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AIR FORCE DATA BASE MANAGEMENT SYSTEMS REFERENCE LIST AND ANNOTATED BIBLIOGRAPHY

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Air Force Academy
Colorado

July 1974

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Data base management systems; Information systems; DBMS; Computer Based Information Systems; Annotated Bibliography; Features of data base management systems.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report lists the data base management system (DBMS) features of thirty-four (34) different applications of DBMSs in the United States Air Force. The features noted include storage structure used, operating environment of the DBMS, data manipulation language (DML) features available, DML type, factors affecting security and integrity, restart and recovery mechanisms, size characteristics of the data base, and on-line communication capabilities and primary use. An annotated bibliography of DBMS literature related to the

30

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features mentioned above is also included. The bibliography contains forty-seven (47) entries.

PREFACE

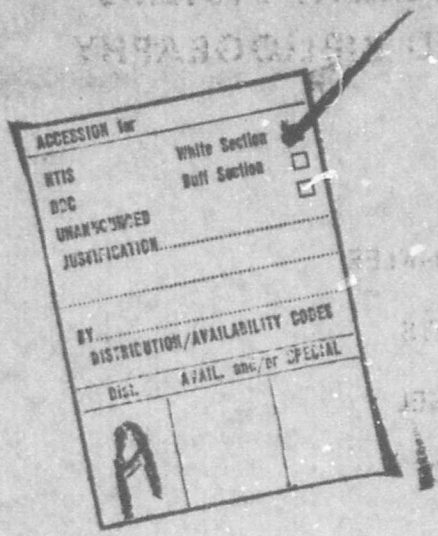
The System Survey Team (SST) of the Informal Technical Working Group Interested in Data Base Management Systems was formed in March, 1972, at the request of attendees at the USAF Academy's Second Annual Worldwide Data Base Management System Symposium. The SST is an informal intercommand working group whose expressed purpose is to provide general and detailed information about Air Force data base management systems to technical workers and managers involved in the research, design, and administration of data base management systems. To meet this goal, the SST initially developed a tutorial entitled Generalized Data Base Management Systems and Selected Air Force Applications which was published in April, 1973. This document is available from the Defense Documentation Center under AD765 203/5.

The SST is currently developing a report entitled The Data Administrator's Handbook which should be published in January, 1975. The annotated bibliography presented herein is the result of research related to the next SST report. The reference list is the result of an SST survey of the data base management system community.

The SST is currently composed of the following members:

Mr. Jack Catalano, ESD/MCS, Secretary
Major Robert W. Egel, DIA/DS-5
Major Donald G. Pursley, USAFA/DFACS, Vice Chairman
Major Robert J. Tufts, AFDSC/GMT
Major Anthony J. Winkler, AFLC/ACT, Chairman

Editorial Review by Lt Colonel W. A. Belford, Jr.
Department of English and Fine Arts
USAF Academy, Colorado 80840



This research report is presented as a competent treatment of the subject, worthy of publication. The United States Air Force Academy vouches for the quality of the research, without necessarily endorsing the opinions and conclusions of the author.

This report has been cleared for open publication and/or public release by the appropriate Office of Information in accordance with AFR 190-17 and DODD 5230.9. There is no objection to unlimited distribution of this report to the public at large, or by DDC to the National Technical Information Service.

This research report has been reviewed and is approved for publication.

Philip J. Erdle

PHILIP J. ERDLE, Colonel, USAF
Vice Dean of the Faculty

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TABLE OF CONTENTS

BACKGROUND

This report has been prepared primarily for the use of that portion of the Air Force community which is interested in data base management systems (DBMSs) from both the technical and the managerial viewpoints. The purpose of this report is to provide information about (1) DBMSs used by Air Force personnel and (2) current DBMS related literature.

The information about DBMSs used by Air Force personnel is provided in Section I of this report. These data were compiled from a survey conducted by the SST in January, 1974. Part I of this section is a list of the respondees to the aforementioned survey. They are grouped by computer corporation and then ordered within each group by machine designation and name of data base management system. The paragraph number corresponding to each respondee is used in Part II to designate the DBMS with the particular characteristics being discussed. For example, III4c refers to the VENUS system on the CDC6600 as reported by Mr. Dennis Wisnosky.

Part II of this report is a compilation of certain characteristics of the DBMSs listed in Part I. For some DBMSs, all questions in the SST survey were not answered. If this event occurred, it was assumed that the system did not have the particular characteristic or that the answer was not currently available.

Although the compiled results have been reviewed by members of the SST, some errors may exist. If there is an error, the survey respondee should contact Major Donald Pursley, USAFA/DFACS, autovon 259-4110, to make corrections.

If more detail is desired about one of the systems listed in Part I, questions should be directed to the designated point of contact for that system.

Section II of this report is an annotated bibliography of DBMS literature. This bibliography is an attempt to provide a pruned list of papers, textbooks, etc. with some information about the contents of each. These references are grouped by subject area as an additional aid to the reader. In addition, the SST has noted those individuals (Manager, System Designer, or Programmer) whom we feel would be most likely to use the reference.

It is hoped that this information will provide a useful tool for members of the Air Force DBMS community and that the community will continue to support SST related activities.

SECTION I

AIR FORCE DATA BASE MANAGEMENT SYSTEM REFERENCE LIST

PART I

SST SURVEY RESPONDEES

I. Special Purpose Computer

AN/FSQ-7 SAGE Unified Operational Program
26 AD(ADC)/SAGE Programming Agency
Luke AFB AZ 85309
Lt Victor J. Summers AV 853-2611 (X 337)
Lt Ronald E. Joy AV 853-2611 (X 870)

II. Burroughs

1. B6700 Advanced Personnel Data System (APDS)-DM6700
AFMPC/DPMDD
Randolph AFB TX 78148
Capt Robert Fretwell AV 487-3030

2. B6700 Advanced Personnel Data System (APDS)-Non DM6700
AFMPC/DPMDD
Randolph AFB TX 78148
Maj Harry M. Kepner AV 487-2545

III. Control Data

1. CDC6600 AFWL R & D Transaction Data File
AFWL
Kirtland AFB NM 87117
Maj David G. Kanter AV 946-3341

2. CDC6600 MARS VI
ADTC/TSX
Eglin AFB FL 32542
Mr. Terry J. Blanchard, GS-12 AV 872-5498

3. CDC6600/6400 at the University of Texas at Austin System 2000
AFHRL/DOJC
Brooks AFB TX 78235
Capt James R. Sells AV 240-3876
Mr. Joe Muniz, GS-12 AV 240-3876
Dr. Ward, GS-13 AV 473-4106

4. CDC6600 VENUS
(a) AFAPL/DOC
Wright-Patterson AFB OH 45433
Mr. Charles W. Anderson, GS-12 AV 785-5636

(b) 4950/ADDI
Wright-Patterson AFB OH 45433
Capt Thomas B. Carroll AV 785-6257

(c) AFML
Wright-Patterson AFB OH 45433
Mr. Dennis Wisnosky, GS-13 AV 785-6890

5. CYBER 73/74 Zodiac Data Management System
AFLC/ACDRS
Wright-Patterson AFB OH 45433
Mr. Harold Hixson, GS-13 AV 787-7765

6. CYBER 73/74 Advanced Logistics System (ALS)
AFLC/ACTAS
Wright-Patterson AFB OH 45433
Capt Jon Johnson AV 787-3060

IV. Honeywell Information Systems

1. HIS635 Integrated Data Store (IDS)
AFLC/ACDRS
Wright-Patterson AFB OH 45433
Mr. Harold Hixson, GS-13 AV 787-7765

2. HIS635 Integrated Data Store (IDS)
AFDSC/GMT
Wash DC 20330
Maj Robert J. Tufts AV 225-6902

3. HIS6000/635 Machine Independent Data Management System (MIDMS)
DIA/DS-5
Wash DC 20301 AV 222-5542

4. HIS6000 WWMCCS MS (WWDMS)
DCA/JTSA
Wash DC 20305
Mr. B. Moore, GS-14 AV227-0101, then 437-2338

5. HIS6050 WWDMS
AF/XOOCSA
Wash DC 20330
Maj John R. Snead AV 225-4162

6. HIS6070 IDS/WWDMS
NORAD/NPC
Ent AFB CO 80913
Capt Johnnie O. Bernier AV 692-6466

7. HIS6080 Program Assisted Console Evaluation Review (PACER)
SAC/ADISH
Offutt AFB NE 68113
Maj Rodney W. Firl AV 271-2061

8. HIS6080 Force Management Information System (FMIS)
SAC/ADOF
Offutt AFB NE 68113
Capt Darrell D. Woodard AV 271-3603

9. HIS6180 JANUS
ESD/MCIT
L. G. Hanscom Fld MA 01730
Lt Paul A. Karger AV 478-5386

V. International Business Machines

1. IBM7094 Formatted File System (FFS)
SAMTEC/ROCM
Vandenburg AFB CA 93437
Mr. John J. Holland, GS-13 AV 276-8838

2. IBM360/40 (or larger) MIDMS (see IV-3)
DIA/DS-5
Wash DC 20301

3. IBM360/65 Customer Information Control System (CICS)
FTD/NIQE
Wright-Patterson AFB OH 45433
Maj Robert J. Davis AV 787-3131

4. IBM360/65 IBM Document Processing System
FTD/ENMP
Wright-Patterson AFB OH 45433
Ms. Doriz Mleczko, GS-12 AV 787-4387

5. IBM360/65 Generalized Information System (GIS)
FTD/ENMP
Wright-Patterson AFB OH 45433
Ms. Janet Merrelli, GS-12 AV 787-4387

6. IBM 360/65 JUMPS (SAMSAM)
AFAFC/AD
3800 York St
Denver CO 80205
Mr. Willie Nunns

7. IBM360/85 Generalized Information Systems (GIS)
SAC/ADISP
Offutt AFB NE 68113
Mr. Erston L. Pollard, GS-12 AV 271-5551

8. IBM360/85 and IBM370/158 Information Management System (IMS)
SAC/ADISP
Offutt AFB NE 68113
Mr. Erston L. Pollard, GS-12 AV 271-5551

9. IBM370/145 Avionics Central Software
AFSC/AFAL/TSC
Wright-Patterson AFB OH 45433
Capt Dan Meigs AV 785-6108

VI. Univac

1. Univac 1106 No Name
   SAC/ADOFW
   Offutt AFB NE 68113
   Maj Richard L. Slyder AV 271-2807

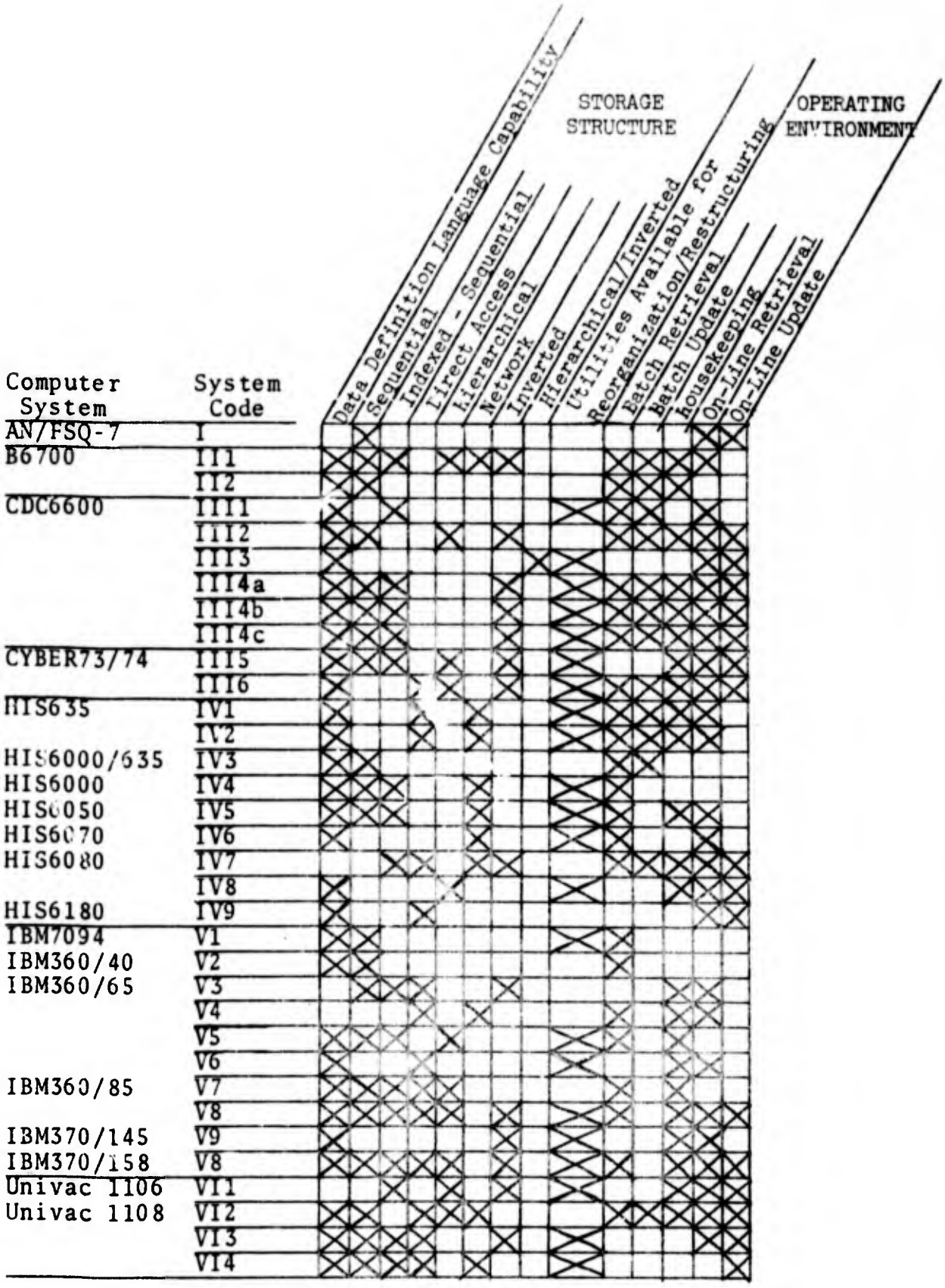
2. Univac 1108 DMS-1100
   FTD/XRB
   Wright-Patterson AFB OH 45433
   Mr. Donald G. Davis, GS-13 AV 787-2942

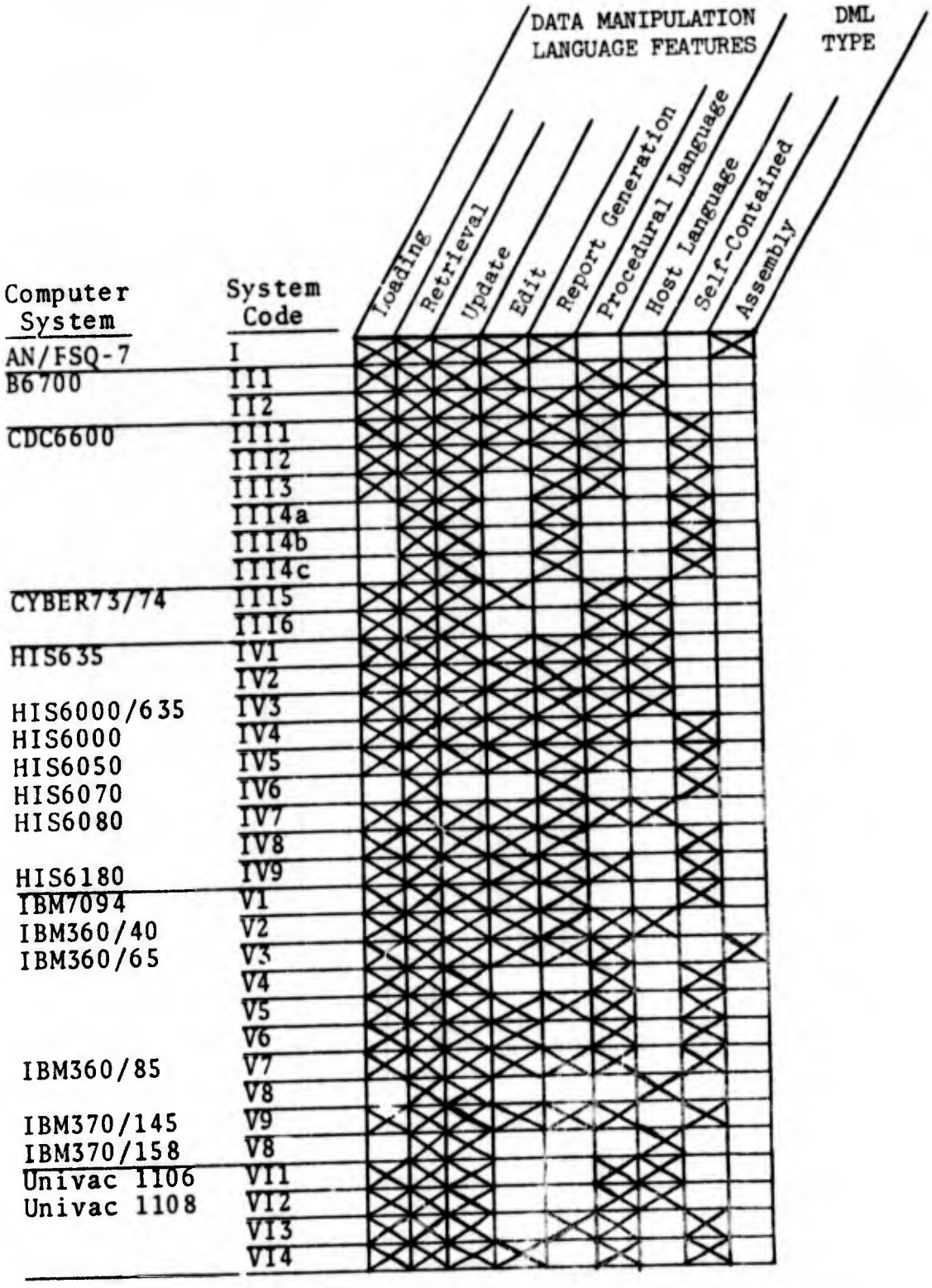
3. Univac 1108 Fortran Oriented Information Management System (FORIMS)
   FTD/ENMP
   Wright-Patterson AFB OH 45433
   Mr. J. R. Hamilton, GS-12 AV 787-4387

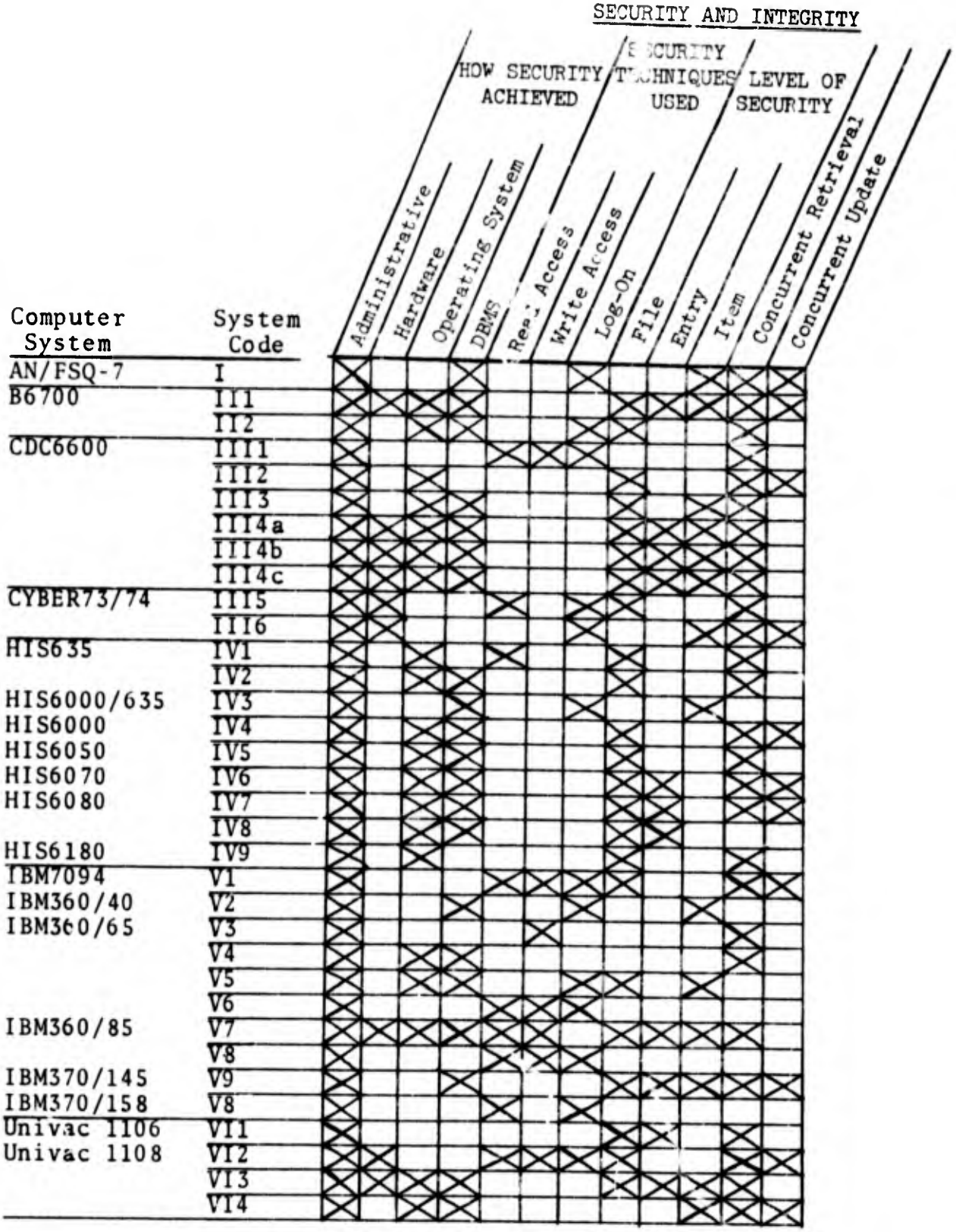
4. Univac 1108 Scientific and Technical Intelligence System (STIS)
   FTD/PDV
   Wright-Patterson AFB OH 45433
   Mr. E. Stull, GS-13 AV 787-2133

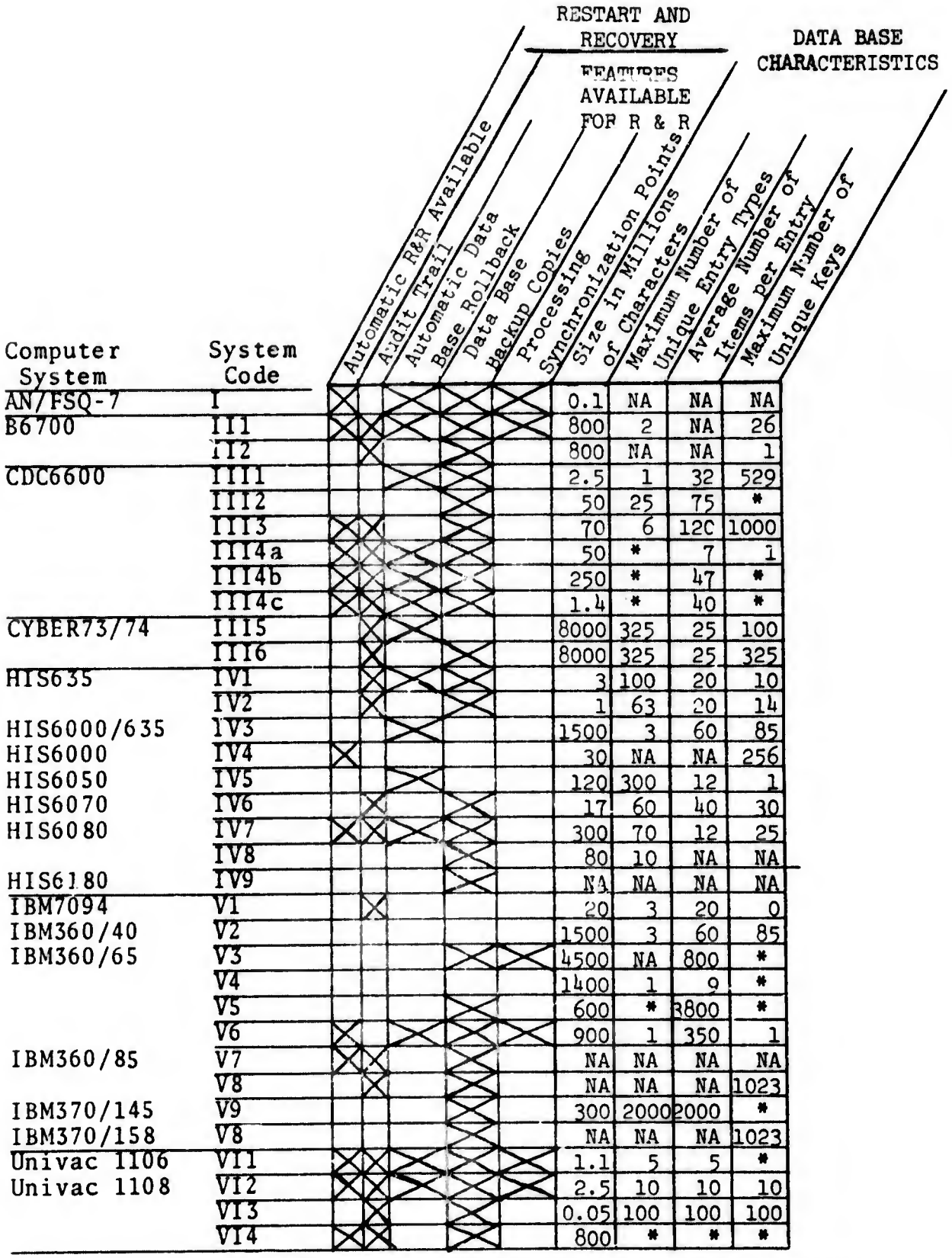
PART II

DATA BASE MANAGEMENT SYSTEMS FEATURES LIST


STORAGE STRUCTURE
OPERATING ENVIRONMENT
Data Definition Language Capability
Sequential
Indexed - Sequential
Direct Access
Hierarchical
Network
Inverted
Hierarchical/Inverted
Utilities Available for Reorganization/Restructuring
Batch Retrieval
Batch Update
Housekeeping
On-Line Retrieval
On-Line Update
Computer System
System Code
AN/FSQ-7 I
B6700 II1
II2
CDC6600 III1
III2
III3
III4a
III4b
III4c
CYBER73/74 III5
III6
HIS635 IV1
IV2
HIS6000/635 IV3
HIS6000 IV4
HIS6050 IV5
HIS6070 IV6
HIS6080 IV7
IV8
HIS6180 IV9
IBM7094 V1
IBM360/40 V2
IBM360/65 V3
V4
V5
V6
IBM360/85 V7
V8
IBM370/145 V9
IBM370/158 V8
Univac 1106 VI1
Univac 1108 VI2
VI3
VI4


DATA MANIPULATION LANGUAGE FEATURES
DML TYPE
Loading
Retrieval
Update
Edit
Report Generation
Procedural Language
Host Language
Self-Contained
Assembly
Computer System
System Code
AN/FSQ-7
I
B6700
II1
II2
CDC6600
III1
III2
III3
III4a
III4b
III4c
CYBER73/74
III5
III6
HIS635
IV1
IV2
HIS6000/635
IV3
HIS6000
IV4
HIS6050
IV5
HIS6070
IV6
HIS6080
IV7
IV8
HIS6180
IV9
IBM7094
V1
IBM360/40
V2
IBM360/65
V3
V4
V5
V6
IBM360/85
V7
V8
IBM370/145
V9
IBM370/158
V8
Univac 1106
VI1
Univac 1108
VI2
VI3
VI4

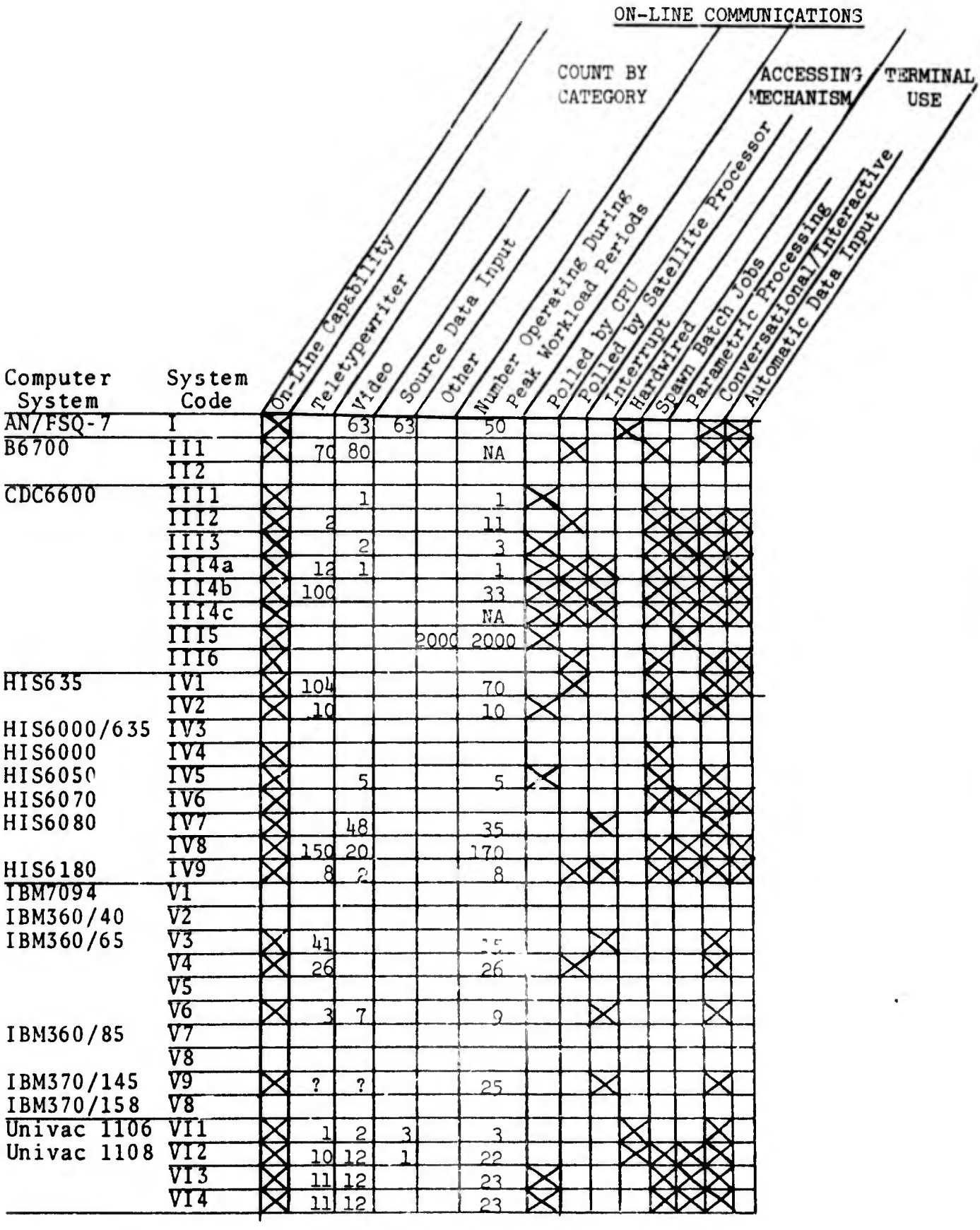

SECURITY AND INTEGRITY
HOW SECURITY ACHIEVED
SECURITY TECHNIQUES USED
LEVEL OF SECURITY
Administrative
Hardware
Operating System
DBMS
Read Access
Write Access
Log-On
File
Entry
Item
Concurrent Retrieval
Concurrent Update
Computer System
System Code
AN/FSQ-7
I
B6700
II1
II2
CDC6600
III1
III2
III3
III4a
III4b
III4c
CYBER73/74
III5
III6
HIS635
IV1
IV2
HIS6000/635
IV3
HIS6000
IV4
HIS6050
IV5
HIS6070
IV6
HIS6080
IV7
IV8
HIS6180
IV9
IBM7094
V1
IBM360/40
V2
IBM360/65
V3
V4
V5
V6
IBM360/85
V7
V8
IBM370/145
V9
IBM370/158
V8
Univac 1106
VI1
Univac 1108
VI2
VI3
VI4



Computer System	System Code	Automatic R&R Available	Audit Trail	Automatic Data Base Rollback	Data Base Backup Copies	Processing Synchronization Points	Size in Millions of Characters	Maximum Number of Unique Entry Types	Average Number of Items per Entry	Maximum Number of Unique Keys
AN/FSQ-7	I	X		X	X	X	0.1	NA	NA	NA
B6700	II1	X	X	X	X	X	800	2	NA	26
	II2		X	X	X		800	NA	NA	1
CDC6600	III1			X	X		2.5	1	32	529
	III2			X	X		50	25	75	*
	III3	X	X		X		70	6	120	1000
	III4a	X	X	X	X		50	*	7	1
	III4b	X	X	X	X		250	*	47	*
	III4c	X	X	X	X		1.4	*	40	*
CYBER73/74	III5		X	X	X		8000	325	25	100
	III6		X	X	X		8000	325	25	325
HIS635	IV1		X	X	X		3	100	20	10
	IV2		X	X	X		1	63	20	14
HIS6000/635	IV3			X	X		1500	3	60	85
HIS6000	IV4	X					30	NA	NA	256
HIS6050	IV5			X	X		120	300	12	1
HIS6070	IV6		X		X		17	60	40	30
HIS6080	IV7	X	X	X	X		300	70	12	25
	IV8				X		80	10	NA	NA
HIS6180	IV9				X		NA	NA	NA	NA
IBM7094	V1		X				20	3	20	0
IBM360/40	V2						1500	3	60	85
IBM360/65	V3				X	X	4500	NA	800	*
	V4						1400	1	9	*
	V5				X		600	*	3800	*
	V6	X		X	X	X	900	1	350	1
IBM360/85	V7	X	X		X		NA	NA	NA	NA
	V8		X		X		NA	NA	NA	1023
IBM370/145	V9				X		300	2000	2000	*
IBM370/158	V8				X		NA	NA	NA	1023
Univac 1106	VI1	X	X	X	X	X	1.1	5	5	*
Univac 1108	VI2	X	X	X	X	X	2.5	10	10	10
	VI3		X		X		0.05	100	100	100
	VI4	X	X		X		800	*	*	*

*No Limit (within bounds of practicality)

NA - Not Available/Not Applicable


ON-LINE COMMUNICATIONS
COUNT BY CATEGORY
ACCESSING MECHANISM
TERMINAL USE
On-Line Capability
Teletypewriter
Video
Source Data Input
Other
Number Operating During Peak Workload Periods
Polled by CPU
Polled by Satellite Processor
Interrupt
Hardwired
Spawn Batch Jobs
Parametric Processing
Conversational/Interactive
Automatic Data Input
Computer System
System Code
AN/FSQ-7 I 63 63 50
B6700 III 70 80 NA
III2
CDC6600 III1 1 1
III2 2 11
III3 2 3
III4a 12 1 1
III4b 100 33
III4c NA
III5 2000 2000
III6
HIS635 IV1 104 70
IV2 10 10
HIS6000/635 IV3
HIS6000 IV4
HIS6050 IV5 5 5
HIS6070 IV6
HIS6080 IV7 48 35
IV8 150 20 170
HIS6180 IV9 8 2 8
IBM7094 V1
IBM360/40 V2
IBM360/65 V3 41
V4 26 26
V5
V6 3 7 9
IBM360/85 V7
V8
IBM370/145 V9 ? ? 25
IBM370/158 V8
Univac 1106 VI1 1 2 3 3
Univac 1108 VI2 10 12 1 22
VI3 11 12 23
VI4 11 12 23

SECTION II

ANNOTATED BIBLIOGRAPHY OF DATA BASE MANAGEMENT SYSTEM LITERATURE

ANNOTATED BIBLIOGRAPHY

Data Definition Language, Data Structures, and Storage Structures

1. Chapin, Ned. A Comparison File Organization Techniques, Proceedings of the 24th National Conference, ACM, 1969, 273-283.

   A discussion of most of the common storage structures, their uses and the trade-offs to be considered. (SYSTEM DESIGNER)

2. Lefkovitz, David. File Structures for On-Line Systems, Washington, D. C., Spartan Books, 1969.

   One of the more important books on this subject. Detailed models of the structures and trade-off analysis of processing within the structures. (SYSTEM DESIGNER)

3. Knuth, Donald E. The Art of Computer Programming, Vol. 1, Fundamental Algorithms, Addison-Wesley, 1969.

   Of primary value in this textbook is the detailed discussion of information structures (storage structures). In addition to the presentation of various storage structures there is also a presentation of algorithms for processing within the structures and an analysis of those algorithms. The main fault with the presentation is the development of the algorithms. (SYSTEM DESIGNER, PROGRAMMER)

4. Sibley, E. H. and Taylor R. W. A Data Definition and Mapping Language. Comm ACM 16, 12 (December 1973), 750-59.

   An introduction to current research into the development of a data definition and mapping language. This language defines the data structure, the storage space, and the mapping between data structure and storage space. Several applications of this language are discussed. Readable for anyone familiar with the basic concepts of GDBMSs. (MANAGER, SYSTEM DESIGNER, PROGRAMMER)

5. SIGFIDET. Proceedings of the ACM SIGFIDET Workshop on Data Description, Access and Control, Denver, CO. November 1972.

   A collection of papers on the following general topics: (1) Data Definition Languages, (2) Data Manipulation Languages, (3) Data Management Systems Performance and Access Methods, (4) Data Management Systems Architecture, and (5) Data Management Systems Applications. Of particular interest are the papers by Fry, Smith, and Taylor on Data Definition and Translation. (SYSTEM DESIGNER, PROGRAMMER)

Reorganization/Restructuring

6. Cardenas, A. F. Evaluation and Selection of File Organization - A Model and System. Comm ACM 16, 9 (Sept 1973), 540-48.

   An approach similar to Winkler [10]. Delination of some critical file characteristics. Not enough detail on the model. Results of simulations of six data bases stored in three storage structures. (SYSTEM DESIGNER)

7. Merten, Alan G. Optimum Assignment of Data to Sequential Storage Devices, ISDOS Project, Working Paper #50.

   Discusses selection of a data organization for sequential storage. Presents a number of analytical models and results. (SYSTEM DESIGNER, PROGRAMMER)

8. Severance, Dennis G. and Merten, Alan G. Performance Evaluation of File Organization through Modeling, ACM Proceedings, August 1972, 1061-1072.

   Identifies and describes the fundamental components of all storage structures. Applies a modeling technique by varying parameters of retrieval speed, storage space, and maintenance overhead to select a good file organization. (SYSTEM DESIGNERS, PROGRAMMERS)

9. Shneiderman, Ben. Optimum Data Base Reorganization Points. Comm ACM 16, 6 (June 1973), 362-65.

   A somewhat mathematical discussion on the cost of reorganization in the two cases (1) where reorganization is accomplished at fixed time intervals and (2) when search cost deteriorates to a given level. The results are applicable to most large systems, although the assumptions may be too simplistic to allow for determination of optimum reorganization points for a particular system configuration. (SYSTEM DESIGNER)

10. Winkler, Anthony J. File Structure Determination, Proceedings of the Symposium on Information Storage and Retrieval, April 1971, 133-46.

    An approach to determining an appropriate storage structure for a given application is presented, by outlining a methodology for comparing the processing time required for Boolean queries against a hierarchically structured file. Algorithms for processing within two different structures are discussed and modeled, and approximating algorithms are developed for simulation of the algorithms. (SYSTEM DESIGNER)

Security and Integrity

11. Conway, R. W., et al. On the Implementation of Security Measures in Information Systems. Comm ACM 15, 4 (April 1972), 211-20.

    A good discussion of the problems of providing security for a data base, as well as examples of existing implementations. Using the idea of a security matrix to provide both data independent and data dependent security measures, a functional model of a security system is presented. A reasonable tutorial on the subject. (SYSTEM DESIGNER)

12. Davis, R. M. Privacy and Security in Data Systems, Computers and People, 23, 3 (March 1974) 20-27.

    An excellent summary of the information privacy and security problems, complete with plausible terminology and recommended solutions. Emphasis is on the relationship between privacy, data confidentiality, and computer system security. (SYSTEM DESIGNER)

13. Harrison, A. The Problem of Privacy in the Computer Age: An Annotated Bibliography, Doc RM-5495-PR/RC, Rand Corporation, Santa Monica, California, December 1967.

14. Harrison, A. The Problem of Privacy in the Computer Age: An Annotated Bibliography Volume 2, Doc RM-5495/1-PR/RC, Rand Corporation, Santa Monica, California, December 1969.

    The above two references contain 638 annotated references on the privacy problem as of December 1969. Reference 14 also contains a sort of the references by eleven subject areas. (SYSTEM DESIGNER)

15. Hoffman, L. J. Computers and Privacy: A Survey, Computing Surveys 1, 2 (June 1969) 85-103.

    This is the classic survey of the computer security problem, and it is an excellent introduction to this problem area. It is referenced by almost all computer security documents published since 1969. The 69 annotated references in the bibliography are of technical interest although many are now out of date. (MANAGER, SYSTEM DESIGNER, PROGRAMMER)

16. The Multics Virtual Memory, Manual AG95, Honeywell Information Systems, Inc., June 1972, 119-164.

    The Multics Access Control is the only USAF recognized security system that has a hope of guaranteeing multilevel security operation within the same computer. This document explains the theory behind this access control in terms easy enough for the layman to understand. (MANAGER, SYSTEM DESIGNER)

17. Tufts, R. J. The Privacy Problem and a Technical Solution, unpublished term paper for course CP6380, Southern Methodist University, Dallas, Texas, 1970.

A general review of the computer security problem and an approach to its solution. The solution recognizes the need for different levels of protection by different organizations. (SYSTEM DESIGNER)

18. Van Tassel, Dennis. Computer Security Management, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1972.

A good general reference on the computer security problem which addresses the problems of detection, protection, and control. This book also contains 171 annotated references on the computer security problem. (MANAGERS, SECURITY OFFICERS)

Restart and Recovery

19. Booth, G. M. Functional Analysis of Information Processing, John Wiley & Sons, New York, 1973, 201-229.

An excellent tutorial on the entire restart and recovery problem. Although the information is categorized by information integrity, functional integrity, and security, the concepts should aid any data administrator to develop a recovery system for his installation. (SYSTEM DESIGNER)

20. Grafton. W. P. Data Base Recovery with IMS/360, Database, spring 1972, 9-12.

A short, general description of the data base recovery problems of IMS/360. The problems and solutions can apply to any data base management system, using both on-line and batch operation against an integrated data base. (SYSTEM DESIGNER, PROGRAMMER)

21. Hembry, D. M. IMS Recovery/Restart Capability, SE Technical Report No. 097, IBM London Field Systems Centre, Addiscombe Road, London, England, March 1972.

IBM has widely advertised the ability of IMS to protect and recover its on-line data bases. This report points out just how bad these recovery facilities are. (SYSTEM DESIGNER)

22. Kirk, F. G. Total System Development for Information Systems, John Wiley & Sons, New York, 1973, 132-133.

A short note on the need for data base fallback, recovery, reconstruction, and corrective procedures during the design of an information system. Each system's problems will be unique to the information needs of that system's users. The approach given tells how to determine these needs and to design the system accordingly. (MANAGER, SYSTEM DESIGNER, PROGRAMMER)

23. Tufts, R. J. and Cooke, R. C. DND MIS Recovery Report, CFSS Task Force, Department of National Defense Document H00200, Ottawa, Ontario, Canada, June 1972.

This general discussion document covers the problems of system and data base recovery for the Canadian Forces Supply System. Integrity of a computer system data base can be approached through three stages: prevention, correction, and repair. Although oriented toward IBM's Information Management System, the ideas expressed apply to any data base management system. (SYSTEM DESIGNER)

24. File Management Supervisor, Manual DB54, Honeywell Information Systems, Inc., March 1973, Chapters 5 and 6.

Honeywell provides differing degrees of protection against common forms of device failure and improper data base update. The facilities available for Honeywell's Integrated Data Store are given in this manual so the data administrator can pick those he wants for his application programs. (SYSTEM DESIGNER, PROGRAMMER)

Teleprocessing/Computer Networking

25. Murphy, D. E. and Kallis Jr., S. A. Introduction to Data Communication, Digital Equipment Corporation, Maynard, Mass.

A pocket reference guide to data communications systems, techniques, facilities, and theory for the novice reader. (MANAGER, SYSTEM DESIGNER, PROGRAMMER)

26. Blanc, R. P. Review of Computer Networking Technology, NBS Technical Note 804, Department of Commerce, National Bureau of Standards, Washington, D.C. (January 1974).

Generally describes the features and characters of six existing computer networks--TYMNET, CYBERNET, GE Information Services, MERIT, ARPANET, TSS. The report concludes with a comparative evaluation of existing technological approaches to networking. (MANAGER, SYSTEMS DESIGNER)

27. Martin. J. T. Introduction to Teleprocessing, Prentice Hall, Englewood Cliffs, N.J. (1973).

In the author's words "this book should provide the easiest possible way to learn about data transmission from the beginning." It provides general introductory technical information on subjects ranging throughout the entire spectrum of data communications. For the more technically inclined reader, it references the author's eight other books on subjects such as communications equipment types and functions, network structures, terminal considerations, software simulators and design techniques. Two of the eight books are listed below. Appendices contain checklists to aid management in the selection of teleprocessing equipment. (MANAGER)

28. Martin, J. T. Systems Analysis for Data Transmission, Prentice Hall, Englewood Cliffs, N.J.

Detailed teleprocessing information concerning terminal, network, user, software, and system design considerations. (SYSTEM DESIGNER)

29. Martin, J. T. Telecommunications and the Computer, Prentice Hall, Englewood Cliffs, N.J.

A very detailed look at the entire data network and its associated terminal equipment, transmission media, modem and multiplexing requirements, and error detection and treatment. (SYSTEM DESIGNER)

30. The Auerbach Guide to Alphanumeric Display Terminals. Auerbach Publishers, Inc., Philadelphia, P.A. (1974).

Over 300 pages of technical reports of 220 different models of cathode ray tube (CRT) terminals. Presents configuration specifications, built in function descriptions, price, and information concerning the manufacturer. (MANAGER)

Data Management

31. Bassler, Richard A. and Logan, Jimmie J. The Technology of Data Base Management Systems. College Readings, Inc., Post Office Box 2323, Arlington VA 22202.

A collection of papers on various aspects of data base management systems. Some of the general topics discussed are: (1) concepts and requirements, (2) information systems, (3) implementation and management, (4) data and storage structures, (5) data base integrity and security, and (6) remote access. (MANAGER, SYSTEM DESIGNER, PROGRAMMER)

32. Canning, R. A. A Structure for EDP Projects, EDP Analyzer, 12, 2 (May 1973).

Discussion of various corporations' approaches to a structured development cycle and a suggested structure for EDP projects. (MANAGER)

33. Canning, R. A. Developments in Data Transmission, EDP Analyzer, 11, 3 (March 1973).

A general discussion of data communications with regard to the present capabilities of common carriers. (MANAGER)

34. Canning, R. A. Distributed Intelligence in Data Communications, EDP Analyzer, 11,2 (February 1973).

A general discussion of data communications with regard to the distribution of program logic out of the computer to applicable points on the network. (MANAGER)

35. Canning, R. A. Data Management, EDP Analyzer, 12,3 (March 1974).

A follow-on report to the February 1974 issue. Points out present problems and deficiencies in DBMSs and takes an educated look at the future. (MANAGER)

36. Canning, R. A. The Current Status of Data Management, EDP Analyzer, 12,2 (February 1974).

Generally describes, among others, two DBMSs in use today (System 2000, ADABAS) which employ a type of inverted file structure for on-line retrieval purposes. Also lists commercial teleprocessing software packages which interface with DBMSs on specific equipment types. (MANAGER)

37. Canning, R. A. The Data Administrator Functions, EDP Analyzer, 10,11 (November 1972).

A survey of data administration in several corporations, presentations on the views of various authors on what the data administrator's functions are, and a detailed definition of the data administrator function. (MANAGER, SYSTEM DESIGNER, PROGRAMMER)

38. Canning, R. A. The Emerging Computer Networks, EDP Analyzer, 11,1 (January 1973).

A general discussion of data communications with regard to the present state of computer networks. (MANAGER)

39. CODASYL Systems Committee. Feature Analysis of Generalized Data Base Management Systems. ACM, April 1971.

A feature analysis of five self-contained systems (GIS, MARK IV, NIPS/FFS, TDMS, and UL/1) and five host language systems (COBOL, DBTG, IDS, IMS, SC-1). (SYSTEM DESIGNER)

40. Gerson, Gordon M. and Winkler, Anthony J. Proceedings of the Second Annual Worldwide Data Base Management System Symposium, The Department of Astronautics and Computer Science of the USAF Academy, December 1971. AD 742323.

Papers presented:

(1) Current Trends in Data Management System Architecture

(2) USAF Personnel Data Base Management System
(3) Air Force On-Line Data System (AFOLDS)
(4) An Approach to Developing a DMS Test Methodology
(5) Environmental Tests of Advisor Data Management Systems
(6) An Approach to the Evaluation and Selection of Data Management Systems
(7) An Evaluation of the GIM Data Management System Through Experience with MAC Cargo Receipts Data

(MANAGER, SYSTEM DESIGNER, PROGRAMMER)

41. Gerson, Gordon M. and Winkler, Anthony J. Proceedings of the 4th Annual Computer Related Information Systems Symposium. The Department of Astronautics and Computer Science of the USAF Academy, January 1974. AD 777313.

Papers presented:

(1) The Advanced Logistics System
(2) The VENUS DBMS
(3) Data Base Buffer Management
(4) A Tool for DBMS Implementation
(5) Resource Sharing with ARPANET
(6) An Approach to the Design of a Secure Data Management System
(7) TAC Automated Planning System
(8) User-Computer Interface: Is Flexibility in On-Line Query Languages "Good" for Everyone?

(MANAGER, SYSTEM DESIGNER, PROGRAMMER)

42. Knuth, Donald E. The Art of Computer Programming, Vol. 3, Sorting and Searching, Addison-Wesley, 1973.

A detailed presentation of the common and some little known techniques for sorting and searching. Algorithms and analysis of the algorithms are presented for each of the techniques discussed. As in Vol. 1, the development of the algorithms is the weak link in the presentation. (PROGRAMMER)

43. Koehr, G. J. et al. Data Management Systems Catalog, The MITRE Corporation, Bedford, MA. MTP-139, January 1973.

"A reference volume of commercially marketed and supported data management systems and retrieval and report formatting systems." A limited feature presentation of 25 self-contained systems, 11 host language systems, and 25 retrieval and report formatting systems. The document was developed to assist the prospective DBMS user in selecting a possible subset of systems which might satisfy his requirements. (SYSTEM DESIGNER)

44. Murdick and Ross. Information Systems for Modern Management, Prentice-Hall.

A comprehensive text stressing a synergistic approach to MIS design and implementation. Identifies points of importance in the exchange of information. (MANAGER, SYSTEM DESIGNER)

45. Sawtelle, Thomas K. The Emerging Role of the Data Base Manager, Rand Report, R-1253-PR, December 1973.

The data base manager as he is defined in the AFLC Advanced Logistics System. (MANAGER)

46. Winkler, Anthony J., et al. Generalized Data Base Management Systems and Selected Air Force Applications. A System Survey Team Technical Report, June 1973, AD 765 203/5.

A tutorial on GDBMSs and case studies on (1) HQ USAF Command and Control System, (2) HQ USAF Military Personnel System - System 2.5, (3) MIDMS, (4) PACER, (5) SACCS/FMIS, (6) SAC/GIS. (MANAGER, SYSTEM DESIGNER)

47. Winkler, Anthony J. and Gerson, Gordon M. Proceedings of the Third Annual Worldwide Data Base Management System Symposium, The Department of Astronautics and Computer Science of the USAF Academy, January 1973, AD 765 204/3.

Papers presented:

(1) An Evolutionary Approach to the Development of Data Base Management Systems
(2) Special Purpose Design - A Human Factor Approach
(3) Information Systems Research for the Future
(4) The Application of a GDBMS to Support the Data Administration Functions
(5) Air Force On-Line Data System (AFOLDS)

(MANAGER, SYSTEM DESIGNER, PROGRAMMER)