indexes of Business Conditions
0YLA	Sub-Spec.	1AFE	Management Research Techniques
0YLB	Western Europe	1AFG	Probability
0YLC	Eastern Europe	1AFH	Statistical Design and Analysis
0YLD	Soviet Union	1AFI	Time Series and Index Numbers
0YLE	North Africa	1AFJ	Other
0YLF	Sub-Sahara Africa	1AGY	Spec.--Engineering Management
0YLG	Middle East	1AGA	Sub-Spec.--Facilities Management
0YLG	South Asia	1AHY	Spec.--Finance
0YLN	Mediterranean	1AMA	Sub-Spec.--
0YLJ	Southeast Asia	1AMB	Corporation Finance
0YLK	Caribbean	1AMC	Investments
0YLL	Latin America	1AMX	Other
0YLM	Far East		
0YLN	Spec.--Telecommunications		
0YLO	Spec.--Inter-Area Specializations,		
0YLP	Other		
0YLN	Sub-Spec.--None		

1 Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section A (Continued)

Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
IAIY	Spec.--Food Service & Institutional Management	IANB	Cooperative Marketing
	Sub-Spec.--	IANC	Purchasing
IAIA	Hospital and Institutional Management	IAND	Retailing
IAIB	Hotel or Club Management	IANE	Sales
IAIC	Restaurant Management	IANF	Wholesaling
IAIX	Other	IANG	Buying
IAJY	Spec.--General Management	IANX	Other
	Sub-Spec.--	IAOY	Spec.--Personnel Administration
IAJA	Business History	IAQA	Sub-Spec.--
IAJB	Business Policies	IAOB	Education and Training
IAJC	Economic Analysis	IAOC	Employee Services
IAJD	Government Policy	IAOD	Industrial Relations
IAJE	International Economic Relations	IAOE	Job Classification
IAJF	Management Research Techniques	IAOF	Job Evaluation
IAJX	Other	IAOG	Labor Relations
IAKY	Spec.--Industrial or Production Management	IAOH	Organization Planning and Development
	Sub-Spec.--	IAOI	Performance Rating
IAKA	Cost Administration	IAOJ	Personnel Tests and Evaluation
IAKB	Factory Management	IAOK	Recruiting, Selection and Employment
IAKC	Industrial Procurement	IAOL	Union Organization
IAKD	Inventory Control	IAOX	Wage and Salary Administration
IAKE	Line Supervision	IAOY	Other
IAKF	Marketing	IAQA	Spec.--R and D Management
IAKG	Operations Research	IAQB	Sub-Spec.--None
IAKH	Plant Layout	IAQC	Spec.--Real Estate
IAKI	Production Planning and Control	IAQX	Sub-Spec.--
IAKJ	Purchasing	IAQY	Commercial Real Estate
IAKX	Time and Motion Study	IAQA	Industrial Real Estate
IALY	Spec.--Insurance	IAQB	Residential Real Estate
	Sub-Spec.--	IAQC	Other
IALA	Casualty Insurance	IAQX	Spec.--Safety Management
IALB	Life Insurance	IAQY	Sub-Spec.--None
IALC	Maritime Insurance	IAQA	Spec.--Systems Management
IALD	Property Insurance	IAQB	Sub-Spec.--None
IALX	Other	IAQC	Spec.--Transportation Management
IAZY	Spec.--Logistics Management	IAQX	Sub-Spec.--
	Sub-Spec.--	IAQY	Air Transportation
IAAA	Advanced or Executive Management	IAQA	Highway Transportation Management
IAAB	Government Accounting and Budgeting	IAQB	Industrial Traffic Management
IAAC	Logistics Function Management	IAQC	Principles of Transportation
IAAD	Logistics Statistics	IAQX	Rail Transportation
IAAE	Management Information Systems	IAQY	Rate Structures
IAAF	Negotiations Management	IAQA	Traffic Control
IAAG	Procurement Management	IAQB	Transportation Geography
IAAH	Systems Analysis	IAQC	Transportation Law
IAAX	Other	IAQX	Water Transportation
IAAY	Spec.--Marketing	IAQY	Other
	Sub-Spec.--	IAQA	Spec.--Aviation Management
IANA	Advertising	IAQB	Sub-Spec.--None
		IAQC	Spec.--Business Administration and Management, Other
		IAQX	Sub-Spec.--None
		IAQY	2. Major Academic Field--MILITARY SCIENCE

1. Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section A (Continued)

5. Data Codes	Data Items and Explanations:
ICYY	General Area of Study: ADMINISTRATIVE/MANAGEMENT TECHNOLOGY
ICAY	Spec.--Administrative/Management Occupational Technologies Sub-Spec.--
ICAA	Administrative Assistant
ICAB	Advertising Management
ICAC	Bookkeeping
ICAD	Resource Management Technology
ICAE	Religious Institutions Administration
ICAF	Civil and Public Administration
ICAG	Data Processing
ICAH	Dental and Medical Secretary
ICAI	Executive Secretarial Science
ICAJ	General Business
ICAK	Technical Management
ICAL	Work Center Management
ICAX	Other
ICBY	Spec.--Distributive Services Occupational Technologies Sub-Spec.--
ICBA	Commercial Education Technology
ICBB	Distribution Technology
ICBC	Material Management
ICBD	Transportation and Traffic Management
ICBE	Travel Agent
ICBF	Fuels Distribution Technology
ICBX	Other

1. Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section B

Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
2YYY	General Area of Study: ARTS, HUMANITIES, AND EDUCATION	2BCE	Vocational Guidance
2AYY	Major Academic Field--CHAPLAINCY AND PASTORAL CARE	2BCX	Other
2AAY	Spec.--Counseling and Guidance	2BDY	Spec.--Curriculum Development
	Sub-Spec.--		Sub-Spec.--
2AAA	Marriage Counseling	2BDA	Audio-Visual Aids
2AAB	Personal Counseling	2BDB	Curriculum Research
2AAX	Other	2BDC	Instructional Materials
2ABY	Spec.--Hospital Ministry	2BDD	Programmed Learning
2ACY	Spec.--Management and Administration	2BDE	Vocational Education
	Sub-Spec.--None	2BDX	Other
2ADY	Spec.--Prison Chaplaincy	2BEY	Spec.--Educational Psychology
	Sub-Spec.--None		Sub-Spec.--
2AEY	Spec.--Religious Education	2BEA	Adolescent Development and Behavior
	Sub-Spec.--	2BED	Child Development and Behavior
2AEA	Audio-Visual Aids	2BEC	Educational Measurement
2AEB	Youth Activities	2BED	Exceptional Child
2AEX	Other	2BEE	Individual Differences
2AXY	Spec.--Chaplaincy and Pastoral Care, Other	2BEF	School Adjustment
	Sub-Spec.--None	2BEG	School Learning
2BYY	2. Major Academic Field--EDUCATION	2BEM	Special Education
2BAY	Spec.--Administrative Functions	2BEX	Other
	Sub-Spec.--	2BFY	Spec.--Elementary Teaching
2BAA	Adult Education		Sub-Spec.--None
2BAB	Community Relations	2BGY	Spec.--Industrial and Vocational Education
2BAC	Educational Administration and Management		Sub-Spec.--None
2BAD	Facility Planning	2BHY	Spec.--Physical Education
2BAE	Philosophy of Education		Sub-Spec.--None
2BAF	School Business Administration and Management	2BIY	Spec.--Secondary Teaching
2BAG	School Law		Sub-Spec.--
2BAH	Supervisory Practices	2BIA	Art
2BAX	Other	2BIB	Business Administration
2BY	Spec.--College Teaching	2BIC	English
	Sub-Spec.--	2BID	Foreign Language
2BBA	Administration and Management	2BIE	Industrial Arts
2BBB	Arts, Humanities and Education	2BIF	Mathematics
2BBC	Biology and Agriculture	2BIG	Music
2BBD	Engineering	2BIM	Natural Sciences
2BDE	Mathematics	2BII	Social Sciences
2BDF	Physical Sciences	2BIJ	Vocational Education
2BDG	Social Sciences	2BIX	Other
2BDX	Other	2BJY	Spec.--Special Teacher Training
2BCY	Spec.--Counseling and Guidance		Sub-Spec.--
	Sub-Spec.--	2BJA	Library Training
2BCA	Educational Guidance	2BJB	Methodology
2BCB	Remedial Education	2BJC	Special Education
2BCC	Student Personnel	2BJX	Other
2BCD	Tests and Measurements	2BKY	Spec.--Educational Technology
			Sub-Spec.--None
		2BXY	Spec.--Education, Other
			Sub-Spec.--None
		2CYV	3. Major Academic Field--FINE AND APPLIED ARTS
		2CAV	Spec.--Architecture

1. Title: Academic Speciality, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section B

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
	Sub-Spec.--	2CFC	Furniture
2CAA	Architectural History	2CFD	Glass and Fiberglass
2CAB	City, Regional and Industrial Planning	2CFE	Jewelry
2CAC	Drawing and Creative Design	2CFF	Landscape
2CAD	Landscape	2CFG	Leathercraft
2CAE	Private Residence Design	2CFH	Metals--other than Jewelry
2CAI	Other	2CFI	Packaging
2CBY	Spec.--Commercial Art	2CFJ	Pottery
	Sub-Spec.--	2CFX	Other
2CBA	Advertising	2CGY	Spec.--Library Science
2CBB	Cartooning		Sub-Spec.--
2CBC	Illustration	2CGA	Archives, Historic Libraries
2CBD	Industrial Patterns	2CGB	Cataloguing and Classification
2CBE	Interior Decoration	2CGC	Law Library
2CBF	Layout	2CGD	Medical Library
2CBG	Lettering	2CGE	Research Library-Research Studies
2CBX	Other	2CGF	Technical Acquisitions
2CCY	Spec.--Decorative Arts and Crafts	2CGX	Other
	Sub-Spec.--	2CHY	Spec.--Music
2CCA	Calligraphy		Sub-Spec.--
2CCB	Ceramics	2CHA	Composition
2CCC	Fashion Illustration	2CHB	Instrumental Music
2CCD	Inlay and Enameling	2CHC	Sacred Music
2CCE	Jewelry	2CHD	Secular Music
2CCF	Mosaic	2CHE	Vocal Music
2CCG	Mural	2CHX	Other
2CCH	Photo Ceramics	2CIY	Spec.--Painting
2CCI	Stage Decoration		Sub-Spec.--
2CCJ	Stained Glass and Fiberglass	2CIA	History of Painting
2CCK	Weaving	2CIB	Oil Painting
2CCL	Wood Carving	2CIC	Oil Portrait Painting
2CCX	Other	2CID	Serigraphy
2CDY	Spec.--Graphic Arts	2CIE	Tempera Painting
	Sub-Spec.--	2CIF	Watercolor Painting
2CDA	Drawing	2CIX	Other
2CDB	Printing	2CJY	Spec.--Performance Arts
2CDC	Graphic/Advertising Design		Sub-Spec.--
2CDD	Printing Technology	2CJA	Ballet
2CDE	Printing Management	2CJB	Drama and Theater
2CDI	Other	2CJC	Modern Dance
2CEY	Spec.--Home Economics	2CJX	Other
	Sub-Spec.--	2CKY	Spec.--Sculpture
2CEA	Child Development		Sub-Spec.--
2CEB	Clothing and Textiles and Textile Chemistry	2CKA	Architectural Sculpture
2CEC	Dietetics-Industrial Management	2CKB	Castling and Metallurgical Techniques
2CED	Family Relations	2CKC	Ceramic Sculpture
2CEE	Home Economics Journalism	2CKD	Creative Sculpture
2CEF	Nutrition Technology	2CKE	History of Sculpture
2CEG	Related Arts	2CKF	Steel Sculpture
2CEI	Other	2CKG	Stone Sculpture
2CFY	Spec.--Industrial Art-Design	2CKX	Other
	Sub-Spec.--	2CXY	Spec.--Fine and Applied Arts, Other
2CFA	Ceramics		Sub-Spec.--None
2CFB	Concrete		

1. Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section B (Continued)

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
2DYV	4. Major Academic Field--FOREIGN LANGUAGE AND AREA (L&A) STUDIES	2FFY	Spec.--Writing
	NOTE: Of the thousands of languages spoken in the world, relatively few have or are likely to have military or diplomatic significance for the United States, and these have been categorized in a way that will be meaningful and useful to the Air Force in determining language policy, training, area assignments, and career planning. Such a classification has the disadvantage of not providing information as to the historical relationships and similarity between languages. Compensating for this disadvantage, however, is the fact that area specialization is necessarily closely tied to geography and only incidentally connected with language families. Although European languages such as English, French, and Spanish are widely spoken in many areas of the world, either as primary or secondary languages (by reason of colonial relationships in the past), only languages native to an area or officially adopted languages are listed. See ADE LA-510, Language Identity.	2FFA	Sub-Spec.--
2EYV	5. Major Academic Field--HUMANITIES, GENERAL	2FFB	Compiling and Editing
2EYV	Spec.--None	2FFC	Drama
	Sub-Spec.--None	2FFD	Fiction
2FAY	6. Major Academic Field--LANGUAGE AND COMMUNICATIVE ARTS	2FFE	Nonfiction
	Spec.--English Language	2FFX	Poetry
	Sub-Spec.--	2FXV	Other
2FAA	English Composition		Spec.--Language and Communicative Arts, Other
2FAB	English Grammar	2GYV	Sub-Spec.--None
2FAX	Other	2GAY	7. Major Academic Field--PHILOSOPHY
2FBY	Spec.--Journalism		Spec.--Aesthetics
	Sub-Spec.--None	2GAA	Sub-Spec.--
2FCY	Spec.--Literature	2GAB	Essence of Beauty
	Sub-Spec.--	2GAC	Philosophy of Art
2FCA	American Literature	2GAX	Other
2FCB	Biblical Literature	2GBY	Spec.--Contemporary Philosophy
2FCC	Classical Literature		Sub-Spec.--
2FCD	Comparative Literature	2GBA	Analytic Philosophy
2FCE	English Literature	2GBB	Bergsonism
2FCX	Other	2GBC	Contemporary Metaphysics
2FDY	Spec.--Public Relations and Related Communications	2GBD	Cultural Idealism (Italian)
	Sub-Spec.--	2GBE	Dialectical Materialism
2FDA	Advertising Writing	2GBF	Existentialism (French)
2FDB	Communications Research	2GBG	Existentialism (German)
2FDC	Motion Pictures	2GBH	Historicism (German)
2FDD	Radio-Television	2GBI	Neo-Kantianism
2FDX	Other	2GBJ	Neopositivism
2FEY	Spec.--Speech	2GBK	Neorealism (English)
	Sub-Spec.--	2GBL	Phenomenology (School of Husserl)
2FEA	Oral Interpretation	2GBM	Pragmatism (American)
2FEB	Phonetics	2GBN	Scientific Idealism (French and British)
2FEC	Techniques of Delivery	2GBO	Thomism
2FEX	Other	2GBX	Other
		2CCY	Spec.--Cultural Philosophies
			Sub-Spec.--
		2CCA	Anthropology
		2CCB	Philosophy of Education
		2CCC	Philosophy of History
		2CCD	Philosophy of Language
		2CCE	Philosophy of Religion
		2CCF	Political and Social Philosophy
		2CCX	Other
		2GDY	Spec.--Empirical Psychology
			Sub-Spec.--
		2GDA	Behavioral Psychology
		2GDB	Characterology
		2GDC	Consciousness
		2GDD	Criminal Psychology
		2GDE	Developmental Psychology
		2GDF	Existential Psychology
		2GDC	Learning
		2GDH	Psychoanalysis
		2GDI	Psychophysics-Psychosomatics
		2GDJ	Other
		2GEY	Spec.--Epistemology
			Sub-Spec.--
		2GEA	Critique of Empirical Knowledge

1. Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Section B (Continued)

		Data Codes	Data Items and Explanations:
2GEB	Critique of Essential Knowledge	2GNY	Spec.--Rational Theology
2GEC	Essence of Truth		Sub-Spec.--
2GED	Space, Time		God and Man
2GEE	Subject-Object and Their Relations	2GMA	God and the World
2GEX	Other	2GMB	God: His Existence and Nature
2GFY	Spec.--Ethics	2GMC	Problem of Evil
	Sub-Spec.--	2GMD	Other
2GFA	Justice: Individual and Social	2GMX	Spec.--Philosophy, Other
2GFB	Moral Acts and Habits	2GXY	Sub-Spec.--None
2GFC	Moral Judgment: Value	2HYY	8. Major Academic Field--RELIGION
2GFD	Moral Laws	2HAY	Spec.--Comparative Religions
2GFE	Moral Virtues		Sub-Spec.--None
2FGX	Other	2HBY	Spec.--Eastern Religions
2GGY	Spec.--History of Western Philosophy		Sub-Spec.--
	Sub-Spec.--	2HBA	Buddhism
2GGA	Ancient Philosophy	2HBB	Hinduism
2GGB	Medieval Philosophy	2HBC	Islam
2GGC	Modern Philosophy	2HBD	Other
2GGX	Other	2HBE	Spec.--Theology
2GHY	Spec.--Logic	2HBY	Sub-Spec.--
	Sub-Spec.--	2HCA	Apologetics
2GHA	Concept, Judgment, Reasoning	2HCB	Dogmatics
2GHB	Methodology	2HCC	Moral Theology
2GHC	Symbolic Logic	2HCD	Other
2GHX	Other	2HCE	Spec.--Western Religions
2GIY	Spec.--Metaphysics	2HDE	Sub-Spec.--
	Sub-Spec.--	2HDA	Early Christianity
2GIA	Causality	2HDB	Judaism
2GIB	Essence and Existence	2HDC	Medieval Christianity
2GIC	Freedom and Determinism	2HDD	Post-Reformation Christianity
2GID	Hierarchy of Being	2HDE	Reformation
2GIE	Human Person	2HDX	Other
2GIF	Metaphysical Principles	2HXY	Spec.--Religion, Other
2GIG	Relation		Sub-Spec.--None
2GIM	Substance and Accident	2IYY	9. Major Academic Field: ARTS, HUMANITIES, AND EDUCATION TECHNOLOGIES
2GIX	Other	2IAY	Spec.--Communications Technology
2GJY	Spec.--Natural and Scientific Philosophy		Sub-Spec.--
	Sub-Spec.--	2IAA	Air Traffic Control
2GJA	Cosmology	2IAB	Photography
2GJB	Methodology of Biological Sciences	2IAC	Communications Processing Management
2GJC	Methodology of Physical Sciences	2IAD	Conference and Court Reporting
2GJX	Other	2IAE	Creative Writing
2GKY	Spec.--Oriental Philosophy	2IAF	Electronic Countermeasures
	Sub-Spec.--	2IAG	Intelligence and Imagery Analysis
2GKA	China	2IAH	Interpreting and Translating
2GKB	India	2IAI	Aerospace, Command, Control, and Warning Systems
2GKC	Middle East		Other
2GKX	Other	2IAX	Spec.--Education (excluding Religion)
2GLY	Spec.--Philosophical Psychology	2IBY	Technology
	Sub-Spec.--		Sub-Spec.--
2GLA	Emotions	2IBA	Comparative Education
2GLB	Identiational Process	2IBB	Instructor in Technology
2GLC	Imagination	2IBC	Occupational Education Technology
2GLD	Instincts	2IBD	Preschool Child Care
2GLE	Life	2IBE	Teacher Aide
2GLF	Memory	2IBX	Other
2GLG	Perception	2ICY	Spec.--Humanities Technology
2GLH	Soul		Sub-Spec.--
2GLI	Whole Man		
2GLX	Other		

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Section B (Continued)

5 Data Codes	Data Items and Explanations:
2ICA	African Studies
2ICB	Afro-American Studies
2ICC	Chicano Studies
2ICD	Classics
2ICE	Indian Histories
2ICF	Peace Studies Technology
2ICX	Other
2IDY	Spec.--Psychology Technology Sub-Spec.--
2IDA	Child Development Technology
2IDB	Personal Development Technology
2IDX	Other
2IEY	Spec.--Recreation Technology Sub-Spec.--
2IEA	Golf Course Operations
2IEB	Parks and Recreation Management Technology
2IEC	Recreation Grounds Management
2IED	Community Organization and Recreation
2IEX	Other
2IFY	Spec.--Religion Technology Sub-Spec.--
2IFA	Christian Education Technology
2IFB	Christian Ministries Technology
2IFC	Christian Vocational Studies Technology
2IFD	Church History Technology
2IFE	Deaconess
2IFX	Other
2IGY	Spec.--Vocational Counseling Technology Sub-Spec.--None

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Data Code Sequence
Section C

5 Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
3YYY	General Area of Study: BIOLOGICAL AND AGRICULTURAL SCIENCES	3ACP	Nucleic Acids
3AYY	1. Major Academic Field-- BIOLOGY	3ACQ	Oncology, Carcinogenesis
NOTE: As in other sciences that have developed along interdisciplinary lines, it is difficult to classify the specialties of Biology categorically and fit all purposes for which a classification is required. The principles of several major divisions of biological study (such as cytology, physiology, ecology, anatomy, genetics, and nutrition) are common to both animal and plant forms, and a classification that lists these individually under both Botany and Zoology would be considered correct. However, for the purpose of Air Force classification and coding, it is more practicable to identify the aforementioned divisions of study as specializations; Botany and Zoology will be considered in the context of "natural history" concerned primarily, but not exclusively, with taxonomy, morphology, and natural habits. Because of their importance to Air Force research activities, Bacteriology and Entomology will also be considered as specializations, although they are strictly speaking, subdivisions of Botany and Zoology respectively.		3ACR	Physical Biochemistry
3AAY	Spec.--Anatomy	3ACS	Radiation Biochemistry
	Sub-Spec.--	3ACT	Steroids
3AAA	Comparative Anatomy	3ACU	Technology, Methodology
3AAB	Gross Anatomy	3ACX	Other
3AAC	Histology	3ADY	Spec.--Biogeography
3AAD	Systemic Anatomy		Sub-Spec.--
3AAX	Other	3ADA	Medical Geography
3ABY	Spec.--Bacteriology	3ADB	Phytogeography
	Sub-Spec.--	3ADC	Zoogeography
3ABA	Growth and Reproduction	3ADX	Other
3ABB	Nutrition and Physiology	3AEY	Spec.--Biological Warfare
3ABC	Taxonomy		Sub-Spec.--None
3ABX	Other	3AFY	Spec.--Biology, General
3ACY	Spec.--Biochemistry		Sub-Spec.--None
	Sub-Spec.--	3AGY	Spec.--Biophysical Specialties
3ACA	Amino Acids, Peptides, Proteins		Sub-Spec.--
3ACB	Antimetabolites	3AGA	Bioacoustics and Transmission
3ACC	Biochemical Mechanisms	3AGB	Biochemical Physics
3ACD	Biochemorhology	3AGC	Bioelectricity and Transmission
3ACE	Carbohydrates	3AGD	Bioelectronics
3ACF	Clinical Biochemistry	3AGE	Bionics
3ACG	Cyto-Histo-Chemistry	3ACF	Bio-optics
3ACH	Endocrine Biochemistry	3AGG	Biosystems, Control, Communications
3ACI	Enzyme, Co-enzyme		
3ACJ	Immunochemistry	3AGH	Biothermics and Bioenergetics
3ACK	Intermediary Metabolism, Biosynthesis	3AGI	Bitransport and Membrane Physics
3ACL	Lipids	3AGJ	Cellular Biophysics
3ACM	Microbiological Chemistry	3AGK	Electron Microscopy
3ACN	Natural Pigments	3AGL	Fluid Biomechanics
3ACO	Neurochemistry	3AGM	Health Physics
		3AGN	Mathematical Biophysics
		3AGO	Methodology, Instrumentation and Measurement
		3AGP	Molecular Biophysics
		3AGQ	Radiation Biology
		3AGR	Solid Biomechanics
		3AGX	Other
		3AHY	Spec.--Bioradiology [Incl. Radiological Defense]
			Sub-Spec.--None
		3AIY	Spec.--Botany
			Sub-Spec.--
		3AIA	Nonvascular Plants
		3AIB	Vascular Plants
		3AIX	Other
		3AJY	Spec.--Cytology
			Sub-Spec.--
		3AJA	Animal Cytology
		3AJB	Plant Cytology
		3AJX	Other
		3AKY	Spec.--Ecology
			Sub-Spec.--

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Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
3AKA	Animal Ecology	3ARD	Histopathology
3AKB	Plant Ecology	3ARE	Phytopathology
3AKX	Other	3ARX	Other
3ALY	Spec.--Entomology	3ASY	Spec.--Pharmacology
	Sub-Spec.--		Sub-Spec.--
3ALA	Agricultural Entomology	3ASA	Chemical Pharmacology
3ALB	Forest Entomology	3ASB	Chemotherapy
3ALC	Insect Control, Chemical	3ASC	Drug Enzymology
3ALD	Insect Control, Other	3ASD	Experimental Therapeutics, Clinical
3ALE	Insect Morphology	3ASE	Industrial Chemicals
3ALF	Insect Pests	3ASF	Pharmacodynamics
3ALG	Insect Physiology	3ASG	Psychopharmacology
3ALM	Medical Entomology	3ASH	Toxicology
3ALX	Other	3ASX	Other
3ANY	Spec.--Genetics	3ATY	Spec.--Physiology
	Sub-Spec.--		Sub-Spec.--
3ANA	Animal Genetics	3ATA	Animal Physiology
3ANB	Cytogenetics	3ATB	General Physiology (Cell)
3ANC	Genetics of Microorganisms	3ATC	Human Physiology
3AND	Plant Genetics	3ATD	Plant Physiology
3ANX	Other	3ATX	Other
3ANY	Spec.--Immunology	3AUY	Spec.--Virology
	Sub-Spec.--		Sub-Spec.--None
3ANA	Antibody Formation	3AVY	Spec.--Zoology
3ANB	Antigens		Sub-Spec.--
3ANC	Antigens--Antibody Reaction	3AVA	Invertebrates
3AND	Complement; Complement-Fix- ation	3AVB	Veterbrates
3ANE	Hypersensitivity	3AVX	Other
3ANF	Infection and Resistance	3AXY	Spec.--Biology, Other
3ANG	Interference; Latency		Sub-Spec.--
3ANH	Tissue Antibodies; Autoanti- bodies	3AXA	Biology, Teaching
3ANX	Other	3AXX	Other
3AOY	Spec.--Nutrition	3BYY	2. Major Academic Field--AGRICUL- TURE
	Sub-Spec.--	3BAY	Spec.--Agriculture and Food Chemistry
3AOA	Animal Nutrition		Sub-Spec.--
3AOB	Clinical Nutrition	3BAA	Alcoholic Beverages
3AOC	Nutrient Value of Foods	3BAB	Animal and Vegetable Fats and Oils
3AOD	Plant Nutrition	3BAC	Animal Feeds
3AOE	Requirements and Deficiencies	3BAD	Bakery and Confectionery Products
3AOX	Other	3BAE	Cereals and Carbohydrates
3APY	Spec.--Paleontology	3BAF	Fertilizers, Plant Growth Regu- lators
	Sub-Spec.--	3BAG	Food and Feed Additives
3APA	Micropaleontology	3BAH	Fruits, Vegetables, Juices
3APB	Paleobotany	3BAI	Meat, Fish, Dairy and Poultry Products
3APC	Paleozoology	3BAJ	Nonalcoholic Beverages
3APD	Palyology	3BAK	Nonfood Crop Products
3APX	Other	3BAL	Pesticides
3AQY	Spec.--Parasitology	3BAX	Other
	Sub-Spec.--None	3BBY	Spec.--Animal Husbandry
3ARY	Spec.--Pathology		Sub-Spec.--
	Sub-Spec.--	3BBA	Large Animal Husbandry
3ARA	Comparative Pathology		
3ARB	Cytopathology		
3ARC	Experimental Pathology		

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5. Data Codes	Data Items and Explanations:
388B	Poultry
388C	Small Animal Husbandry
388X	Other
38CY	Spec.--Crop Science (Agronomy) Sub-Spec.--
38CA	Crop Breeding, Hybridization
38CB	Crop Management
38CC	Field Crops
38CD	Pasture and Forage Crops
38CE	Seeds
38CF	Turf and Ornamental Crops
38CG	Weed Control
38CX	Other
38DY	Spec.--Fish and Wildlife Sub-Spec.--
38DA	Fish and Wildlife Controls
38DB	Food Habits
38DC	Habitat Influences
38DD	Population Dynamics
38DE	Propagation and Management
38DX	Other
38EY	Spec.--Forestry and Range Science Sub-Spec.--
38EA	Erosion Control
38EB	Forest Products
38EC	Forest Protection
38ED	Forest Management
38EE	Irrigation
38EF	Range Management
38EG	Silviculture
38EM	Watershed Management
38EX	Other
38FY	Spec.--Horticulture Sub-Spec.--
38FA	Floriculture and Ornamentals
38FB	Fruits
38FC	Vegetables
38FX	Other
38GY	Spec.--Soil Science Sub-Spec.--
38GA	Forest and Range Soils
38GB	Soil and Water Management
38GC	Soil Chemistry
38GD	Soil Fertility, Fertilizers, and Plant Nutrition
38GE	Soil Genesis, Morphology and Classification
38GF	Soil Microbiology
38GG	Soil Physics
38GX	Other
38HY	Spec.--Mechanized Agriculture
38XY	Spec.--Agriculture, Other Sub-Spec.--None
38IY	3. Major Academic Field--AGRICUL- TURAL TECHNOLOGIES
38IY	Spec.--Floral Design and Management Sub-Spec.--None
38IX	Other

Section D

Data Codes	Data Items and Explanations:
4YYY	General Area of Study: ENGINEERING
NOTE: There is a problem of differentiating between Aeronautical Engineering, Astronautical Engineering, and Aerospace Engineering. Historically, the major discipline was Aeronautical Engineering. With the advent of practical applications of ballistic missile technology, a segment of this Aeronautical Engineering field was developed to such an extent that it has become a major academic field in its own right, i.e., Astronautical Engineering. The colleges and universities in this country have reflected the emphasis in this area by the modification of the titles of departments of Aeronautical Engineering to titles such as: Department of Aeronautics and Astronautics; Department of Aeronautical and Astronautical Engineering; and the Department of Aero-Space Engineering. The term "aerospace" has come into use primarily as a shortened equivalent of the phrase "aeronautical and astronautical." The hybrid term, Aerospace Engineer, would appropriately apply to an individual whose background and interests fall equally in both areas, i.e., aeronautics and astronautics, while the Aeronautical or Astronautical Engineer would be one whose training was primarily (but not necessarily exclusively) in the areas of aeronautics and astronautics, respectively. Although aeronautical and astronautical engineering could be considered specializations of aerospace engineering, the practical application of this term in the Air Force officer classification system is limited, since this system is designed to fit an individual to the job which best utilizes his talents. In order to satisfy the requirement of the officer classification system and still use the term "Aerospace Engineer," this classification will list all three terms. The term "Aerospace Engineer" will imply an engineer whose background and interests fall equally or overlap in the other two areas.	
4AAY	1. Major Academic Field--AERONAUTICAL ENGINEERING
4AAY	Spec.--Aerodynamics Sub-Spec.--
4AAA	Aerodynamic Loads
4AAB	Ballistics
4AAC	Compressibility
4AAD	Flight Test and Research
4AAE	Gas Dynamics, Subsonic
4AAF	Gas Dynamics, Supersonic and Hypersonic
4AAG	Heat Flow
4AAH	Hydrodynamics
4AAI	Magneto-Gas-Dynamics
4AAJ	Non-Continuum Gas Dynamics
4AAK	Rotary Wing
4AAL	Unsteady Gas Dynamics
4AAM	Viscous Aerodynamics
4AAN	Wind Tunnels

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5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
4AAZ	Other		ENGINEERING
4ABY	Spec.--Air Weapons Sub-Spec.--None	4BAY	Spec.--Aerospace-Mechanical Engineering Sub-Spec.--None
4ACY	Spec.--Design Sub-Spec.--	4BBY	Spec.--Configuration Design Sub-Spec.--None
4ACA	Applied Aerodynamics and Performance	4BCY	Spec.--Guided Missiles Sub-Spec.--None
4ACB	Component Design	4BDY	Spec.--Systems Integration Sub-Spec.--None
4ACC	Configuration Design, Manned Vehicles	4BXY	Spec.--Aerospace Engineering, Other Sub-Spec.--None
4ACD	Configuration Design, Unmanned Vehicles	4CYY	3. Major Academic Field--AGRI- CULTURAL ENGINEERING
4ACE	Detail Design	4CAY	Spec.--Agricultural Structures and Equipment Sub-Spec.--None
4ACF	Systems Design	4CBY	Spec.--Electric Power and Process- ing Sub-Spec.--None
4ACX	Other	4CCY	Spec.--Power and Machinery Sub-Spec.--None
4ADY	Spec.--Instrumentation Sub-Spec.--	4CDY	Spec.--Soil and Water Engineering Sub-Spec.--None
4ADA	Aircraft Instrumentation	4CXY	Spec.--Agricultural Engineering, Other Sub-Spec.--None
4ADB	Automatic Control Systems	4DYY	4. Major Academic Field--ARCHI- TECTURAL ENGINEERING
4ADC	Bombardment, Fire Control and Navigation Systems	4DAY	Spec.--City and Regional Planning Sub-Spec.--
4ADX	Other	4DAA	City Planning
4AEY	Spec.--Propulsion Sub-Spec.--	4DAB	Regional Planning
4AEA	Combustion	4DAC	Urban Design
4AEB	Compressors, Turbines	4DAX	Other
4AEC	Hybrid Engines	4DBY	Spec.--Electrical Systems Sub-Spec.--
4AED	Liquid Fuels	4DBA	Communications
4AEE	Power Plant Testing	4DBB	Illumination
4AEF	Propulsion Systems	4DBC	Wiring
4AEG	Ramjet	4DBX	Other
4AEH	Reciprocating Engines	4DCY	Spec.--Mechanical Systems Sub-Spec.--
4AEI	Rockets	4DCA	Air Conditioning
4AEJ	Solid Fuels	4DCB	Refrigeration
4A EK	Turbojet	4DCC	Thermodynamics
4AEX	Other	4DCX	Other
4AFY	Spec.--Stability and Control Sub-Spec.--	4DDY	Spec.--Sanitary Systems Sub-Spec.--
4AFA	Manned Vehicles Dynamics	4DDA	Plumbing
4AFB	Unmanned Vehicle Dynamics	4ddb	Sewerage
4AFX	Other	4DDC	Water Supply
4AGY	Spec.--Structures Sub-Spec.--	4DDX	Other
4AGA	Aeroelasticity	4DXY	Spec.--Architectural Engi- neering, Other Sub-Spec.--None
4AGB	Aircraft Structures		
4AGC	Flutter, Vibration		
4AGD	Loads		
4AGE	Materials		
4AGF	Missile Structures		
4AGG	Stress Analysis		
4AGH	Structural Test and Analysis		
4AGI	Thermal Effects		
4AGX	Other		
4AXY	Spec.--Aeronautical Engineering, Other Sub-Spec.--None		
4BYY	2. Major Academic Field--AEROSPACE		

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Data Code Sequence
Section D (Continued)

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
4EYY	5. Major Academic Field--ASTRONOMICAL ENGINEERING	4EGH	Structural Test and Analysis
4EAY	Spec.--Design	4EGI	Vehicle Structural Dynamics
	Sub-Spec.--	4EGX	Other
4EAA	Component Design	4EXY	Spec.--Aeronautical Engineering, Other
4EAB	Configuration Design, Manned		Sub-Spec.--None
	Ballistic Vehicles	4FYY	6. Major Academic Field--CERAMIC ENGINEERING
4EAC	Configuration Design, Unmanned	4FAY	Spec.--Ceramic Engineering Design
	Ballistic Vehicles		Sub-Spec.--None
4EAD	Spacecraft Design	4FBY	Spec.--Ceramic Materials
4EAE	Vehicle Performance		Sub-Spec.--
4EAX	Other	4FBA	Abrasives
4EBY	Spec.--Gas Dynamics	4FBB	Cements, Limes, Plasters
	Sub-Spec.--	4FBC	Ceramic Metal Materials
4EBA	Heat Flow		Systems
4EBB	Rarified Gas Dynamics	4FBD	Clay Products
4EBC	Re-entry Mechanics	4FBE	Electrical Ceramics
4EBD	Supersonic and Hypersonic Dynamics	4FBF	Glass
	Other	4FBG	Refractory Materials Systems
4EBX	Other	4FBH	Whitewares
4ECY	Spec.--Guidance and Control	4FBX	Other
	Sub-Spec.--None	4FCY	Spec.--Ceramic Processes
4EDY	Spec.--Instrumentation		Sub-Spec.--
	Sub-Spec.--	4FCA	Ceramic Fabrication
4EDA	Automatic Control Systems		Processes
4EOD	Data Transmission	4FCB	Ceramic Thermal Processes
4EDC	Environment Simulation	4FCC	Kilns, Furnaces, and Pyrometry
4EDD	Flight Test and Research	4FCX	Other
4EDE	Guidance and Control	4FXY	Spec.--Ceramic Engineering, Other
4EDF	Inertial Guidance Systems		Sub-Spec.--None
4EDG	Trajectories and Orbits	4GYV	7. Major Academic Field--CHEMICAL ENGINEERING
4EDH	Vehicle Stabilization	4GAY	Spec.--Corrosion and Preservation
4EDX	Other		Sub-Spec.--None
4EEY	Spec.--Propulsion	4GBY	Spec.--Equipment Design
	Sub-Spec.--		Sub-Spec.--
4EEA	Combustion	4GBA	Automatic Process Controls
4EEB	Design of Power Plants	4GBB	Cracking Equipment
4EEC	Liquid Fuels	4GBC	Filters
4EED	Non-Chemical Propulsion	4GBD	Materials Handling Equipment
4EEE	Nuclear Propulsion	4GBE	Measurement and Controls
4EEF	Power Plant Testing	4GBF	Mixers
4EEG	Rockets	4GBC	Separators, Mechanical
4EEH	Solid Fuels	4GBX	Other
4EEX	Other	4GCY	Spec.--Unit Operations
4EFY	Spec.--Space Facilities		Sub-Spec.--
	Sub-Spec.--None	4CCA	Adsorption and Absorption
4EGY	Spec.--Structures	4CCB	Chemical Separation
	Sub-Spec.--	4CCC	Crystallization
4EGA	Aeroelasticity	4CCD	Electrochemical Operations
4EGB	Ballistic Missile Structures	4CCE	Evaporation
	Materials	4CCF	Fluid Flow
4EGC	Materials	4CCG	Heat Transfer
4EGD	Pressure Vessel	4CCN	Mass Transfer
4EGE	Spacecraft Structures	4CCI	Mechanical Separation
4EGF	Stress Analysis		
4EGG	Structural Optimization		

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Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
4CCJ	Mixing		Sub-Spec.--
4CCK	Nuclear Processes	4MIA	Air Systems
4CCL	Size Reduction	4MIB	Highway and Road Systems
4CCX	Other	4MIC	Rail Systems
4GXY	Spec.--Chemical Engineering, Other	4MID	Water Systems
	Sub-Spec.--None	4MIX	Other
4HYY	8. Major Academic Field--CIVIL ENGINEERING	4HXY	Spec.--Civil Engineering, Other
			Sub-Spec.--None
4HAY	Spec.--City and Regional Planning	4HJY	Spec.--Civil Engineering/ Facilities
	Sub-Spec.--		Sub-Spec.--None
4HAA	City Planning	4IYY	9. Major Academic Field--ELECTRICAL ENGINEERING
4HAB	Regional Planning		
4HAC	Urban Design	4IAY	Spec.--Armament
4HAX	Other		Sub-Spec.--None
4HBY	Spec.--Construction Engineering	4IBY	Spec.--Electromagnetic Waves and Distributed Parameter Systems
	Sub-Spec.--		Sub-Spec.--
4HBA	Building Construction	4IBA	Acoustics
4HBB	Construction Management	4IBB	Antennas
4HBB	Other	4IBC	Electromagnetic Field Theory
4HBY	Spec.--Environic Engineering	4IBD	Electronic Countermeasures
	Sub-Spec.--None	4IBE	Radio Astronomy
4HDY	Spec.--Hydraulic Engineering	4IBF	Radio Wave Propagation
	Sub-Spec.--	4IBG	Travelling Wave Circuits
4HDA	Fluid Mechanics	4IBX	Other
4HDB	Hydraulic Machinery	4ICY	Spec.--Electron Devices
4HDC	Hydraulic Structures		Sub-Spec.--
4HDD	Hydrology	4ICA	Magneto-Electric Devices
4HDE	Hydromechanics	4ICB	Microwave Tubes
4HDF	Waterways and Harbors	4ICC	Molecular Electronics
4HDX	Other	4ICD	Quantum Electron Devices
4HEY	Spec.--Sanitary Engineering	4ICE	Solid State Electron Devices
	Sub-Spec.--	4ICF	Solid State Materials Science
4HEA	Air Pollution	4ICG	Thermionic Tubes (Non Micro- wave)
4HEB	Sewage and Industrial Wastes		Other
4HEC	Water Pollution Control	4ICX	Spec.--Energy Conversion and Distribution
4HED	Water Supply	4IEY	Sub-Spec.--
4HEX	Other		Electrochemical Devices
4HFX	Spec.--Soil and Foundation Engineering	4IEA	Electromechanical Devices
	Sub-Spec.--	4IEB	Electrothermal Devices
4HFA	Foundation Design and Construction	4IEC	Illumination
4HFB	Soil Mechanics	4IED	Power Systems
4HFX	Other	4IEE	Other
4HGY	Spec.--Structural Engineering	4IEF	Spec.--Environic Engineering
	Sub-Spec.--		Sub-Spec.--None
4HGA	Structural Analysis	4ICY	Spec.--Information Systems
4HGB	Structural Design		Sub-Spec.--
4HGC	Structural Dynamics	4IGA	Communications Systems, General
4HGX	Other		Information Theory
4HMY	Spec.--Surveying and Mapping	4IGB	Instrumentation
	Sub-Spec.--	4IGC	Radar Systems
4HMA	Cartographic Surveying	4IGD	Radio Communications Systems
4HMB	Mapping	4IGE	
4HMC	Photogrammetry		
4HMX	Other		
4HIY	Spec.--Transportation and Traffic Engineering		

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5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
4IGF	Satellite Communication Systems	4LBA	Sub-Spec.--
4IGG	Statistical Communication Theory	4LBA	Applied Problems
4IGH	Telemetry	4LBB	Depreciation Techniques
4IGI	Television Systems	4LBC	Economic Lot Size Determination
4IGJ	Wire Communication Systems	4LBD	Industrial Organization
4IGX	Other	4LBE	Labor Relations
4IMY	Spec.--Lumped Parameter Systems	4LBF	Replacement Analysis
	Sub-Spec.--	4LBY	Other
4IMA	Electronic Circuits	4LCA	Spec.--Human Factors in Engineering
4IMB	Feedback Control Systems	4LCB	Sub-Spec.--
4IMC	Guidance Systems	4LCC	Controls and Placement
4IMD	Linear Circuit and System Analysis and Synthesis	4LCD	Environmental Effects
4IME	Non Linear Analysis	4LCE	Error Analysis
4IMX	Other	4LCE	Machine Design
4IYJ	Spec.--Electro-Optics	4LCE	Time and Motion Study
	Sub-Spec.--None	4LCF	Waiting Line Theory
4IXY	Spec.--Electrical Engineering, Other	4LCX	Other
	Sub-Spec.--None	4LDY	Spec.--Job Design
4JYY	10. Major Academic Field--ENGI-NEERING GENERAL	4LDA	Sub-Spec.--
	Sub-Spec.--None	4LDB	Ergonomics
4KYY	11. Major Academic Field--ENGI-NEERING SCIENCES	4LDC	Predetermined Standard Data
	Sub-Spec.--None	4LDC	Systems and Procedures Design
4KAY	Spec.--Dynamics	4LDD	Time and Motion Study
	Sub-Spec.--	4LDX	Other
4KAA	Dynamics of Structures	4LEY	Spec.--Maintenance Engineering
4KAB	Engineering Mechanics		Sub-Spec.--None
4KAC	Particle Dynamics	4LFY	Spec.--Operational Analysis
4KAD	Thermodynamics		Sub-Spec.--
4KAX	Other	4LFB	Management Science
4KBY	Spec.--Fluid Mechanics	4LFC	Operations Research
	Sub-Spec.--	4LFX	Other
4KBA	Fluid Dynamics	4LCY	Spec.--Production Planning and Control
4KBB	Gas Dynamics		Sub-Spec.--
4KBC	Hydrodynamics	4LGA	Inventory Control
4KBD	Hydrostatics	4LGB	Materials Handling
4KBE	Viscous Flow	4LGC	Packaging
4KBI	Other	4LCD	Plant Layout
4KCY	Spec.--Materials, Elasticity and Plasticity	4LCE	Production Engineering
	Sub-Spec.--	4LCF	Production Planning
4KCA	Elastic Stability	4LCX	Other
4KCB	Mechanical Properties of Materials	4LHY	Spec.--Quality Control
4KCC	Plastic Stability		Sub-Spec.--
4KCD	Theory of Elasticity	4LMA	Standards and Testing of Materials
4KCE	Theory of Plasticity	4LMB	Statistical Quality Control
4KCX	Other	4LMX	Other
4KXY	Spec.--Engineering Sciences, Other	4LXY	Spec.--Industrial Engineering, Other
	Sub-Spec.--None	4MYY	Sub-Spec.--None
4LYY	12. Major Academic Field--INDUSTRIAL ENGINEERING	4RAY	13. Major Academic Field--MECHANICAL ENGINEERING
4LBY	Spec.--Engineering Economics	4RBY	Spec.--Automotive Engineering
			Sub-Spec.--None
		4RBY	Spec.--Dynamics
		4RBY	Sub-Spec.--
		4RBA	Dynamics of Machinery

1 Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section D (Continued)

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
4RBB	Fluid Dynamics	4NBY	Spec.--Foundry Engineering
4RBC	Gas Dynamics		Sub-Spec.--
4RBD	Mechanics of Compressible Fluids	4NBA	Foundry Techniques and Design
4RBE	Vibrations	4NBB	Foundry Theory
4RBX	Other	4NBX	Other
4RCY	Spec.--Environic Engineering	4NCY	Spec.--Physical Metallurgy
	Sub-Spec.--None		Sub-Spec.--
4RDY	Spec.--Lubrication Engineering	4NCA	Engineering Physical Metallurgy
	Sub-Spec.--None	4NCB	Theoretical Physical Metallurgy
4REY	Spec.--Marine Engineering	4NCX	Other
	Sub-Spec.--None	4NDY	Spec.--Powder Metallurgy
4RFY	Spec.--Materials Engineering		Sub-Spec.--
	Sub-Spec.--None	4NDA	Metal Powder Part Fabrication
4RCY	Spec.--Power Plants	4NDB	Metal Powder Production
	Sub-Spec.--	4NDX	Other
4RGA	Boilers and Steam Engineering	4NXY	Spec.--Metallurgical Engineering, Other
4RGB	Gas Turbines		Sub-Spec.--None
4RGC	Internal Combustion Engines	4OYY	15. Major Academic Field--MINING AND PETROLEUM ENGINEERING
4RGD	Nuclear Power Plants		Spec.--Mining Engineering
4RGE	Steam Engines	4OAY	Sub-Spec.--
4RGX	Other	4OAA	Beneficiation
4RHY	Spec.--Product Design	4OAB	Mine Development
	Sub-Spec.--	4OAC	Mine Exploration
4RHA	Advanced Product Design	4OAD	Mine Production
4RHB	Control Systems Design	4OAE	Open Cut Mining
4RHC	Engine Design	4OAF	Place Mining
4RHD	Experimental Methods in Design	4OAG	Underground Mining
4RHE	Machine Design	4OAX	Other
4RHF	Structural Design	4OBY	Spec.--Petroleum Engineering
4RHX	Other		Sub-Spec.--
4RIY	Spec.--Thermodynamics and Heat Transfer	4OBA	Petroleum Exploration Development
	Sub-Spec.--	4OBB	Petroleum Production
4RIA	Air Conditioning and Refrigeration	4OBC	Pipeline Transmission
4RIB	Boundary Layer Flow	4OBD	Underground Storage
4RIC	Engineering Thermodynamics	4OBX	Other
4RID	Heat Transmission	4OXY	Spec.--Mining and Petroleum Engineering, Other
4RIE	Thermodynamics of Propulsion Systems		Sub-Spec.--None
4RIX	Other	4PYY	16. Major Academic Field--NAVAL ARCHITECTURE
4RJY	Spec.--Welding Engineering	4PAY	Spec.--Design of Structures
	Sub-Spec.--None		Sub-Spec.--None
4RXY	Spec.--Mechanical Engineering, Other	4PBY	Spec.--Shipbuilding
	Sub-Spec.--None		Sub-Spec.--None
4RYY	14. Major Academic Field--METALLURGICAL ENGINEERING	4PCY	Spec.--Hydrodynamics
	Sub-Spec.--		Sub-Spec.--None
4RAY	Spec.--Extraction	4PDY	Spec.--Model Basin Studies
	Sub-Spec.--		Sub-Spec.--None
4RAA	Electrometallurgical Extraction	4PXV	Spec.--Naval Architecture, Other
4RAB	Hydrometallurgical Extraction		Sub-Spec.--None
4RAC	Mill Design	4QYY	17. Major Academic Field--NUCLEAR ENGINEERING
4RAD	Nonferrous Extraction		Spec.--Instrumentation
4RAE	Pyrometallurgical Extraction	4QAY	Sub-Spec.--
4RAX	Other		

1 Title Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section D (Continued)

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
4QAA	Accelerators	4RDE	Weapon Systems
4QAB	Radiation Detection and Measurement	4RDX	Other
4QAC	Reactor Instrumentation and Control	4REY	Spec.--Transportation Safety
4QAX	Other	4REA	Sub-Spec.--
4QBY	Spec.--Nuclear Processes	4REB	Air Transportation Safety
4QBA	Sub-Spec.--	4REC	Highway Transportation Safety
4QBB	Activation Analysis	4RED	Rail Transportation Safety
4QBB	Materials Handling	4RED	Underground Transportation Safety
4QBC	Nuclear Spectroscopy	4REX	Other
4QBD	Radiochemistry	4RFY	Spec.--Fire Protection Engineering
4QBE	Reactions and Scattering	4RXY	Sub-Spec.--None
4QBX	Other	4SYY	Spec.--Safety Engineering, Other
4QCY	Spec.--Nuclear and Radiation Effects	4SYY	Sub-Spec.--None
4QCA	Sub-Spec.--	4SYY	19. Major Academic Field--SPACE PHYSICS ENGINEERING
4QCB	Blast and Thermal Effects	4SYY	Spec.--None
4QCB	Health Physics	4SYY	Sub-Spec.--None
4QCC	Radiation Defense	4TYY	20. Major Academic Field--SYSTEMS ENGINEERING
4QCD	Radiation Hazards	4TAY	Spec.--Control Systems
4QCE	Radiation Shielding	4TAY	Sub-Spec.--None
4QCF	Waste Disposal	4TBY	Spec.--Cybernetics
4QCX	Other	4TBY	Sub-Spec.--None
4QDY	Spec.--Nuclear Reactor Engineering	4TCY	Spec.--Decision Theory, Sequential Analysis
4QDA	Sub-Spec.--	4TCY	Sub-Spec.--None
4QDA	Reactor Analysis	4TDY	Spec.--Econometrics
4QDB	Reactor Design	4TDY	Sub-Spec.--None
4QDX	Other	4TEY	Spec.--Game Theory
4QXY	Spec.--Nuclear Engineering, Other	4TEY	Sub-Spec.--None
4RYY	Sub-Spec.--None	4TFY	Spec.--Human Factors in Engineering
4RAY	18. Major Academic Field--SAFETY ENGINEERING	4TCY	Sub-Spec.--None
4RAY	Spec.--Accident Prevention	4TCY	Spec.--Modeling
4RAA	Sub-Spec.--	4TCY	Sub-Spec.--None
4RAA	Design of Structures	4TMY	Spec.--Operations Research
4RAB	Investigative Techniques	4TMY	Sub-Spec.--None
4RAC	Principles of Prevention	4TIY	Spec.--Optimization
4RAX	Other	4TIY	Sub-Spec.--None
4RBY	Spec.--Industrial Safety	4TJY	Spec.--Reliability
4RBA	Sub-Spec.--	4TJY	Sub-Spec.--None
4RBA	Occupational Hazards	4TKY	Spec.--Simulation
4RBB	Pollution and Contamination	4TKY	Sub-Spec.--None
4RBC	Protective Equipment	4TLY	Spec.--Statistical Communication Theory
4RBY	Other	4TLY	Sub-Spec.--None
4RCY	Spec.--Safety Management	4TNY	Spec.--Systems Theory
4RCA	Sub-Spec.--	4TNY	Sub-Spec.--None
4RCA	Educational Techniques	4TNY	Spec.--Value Theory
4RCB	Management Functions	4TNY	Sub-Spec.--None
4RCC	Program Planning and Supervision	4TXY	Spec.--Systems Engineering, Other
4RCX	Other	4TXY	Sub-Spec.--None
4RDY	Spec.--Systems Safety	4UYV	21. Major Academic Field--TEXTILE ENGINEERING
4RDA	Sub-Spec.--	4UYV	Spec.--None
4RDA	Control Systems		
4RDB	Missiles Systems		
4RDC	Orbital Vehicle Systems		
4RDD	Propulsion Systems		

1. Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
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Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
4VYV	22. Major Academic Field-- ENGINEERING, OTHER	4VJF	Quality Control Technology
4VFY	Spec.--Computer Engineering Technology	4VJX	Other
	Sub-Spec.--	4VKY	Spec.--Mechanical Engineering Technology
4VFA	Digital Equipment Technology		Sub-Spec.--
4VFB	Electronic Computer Technology	4VKA	Air Conditioning Engineering Technology
4VFX	Other	4VKB	Automotive Engineering Technology
4VGY	Spec.--Electrical Technology	4VKE	Automotive Mechanics
	Sub-Spec.--	4VKD	Fluid Power Engineering Technology
4VGA	Electric Power Technology	4VKE	Gunsmithing
4VGX	Other	4VKF	Heavy Equipment Technology
4VHY	Spec.--Electronics Engineering Technology	4VKG	Morology
	Sub-Spec.--	4VKM	Internal Combustion Engine Engineering Technology
4VHA	Avionics Communication-Navigation Systems	4VKI	Mechanical Design Technology
4VHB	Avionics Instrument Systems Technology	4VKJ	Mechanical Power Technology
4VHC	Avionics Radar Technology	4VKX	Other
4VHD	Communications Equipment Technology	4VLY	Spec.--Metallurgical Engineering Technology
4VHE	Communications Wire Technology		Sub-Spec.--
4VHF	General Electronic Technology	4VLA	Automotive Body Repair
4VHG	Ground Radar Technology	4VLB	Metal Working Technology
4VHN	Instrumentation Technology	4VLX	Other
4VHI	Meteorological Equipment Technology	4VNY	Spec.--Nuclear Science Technology
4VHJ	Nuclear Technology		Sub-Spec.--
4VHK	Photographic Systems Technology	4VNA	Radiation and Nuclear Technology
4VHL	Radio Communications Technology	4VNX	Other
4VHM	Sensor Systems Technology	4VNY	Spec.--Petroleum Engineering Technology
4VHN	Telecommunications Systems Control Technology		Sub-Spec.--
4VHO	Training Devices Technology	4VNA	Fuels Technology
4VHX	Other	4VNX	Other
4VIY	Spec.--Engineering Technology (General)	4VOY	Spec.--Safety Engineering Technology
	Sub-Spec.--		Sub-Spec.--
4VIA	Microprecision Technology	4VOA	Fire Protection and Safety Technology
4VIX	Other		Other
4VJY	Spec.--Industrial Engineering Technology	4VOX	Other
	Sub-Spec.--	4VPY	Spec.--Textile Technology
4VJA	Industrial Instruments Technology		Sub-Spec.--
4VJB	Manufacturing Engineering Technology	4VPA	Apparel Design Technology
4VJC	Packaging Technology	4VPB	Bindery Technology
4VJD	Production Planning Technology	4VPC	Fabric and Rubber Products
4VJE	Paper Technology	4VPD	Power Sewing Technology
		4VPE	Upholstery
		4VPX	Other

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Section E

5 Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
5YYY	General Area of Study: LAW	SABU	Wills, Estate Planning, Probate Law
5AAY	1. Major Academic Field--CIVIL LAW	SABX	Other
5AAY	Spec.--International Law	SACY	Spec.--Public Law
	Sub-Spec.--		Sub-Spec.--
5AAA	Private International Law	SACA	Administrative Law
5AAB	Public International Law	SACB	Admiralty Law
5AAX	Other	SACC	Aeronautics-Space Law
5ABY	Spec.--Private Law	SACD	Antitrust Law
	Sub-Spec.--	SACE	Atomic Energy Law
SABA	Associations Law (Non-Corporate)	SACF	Comparative Jurisprudence
SABB	Banking and Commercial Law	SACG	Constitutional Law
SABC	Bankruptcy Law	SACH	Criminal Law and Procedure
SABD	Communications Law	SACI	Government Contracts Law
SABE	Copyright Law	SACJ	Marital Law
SABF	Corporations Law	SACK	Medical Jurisprudence
SABG	Domestic Relations Law	SACL	Military Law
SABH	General Practice	SACM	Motor Carriers Law
SABI	Insurance Law	SACN	Workmen's Compensation Law
SABJ	Investments Law	SACX	Other
SABK	Labor Law	SAXY	Spec.--Civil Law, Other
SABL	Natural Resources Law		Sub-Spec.--None
SABM	Negligence Law	5BYY	2. Major Academic Field--MILITARY JUSTICE
SABN	Patent Law	5BAY	Spec.--Military Criminal Law
SABO	Real Estate Law		Sub-Spec.--None
SABP	Taxation Law	5BXY	Spec.--Military Justice, Other
SABQ	Trademark Law		Sub-Spec.--None
SABR	Trial Law		
SABS	Trust Law		
SABT	Utilities Law		

Section F

6YYY	General Area of Study: MATHEMATICS	Data Codes	Data Items and Explanations:
NOTE: It is difficult to define mathematical terms of nontechnical language. These terms are technical by their nature and are not susceptible to description in a few words. Most mathematical terms can be defined only by using technical terminology, and this sometimes defeats the purpose of the definition since new technical terms are introduced which may require further definition. The definitions for mathematical terms in this manual therefore, are not to be considered as absolute or precise definitions, but rather as further extensions or descriptions of the terms.			
6AAY	1. Major Academic Field--ALGEBRA	6AHY	Theory
6AAY	Spec.--Boolean Algebra		Sub-Spec.--None
	Sub-Spec.--None	6AIY	Spec.--Polynomials
6ABY	Spec.--Combinatorial Analysis		Sub-Spec.--None
	Sub-Spec.--None	6AIX	Spec.--Presentation Theory
6ACY	Spec.--Differential Algebra		Sub-Spec.--None
	Sub-Spec.--None	6AXY	Spec.--Algebra, Other
6ADY	Spec.--Fields, Rings, Algebras		Sub-Spec.--None
	Sub-Spec.--None	6BYY	2. Major Academic Field--ANALYSIS AND FUNCTIONAL ANALYSIS
6AEY	Spec.--Groups, Generalizations	6BAY	Spec.--Banach Spaces and Algebras
	Sub-Spec.--None		Sub-Spec.--None
6AFY	Spec.--Homological Algebra	6BBY	Spec.--Calculus of Variations
	Sub-Spec.--None		Sub-Spec.--None
6AGY	Spec.--Linear Algebra and Matrix	6BCY	Spec.--Convexity, Inequalities
			Sub-Spec.--None
		6BDY	Spec.--Difference and Functional Equations
			Sub-Spec.--None
		6BEY	Spec.--Functions of Complex Variables
			Sub-Spec.--None
		6BFY	Spec.--Functions of Real Variables
			Sub-Spec.--None
		6BGY	Spec.--Functions of Several Complex Variables

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Data Code Sequence
Section F (Continued)

5. Data Codes	Data Items and Explanations	Data Codes	Data Items and Explanations
	Sub-Spec.--None	6CXY	Spec.--Geometry, Other
6BMY	Spec.--Milbert Spaces		Sub-Spec.--None
	Sub-Spec.--None	6DYY	4. Major Academic Field--LOGIC
6BIY	Spec.--Integral and Integro- Differential Equations		AND FOUNDATIONS
	Sub-Spec.--None	6DAY	Spec.--Applications of Logic
6BJY	Spec.--Integral Transforms		Sub-Spec.--None
	Sub-Spec.--None	6DBY	Spec.--Foundations of Mathematics
6BKY	Spec.--Lie Groups and Algebras		Sub-Spec.--None
	Sub-Spec.--None	6DCY	Spec.--Intuitionism
6BLY	Spec.--Operational Calculus		Sub-Spec.--None
	Sub-Spec.--None	6DDY	Spec.--Lattices
6BNY	Spec.--Ordinary Differential Equations		Sub-Spec.--None
	Sub-Spec.--None	6DEY	Spec.--Normal and Symbolic Logic
6BNY	Spec.--Partial Differential Equations		Sub-Spec.--None
	Sub-Spec.--None	6DFY	Spec.--Order, Total and Partial
6BOY	Spec.--Potential Theory, Subharmonic Functions		Sub-Spec.--None
	Sub-Spec.--None	6DGY	Spec.--Recursive Functions
6BPY	Spec.--Series, Summability		Sub-Spec.--None
	Sub-Spec.--None	6DHY	Spec.--Set Theory
6BOY	Spec.--Special Functions		Sub-Spec.--None
	Sub-Spec.--None	6DXY	Spec.--Logic and Foundations, Other
6BRY	Spec.--Trigonometric Series and Integrals		Sub-Spec.--None
	Sub-Spec.--None	6EYY	5. Major Academic Field-
6BXY	Spec.--Analysis and Functional Analysis, Other		MATHEMATICS OF RESOURCE USE
	Sub-Spec.--None	6EAY	Spec.--Activity Analysis
6CYY	3. Major Academic Field--GEOMETRY		Sub-Spec.--None
6CAY	Spec.--Affine Geometry		Sub-Spec.--None
	Sub-Spec.--None	6EBY	Spec.--Actuarial Mathematics
6CBY	Spec.--Algebraic Geometry		Sub-Spec.--None
	Sub-Spec.--None	6ECY	Spec.--Astronomy
6CCY	Spec.--Complex Manifolds		Sub-Spec.--None
	Sub-Spec.--None	6EDY	Spec.--Biometrics, Biostatistics
6CDY	Spec.--Convex Domains, Extremum Problems		Sub-Spec.--None
	Sub-Spec.--None	6EEY	Spec.--Celestial Mechanics
6CEY	Spec.--Differential Geometry, Tensor Analysis		Sub-Spec.--None
	Sub-Spec.--None	6EFY	Spec.--Control Systems
6CFY	Spec.--Euclidean Geometry		Sub-Spec.--None
	Sub-Spec.--None	6EGY	Spec.--Cryptography
6CGY	Spec.--Finite Geometries		Sub-Spec.--None
	Sub-Spec.--None	6EHY	Spec.--Dynamic Programming
6CHY	Spec.--Foundations of Geometry		Sub-Spec.--None
	Sub-Spec.--None	6EJY	Spec.--Econometrics
6CIY	Spec.--Integral Geometry		Sub-Spec.--None
	Sub-Spec.--None	6EKY	Spec.--Game Theory
6CJY	Spec.--Projective, Non-Euclidean Geometries		Sub-Spec.--None
	Sub-Spec.--None	6ELY	Spec.--Information and Commu- cation Theory
6CKY	Spec.--Riemannian Geometry		Sub-Spec.--None
	Sub-Spec.--None	6ELY	Spec.--Logistics, Inventory
			Sub-Spec.--None
		6EMY	Spec.--Operations Research
			Sub-Spec.--None
		6ENY	Spec.--Psychometrics
			Sub-Spec.--None
		6EOY	Spec.--Weapon Systems Evaluation
			Sub-Spec.--None
		6EYX	Spec.--Mathematics of Resource Use, Other

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Section F (Continued)

5	Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
		Sub-Spec.--None	6MBY	Spec.--Foundations of Probability Sub-Spec.--None
6FYY		6. Major Academic Field--NUMBER THEORY	6MCY	Spec.--Limit Theorems Sub-Spec.--None
6FAY		Spec.--Algebraic Number Theory Sub-Spec.--None	6MDY	Spec.--Markov Processes Sub-Spec.--None
6FBY		Spec.--Analytic Number Theory Sub-Spec.--None	6MEY	Spec.--Stochastic Processes, General Sub-Spec.--None
6FCY		Spec.--Diophantine Approximations Sub-Spec.--None	6MFY	Spec.--Theory of Generating Functions Sub-Spec.--None
6FDY		Spec.--Elementary Number Theory Sub-Spec.--None	6MXY	Spec.--Probability, Other Sub-Spec.--None
6FEY		Spec.--Geometry of Numbers Sub-Spec.--None	6IYY	9. Major Academic Field--STATISTICS
6FXY		Spec.--Number Theory, Other Sub-Spec.--None	6IAY	Spec.--Analytical Statistics Sub-Spec.--None
6GYY		7. Major Academic Field--NUMERICAL METHODS AND COMPUTATION	6IAY	Sub-Spec.--None
6GAY		Spec.--Algorithm Construction Sub-Spec.--None	6IBY	Spec.--Decision Theory, Sequential Analysis Sub-Spec.--None
6GCY		Spec.--Difference and Functional Equations Sub-Spec.--None	6ICY	Spec.--Design and Analysis of Experiments Sub-Spec.--None
6GFY		Spec.--Eigenvalues, Rayleigh-Ritz Method Sub-Spec.--None	6IDY	Spec.--Estimation and Testing, Parametric Sub-Spec.--None
6GGY		Spec.--Error Analysis Sub-Spec.--None	6IEY	Spec.--Multivariate Analysis Sub-Spec.--None
6GMY		Spec.--General Methods, Iteration Sub-Spec.--None	6IFY	Spec.--Nonparametric Methods Sub-Spec.--None
6GIY		Spec.--Integral and Integro- Differential Equations Sub-Spec.--None	6IGY	Spec.--Quality Control Sub-Spec.--None
6GJY		Spec.--Interpolation, Approximation Curve-Fitting Sub-Spec.--None	6IMY	Spec.--Sampling Techniques Sub-Spec.--None
6GKY		Spec.--Linear Equations, Matrices	6IIY	Spec.--Survey Methods Sub-Spec.--None
6GLY		Spec.--Linear Programming Sub-Spec.--None	6IJY	Spec.--Theory of Statistical Inference Sub-Spec.--None
6GMY		Spec.--Nomography, Tables Sub-Spec.--None	6IKY	Spec.--Time Series Analysis Sub-Spec.--None
6GNY		Spec.--Numerical Differentiation, Quadrature Sub-Spec.--None	6IXY	Spec.--Statistics, Other Sub-Spec.--None
6GOY		Spec.--Numerical Solutions of Ordinary Differential Equations Sub-Spec.--None	6JYY	10. Major Academic Field--TOPOLOGY
6GPY		Spec.--Numerical Solutions of Partial Differential Equations Sub-Spec.--None	6JAY	Spec.--Algebraic Topology Sub-Spec.--None
6GXY		Spec.--Numerical Methods and Computation, Other Sub-Spec.--None	6JBY	Spec.--Fibre Bundles and Spaces Sub-Spec.--None
6HYY		8. Major Academic Field--PROBABILITY	6JCY	Spec.--Graphs Sub-Spec.--None
6HAY		Spec.--Applications of Probability Sub-Spec.--None	6JDY	Spec.--Manifolds Sub-Spec.--None
			6JEY	Spec.--Point-Set Topology Sub-Spec.--None
			6JFY	Spec.--Topological Algebra Sub-Spec.--None
			6JXY	Spec.--Topology, Other Sub-Spec.--None

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Section G

5 Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
7YYY	General Area of Study: MEDICAL SCIENCES	7BEY	Spec.--Periodontics Sub-Spec.--None
7AYY	1. Major Academic Field--ALLIED SCIENCES	7BFY	Spec.--Prosthodontics Sub-Spec.--None
7AAY	Spec.--Basic Biomedical Sciences Sub-Spec.--	7BXY	Spec.--Dental Science, Other Sub-Spec.--None
7AAA	Biochemistry	7CYY	3. Major Academic Field--HOSPITAL ADMINISTRATION
7AAB	Biomedical Engineering	7CAY	Spec.--Hospital Administration Sub-Spec.--
7AAC	Bionics	7CAA	Administrative Service
7AAD	Biophysics	7CAB	Business Office Administration
7AAE	Microbiology	7CAC	Clinics Administration
7AAF	Physiological Optics	7CAE	Hospital Planning
7AAG	Physiology (Human)	7CAF	Hospital Services Administration
7AAX	Other	7CAG	Medical Materiel
7ABY	Spec.--Professional Services Sub-Spec.--	7CAH	Medical Records
7ABA	Aerospace Physiology	7CAI	Personnel Administration
7ABB	Bacteriology	7CAJ	Public Relations
7ABC	Biometrics	7CAX	Other
7ABD	Clinical Laboratory Management	7CXY	Spec.--Hospital Administration, Other Sub-Spec.--None
7ABE	Clinical Psychology	7DYY	4. Major Academic Field--MEDICINE AND SURGERY
7ABF	Dietetics	7DAY	Spec.--Anesthesiology Sub-Spec.--None
7ABG	Industrial Hygiene	7DBY	Spec.--Colon and Rectal Surgery Sub-Spec.--None
7ABH	Medical Entomology	7DCY	Spec.--Dermatology Sub-Spec.--None
7ABI	Mycology	7DDY	Spec.--General Practice Sub-Spec.--None
7ABJ	Nuclear Health Physics	7DEY	Spec.--General Surgery Sub-Spec.--None
7ABK	Occupational Therapy	7DFY	Spec.--Geriatrics Sub-Spec.--None
7ABL	Optometry	7DGY	Spec.--Internal Medicine Sub-Spec.--
7ABM	Parasitology	7DGA	Allergy
7ABN	Pharmacology	7DGB	Cardiovascular Diseases (Cardiology)
7ABO	Physical Therapy	7DGC	Endocrinology
7ABP	Psychiatric Social Work	7DGD	Gastroenterology
7ABQ	Sanitary Engineering	7DGE	Hematology
7ABR	Serology	7DGF	Pulmonary Diseases
7ABS	Space Pharmacodynamics	7DGG	Rheumatology
7ABT	Toxicology	7DGX	Other
7ABU	Virology	7DHY	Spec.--Neurology Sub-Spec.--None
7ABV	Pharmacy	7DIY	Spec.--Neurosurgery Sub-Spec.--None
7ABW	Podiatry	7DJY	Spec.--Obstetrics and Gynecology Sub-Spec.--None
7ABX	Other		
7ACY	Spec.--Allied Sciences, Other Sub-Spec.--None		
7BYY	2. Major Academic Field--DENTAL SCIENCE		
7BAY	Spec.--General Dentistry Sub-Spec.--		
7BAA	Crown and Bridge		
7BAB	Oral Diagnosis		
7BAX	Other		
7BBY	Spec.--Oral Pathology Sub-Spec.--None		
7BCY	Spec.--Oral Surgery Sub-Spec.--None		
7BDY	Spec.--Orthodontics Sub-Spec.--None		

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5	Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
	7DXV	Spec.--Ophthalmology	7EAA	Anesthesia
		Sub-Spec.--None	7EAB	Cardiovascular Disease Nursing
	7DLY	Spec.--Orthopedic Surgery	7EAC	Communicable Disease Nursing
		Sub-Spec.--None	7EAD	Flight Nursing
	7DMY	Spec.--Otorhinolaryngology	7EAE	General Duty Nursing
		Sub-Spec.--None	7EAF	Industrial Nursing (Incl Nuclear Nursing)
	7DNY	Spec.--Pathology	7EAG	Nursing Research
		Sub-Spec.--	7EAM	Obstetric Nursing
	7DNA	Clinical Pathology	7EAI	Operation Room Nursing
	7DNB	Forensic Pathology	7EAJ	Pediatric Nursing
	7DNC	Hematology	7EAK	Premature Infant Nursing
	7DND	Surgical Pathology	7EAL	Psychiatric Nursing
	7DNX	Other	7EAM	Public Health Nursing
	7DOY	Spec.--Pediatrics	7EAX	Other
		Sub-Spec.--	7EBY	Spec.--Nursing Administration
	7DOA	Pediatric Allergy		Sub-Spec.--
	7DOB	Pediatric Cardiology	7EBA	Nursing Education
	7DOX	Other	7EBB	Personnel Management
	7DPY	Spec.--Physical and Rehabilitative Medicine	7EBC	Ward Management
		Sub-Spec.--None	7EBX	Other
	7DQY	Spec.--Plastic Surgery	7EXY	Spec.--Nursing Science, Other
		Sub-Spec.--None		Sub-Spec.--None
	7DRY	Spec.--Preventive Medicine	7FYY	6. Major Academic Field--VETERINARY MEDICINE
		Sub-Spec.--	7FAY	Spec.--Veterinary Clinical Medicine
	7DRA	Aerospace Medicine		Sub-Spec.--
	7DRB	Immunology	7FAA	Laboratory Animal Medicine
	7DRC	Occupational Medicine (Industrial Medicine)	7FAB	Large Animal Medicine
	7DRD	Preventive Medicine	7FAC	Small Animal Medicine
	7DRE	Public Health Medicine (Incl Epidemiology)	7FAD	Veterinary Surgery
		Other	7FAX	Other
	7DRX	Spec.--Psychiatry	7FBY	Spec.--Veterinary Food Inspection
	7DSY	Sub-Spec.--		Sub-Spec.--
	7DSA	Pediatric Psychiatry	7FBA	Food Microbiology
	7DSX	Other	7FBB	Meat and Dairy Food Hygiene
	7DTY	Spec.--Radiobiology	7FBX	Other
		Sub-Spec.--None	7FCY	Spec.--Veterinary Public Health
	7DUY	Spec.--Radiology		Sub-Spec.--
		Sub-Spec.--	7FCA	Veterinary Epidemiology and Epizootiology
	7DUA	Diagnostic Radiology	7FCB	Zoonoses
	7DUB	Therapeutic Radiology	7FCX	Other
	7DUX	Other	7FDY	Spec.--Veterinary Research Medicine
	7DYY	Spec.--Thoracic Surgery		Sub-Spec.--
		Sub-Spec.--None	7FDA	Bacteriology
	7DMY	Spec.--Urology	7FDB	Biochemistry
		Sub-Spec.--None	7FDC	Food Science
	7DXY	Spec.--Medicine and Surgery, Other	7FDD	Food Technology
		Sub-Spec.--None	7FDE	Pathology
	7EYY	5. Major Academic Field--NURSING SCIENCE	7FDF	Physiology
		Spec.--Clinical Nursing	7FDG	Radiation Biology
		Sub-Spec.--	7FDM	Virology
	TEAY		7FDX	Other

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5 Data Codes Data Items and Explanations

Data Code Sequence
Section G (Continued)

7FEA	Spec --Animal Technician
	Sub-Spec.--
7FEA	Farrrier
7FEX	Other
7GY Y	7. Major Academic Field--Health Care Sciences Occupational Technologies
7GAY	Spec.--Biomedical Sciences Technology
	Sub-Spec.--
7GAA	Biomedical Equipment Technician
7GAB	Community and Mental Health
7GAC	Cytology Technician
7GAD	Food and Nutritional Science
7GAE	Histologic Technician
7GAF	Medical Laboratory Technician
7GAG	Optometric Technician
7GAH	Pharmacy Technician
7GAI	Physical Therapist Assistant
7GAJ	Physiological Training Technology
7GAK	Medical Assistant
7GAX	Other
7GBY	Spec.--Dentistry Technology
	Sub-Spec.--
7GBA	Expanded Duty Dental Assistant
7GBB	Dental Laboratory Technology
7GBC	Dental Assisting
7GBD	Dental Hygiene
7GBX	Other
7GCY	Spec --Health Care Management
	Sub-Spec.--
7GCA	Environmental Health Technology
7GCB	Nursing Home Administration
7GCX	Other
7GDY	Spec.--Medical Technology
	Sub-Spec.--
7GDA	Cardiopulmonary Laboratory Technician
7GDB	Clinical Audiology
7GDC	Clinical Laboratory Science
7GDD	Clinical Microbiology
7GDE	Emergency Medical Technician
7GDF	Orthopedic Assistant
7GDC	Otolaryngology Technician
7GDW	Radiologic Technology
7GDI	Ophthalmic Technology
7GDJ	Clinical Assistant, Health Care
7GD X	Other
7GEY	Spec.--Nursing Science Technology
	Sub-Spec.--
7GEA	Operating Room Technician
7GEB	Psychiatric Nursing Technician
7GEX	Other
7GXY	Spec --Health Care Sciences Occupational Technologies, Other
7FX Y	Spec --Veterinary Medicine, Other
	Sub-Spec.--None

1. Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section H

Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
8YYY	General Area of Study: PHYSICAL SCIENCES	88BY	Spec.--Photogrammetry
8AYY	1. Major Academic Field--ASTRONOMY	88BA	Sub-Spec.--
8AAY	Spec.--Physical Astronomy	88BB	Aerial and Space Photogrammetry
	Sub-Spec.--	88BC	Analytical Photogrammetry
8AAA	Astronomical Instruments	88BD	Ballistics and Satellite Photogrammetry
8AAB	Astronomical Photometry	88BE	Mosaic Preparation
8AAC	Astronomical Spectroscopy	88BF	Montopographic Photogrammetry
8AAD	Astrophysics	88BG	Stereo-Plotting
8AAE	Cosmogony	88BH	Terrestrial Photogrammetry
8AAF	Cosmology	88BX	Topographic Photogrammetry
8AAG	Galaxies	88CY	Other
8AAH	Gamma Radiation Astronomy		Spec.--Phot-Interpretation
8AAI	Origin of Cosmic Rays	88CA	Sub-Spec.--
8AAJ	Physics of the Interstellar Medium		Interpretation; Cultural Features
8AAK	Physics of the Solar System	88CB	Interpretation; Military Features
8AAL	Physics of the Sun	88CC	Interpretation; Natural Features and Resources
8AAM	Planetary Atmospheres		Other
8AAN	Planets, Satellites	88CX	Spec.--Cartographic Sciences, Other
8AAO	Radar Astronomy	88XY	Sub-Spec.--None
8AAP	Radiation		3. Major Academic Field--
8AAQ	Radio Astronomy	88CY	CHEMISTRY
8AAR	Satellite Instrumentation	88CA	Spec.--Agriculture and Food Chemistry
8AAS	Selenology	88CB	Sub-Spec.--
8AAT	Space Astronomy		Alcoholic Beverages
8AAU	Stellar Energy Generation, Nucleogenesis	88CAE	Animal and Vegetable Fats and Oils
	Variable Stars	88CAF	Animal Feeds
8AAV	Selenodesy		Bakery and Confectionery Products
8AAX	Other	88CAG	Cereals and Carbohydrates
8ABY	Spec.--Positional Astronomy	88CAH	Fertilizers, Plant Growth Regulators
	Sub-Spec.--	88CAI	Food and Feed Additives
8ABA	Astronomy	88CAJ	Fruits, Vegetables, Juices
8ABB	Astronomical Instruments	88CAK	Meat, Fish, Dairy and Poultry Products
8ABC	Astronomical Spectroscopy	88CAL	Nonalcoholic Beverages
8ABD	Celestial Mechanics	88CAX	Nonfood Crop Products
8ABE	Celestial Navigation	88CBY	Pesticides
8ABF	Geodetic Astronomy		Other
8ABG	Radio Astronomy		Spec.--Analytical Chemistry
8ABH	Statistical Astronomy	88CBA	Sub-Spec.--
8ABX	Other	88CBB	Absorption Spectroscopy
	Spec.--Astronomy, Other	88CBC	Chemical Microscopy
	Sub-Spec.--None	88CBD	Chromatographic Analysis
88YY	2. Major Academic Field--CARTOGRAPHIC SCIENCES	88CBE	Electrometric Analysis
88AY	Spec.--Cartography	88CBF	Emission Spectroscopy
	Sub-Spec.--	88CBG	Gas Analysis
88AA	Compilation Cartography	88CBH	Gravimetric Analysis
88AB	Design Cartography		Mass Spectroscopy
88AC	Hypsographic Cartography		
88AD	Radar Cartography		
88AE	Reproduction Cartography		
88AF	Terrain Model Cartography		
88AG	Theoretical Cartography		
88AH	Topography		
88AX	Other		

1 Title Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section M (Continued)

5 Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
BCBI	Microchemistry	BCEP	Nitrogen Family
BCBJ	Nucleonics	BCEQ	Nonmineral Products: Asbestos, Vermiculite
BCBK	Qualitative Analysis	BCER	Oxygen Family
BCBL	Solvent Extraction	BCES	Pigments and Industrial Minerals
BCBM	Titrimetric Analysis	BCET	Radioactive Minerals and Products
BCBN	X-ray Analysis	BCEU	Solutions and Solvent Theory
BCBX	Other	BCEV	Theoretical Inorganic Chemistry
BCCY	Spec.--Biochemistry	BCEW	Transition Elements
	Sub-Spec.--	BCEX	Other
BCCA	Amino Acids, Peptides, Proteins	BCFY	Spec.--Nuclear Chemistry
BCCB	Antimetabolites		Sub-Spec.--None
BCCC	Biochemical Mechanisms	BCGY	Spec.--Organic Chemistry
BCCD	Biochemorphology		Sub-Spec.--
BCC E	Carbohydrates	BCGA	Adhesives
BCCF	Clinical Biochemistry	BCGB	Alkaloids
BCCG	Cyto-Histo-Chemistry	BCGC	Amino Acids
BCCM	Endocrine Biochemistry	BCGD	Antibiotics
BCCI	Enzyme, Co-Enzyme	BCGE	Carbohydrates
BCCJ	Immunochemistry	BCGF	Elastomers and Related Products
BCCK	Intermediary Metabolism, Biosynthesis	BCGG	Explosives and Rocket Fuels
		BCGH	Fluorine Compounds
BCC L	Lipids	BCGI	Free Radical
BCCM	Microbiological Chemistry	BCGJ	Heterocycles
BCCN	Natural Pigments	BCGK	Oils, Fats, Waxes
BCCO	Neurochemistry	BCGL	Organometallics
BCCP	Nucleic Acids	BCGM	Petroleum
BCCQ	Oncology, Carcinogenesis	BCGN	Phosphorus Compounds
BCCR	Physical Biochemistry	BCGO	Plastics and Synthetic Resins
BCCS	Radiation Biochemistry		
BCC T	Steroids	BCGP	Protective Coatings
BCCU	Technology, Methodology	BCGQ	Reaction Mechanisms
BCCX	Other	BCGR	Silicon Compounds
BCDY	Spec.--Chemical Warfare	BCGS	Soaps, Detergents, Surfactants
	Sub-Spec.--None		
BCEY	Spec.--Inorganic Chemistry	BCGT	Steroids
	Sub-Spec.--	BCGU	Terpenes and Other Alicyclics
BCEA	Alkaline Earths		
BCEB	Atomic Nuclei	BCGV	Textiles and Related Products
BCEC	Boron Family		
BCED	Building Products: Cement, Lime, etc.	BCGW	Use of Isotopes
		BCGX	Other
BCEE	Carbon Family	BCMY	Spec.--Physical Chemistry
BCEF	Clay and Clay Products		Sub-Spec.--
BCEG	Coordination Compounds	BCMA	Catalysis
BCEM	Electronic Materials: Semi- conductors, Ferroelectrics, Ferromagnetics	BCMB	Chemical Kinetics
		BCMC	Colloid Chemistry
BCEI	Explosives and Rocket Fuels	BCMD	Electrochemistry
BCEJ	Extranuclear Structure	BCME	Flames and Explosives
BCEK	Glass, Fused Silica	BCMF	Fused Salts
BCEL	Halogen Family	BCMG	Gaseous State
BCEM	Hydrogen	BCMH	High Pressure Chemistry
BCE N	Industrial Carbon, Graphite, Carbon Black Inner-Transition Elements, Lanthanide Series and Actinide Series	BCMI	High Temperature Chemistry
BCEO		BCMJ	Homogeneous Chemical Equilibrium
		BCMK	Ion Exchange and Application

1. Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section M (Continued)

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
BCHL	Liquid State	BDCN	Structural Geology, Igneous and Metamorphic
BCHM	Molecular Structure	BDCO	Structural Geology, Sedimentary
BCHN	Phase Equilibria	BDCX	Other
BCHO	Photochemistry	BDDY	Spec.--Geophysics
BCMP	Polymer Chemistry		Sub-Spec.--
BCHQ	Quantum Theory	BDDA	Exploration Seismology
BCHR	Radiochemistry	BDDB	Geomagnetism
BCHS	Solid Methods (Incl. X-rays)	BDDC	Geophysical Surveying
BCHT	Solutions of Electrolytes and Nonelectrolytes	BDDD	Gravimetry
BCHU	Surface Chemistry	BDEE	Heat Flow
BCHV	Thermochemistry	BDDF	Meteorological Geophysics
BCHW	Thermodynamics	BDDG	Physical Properties of Materials
BCHX	Other	BDDH	Seismology
BCHY	Spec.--Chemistry, Other	BDDI	Tectonophysics
	Sub-Spec.--	BDDJ	Volcanology
BCXA	Chemistry Teaching	BDDX	Other
BCXX	Other	BDEY	Spec.--Paleontology
BDYY	4. Major Academic Field--EARTH SCIENCES		Sub-Spec.--
BDAY	Spec.--Geochemistry	BDEA	Micropaleontology
	Sub-Spec.--	BDEB	Paleobotany
BDAA	Cosmochemistry	BDEC	Paleozoology
BDAB	General Inorganic Geochemistry	BDED	Palynology
BDAC	Geochronology	BDEX	Other
BDAD	Isotope Geochemistry	BDFY	Spec.--Physical Geography
BDAE	Mineral Synthesis and Stability Relations of Minerals		Sub-Spec.--
BDAF	Organic Geochemistry	BDFB	Biogeography
BDAX	Other	BDFC	Climatology
BDBY	Spec.--Geodesy	BDFD	Geomorphology
	Sub-Spec.--	BDFE	Military Geography
BDBA	Geodetic Astronomy	BDFX	Oceanography
BDBB	Geodetic Gravimetry	BDFY	Soils Geography
BDBC	Geodetic Leveling	BDFZ	Other
BDBD	Geodetic Surveying	BGGY	Spec.--Soil Science
BDBE	Satellite Geodesy		Sub-Spec.--
BDBF	Selenology	BGCA	Soil and Water Management
BDBG	Selenodesy	BGCB	Soil Chemistry
BDBX	Other	BGCC	Soil Fertility, Fertilizers, and Plant Nutrition
BDCY	Spec.--Geology	BGCD	Soil Genesis, Morphology and Classification
	Sub-Spec.--	BGCE	Soil Mechanics and Engineering
BDCA	Areal Geology	BGCF	Soil Microbiology
BDCB	Crystallography	BGCG	Soil Mineralogy
BDCD	Engineering Geology	BGCH	Soil Physics
BDCD	Geology of Mineral Deposits	BDCX	Other
BDCD	Geology of Petroleum Deposits	BDCY	Spec.--Earth Sciences, Other
BDCF	Geology of Solid Fuels		Sub-Spec.--None
BDCG	Geomorphology	BEYY	5. Major Academic Field--HYDROSPHERIC (WATER) SCIENCES
BDCM	Glacial Geology		Spec.--Hydrology
BDCI	Mineralogy		Sub-Spec.--
BDCJ	Petrography	BEAY	Chemistry of Water
BDCJ	Petrogeology	BEAA	Cryology and Cryopedology
BDCJ	Petrogeology	BEAB	
BDCL	Sedimentology		
BDCM	Stratigraphy		

1. Title: Academic Specialty, AOE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section M (Continued)

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
BEAC	Evapo-transpiration	BFBF	Physiological Climatology
BEAD	Glaciology	BFBC	Synoptic Climatology
BEAE	Ground Waters	BFBX	Other
BEAF	Precipitation	BFCY	Spec.--Meteorological Instrumentation
BEAG	Soil Moisture		Sub-Spec.--
BEAH	Surface Waters	BFCA	Automatic Data Sensing Systems
BEAI	Transportation	BFCB	Balloon Sounding Systems
BEAX	Other	BFCC	Radar and Rocket Instrumentation
BEBY	Spec.--Oceanography	BFGD	Satellite Instrumentation
	Sub-Spec.--	BFCX	Other
BEBA	Biological Oceanography	BFDY	Spec.--Special Areas
BEBC	Chemical Oceanography		Sub-Spec.--
BEBD	Descriptive Oceanography	BFDA	Agricultural Meteorology
BEDE	Hydrography	BFDB	Air Pollution
BEDE	Ocean-bottom Processes	BFDC	Aviation Meteorology
BEDE	Physical Oceanography	BFDD	Marine Meteorology
BEDE	Sea-Air Interactions	BFDE	Polar Meteorology
BEDE	Shore and Near Shore Processes	BDFD	Tropical Meteorology
BEDE	Underwater Sound	BFDX	Other
BEDE	Other	BFEY	Spec.--Synoptic Meteorology
BEEX	Spec.--Hydrospheric (Water) Sciences,		Sub-Spec.--
BEEX	Other	BFEA	Hydrometeorology
BEEX	Sub-Spec.--None	BFEB	Mesometeorology
BFYY	6. Major Academic Field--METEOROLOGY	BFEC	Micrometeorology
	(ATROSPHERIC SCIENCES)	BFED	Numerical Analysis and Prediction
BFAY	Spec.--Atmospheric Dynamics	BFEE	Observations
	Sub-Spec.--	BFEF	Radar Meteorology
BFAA	Aeronomy	BFEG	Weather Analysis and Forecasting
BFAB	Airglow	BFEY	Other
BFAC	Atmospheric Electricity		Spec.--Meteorology, Other
BFAD	Atmospheric Optics and		Sub-Spec.--None
	Acoustics	BGYY	7. Major Academic Field--
BFAE	Atmospheric Thermodynamics		PHOTOGRAPHIC SCIENCES
BFAF	Aurora	BGAY	Spec.--Photography
BFAG	Cloud and Precipitation		Sub-Spec.--
	Physics	BGAA	Aerospace Photography
BFAH	Composition	BGAB	Motion Picture Photography
BFAI	Dynamics of Atmospheric Motion	BGAC	Optical Instrumentation
BFAJ	Magneto-hydrodynamics		Photography
BFAK	Radiation	BGAD	Still Photography
BFAL	Solar-Terrestrial Relationships	BGAE	Video Photography
BFAM	Turbulence and Diffusion	BGAX	Other
BFAZ	Other	BGXY	Spec.--Photographic Sciences, Other
	NOTE: Although the definitions of		Sub-Spec.--None
	Oceanography and its subspecializations	BHYY	8. Major Academic Field--PHYSICS
	are oriented toward the oceans and the	BHAY	Spec.--Acoustics
	seas, they are also applicable with		Sub-Spec.--
	slight modification to fresh water	BHAA	Applied Acoustics, Instruments
	studies (Limnology). A separate		and Apparatus
	listing for Limnology is not included	BHAB	Architectural Acoustics
	in this manual.	BHAC	Ear and Hearing
BFBY	Spec.--Climatology	BHAD	Electroacoustics
	Sub-Spec.--	BHAE	Infrasonics
BFBZ	Applied Climatology	BHAF	Mechanical Vibrations and Shock
BFBZ	Bioclimatology	BHAG	Musical Instruments and Music
BFBZ	Microclimatology	BHAM	Noise
BFBZ	Paleoclimatology		
BFBZ	Physical Climatology		

1. Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section M (Continued)

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
BHAI	Sound Transmission	BHEK	X-ray Interactions
BHAJ	Speech Communication	BHEL	X-ray Phenomena
BHAK	Theory of Waves and Vibrations	BHEM	X-ray Technology
BHAL	Ultrasonics	BHEX	Other
BHAM	Underwater Sound	BHFX	Spec.--Electronics
BHAX	Other	BHFB	Sub-Spec.--
BHBY	Spec.--Astrophysics	BHFC	Electron Ballistics
	Sub-Spec.--None	BHFD	Electron Tubes
BHCY	Spec.--Atomic and Molecular Physics	BHFE	Electronic Device Circuitry
	Sub-Spec.--	BHFF	Electronics Instrumentation
BHCA	Atomic, Ionic, and Molecular	BHFG	Emission
	Beams	BHFM	Gas Devices
BHCB	Atomic Masses and Abundance	BHFX	Semiconductor Devices
BHCC	Atomic and Molecular Structure	BHGY	Solid State Electronics
	and Spectra		Other
BHCD	Chemical Bonds and Structure	BHGA	Spec.--Elementary Particle Physics
BHCE	Electron Paramagnetic Resonance	BHGB	Sub-Spec.--
BHCF	Impact and Scattering Phenomena	BHGC	Cosmic Rays
BHCG	Lasers	BHGD	High Energy Accelerators
BHCH	Mass Spectroscopy	BHGE	High Energy Phenomena
BHCI	Nuclear Magnetic Resonance	BHGX	Particle Detectors
BHCJ	Other	BHNY	Phenomenological Computer Analysis
BHDY	Spec.--Biophysical Specialties		Other
	Sub-Spec.--	BHNY	Spec.--Engineering Physics
BHDA	Bioacoustics and Transmission		Sub-Spec.--None
BHDB	Biochemical Physics	BHIY	Spec.--Mechanics
BHDC	Bioelectricity and Transmission		Sub-Spec.--
BHDD	Bioelectronics	BHIA	Analytical Mechanics
BHDE	Bionics	BHIB	Ballistics
BHDF	Bio-optics	BHIC	Elasticity
BHDG	Bio-systems; Control and	BHID	Flight Dynamics
	Communications	BHIE	Friction
BHDH	Biothermics and Bioenergetics	BHIF	High Pressure Physics
BHDI	Bitransport and Membrane Physics	BHIG	Impact Phenomena
BHDJ	Cellular Biophysics	BHIM	Instruments and Measurement
BHDK	Electron Microscopy	BHIX	Other
BHDL	Fluid Biomechanics	BHJY	Spec.--Metallurgy
BHDP	Health Physics		Sub-Spec.--None
BHDA	Mathematical Biophysics	BHNY	Spec.--Nuclear Effects Physics
BHDF	Methodology, Instrumentation and		Sub-Spec.--
	Measurements	BHKA	Biological Effects
BHDP	Molecular Biophysics	BHKB	Blast Effects
BHDQ	Radiation Biology	BHKC	Nuclear Effects
BHDR	Solid Biomechanics	BHKD	Thermal Effects
BHDZ	Other	BHKK	Other
BHEY	Spec.--Electromagnetism	BHLY	Spec.--Nuclear Physics
	Sub-Spec.--		Sub-Spec.--
BHEA	Antenna Theory	BHLA	Accelerators
BHEB	Electrical Measurements and	BHLB	Detectors
	Instrument	BHLC	Neutrons
BHEC	Electromagnetic Waves	BHLD	Nuclear Properties
BHED	Electromagnetic Wave Propagation	BHLE	Nuclear Reactions and Scattering
BHEE	Electron Dynamics	BHMF	Nuclear Spectroscopy
BHEF	Electron Microscopy, Ion Optics	BHLC	Radiation Effects
BHEG	Rosers	BHLH	Radioactive Materials, Isotopes
BHEH	Microwaves	BHLI	Radiation Shielding
BHEI	Physical Electronics	BHLX	Other
BHEJ	Quantum Electronics		

1. Title: Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section H (Continued)

Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
BHWY	Spec.--Optics	BHOD	Dielectrics (Incl Fluids)
	Sub-Spec.--	BHOE	Dislocations and Plasticity
BHMA	Atmospheric and Space Optics	BHOF	Dynamics of Crystal Lattices
BHMB	Color, Colorimetry	BHOG	Electron Emission
BHMC	Fiber Optics	BHOM	Ferromagnetism
BHMD	Geometrical Optics	BHOI	High Polymers and Glasses
BHME	Geophysical Optics	BHOJ	Internal Friction
BHMF	Illumination	BHOK	Lattice Effects and Diffusion
BHMG	Information Theory (Image Evaluation)	BHOL	Luminescence
BHMH	Infrared Phenomena	BHOM	Para- and Diamagnetism Phenomena
BHMI	Interferometry	BHON	Photoconductivity
BHMJ	Lasers	BHOQ	Photoelectric Phenomena
BHMK	Lenses	BHOP	Piezo and Ferro-Electricity
BHML	Optical Instruments	BHOQ	Radiation Damage
BHMM	Optical Materials	BHOR	Resonance Phenomena
BHMN	Photography	BHOS	Semiconductors
BHMO	Physical Optics	BHOT	Superconductivity
BHMP	Physiological Optics	BHOU	Surface Physics
BHMQ	Radiometer, Photometry	BHOV	Thermal Conduction in Solid State
BHMR	Spectroscopy	BHOW	Thin Films
BHMX	Other	BHOX	Other
BHMY	Spec.--Physics of Fluids	BHPY	Spec.--Thermal Physics
	Sub-Spec.--		Sub-Spec.--
BHNA	Aerodynamics	BHPA	Calorimetry
BHNB	Aerosols	BHPB	Heat Transmission
BHNC	Boundary Layer Effects	BHPC	High Temperature Physics
BHND	Cavities and Jets	BHPD	Low Temperature Physics
BHNE	Compressible Fluid Dynamics	BHPE	Temperature and its Measurement
BHNF	Explosion Phenomena	BHPF	Thermal Properties
BHNG	High Temperature Flow	BHPG	Thermodynamics
BHMH	Incompressible Fluid Dynamics	BHPH	Thermodynamic Relations
BHMI	Magneto-Fluid Dynamics	BHPI	Thermodynamic Tables
BHMJ	Plasma Physics	BHPX	Other
BHMK	Rarefied Gas Flow	BHXY	Spec.--Physics, Other
BHML	Rheology		Sub-Spec.--
BHMN	Shock Wave Phenomena	BHXA	Constants, Standards, Metrology
BHMN	Structure and Property of Fluids	BHXB	Energy Conversion Problems
BHMO	Superfluidity	BHXC	Field Theory
BHMP	Transport Phenomena	BHXD	High Vacuum Techniques
BHMQ	Turbulence	BHXE	Many Body Theory
BHMR	Viscosity	BHXF	Mathematical Physics
BHMX	Other	BHXC	Mossbauer Effect
BHOY	Spec.--Solid State Physics	BHXM	Operations Research
	Sub-Spec.--	BHXI	Physics Teaching
BHOA	Ceramics	BHXJ	Quantum Mechanics
BHOB	Cooperative Phenomena	BHXM	Relativity and Gravitation
BHOC	Crystallography	BHXL	Statistical Mechanics and Kinetic Theory
		BHXX	Other

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Data Code Sequence
Section I (Continued)

5 Data Codes	Data Items and Explanations	Data Codes	Data Items and Explanations:
9YYY	General Area of Study: SOCIAL SCIENCES	9BEA	History of Labor Movements
9AYY	1. Major Academic Field--ANTHROPOLOGY	9BEB	International Labor Problems
9AAY	Spec.--Applied Anthropology	9BEC	Labor-Management Relations
	Sub-Spec.--None	9BED	Manpower and Labor Markets
9ABY	Spec.--Archaeology	9BEX	Other
	Sub-Spec.--	9BFY	Spec.--Land Economics
9ABA	New World Archaeology		Sub-Spec.--
9ABB	Old World Archaeology	9BFA	Agricultural Economics
9ABX	Other	9BFB	Economic Geography
9ACY	Spec.--Cultural Anthropology	9BFC	Natural Resources
	Sub-Spec.--	9BFD	Regional and Urban Planning
9ACA	Cultural Dynamics	9BFX	Other
9ACB	Enthnography	9BGY	Spec.--Money, Credit, Banking
9ACC	Enthnology		Sub-Spec.--
9ACD	Social Anthropology	9BGA	Commercial Banking
9ACX	Other	9BGB	Consumer Finance and Mortgage Credit
9ADY	Spec.--Linguistics	9BGC	International Finance
	Sub-Spec.--None	9BGD	Monetary Theory and Policy
9AEY	Spec.--Physical Anthropology	9BGX	Other
	Sub-Spec.--	9BMY	Spec.--National Defense Economics
9AEA	Anthropometry		Sub-Spec.--None
9AEB	Human Paleontology	9BIY	Spec.--Public Finance
9AEC	Racial Genetics		Sub-Spec.--
9AEX	Other	9BIA	Central Government Finance
9AXY	Spec.--Anthropology, Other	9BIB	Fiscal Theory and Policy
	Sub-Spec.--None	9BIC	State and Local Finance
9BYY	2. Major Academic Field--ECONOMICS	9BIX	Other
9BAY	Spec.--Economic History and Development	9BJY	Spec.--Quantitative Economics
	Sub-Spec.--		Sub-Spec.--
9BAA	Development Economics	9BJA	Econometrics
9BAB	History of Economic Thought	9BJB	Input--Output Analysis
9BAX	Other	9BJC	Social Accounting
9BBY	Spec.--Economic Theory	9BJD	Statistical Methods
	Sub-Spec.--	9BJX	Other
9BBA	Comparative Economic Systems	9BXY	Spec.--Economics, Other
9BBB	Income and Employment Theory		Sub-Spec.--None
9BBC	Price and Allocation Theory	9CYY	3. Major Academic Field--GEOGRAPHY
9BBD	Theory of Business Fluctuations	9CAY	Spec.--Biogeography
9BBX	Other		Sub-Spec.--
9BCY	Spec.--Industrial Economics	9CAA	Medical Geography
	Sub-Spec.--	9CAB	Phytogeography
9BCA	Competition in American Industry	9CAC	Zoogeography
9BCB	Economics of Industry (Specific Industry Specialization)	9CAX	Other
9BCC	Industrial Organization	9CBY	Spec.--Cultural Geography (Incl Human)
9BCD	Public Utilities		Sub-Spec.--
9BCX	Other	9CBA	Historical Geography
9BDY	Spec.--International Economics	9CBB	Philosophy of Geography
	Sub-Spec.--	9CBC	Political Geography
9BCA	Economic Problems (Area Studies)	9CBD	Population Geography
9BDB	International Economic Relations	9CBE	Regional Geography
9BDC	Theory of International Trade	9CBF	Settlement Geography
9BDD	U.S. Tariff Policy	9CBG	Theoretical Geography
9BDX	Other	9CBI	Toponomy
9BEY	Spec.--Labor Economics	9CBI	Urban Geography
	Sub-Spec.--	9CBX	Other

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1 Title Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section I (Continued)

5 Data Codes	Data Items and Explanations	Data Codes	Data Items and Explanations
9CCY	Spec.--Economic Geography Sub-Spec --	9DDF	Indonesia
9CCA	Agricultural Geography	9DDG	Japan
9CCB	Manufacturing Geography	9DDH	Korea
9CCC	Marketing Geography	9DDI	Pacific Islands
9CCD	Resource Geography	9DDJ	Philippine Islands
9CCE	Transportation Geography	9DDK	Thailand
9CCX	Other	9DDX	Other
9CDY	Spec.--Military Geography Sub-Spec.--None	9DEY	Spec.--Medieval History Sub-Spec.--None
9CXY	Spec.--Geography, Other Sub-Spec.--None	9DFY	Spec.--Middle East Sub-Spec --
9DYY	4. Major Academic Field--HISTORY NOTE: Although the professional historian, when speaking of categorization, thinks first in terms of period and then in terms of country, the categorization more useful to the Air Force is that of classification by country or area. For example, it is not as important for the Air Force to identify an officer who has studied the history of Europe from the time of the Renaissance onward, as it is to identify an officer who has studied a specific country or region of Europe, particularly with respect to the recent political, social, and cultural history. In the following categorization, except for Ancient History and Medieval History which are traditional expressions of academic periodization, and Subject Histories, the specializations are based on geographic regions.	9DFA	Afghanistan
		9DFB	India
		9DFC	Pakistan
		9DFX	Other
		9DGY	Spec.--Near East Sub-Spec.--
		9DGA	Iran
		9DGB	Iraq
		9DGC	Israel
		9DGD	Jordan
		9DGE	Lebanon
		9DGF	Saudi Arabia (Incl Associated Areas)
		9DGG	Syria
		9DGH	Turkey
		9DGX	Other
		9DHY	Spec.--North America (Incl Central America) Sub-Spec.--
		9DHA	Canada
		9DHB	Central America
		9DHC	Mexico
		9DHD	United States (to 1789)
		9DHE	United States (1789-1900)
		9DHF	United States (1900-Present)
		9DHG	United States Economic History
9DAF	Spec.--Africa Sub-Spec --	9DHH	United States Intellectual History
9DAA	East Central Africa	9DHI	United States Military History
9DAB	North Africa	9DHJ	United States Political History
9DAC	South Africa	9DIX	Other
9DAD	West Central Africa	9DIY	Spec.--South America Sub-Spec.--
9DAX	Other	9DIA	Argentina
9DBY	Spec.--Ancient History Sub-Spec --None	9DIB	Bolivia
9DCY	Spec.--Eastern Europe and the Balkans Sub-Spec --	9DIC	Brazil
9DCA	Balkan Countries	9DID	Chile
9DCB	Slavic Countries	9DIE	Colombia
9DCX	Other	9DIF	Ecuador
9DDY	Spec.--Far East (Incl Oceania) Sub-Spec --	9DIG	Paraguay
9DDA	Australia (Incl New Zealand)	9DIM	Peru
9DDB	Burma	9DII	Uruguay
9DDC	Cambodia, Laos, Vietnam	9DIJ	Venezuela
9DDD	China (Incl Mongolia and Tibet)	9DIX	Other
9DDE	Formosa		

1 Title Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section I (Continued)

5 Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
90JY	Spec.--Subject Histories (Academic Disciplines)	9ECB	Foreign Policy
90JA	History of Economic Thought	9ECC	International Law
90JB	History of Education	9ECD	International Organization
90JC	History of Philosophy	9ECE	International Politics
90JD	History of Political Thought	9ECX	Other
90JE	History of Religion	9EDY	Spec.--Political Theory and Political Behavior
90JF	History of Science		Sub-Spec.--
90JG	Military History	9EDA	History of Political Thought
90JH	Social and Cultural History	9EDB	Legislative Process
90JX	Other	9EDC	Method and Scope
90NY	Spec.--Union of Soviet Socialist Republics (USSR)	9EDD	Periodic, Individual, Ideological or National Studies
	Sub-Spec.--	9EDE	Political Parties and Interest Groups
90NA	Armerian SSR	9EDF	Public Opinion and Electoral Behavior
90NB	Azerbaijan SSR		Other
90NC	Byelorussian SSR	9EDX	Spec.--Public Law
90ND	Estonian SSR	9EEY	Sub-Spec.--
90NE	Georgian SSR	9EEA	Constitutional Law
90NF	Kazakh SSR	9EEB	Jurisprudence
90NG	Kirghiz SSR	9EEY	Other
90NH	Latvian SSR	9EEX	Spec.--Political Science, Other
90NI	Lithuanian SSR	9EYX	Sub-Spec.--None
90NJ	Moldavian SSR	9FYF	6. Major Academic Field--PSYCHOLOGY
90NK	Russian SFSR	9FAY	Spec.--Clinical Psychology
90NL	Tadjik SSR		Sub-Spec.--
90NM	Turkmen SSR	9FAA	Behavior Problems
90NN	Ukraine SSR	9FAB	Crime and Delinquency
90NO	Uzbek SSR	9FAC	Experimental Psychopathology
90NX	Other	9FAD	Group Therapy
90LY	Spec.--Western Europe	9FAE	Individual Diagnosis and Therapy
	Sub-Spec.--	9FAF	Mental Deficiency
90LA	Benelux Countries	9FAG	Objective Tests
90LB	France	9FAH	Projective Techniques
90LC	Germany and Austria	9FAI	Speech Pathology
90LD	Iberian Peninsula	9FAX	Other
90LE	Italy	9FBY	Spec.--Counseling and Guidance
90LF	Scandinavian Countries		Sub-Spec.--
90LG	Switzerland	9FBA	Directive Therapy
90LH	United Kingdom and Ireland	9FBB	Educational Counseling
90LX	Other	9FBC	Nondirective Therapy
90XY	Spec.--History, Other	9FBD	Rehabilitation
	Sub-Spec.--None	9FBE	Vocational Counseling
9EYY	5. Major Academic Field--POLITICAL SCIENCE	9FBX	Other
	Sub-Spec.--	9FCY	Spec.--Development Psychology
9EAY	Spec.--Comparative Government		Sub-Spec.--
	Sub-Spec.--	9FCA	Child and Adolescent Psychology
9EAA	Area Specialization	9FCB	Maturity and Old Age
9EAB	Country Specialization	9FCC	Nursery and Pre-school Psychology
9EAC	Institutional or Functional Specialization	9FCD	School Psychology
9EAD	Type Specialization	9FCX	Other
9EAX	Other	9FDY	Spec.--Educational Psychology
9EBY	Spec.--Geopolitics		Sub-Spec.--
	Sub-Spec.--None	9FDA	Educational Measurement
9ECY	Spec.--International Relations	9FDB	Programmed Learning
	Sub-Spec.--		
9ECA	Defense Policy		

1 Title Academic Specialty, ACE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section I (Continued)

5	Data Codes	Data Items and Explanations	Data Codes	Data Items and Explanations
	9FOC	School Adjustment		Sub Spec --
	9FDD	School Learning	9FJA	Culture and Personality
	9FDE	Special Education	9FJB	Group Interaction
	9FDF	Student Personnel	9FJC	Language and Communication
	9FDX	Other	9FJD	Leadership
	9FEY	Spec -- Experimental Psychology	9FJE	Mass Media Communication
		Sub-Spec --	9FJF	Social Attitudes
	9FEA	Animal Learning	9FJG	Social Perception and Cognition
	9FEB	Audition		Surveys and Polls
	9FEC	CNS Functions	9FJM	Other
		Communications Research and Information Theory	9FJX	Spec -- Psychology, Other
	9FED	Comparative Psychology	9FXY	Sub-Spec -- None
	9FEE	Engineering Psychology (Human Performance Eng)	9GYV	7. Major Academic Field--PUBLIC ADMINISTRATION
	9FEF	Human Learning	9GAY	Spec -- Administrative Policy and Public Policy
	9FEG	Motivation		Sub-Spec --
	9FEH	Perception	9GAA	American Government
	9FEI	Physiological Psychology	9GAB	Communication
	9FEJ	Psychophysics	9GAC	Leadership
	9FEK	Sensory Processes	9GAD	Political Parties
	9FEL	Symbolic Processes, Problem Solving	9GAE	Pressure Groups
	9FEM	Vision	9GAF	Public Opinion
	9FEN	Other	9GAX	Other
	9FEX	Spec -- Industrial and Personnel Psychology	9GBY	Spec -- Constitutional and Administrative Law
	9FFY	Sub-Spec --		Sub-Spec --
	9FFA	Employee Morale and Attitudes	9GBA	Administrative Law and Regulation
	9FFB	Human Relations		Other
	9FFC	Job Analysis and Classification	9GBX	Spec -- International Administration
	9FFD	Labor-Management Relations	9GCY	Sub-Spec --
	9FFE	Marketing	9GCA	Comparative Government
	9FFF	Performance Rating	9GCB	International Law and Regulation
	9FFG	Recruiting, Selection, Employment		International Relations and Politics
	9FFH	Training and Development	9GCC	Other
	9FFI	Other	9GCX	Spec -- Organizational Theory and Management Concepts
	9FGY	Spec -- Personality	9GDY	Sub-Spec --
		Sub-Spec --		Accountability
	9FGA	Personality Development	9GDA	Anatomy of Organization
	9FGB	Personality Measurement	9GDB	Decision Making
	9FGC	Personality Theory	9GDC	Functions of Management
	9FGD	Structure and Dynamics of Personality	9GDD	Modification and Control
		Other	9GDE	Process of Management
	9FCX	Spec -- Psychological Warfare	9GDF	Scientific Management
	9FHY	Sub-Spec -- None	9GDX	Other
		Spec -- Psychometrics	9GEY	Spec -- Public Budgeting and Public Finance
	9FIY	Sub-Spec --		Sub-Spec --
	9FIA	Experimental Design		Administrative Law and Regulation
	9FIB	Factor Analysis		
	9FIC	Psychological Testing		
	9FID	Statistical Development		
	9FIE	Test Construction, Validation		
	9FIF	Test Theory, Scale Analysis		
	9FIX	Other		
	9FJY	Spec -- Social Psychology		

1 Title Academic Specialty, ADE AC-030, Effective 1 Jun 1975 (Continued)
Data Code Sequence
Section H (Continued)

5	Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
	9GEB	Business Regulation	9HED	Social Conflict
	9GEC	Financial Management	9HEX	Other
	9GED	Fiscal Policy	9HFX	Spec -- Social Institutions
	9GEE	Public Finance		Sub-Spec --
	9GEF	Taxation	9HFA	Educational Sociology
	9GEX	Other	9HFB	Legal Sociology
	9GFY	Spec -- Public Personnel Management	9HFC	Leisure and Popular Culture
		Sub-Spec --	9HFD	Medical Sociology
	9GFA	Administrative Leadership	9HFE	Military Sociology
	9GFB	Personnel Administration	9HFF	Occupational Sociology
	9GFC	Recruiting, Selection, Employment	9HFG	Political Sociology
	9GFX	Other	9HFM	Sociology of Religion
	9GXY	Spec -- Public Administration, Other	9HFI	Sociology of Science
		Sub-Spec -- None	9HFJ	Sociology of Arts
	9HYY	8 Major Academic Field--SOCIOLOGY	9HFX	Other
	9MAY	Spec -- Criminology and Police Administration	9HGY	Spec -- Social Organization
		Sub-Spec --		Sub-Spec --
	9MAA	Correctional Administration	9HGA	Industrial Sociology
	9MAB	Criminal Anthropology	9HGB	Large-Scale Organization
	9MAC	Criminal Investigation	9HGC	Small-Scale Organization
	9MAD	Criminal Psychology	9HGD	Voluntary Associations
	9MAE	Criminology	9HGX	Other
	9MAF	Evidence Identification	9HMY	Spec -- Social Problems
	9MAG	Industrial Security		Sub-Spec --
	9MAH	Penal Code	9HHA	Corrections
	9MAI	Penology	9HHB	Crime and Delinquency
	9MAJ	Police Administration	9HHC	Deviance
	9MAK	Prevention and Control	9HHD	Mental Health
	9MAL	Traffic Enforcement	9HHE	Social Psychiatry
	9MAR	Forensic Science	9HHX	Other
	9MAX	Other	9HIY	Spec -- Social Psychology
	9HBY	Spec -- Demography		Sub-Spec --
		Sub-Spec --	9HIA	Collective Behavior and Social Movement
	9HBA	Labor Force	9HIB	Public Opinion and Communication
	9HBB	Population Structure	9HIC	Role Theory
	9HBC	Population Trends	9HID	Small Groups
	9HBD	Vital Statistics	9HIE	Socialization and Personality
	9H BX	Other	9HIX	Other
	9HCY	Spec -- Family	9HJY	Spec -- Social Structure
		Sub-Spec --		Sub-Spec --
	9HCA	Adolescence and Courtship	9HJA	Intergroup Relations
	9HCB	Aging and Retirement	9HJB	International Relations
	9HCC	Consumer Behavior	9HJC	Stratification
	9HCD	Family and Kinship	9HJX	Other
	9HCE	Marriage and Divorce		Spec -- Social Theory
	9HCF	Sexual Behavior	9HKY	Sub-Spec --
	9HCX	Other	9HKA	History of Sociology
	9HDY	Spec -- Rural Urban Sociology	9HKB	Mathematical Sociology
		Sub-Spec --	9HKC	Models
	9HDA	Community Studies	9HKD	Sociology of Knowledge
	9HDB	Human Ecology	9HKE	Theory Construction
	9HDC	Rural Sociology	9HKX	Other
	9HDD	Urban Sociology	9HXY	Spec -- Sociology, Other
	9HDX	Other		Sub-Spec -- None
	9HEY	Spec -- Social Change and Development	ZZZZ	ACADEMIC SPECIALITY UNKNOWN
		Sub-Spec --		
	9HEA	Cultural Sociology		
	9HEB	Economic Development		
	9HEC	Historical Sociology		

Addendum A-2

Aggregate Academic Specialty Codes (ASCs)

(Provided by Air Force Data Services Center, Washington DC)

AG CODE	ASCs	DESCRIPTION
AAAY	4AYY, 4BYY, 4EYY, 4KYY, 4MY	Aeronautical-Astronautical and Mechanical Engineering
AABY	6YYY, 8CYY, 8IYY	Basic Sciences
AACY	OCBY, OCCC, 6GGY, 6GJY, 6IYY	Data Reduction and Analyses
AADY	4BCY, 4EDE, 4IHY, 4MHB, 4TAY, 6EFY	Guidance and Control
AAEY	4ICE, 4ICF, 8IIFH, 8HOY	Solid State
AAFY	OYJY, OYKY, 1AMG, 1ASY, 4ACF, 4BDY, 4LDC, 4TYY	Systems Engineering
AAGY	1AGY, 1APY, 1ASY	Program Management
AAHY	OCCC, OYEY, 1AKG, 4LCF, 4LFY, 4TGY, 4THY, 4TIY, 4TKY, 6EIIY, 6EMY, 6EOY, 6GLY, 8HXH	Quantitative Analyses

Addendum A-3

Requirements Academic Specialty Codes Specific
to Four Characters

(Provided by Air Force Data Services Center, Washington DC)

OYLA	4EAB	4MBE	5ACG
OYLB	4EAC	4MHA	5ACH
OYLC	4EAD	4MHB	5ACI
OYLD	4EAE	4MHC	5ACJ
OYLE	4EDA	4MHD	5ACK
OYLF	4EDB	4MHE	5ACL
OYLG	4EDC	4MHF	5ACM
OYLH	4EDD	4MIA	5ACN
OYLI	4EDE	4MIB	
OYLJ	4EDF	4MIC	8HMA
OYLK	4EDG	4MID	8HMB
OYLL	4EDH	4MIE	8HMC
OYLM	4IBD		8HMD
	4IEE	5ABA	8HME
1AGA	4IGA	5ABB	8HMF
1AMH	4IGB	5ABC	8HMG
	4IGC	5ABD	8HMH
4ACA	4IGD	5ABE	8HMI
4ACB	4IGE	5ABF	8HMJ
4ACC	4IGF	5ABG	8HMK
4ACD	4IGG	5ABH	8HML
4ACE	4IGH	5ABI	8HMM
4ACF	4IGI	5ABJ	8HMN
4ADA	4IGJ	5ABK	8HMO
4ADB	4IHA	5ABL	8HMP
4ADC	4IHB	5ABM	8HMQ
4AEA	4IHC	5ABN	8HMR
4AEB	4IHD	5ABO	8HXA
4AEC	4IHE	5ABP	8HXB
4AED	4KAA	5ABQ	8HXC
4ALE	4KAB	5ABR	8HXD
4AEF	4KAC	5ABS	8HXE
4AEG	4KAD	5ABT	8HXF
4AEH	4LFA	5ABU	8HXG
4AEI	4LFB	5ACA	8HXH
4AEJ	4LFC	5ACB	8HXI
4AEK	4MBA	5ACC	8HXJ
4AFA	4MBB	5ACD	8H XK
4AFB	4MBC	5ACE	8HXL
4EAA	4MBD	5ACF	

Addendum A-4

Obsolete and Replacement Academic Specialty Codes

(Provided by Air Force Data Services Center, Washington DC)

OLD	NEW
OYJY	OY EY
1AAD	1AAB
1ACA	OCBY
1ACB	OCAC
1ACX	OCAD
1ACY	OCAB
1AFB	1AFD
4HJY	4HY Y
4IDA	OCBA
4IDB	OCBB
4IDC	OCBC
4IDD	OCBD
4IDE	OCBE
4IDX	OCBX
4IDY	OCBY
4LAA	OCCA
4LAB	OCCB
4LAX	OCCX
4LAY	OCCY
4LFA	OCCC
6GBY	OCDA
6GDY	OCDB
6GEY	OCDC

Addendum A-5

Career Area Air Force Specialty Codes (AFSCs)

(As supplied by the Air Force Data Services Center, Washington DC; different, in some instances, from Fig. 2-1 in AFM 36-19)

CODE	AFSCs	CAREER AREA
ADMI	70XX	Administration
CHAP	89XX	Chaplain
CIVI	55XX, 62XX	Civil Engineer & Services
COMM	30XX	Communications & Electronics
COMT	005X, 67XX, 69XX	Comptroller
EDUC	0900, 0940, 0950, 75XX	Education & Training
HIST	0930	Historian
INFO	79XX	Information
INTE	0910, 57XX, 80XX	Intelligence
LAW1	88XX	Law
LOGI	0005, 004X, 009X, 31XX, 40XX, 46XX, 60XX, 63XX, 64XX, 65XX, 66XX	Logistics
MANP	74XX	Manpower
OPER	002X, 003X, 006X, 007X, 008X, 021X, 051X, 10XX, 11XX, 12XX, 13XX, 14XX, 15XX, 16XX, 17XX, 18XX, 20XX, 21XX, 22XX, 23XX	Operations
PERS	001X, 0920, 73XX	Personnel
SCIE	26XX, 27XX, 28XX, 29XX	Scientific & Development Eng

Addendum A-5 (Continued)

CODE	AFSCs	CAREER AREA
SECU	81XX	Security Police
SPEC	82XX	Special Investigations
WEAT	25XX	Weather
COMP	0960, 51XX	Computer Technology
OPRE	2691A, 2695A	Operations Research
PIPE	0001, 0003, 0004, 0006, 0007, 0008, 0101, 0102, 0103, 0104, 0105, 0110, 0111	Pipeline

Addendum A-6

Consolidated Base Personnel Office (CBPO) Codes

The listing of bases and CBPO codes beginning on the next page is reproduced from AFM 300-4, Vol XII.

1. Title: Complaint, Type Of, ADE CO-485, Effective 1 Jul 1975			
2. Data Name: COMPLNT-TYPE			
3. Definition/Explanation: The type of complaint being submitted for adjudication.			
4. Data Use Identifiers and Explanations:	4a. Data Name		4b. Code Size and Class
Complaint, Type of: See 3 above	COMPLNT-TYPE		1A
5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
A	EEO Discrimination, AFR 40-713	E	Unfair Labor Practice
B	Appeal-EEO Discrimination, AFR 40-771	F	Grievance-Negotiated Procedures
C	Appeal-Non Discrimination, AFR 40-771	G	Grievance-Air Force Procedures
D	Appeal-Other	M-W	Reserved for Future Use
		X	Other

1. Title: Consolidated Base Personn Office Number, ADE CO-500, Chg Eff: 1 Jul 1975			
2. Data Name: CBPO-NR			
3. Definition/Explanation: A sequential Alphanumeric number assigned to a Consolidated Base Personnel office			
4. Data Use Identifiers and Explanations:	4a. Data Name		4b. Code Size and Class
Central Civilian Personnel Office Number: A sequential alpha-numeric number assigned to a Central Civilian Personnel Office to be used interchangeable with Consolidated Base Personnel Office Number.	CCPO-NR		2AN
Consolidated Base Personnel Office Number: See 3 above	CBPO-NR		2AN
Consolidated Base Personnel Office Number Initiated First Assignment: It identifies the CBPO number which initiated the first projected assignment. Applies to USAFR only.	CBPO-NR-INIT-1ST-ASC		2AN
Consolidated Reserve Personnel Office Number: Used to route data to respective offices.	CRPO-NR		2AN
Gain CBPO Number of a CBPO Directed Reassignment: Identifies the CBPO number which an individual will be assigned as a result of a CBPO directed assignment action.	CBPO-NR-DIR-ASGHT-PAS		2AN
CBPO Number, Gaining: Gaining CBPO number of the CBPO and unit which will gain the individual.	CBPO-NR-GAIN		2AN
CBPO Number, Losing: Number of the CBPO and unit which will lose an individual.	CBPO-NR-LOSING		2AN
New CBPO Number: The CBPO number associated with a new or changed Personnel Accounting Symbol or the establishment of a new CBPO.	NEW-CBPO-NR		2AN
Personnel Accounting Symbol CBPO Number Attachment Training: The number of the CBPO which services the unit to which a member is attached for training when different from unit of assignment.	PAS-CBPO-NR-ATCH-TNG		2AN
Reenlisting Consolidated Base Personnel Office Number: Identifies the CBPO at which a TDY Airman is reenlisting.	REENL-CBPO-NR		2AN
Routing CBPO Number: Number of the CBPO and unit to which a personnel transaction is routed.	ROUTE-CBPO-NR		2AN
Second Gaining Consolidated Base Personnel Office Number: The number of the Gaining Consolidated Base Personnel Office of the second pending assignment.	2ND-GAIN-CBPO-NR		2AN
Second Losing Consolidated Base Personnel Office Number: The number of the losing Consolidated Base Personnel Office of the Second Pending Assignment.	2ND-LOSING-CBPO-NR		2AN
Temporary Duty Personnel Accounting Symbol, Consolidated Base Personnel Office Number of Attachment: The number of the Consolidated Base Personnel Office of attachment for an individual currently on TDY.	TDY-PAS-CBPO-NR-ATCH		2AN
Uniform Officer Record CBPO Number: The CBPO Number contained (This is an Interim Code, pending development by the Department of Defense)	UOR-CBPO-NR		2AN
5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
AH	Alconbury RAF, Sta, United Kingdom, (USAFE)	BH	Bergstrom AFB, TEX (TAC)
AK	Washington/AFTC, DC (HQ COMD, USAF) (1035)	BL	Bitburg AB, Germany (USAFE)
AM	Altus AFB, OKLA, (MAC)	BN	Blytheville AFB, AR? (SAC)
AT	Andersen AFB, Guam (SAC)	BP	Bolling AFB, DC, (HQ COMD, USAF) (1100)
AU	Andrews AFB, MD (HQ COMD, USAF)	BV	Brooks AFB, TEX (AFSC)
AX	Athens, Greece (USAFE)	CC	Camp New Amsterdam AB, Netherlands (USAF)
AY	Aviano AB, Italy (USAFE)	CD	Cannon AFB, NMEX (TAC)
BB	Barksdale AFB, LA (SAC)	CF	Carswell AFB, TEX (SAC)
BD	Beale AFB, CAL (SAC)	CH	Castle AFB, CAL (SAC)
BF	Bentwaters RAF Sta, United Kingdom (USAFE)	CK	Chanute AFB, Ill (ATC)
		7K	Chanute AFB, ILL (ATC-Pipeline)

1. Title: Consolidated Base Personnel Office Number, ADE CO-500, Chg Eff: 1 Jul 1975 (Continued)

PART I (Continued)

5. Data Codes	Data Items and Explanations:	Data Codes	Data Items and Explanations:
CL	Charleston AFB, SCAR (MAC)	LU	Los Angeles AFS, CAL (AFSC)
CP	Clark AB, Philippines (PACAF)	LW	Lowry AFB, COL (ATC)
CO	Columbus AFB, MISS (ATC)	ZL	Lowry AFB, COL (ATC-Pipeline)
CZ	Craig AFB, ALA (ATC)	LY	Luke AFB, ARZ (TAC)
DF	Davis-Monthan AFB, ARZ (SAC)	MA	MacDill AFB, FLA (TAC)
DC	Debbins AFB (GEO (Integrated CBPO Test Site Active & USAFR)	MB	Malstrom AFB, MONT (SAC)
DJ	Denver, COL (AFAPC)	MD	March AFB, CAL (SAC)
DM	Dover AFB, DEL (MAC)	ME	Mather AFB, CAL (ATC)
DT	Duluth IAP, MINN (ADC)	MG	Maxwell AFB, ALA (AU)
DW	DYESS AFB, TEX (SAC)	MH	McChord AFB, WASH (MAC)
EB	Edwards AFB, CAL (AFSC)	MU	McClellan AFB, CAL (AFLC)
ED	Eglin AFB, FLA (AFSC)	NK	McConnell AFB, KAN (SAC)
EE	Eglin Aux Fld 9, FLA (TAC)	NL	Mildenhall RAF Sta, United Kingdom (USAFE)
EG	Ellington AFB, TEX (Integrated CBPO Test Site Active & USAFR)	NN	McGuire AFB, NJ (MAC)
EH	Eielson AFB, ALS (AAC)	NP	Minot AFB, ND (SAC)
EJ	Ellsworth AFB, SDAK (SAC)	NT	Noody AFB, GEO (ATC)
EL	Elmendorf AFB, ALS (AAC)	NW	Rt Home AFB, IDA (TAC)
ER	England AFB, LIA (TAC)	NY	Myrtle Beach AFB, SCAR (TAC)
EP	Peterson Fld, COLO (ADC) (4600th)	NJ	Nellis AFB, NEV (TAC)
FC	Fairchild AFB, WASH (SAC)	NV	Morton AFB, CAL (MAC)
FR	Fort Belvoir, AI, VIR (HQ CONQ, USAF)	OD	Offutt AFB, NEB (SAC)
FW	Francis E. Warren AFB, WYO (SAC)	OP	Osan AB, Korea (PACAF)
GB	George AFB, CAL (TAC)	PF	Patrick AFB, FLA (AFSC)
GF	Goodfellow AFB, TEX (USAFSS)	PJ	Pease AFB, NH (SAC)
GR	Grand Forks AFB, NDAK (SAC)	PS	Plattsburgh AFB, NY (SAC)
GW	Griffiss AFB, NY (AFLC)	PV	Pope AFB, NCAR (TAC)
BX	Grissom AFB, IND (SAC)	RF	Ramstein AB, Germany (USAFE)
HB	Hahn AB, Germany (USAFE)	RJ	Randolph AFB, TEX (ATC)
HF	Hancock Fld, NY (ADC)	RR	Reese AFB, TEX (ATC)
HM	HQ USAF (1143 ABSq), DC	RP	Rhein Main AB, Germany (USAFE) (7310)
HL	Mickam AFB, NAM (PACAF)	RT	Richards Gebaur, MO (AFSC)
HP	Mill AFB, UTAH (AFLC)	RX	Robins AFB, GEO (AFLC)
HS	Holloman AFB, NMEX (TAC)	SF	Scott AFB, ILL (MAC)
HV	Homestead AFB, FLA (TAC)	SJ	Sembach AB, Germany (USAFE)
AF	Howard AFB, Canal Zone (USAFBOU)	SN	Seymour Johnson AFB, NCAR (TAC)
IN	Incirlik, Turkey (USAF)	SP	Shaw AFB, SCAR (TAC)
KB	Kadena AB, Okinawa (PACAF)	SQ	Sheppard AFB, TEX (ATC)
KF	Keesler AFB, MISS (ATC)	ZS	Sheppard AFB, TEX (ATC-Pipeline)
KJ	Kelly AFB, TEX (USAFSS) (6960th)	SA	Springfield VIR (HQ CONQ)
KH	Kelly AFB, TEX (AFLC)	ST	Spangdahlem AB, Germany (USAFE)
KM	Kincheloe Afd, NICH (SAC)	PE	Stuttgart, Germany (HQ CONQ, USAFE)
KV	Kirtland AFB, NM (AFSC)	TE	Tinker AFB, OKLA (AFLC)
KY	K. I. Sawyer AFB, MI (SAC)	TJ	Torrejon AB, Spain (USAFE)
KU	Kusan AB, Korea (PACAF)	TP	Travis AFB, CAL (MAC)
LA	Lackland AFB, TEX (ATC)	TX	Tyndall AFB, FLA (ADC)
LB	Lackland AFB, TX (AFSC)	UD	Udorn AFB, Thailand (PACAF)
LC	Lajes Fld, Azores (MAC)	UC	U-Tapao AFD, Thailand (PACAF)
LD	Lakenheath RAF Sta, United Kingdom (USAFE)	UP	Upper Heyford RAF Sta, United Kingdom (USAFE)
LE	Langley AFB, VIR (TAC)	US	USAF Academy, COL (USAF)
LJ	Loughlin AFB, TEX (ATC)	VN	Vance AFB, OKLA (ATC)
LK	Laurence G. Hanscom Fld, MASS (AFSC)	VQ	Vandenberg AFB, CAL (SAC)
LP	Little Rock AFB, ARK (TAC)	WG	Washington/Forrestal Bldg (AFOSI)
LQ	Rickenbacker AFB, OHIO (SAC)	WN	Webb AFB, TEX (ATC)
LS	Loring AFB, NWE (SAC)	WT	Whiteman AFB, MO (SAC)
		WU	Wiesbaden AB, Germany (USAFE)
		WV	Williams AFB, ARZ (ATC)
		WY	Wright-Patterson AFB, OHIO (AU)
		WE	Wright-Patterson AFB, OHIO (AFIC)
		WZ	Wurtsmith AFB, NICH (SAC)
		YH	Yokota AB, Japan (PACAF)

1. Title: Consolidated Base Personnel Office Number, ADE CO-500, Chg Eff: 1 Jul 1975 (Continued)

5. Data Codes Data Items and Explanations: Data Codes Data Items and Explanations:

PART I--(Continued)

ZB	Lackland AFB, TEX (ATC-Pipeline)	G2	Rosecrans Memorial Apt (ANG), St Joseph, MO
ZW	Zweibrucken AB, Germany (USAFE)	G3	Gt Falls IAP, MONT
PART II--ANG & AFRES			
A2	Dannelly Fld, Montgomery, ALA	G4	Lincoln AFB (ANG), NEB
A3	Sumpter Smith ANG Base Birmingham, ALA	G5	Muni Apt (ANG), Reno, NEV
A4	Kulis ANG Base, Anchorage, ALS	G6	Pease AFB (ANG), Portsmouth NH
A5	Sky Harbor Muni Apt (ANG), Phoenix, ARZ	G7	McGuire AFB (ANG), 1st Combat Support Sq, NJ
A6	Tucson IAP, Tucson, ARZ	G8	Atlantic City APT, NJ
A7	Little Rock/ANG, ARK	G9	McGuire AFB (ANG), (107th Combat Support Sq), NJ
A8	Muni Apt (ANG), Ft Smith, ARK	H2	Kirtland AFB (ANG), NMEX
B2	Fresno Air Terminal (ANG), Fresno, CAL	H3	Westchester County Apt (ANG), White Plains, NY
B3	Muni Apt (ANG), Hayward, CAL	H4	Suffolk County Apt, NY
B4	Ontario IAP, CAL	H6	Niagara Falls Muni Apt (ANG), Niagara Falls, NY
B5	Van Nuys Apt (ANG), Van Nuys, CAL	H7	Hancock Fld (ANG), Syracuse, NY
B6	Buckley ANG Base, Aurora, COL	H8	Schenectady County Apt (ANG), Schenectady, NY
B7	Bradley IAP, Windsor Locks, CONN	H9	Douglas Muni Apt (ANG), Charlotte, NCAR
B8	Ctr Wilmington Apt (ANG) New Castle, DEL	J2	Hector Fld (ANG), Fargo, NDAK
B9	Andrews AFB (ANG), Wash DC	J3	Rickenbacker AFB/ANG, OHIO
C2	Jacksonville IAP, Jacksonville, FLA	J4	Springfield Muni Apt (ANG), (177th Combat Support Sq), Springfield, OHIO
C3	Dobbins AFB (ANG), GEO	J6	Mansfield LAMN Apt, OHIO
C4	Savannah Rpt, Savannah, GEO	J7	Toledo Express Airport (ANG), Swanton, OHIO
C5	Hickman AFB (ANG), Honolulu, Haw	J8	Rickenbacker AFB/ANG, OHIO
C6	Boise Air Terminal (ANG), Boise, IDA	J9	Will Rogers World Apt, OKLA
C7	O'Hare IAP (ANG), Chicago, ILL	K2	Tulsa IAP, OKLA
C8	Capital Muni Apt (ANG), Springfield, ILL	K3	Portland IAP (ANG), Portland, ORE
C9	Ctr Peoria Apt (ANG), Peoria, ILL	K4	Harrisburg/Olmstead IAP, PENN
D2	Mulman Fld (ANG), Terra Haute, IND	K5	Ctr Pittsburgh Apt (ANG), (111th Support Sq) Corapolis, PENN
D3	Boer Fld (ANG), Ft Wayne, IND	K6	Willow Grove NAS (ANG), PENN
D4	Des Moines Rpt, IOWA	K7	Ctr Pittsburgh Apt (ANG), 111th Support Sq, Corapolis, PENN
D5	Sioux City Apt (ANG), Sergeant Bluff, IOWA	K8	Puerto Rico IAP (ANG), San Juan, Puerto Rico
D6	McConnell AFB (ANG), KAN	K9	TF Green Apt (ANG), Warwick, RH IS
D7	Forbes ANGB, KAN	L2	McEntire ANG Base, Eastover, SCAR
D8	Standiford Fld, Louisville, KEN	L3	Joe Foss Fls (ANG), Sioux Falls, SDAK
D9	New Orleans ANG/ANX, LIA	L4	Nashville Metro Apr, TENN
E2	Bangor IAP, ME	L5	Memphis Metro IAP, TENN
E3	Martin Apt (ANG), (175th Combat Support Sq), Baltimore, MLD	L6	McGhee-Tyson Apt (ANG), Knoxville TENN
E4	Martin Apt (ANG), 135th Combat Support Sq), Baltimore, MLD	L7	Kelly AFB (ANG), TEX
E5	Otis ANG/ANX, MASS	L8	USN Air Sta (ANG), Dallas, TEX
E7	Barnes Muni Apt (ANG), Westfield, MASS	L9	Ellington AFB (ANG), TEX
E8	W. K. Kellogg AFB, MICH	M2	Salt Lake City IAP, UTAH
E9	Selfridge ANGB, MICH		
F2	Selfridge ANGB, Mich		
F3	Minn-St Paul IAP (ANG), St Paul, MINN		
F4	Duluth IAP (ANG), Duluth, MINN		
F6	Thompson Fld (ANG), Jackson, MISS		
F7	Key Field (ANG), Meridian, MISS		
F8	Lambert/St Louis Rpt, MO		

1 Title: Consolidated Base Personnel Office Number, ADE CO-500, Chg Eff: 1 Jan 1976 (Continued)

5 Data Codes Data Items and Explanations:

PART II--ANG & ACRES (Continued)

R3 Burlington IAP, VT
R4 Byrd Fld (ANG), Sandston, VIR
R5 Spokane IAP (ANG), Spokane, WASH
R7 Kanawha Aprt (ANG), Charleston, WVA
R8 Martinsburg Runi Aprt (ANG), Martinsburg, WVA
R9 Truxax Field (ANG), Madison, WISC
N2 Gen B. Mitchell ANGB, Milwaukee, WISC
N3 Runi Aprt (ANG), Cheyenne, WYO
R2 Rickenbacker AFB (USAFR), OHIO
R4 Selfridge ANG (USAFR), MICH
R5 Kelly AFB (USAFR), San Antonio, TEX
R7 Gen Billy Mitchell Fld (USAFR), Milwaukee, WISC
R8 Richards-Gebour AFB (USAFR), Grandview, MO
R9 Dobbins AFB (USAFR), Marietta, GEO
S1 Ellington AFB (USAFR), Houston
S3 Andrews AFB (USAFR), MD
S4 Carswell AFB (USAFR), Ft Worth, PENN
S5 Willow Grove NAS (USAFR), PENN
S7 ARPC (Residuals) (USAFR)
S8 ARPC (Air Reserve Squadrons, Reinforcement Designees and Specialty Training Squadrons, Mobilization Augmentees and Overseas Mobilization Augmentees attached to HQ ARPC (CAC) for administration and further attached to Element Training Squadrons for Training (USAFR)
T1 Norton AFB (USAFR), CAL
T2 McChord AFB (USAFR), WASH
T3 McGuire AFB (USAFR), NJ
T4 Dover AFB (USAFR), DEL
T5 Charleston AFB (USAFR), SCAR
T6 Scott AFB (USAFR), ILL
T7 Maxwell AFB (USAFR), ALA
T8 Travis AFB (USAFR), CAL
T9 Youngstown MAP (USAFR), OHIO
U2 Grissom AFB (USAFR), IND
U3 Homestead AFB (USAFR), FLA
U4 Hamilton AFB (USAFR), CAL

Data Codes

Data Items and Explanations:

U5 Niagara Falls IAP, (USAFR), NY
U6 Barksdale AFB (USAFR), LIA
U7 Tinker AFB (USAFR), OKLA
U8 McClellan AFB, (USAFR), CAL
U9 Hill AFB (USAFR), UTAH
W1 Greater Pittsburgh APT (USAFR) PENN
W2 Chicago-O'Hare IAP (USAFR), ILL
W3 Rinn-St. Paul IAP (USAFR), MINN
W4 New Orleans NAS (USAFR), LIA
W5 Westover AFB (USAFR), MASS
W7 Keesler AFB, (USAFR), MISS
PART III--Consolidated Reserve Personnel Offices
81 Dobbins AFB, Marietta, GEO
82 Richards-Gebour AFB, Grandview, MO
83 Homestead AFB, FLA
85 Charleston AFB, SCAR
94 Bolling AFB, Wash DC (HQ COMD/USAF/DPR)
96 ARPC (Category A&B units, other than Reserve Military Airlift, Tactical Airlift, Medical Service Units) (USAFR), Denver, COL

PART IV--CENTRAL CIVILIAN PERSONNEL OFFICES-UNIQUE IDENTIFIERS

1A Ankara AB TURKEY
1B Arnold AFS, TENN
1C Atlanta, GA
1D Chicago/O'Hare IAP, Chicago, ILL
1E Dallas USN AS, Dallas, TX
1F Dobbins AFB, GA
1G Ellington AFB, TX
1H Ft. Detrick, MD
1J Goose AB, CANADA
1K Greater Pittsburg APT, PA
1L Hamilton AFB, CA
1M Izmir AB, TURKEY
1N Karamursel AB, TURKEY
1P Keflavick AB, ICELAND
1Q Kingsley Field, OR
1R Kirkland AFB, (AFCMD) N.W.
1S WPLS/St. Paul IAP, Minneapolis, MINN
1T Newark AFS, OHIO
1U Otis AFB, MASS
1V San Francisco USN AS, CA
1W Taipei ASN, TAINAN (CCK)
1X Westover AFB, MASS
1Y Willow Grove NAS, PA
1Z Wright-Patterson (ASD), OHIO
2A Youngstown, OHIO

*Office symbol is necessary to identify the location of a CBPO in a specific RAJCOM.

Addendum A-7

Major Commands Codes

(Extracted from AFM 300-4, Vol XII, ADE MA-360, 10 March 1976)

CODE	COMMAND
A	Alaskan Air Command
B	US Air Force Academy
C	Aerospace Defense Command
D	US Air Forces in Europe
E	Air Force Accounting and Finance Center
F	Air Force Logistics Command
G	Aeronautical Chart & Information Center (Historical)
H	Air Force Systems Command
I	Air Reserve Personnel Center
J	Air Training Command
K	Air University
L	USAF Southern Command
M	HQ Air Force Reserve
N	Headquarters USAF
O	Air Force Data Automation Agency
P	Headquarters Command, USAF
R	Pacific Air Forces
S	Strategic Air Command
T	Tactical Air Command
U	USAF Security Service
V	HEADQUARTERS USAF
W	HEADQUARTERS USAF

Addendum A-7 (Continued)

CODE	COMMAND
X	Office of Aerospace Research (Historical)
Y	Air Force Communications Service
2	Air Force Inspection and Safety Center
3	Air Force Test and Evaluation Center
5	Air Force Intelligence Service
6	Air Force Audit Agency
7	Air Force Office of Special Investigation
9	USAF Military Personnel Center

Appendix B

Maintainer's Guide

This appendix contains: instructions for building new Inventory and Requirements data bases from the AFMPC tapes, data file structure, a file directory, and some programming notes.

Building New Data Bases

This section is a procedural guide to be followed by an individual without computer programming experience to build new data bases from the AFMPC magnetic tapes. If any problems are encountered or programming changes desired, assistance should be requested from the AFIT School of Engineering Computer Operations Staff ADRIS monitor.

(1) The two data base magnetic tapes must be individually identified before turning them over to the tape library for processing. Each tape can be identified from a tag attached by the AFMPC before shipment to AFIT. For each tape, record the Reel Number--a 6-digit integer, and the File ID--"AUTHAFIT" for the Requirements tape and "ASGDAFIT" for the Inventory tape.

Hand carry the two tapes to the control desk at the Aeronautical Systems Division (ASD) Computer Center, Bldg. 676. Inform the desk clerk that you wish "X" numbers (Visual Serial Numbers) assigned to the two tapes. The clerk will direct you to fill out some forms with your

problem number, office symbol, and phone. Then, the clerk will attach an adhesive label, marked with an X number, to each tape. Be sure to record the X number (X followed by five digits) and note the tape that the X number is linked with. This is necessary to distinguish the tapes from one another during later processing.

(2) The data bases can now be built. All magnetic tape computer jobs must be submitted as a card deck with a Magnetic Tape Transaction Request blue card (ASD Form 59). This card can be obtained at the turn-in window in the AFIT Computer Lab. The form should be filled out as shown in Fig. 17.

MAGNETIC TAPE TRANSACTION REQUEST					
REQUESTOR (Print) LEE, R.	SYMBOL AFIT7 ENR	PROBLEM NR. T770008	PHONE 55533	DATE 1 Jun 77	PRC
TYPE OF TRANSACTION	TAPE NUMBER	PROBLEM NR ASSIGNED TO TAPE	RING STATUS IN OUT	THIS SECTION TO BE CLASSIFIED TAPE	
COMPUTER RUN	X X01645	T770008	X	CLASSIFICATION OF TAPE: COMPLETION OF RUN	
ASSIGN				DOWNGRADING INSTRUC: AFTER COMPLETION OF	
LIBRARY RELEASE				EMERGENCY CLASSIFIED D PROCEDURE	
CUSTOMER REMOVAL				DEGAUSS	
TRANSFER	APPROPRIATE X Number	MEANS TAPE CAN BE READ ONLY		PICK-UP WITHIN TWO F NOTIFICATION	
CLEAN				SIGNATURE	
STRIP				R. Lee	
DEGAUSS					
CERTIFY					

ASD FORM 59 SEP 73 99 PREVIOUS EDITION MAY BE USED

Fig. 17. Magnetic Tape Transaction Request.

Tape Test. A test run should first be made on each magnetic tape. The card deck contents are shown below. All cards are punched starting in column 1. To test the SPLY build program with the Inventory tape:

(ASD Form 59)


LE1¹,NT1,STCSB.T770008,LEE,TEST SPLY
BEGIN,TSPLY,BUILD,(MPC #)²,(X No)³.
7/8/9⁴
(Date)⁵
2,500⁶
6/7/8/9⁷

These numbers are for the "ASGDAFIT" Inventory tape. Period must be in first column after X No.

- Notes:
- 1 This parameter is the job identification banner. It will appear at the top of the computer printout from the job. Also, the first letter will be used by the AFIT computer operator to return the printout and card deck to the output bins in the computer lab.
 - 2 Insert here the 6-digit MPC tape number for the "ASGDAFIT" Inventory tape.
 - 3 Insert here the corresponding X number: X followed by five digits.
 - 4 Multipunch a 7, 8, and 9.
 - 5 Punch date on which data base information became current ("as of" date) (limit of 10 characters).
 - 6 The "2" indicates a test run printout will be produced and the "500" that the test run will be made on 500 tape records.
 - 7 The last card in the deck is the orange 6/7/8/9 end-of-job card, available at the turn-in window.

To test the DMND build program with the Requirements
tape:

(ASD Form 59)
LE2,NT1,STCSB.T770008,LEE,TEST DMND
BEGIN,TDMND,BUILD,(MPC #), (X #).
7/8/9
2,500
6/7/8/9

 These numbers are for the
"AUTHAFIT" Requirements
tape. Period is required.

Both card decks may be submitted at the same time.
There are four things to look for in the printout to see
if the programs are working with the tapes.

(a) The 500 records and a record storage directory
should have been printed. Check the records to see if the
information printed looks correct. See Table VIII. Note
that the records are printed in ascending order of the ASCs
(all "0" ASCs first, followed by all "1" ASCs, etc.). The
starting number of each new ASC group (counting down the
printout page) should correspond to the equivalent storage
directory file value. To help you count the records, every
10th one is numbered.

(b) Check to see that the tape creation date was
printed correctly (only on SPLY program output listing).

The next two things to check for also apply to the
printout received back with the runs that create the whole
data base.

(c) If a record is found with a bad ASC (non-
digit first character), this fact is noted in the output

Table VIII

DMND Build Program Test Output

EL	ASC	PRE	SUFF	AFSC	CBPO	MAJCOM	GR	COUNT
----	-----	-----	------	------	------	--------	----	-------

RANDOM RECORD 1 FOLLOWS:

P	OCAY			5116	EL	OA		5
R	OCYY	T	A	5135	US	OB		4
.
P	OCYY	T	C	5125	US	OB		4
P	OCYY	T	A	5135	US	OB		4
P	OCYY	T	B	5145	US	OB		4
P	OCYY	T		5116	US	OB		4
P	OCYY	T	B	5135	US	OB		3
P	1AYY			36	EL	OA		6
.

RANDOM RECORD 2 FOLLOWS

RECORD STORAGE DIRECTORY

PD(1)	=	1	Inter-Area
PD(2)	=	15	Admin, Man, Mil Sci
PD(3)	=	76	Arts, Hum, Educ
PD(4)	=	145	Biolog & Agricul Sci
PH(5)	=	159	Engineering
PD(6)	=	315	Civil Law
PD(7)	=	315	Math
PD(8)	=	338	Phys Sci
PD(9)	=	400	Soc Sci
PD(10)	=	501	YYYY ASCs
PD(11)	=	501	Aggreg ASCs
PD(12)	=	501	Last Record + 1

listing and the record is also printed for checking. More than a few errors of this type would indicate that the tape format has changed or there were many key punch errors at the AFMPC.

(d) If a record has alphabetic characters where numeric characters are expected the printout will indicate an "illegal data in field" error for each occurrence (up to 50) and point out the offending character. An example would be a nonnumeric character in an AFSC. There should not be more than a few (if any) of these errors for the whole data base. A record with such an error (either in grade or AFSC) will be accepted into the data base; however, the value retained for the AFSC or grade will be that of the corresponding field of the previous record processed. The number of "illegal data in field" errors found is printed in the output listing.

If there is any doubt in the test runs, get help.

Data Base Creation. The Inventory and Requirements data bases must be separately created. First, submit the following deck to create the Inventory data base.

(ASD Form 59)

LE3,NT1,T120¹,I0255²,CM32000,STCSB.T770008,LEE,SPLY
BEGIN,SPLYGO,BUILD,(MPC #),(X #).

7/8/9

1,100000³

6/7/8/9

For the "ASGDAFIT"
Inventory tapes, mandatory
period.

Notes: 1,2 These values are the requested amounts of time for program execution and input/output channel time respectively. These values should be kept approximately 25% above the amounts used by the previous data base creation. Refer to the day-file at the bottom of the execution listing: see the "CPA" value for ¹ and the "IO" value for ² (values are for full data base creations, not test runs)

3 The "1" and "100000" indicate a full data base creation run.

Successful building of the Inventory data base can be verified only by checking the job dayfile, a summary report of what happened to the job, found at the very end of the output listing. The dayfile should contain two successful "initial catalogs". The listing should look something like the following:

```
.  
.  
INITIAL CATALOG  
CT ID=          AFIT PFN=ADRISINV  
CT CY= 001      00055808 WORDS.  
CATALOG,TAPE40,ADRISPOINTER,CY=1,XR=* ---  
*,RP=999.  
INITIAL CATALOG  
CT ID=          AFIT PFN=ADRISPOINTER  
CT CY= 001      00000128 WORDS.
```

The size of the pointer file will always be 128 words; however, the ADRISINV file should remain constant or grow slightly from quarter-to-quarter.

The printout of the record storage directory above the dayfile should also be checked. The entries can be compared with the previous data base values to determine changes in the size of each ASC group.

The program will print out the size of the inventory key index. If SIZE x 100 - 500 is less than the last entry in the pointer file, PS(12), notify the ADRIS monitor.

Run the DMND card deck shown below only after the SPLY program output has been checked and is all right.

(ASD Form 59)

LE4,NT1,T55,IO110,CM44000,STCSB.T770008,LEE,DMND
BEGIN,DMNDGO,BUILD,(MPC #),(X #).

7/8/9

2,100000

6/7/8/9

For the "AUTHAFIT"
Requirements tape-period
required.

The same notes following the build Inventory deck for the T and IO parameters apply here also. The dayfile should contain a successful "initial catalog" and "extend" as shown below.

INITIAL CATALOG

CT ID= AFIT PFN=ADRIREQ
CT CY= 001 00022848 WORDS.
EXTEND,TAPE40
EX ID= AFIT PFN=ADRISPOINTER
EX CY= 001 00000128 WORDS.

As with SPLY the pointer file should remain constant at 128 words while the ADRIREQ file should remain constant or change slightly from quarter-to-quarter. From June 1976 to January 1977, overall Master's Degree AAD Requirements declined by approximately 1,000.

The other checks described for SPLY should also be made for DMND. If everything looks in order, the final test should be to run the ADRI interactive program with all parameters equal to "*". The totals (not including 0-6s) should approximate the following, obtained from the January 1977 data base:

Master's Inventory	-	24,098
Master's Requirements	-	7,877
PHD Inventory	-	959
PHD Requirements	-	848

The rest of the Maintainer's Guide is for the use of the computer staff ADRIS monitor.

Data File Format and Structure

The data files associated with the ADRIS system can be described in terms of two magnetic tapes (received quarterly from AFMPC) containing source information and the three data files constructed from these tapes. In addition, there are four auxiliary data files, separately prepared, that may require updating from time to time.

Magnetic Tapes. One magnetic tape contains the Inventory data base while the other tape contains the Requirements data base. The two tapes are nine-track, 1600 BPI, coded in EBCIDIC, and labeled--with 25 records to the block. Record structure and read formatting are shown in Table IX (only needed fields are read by the build programs).

Constructed Data Files. The SPLY program builds the Inventory data base while the DMND program builds the Requirements data base. Both data bases are built using the FORTRAN WRITMS statement to create a random file structure which is stored on permanent disc space for interactive program use. Each random record consists of 100 of the tape records. The Education Level, ASC, AFSC, grade, CBPO, and major command of each legal tape record is packed into two

Table IX

Tape Fields and Format

<u>Data Element</u>	<u>Character Position</u>	<u>Read Format</u>
INVENTORY: 96 characters/block (Processed by SPLY)		
Academic Specialty Code (ASC)	1-4	4A1
Education Level	5	A1
Duty Air Force Specialty Code Prefix	6	A1
Duty Air Force Specialty Code and Suffix	7-11	I4,A1
Current Grade	12-13	I2
Assignment Availability Date (Year-Month)	14-17	I4
PAS CBPO Code	18-19	A2
PAS MAJCOM - ID	20-21	A2
PAS Number	22-25	
Method to Achieve Educational Level	26	
PAS Organization Number	27-30	
PAS Organization Kind	31-33	
PAS Organization Type	34-35	
PAS Installation Name	36-52	
PAS Country or State Name (Abbrev)	53-57	
Functional Account	58-63	
Organizational Structure ID	64-68	
Program Element	69-74	
Restricted Field (May <u>not</u> be used)	75-80	
Blank Fill	81-96	
REQUIREMENTS: 102 characters/block (Processed by DMND)		
ASC	1-4	4A1
Education Level	5	A1
Authorized Air Force Specialty Code Prefix	6	A1
Authorized Air Force Specialty Code and Suffix	7-11	I4,A1
Authorized Grade	12-13	I2
Authorized Manpower Level, 15th of the Month	14	I1
PAS CBPO Code	15-16	A2
PAS MAJCOM Code	17-18	A2
PAS Number	19-22	
Authorized Functional Account Descriptor	23-40	
Authorized PAS Organization Number	41-44	
Authorized PAS Organization Kind	45-47	
Authorized PAS Organization Type	48-49	
PAS Installation Name	50-66	
PAS Country or State Name (Abbrev)	67-71	
Authorized Functional Account	72-77	
Authorized Program Element	78-83	
Authorized Organization Structure ID	84-88	
Blank Fill	89-102	

words; therefore, each CYBER random record is 200 words long.

SPLY and DMND each write a random record pointer index of 12 words to the pointer file. The two data base files are organized by grouping records according to the ASC general area of study (all "0s" together, all "1s" together, etc.). The pointer index, then, contains the beginning record number of each ASC group (for example, "0" - 1; "1" - 1,124; "2" - 4,999; etc.)

A third pointer file record is used to store the magnetic tape creation date. This date is printed during use of the interactive ADRIS program.

Auxiliary Files. All four auxiliary files are sequentially structured. SPLY and DMND use the CONVRT file to convert obsolete ASCs to their replacement values. The file contains 23 obsolete ASCs and their replacements. The ASCs are organized in 80-column card-image records. The 23 obsolete ASCs occupy the first 92 character positions with the replacement ASCs occupying the corresponding character positions from 93 to 184. The 23 obsolete ASCs are ordered to reflect a minimum search binary tree structure as explained in Chapter V. If new ASCs are added to the file they should be inserted so as to maintain the minimum search structure. The build programs expect the first four characters on the file to be the "root" element of the tree.

The DMND program uses the GENERAL file to determine which ASCs must have their third or fourth characters generalized (converted to "Y"). The GENERAL file is used to construct a hash table as explained in Chapter V. File format is 80-column card-image records with eight ASCs and their associated codes per card, as shown in Fig. 18.

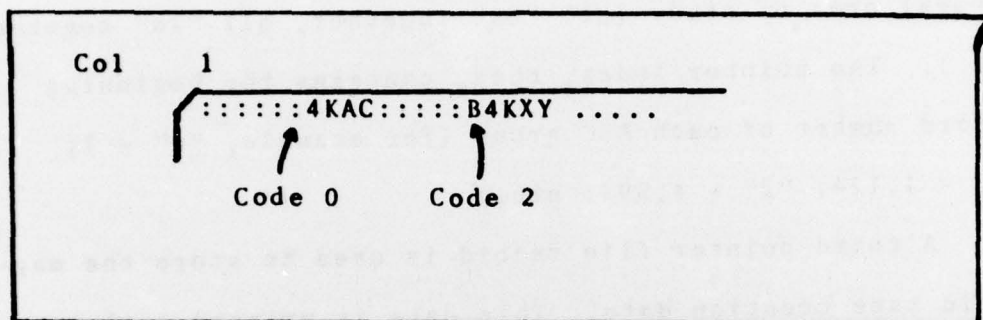


Fig. 18. General Data File.

The file is read with a (5X,R5) format so ":" translates into internal integer 0 and "B" into 2. Code 0 is a cue that the ASC is to be left unchanged while code 2 is a cue to convert the last two characters to "YY". There is no ordering to the file so any additions may be made to the end of the file. Additions should not be made without confirming that no more than two ASCs hash to any particular table position. This can be checked by using the HASHTST program stored in the UPDATE source library described in a later section. Two ASCs on the GENERAL file hash to the number 1,213; two other ASCs hash to 3,607.

The AREA data file is used by the interactive program to convert AFSC area descriptors (see Addendum A-5 of User's

Guide) into the constituent AFSCs. The file is composed of card-image records as shown by two examples in Fig. 19.

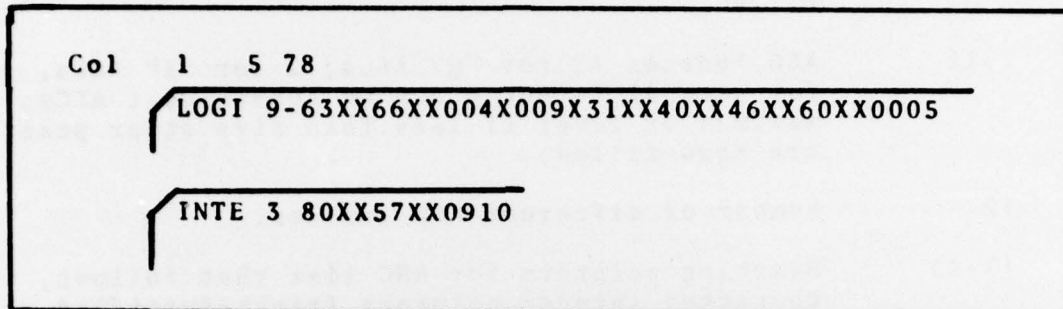


Fig. 19. Area Data File Structure

Characters 1-4 are the area descriptor (four characters must be used)--LOGI for logistics and INTE for Intelligence. Characters 5 and 6 contain the number of constituent AFSCs. Character 7 contains a dash ("-") if the first two AFSCs in the list are to be considered inclusive (i.e., 63XX-66XX above), otherwise character 7 is a blank. The remaining characters are the constituent ASCs. There is no record ordering.

Data file AGGREG is used by the interactive program to convert ASC aggregate codes to constituent ASCs. The file is composed of card-image records as shown by example in Fig. 20.

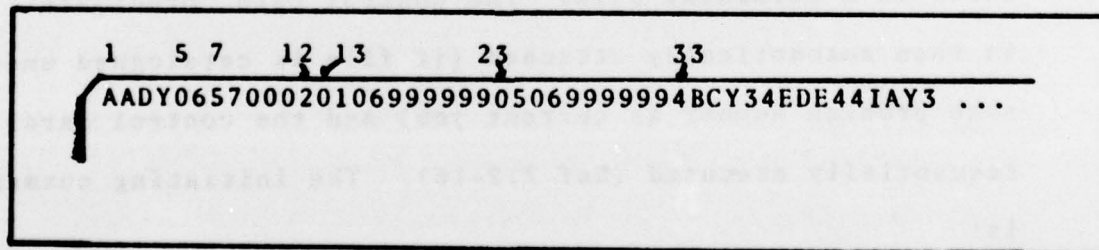


Fig. 20. AGGREG Data File Structure.

<u>Column</u>	<u>Description</u>
1-4	Aggregate ASC
5-6	Number of constituent ASCs, right-justified, zero-filled.
7-11	ASC indexes (1 for "0" ASCs, 2 for "1" ASCs, etc.) for each different group of constituent ASCs; maximum of five; if less than five other positions are zero-filled.
12	Number of different ASC indexes.
13-22	Starting pointers for ASC list that follows, two character integer pointers (right-justified, zero-filled) with a maximum of five. First pointer corresponds to first ASC index, etc. Unused pointers are 9-filled.
23-32	Ending pointers for ASC list that follows, same structure as starting pointer.
33 on	List of constituent ASCs. Each ASC is followed by a digit that indicates the number of specific (non "Y") characters in the ASC.

File Directory

The ADRIS build and interactive programs are stored on permanent file disc space in object form. All ADRIS data files are also stored as permanent files. The programs and data files are attached and used through the use of the University of Washington Control Language facility. The language permits the storing of a string of SCOPE control cards on a permanent file. The control card "procedure" is then automatically attached (if file is catalogued under same problem number as current job) and the control cards sequentially executed (Ref 7:2-16). The initiating command is:

BEGIN, (procedure name), (permanent file name),
(optional formal param)...

Use of this job control language simplifies ADRIS use for noncomputer oriented users.

All permanent files are stored under the ADRIS problem number, T770008, with an infinite retention period. The problem number has been protected from file expiration. All files are stored in cycle number one and are catalogued with password XR=MATT protection for multiple attaches and alteration prevention.

All ADRIS source code programs, data, and control card procedures are saved on an UPDATE library, ID=AFIT, file name ADRISLIB, CY=1, PW=MATT. A magnetic tape backup is also kept. Since 80-column data records and control cards are stored in the library, the D and 8 options must be used with the UPDATE command. These options will extract data and control cards with the full 80 columns of information available (and no sequence or ID numbers beyond). The command UPDATE, Q, D, 8, C=ADRIS will place a data file or control card procedure on file ADRIS. The deck name(s) of the desired information should follow *COMPILE in the input file.

Table X specifies the storage location, *DECK name (UPDATE library name), and content of all ADRIS information.

Table X

File Directory

<u>PF NAME</u>	<u>*DECK</u>	<u>DESCRIPTION</u>
ADRISLIB		UPDATE library of all *DECK information
ADRISOBJ		Absolute object of interactive ADRIS program overlay version
	ADRIS1	Source of interactive ADRIS overlay version
	ADRIS2	Source of interactive ADRIS non-overlay version
ADRISREQ		Current Requirements data base
ADRISINV		Current Inventory data base
ADRISPOINTER		Current Pointer file (also data base currency date)
AGGREG	AGGREG	Aggregate ASC data file
AREA	AREA	Area AFSC data file
RLEE	RLEE	Control card procedure to attach data files and execute ADRISOBJ. Procedure name is AFIT.
SPLYOBJ	SPLY	Object and source for building ADRISINV
DMNDOBJ	DMND	Object and source for building ADRISREQ
CONVRT	CONVRT	Data file for obsolete ASC conversion
GENERAL	GENERAL	Data file for ASC generalization
BUILD	BUILD	Contains four procedures: TSPLY, TDMND, SPLYGO, DMNDGO to test build programs with magnetic tapes and then build new data bases.
	HASHTST	Source for hash algorithm testing

Table X (Continued)

<u>PF NAME</u>	<u>*DECK</u>	<u>DESCRIPTION</u>
	TAPE1	Source for converting 7-bit ASCII into display code
	TAPE2	Source for converting BCD into display code
	TEST	Test case data (same as Table V) for batch run

Miscellaneous Notes

(1) The random file key indexes (arrays KEYS and KEYD) in the build and interactive programs must be kept at least one larger than the number of random records. The first section of this Maintainer's Guide directs the data base builder to notify the ADRIS computer staff monitor if the number of random records approaches the KEYS or KEYD dimensions. If the dimensions are changed, they must be changed in the applicable build program and in the interactive program (COMMON and OPENMS statements).

(2) A more comprehensive check of the build programs can be accomplished by separately reading the records from the magnetic tape and comparing these records with those printed by the build test programs.

(3) CYBER Record Manager cannot process magnetic tape blocks larger than 5,120 characters.

(4) The ADRIS interactive program expects the following data file assignments:

TAPE1 - Inventory data base
TAPE2 - Requirements data base
TAPE4 - Pointer file
TAPE6 - Aggregate data file
TAPE9 - Area data file

(5) The object code overlay of the ADRIS interactive program expects the overlays to be stored on file AADMS.

(6) Before ADRIS can be executed by a user logging in to INTERCOM under his own problem number, the RLEE file must be attached:

```
ATTACH,RLEE,ID=T770008  
BEGIN,AFIT,RLEE
```

(7) ADRIS may be run as a batch card job if there are a large number of cases or products to be run. The user responses should be prepared on cards in the input file. This method can be a little tricky since all program requests must be anticipated. The input card images used to run the validation effort test cases are stored on the UPDATE library in *DECK TEST.

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER GCS/MA/77M-3	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) ADVANCED DEGREE REQUIREMENTS INFORMATION SYSTEM,		5. TYPE OF REPORT & PERIOD COVERED MS Thesis
7. AUTHOR(s) Matthew B. Waldron Capt USAF		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Air Force Institute of Technology (AU) Wright-Patterson AFB OH 45433		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS Master's thesis		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) 12 167p.		12. REPORT DATE March 1977
		13. NUMBER OF PAGES 74
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited. AFIT/GCS/MA/77M-3		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Approved for public release; IAW AFR-190-17 JERRAL F. GUESS, Capt, USAF Director of Information		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Advanced Degree Requirements Information System (ADRS) Academic Specialty Code (ASC) Interactive Program Terminal Response Time		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The Advanced Degree Requirements Information System (ADRS), an interactive computer-based data retrieval system, was updated, validated, optimized, and documented. The developmental ADRS software designed for the Honeywell 6060 at Gunter AFS, Alabama, was converted for use on the Control Data CYBER 74 at Wright-Patterson AFB, Ohio. ADRS was implemented for use by noncomputer oriented Air Force Institute of Technology faculty and staff at		

012225

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time-sharing terminals. The ADRIS Inventory and Requirements data bases can be queried for information about Air Force graduate degree officers and Advanced Academic Degree job positions. The ADRIS system was analyzed, tested, and altered to insure correct operation and reliable output reports. A successful validation effort was conducted with the Air Force Data Services Center using two separately developed computer programs to compare results. A new feature was added to ADRIS to process user queries involving Aggregate Academic Specialty Codes--groupings of related ASCs attached to validated job positions. ADRIS was improved through optimization techniques that reduced data base processing time by over 70% and the resultant user response time by 50%. System User's and Maintainer's Guides are provided.

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