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AUTOMATION AND THE NAVAL LABORATORIES ARCHIVAL PROGRAM
A REPORT AND RECOMMENDATIONS

by
David Bearman

Society of American Archivists
Task Force on National Information Systems
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FINAL REPORT

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NOVEMBER 1982

DTNSRDC-NLHP-CR-1-82

83 02 03 032

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER DTNSRDC-NLHP-CR-1-82	2. GOVT ACCESSION NO. AD-A124565	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Automation and the Naval Laboratories Archival Program: A Report and Recommendations	7. AUTHOR(s) David Bearman	5. TYPE OF REPORT & PERIOD COVERED Final Aug-Sep 1982
		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Society of American Archivists, Task Force on Nat'l Info. Sys., Smithsonian Inst., Arts & Ind. Bldg., Rm. 2135, Washington, DC 20560	8. CONTRACT OR GRANT NUMBER(s) N00167-82-G0-0140 <i>ok sec of 3rd page</i>	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 65861N, Z0832 5040-001
11. CONTROLLING OFFICE NAME AND ADDRESS Office of the Historian of Navy Labs.; Code 504 David Taylor Naval Ship R&D Center Bethesda, MD 20084	12. REPORT DATE November 1982	13. NUMBER OF PAGES 27
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report) Unclassified	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
	16. DISTRIBUTION STATEMENT (of this Report) APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED	
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Automation and Navy Laboratories Archives Program Archival records management Automated archival records management system Integrated Library System (ILS)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) -over-		

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EDITION OF 1 NOV 65 IS OBSOLETE
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This is an automation study for the Navy Laboratories Archives Program conducted by David Bearman, Project Director for the Society of American Archivists' Task Force on National Information Systems. It recommends an integrated system of records administration for records of permanent archival value consisting of two basic parts: 1) A central collection of general reference documents on Navy R&D, to be located in the Office of the Historian of Navy Laboratories; and 2) permanent archival documents generated by each of the laboratories, to remain in the laboratory or in a Federal records center under the control of the laboratory until such time as the records were relinquished to the National Archives and Records Services. This integrated system of archival records management would be guided by the Navy Laboratories Archives through the use of a regulated, automated information collection system.

An integrated system of archival records administration means that the offices involved in the active use of the records would become responsible for collecting documentation on historically valuable records while the records are still active. The study recommends that the archives would guide and oversee this process by working with records officers in each laboratory to (1) determine those records series of permanent archival value; (2) assign for each series so designated an Office of Record which would assume the responsibility for the physical and intellectual control of the records while they remain in the custody of the Navy; (3) provide and maintain authority files that would be used to compile consistent indexes to the records in all the Offices of Record for all the laboratories; (4) see that the resulting archival data base is made available to users at each laboratory through the library information system already in place at that laboratory, and (5) purge and transfer the records to Federal records centers and, ultimately, to the National Archives when they are no longer active. Additionally, the Navy Laboratories Archives would maintain a central data bank on all the archival record series from data communicated to the central archives from all the laboratories via the Naval Laboratories Computer Network (NALCON).

Integrated automated information systems within each of the laboratories should be of direct benefit (1) to the offices that input data, by allowing them to retrieve it in a more efficient and cost effective manner; (2) to other users by making available information concerning permanent records related to Navy R&D; and (3) to the Navy Laboratories History Program, by providing it with knowledge of historically valuable records and their location within the Navy Laboratory System.

As a first step in the process of automating information about records of permanent archival value within the Navy Laboratories system, the Archivist of Navy Laboratories will conduct a pilot project utilizing the Integrated Library System (ILS) for information about records stored in the central archives collection. ILS is an automated information system that has several advantages for archival information retrieval, including a standard protocol for exchanging information with other repositories. The Naval Research Laboratory library now uses ILS for managing its holdings.

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AUTOMATION AND THE NAVAL LABORATORIES ARCHIVAL PROGRAM

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EXECUTIVE SUMMARY

The Naval Laboratories History Program was established as a permanent function in October 1981 to "improve the corporate memory of the Navy Laboratory System". Its mission necessarily includes maintaining a system for identifying, retrieving and disseminating information concerning permanently valuable historical records of the Navy Laboratories. This study was undertaken to determine how automation could best be employed in achieving that mission.

The study examined the function of the Navy Laboratories operational archives and its information needs, the functions of offices currently maintaining historically valuable records series and their information needs, and the potential of existing information systems at two Navy Laboratories. The goal of the study was to evaluate possible strategies for managing historical information and to suggest concrete steps which the Naval Laboratories History Program should take to utilize automated capabilities to achieve its mission.

The strategy best suited to the Naval Laboratories operational archives is one that enables it to capture important information concerning historically valuable records during their active lives, while the records themselves remain in action offices. The operational archives should designate official "offices of record" for important materials, provide and maintain authority files that would be used to compile consistent indexes to the records, and, once their active life has ended, assist in purging and transferring the records to the National Archives. In other words, the system should emphasize decentralized records administration guided and overseen by the archives through the use of a regulated information collection system. The archives data base that results should be available to users at each laboratory through the library information system already in place at that laboratory. Data should be communicated to the central archives office using an internal protocol and the Naval Laboratories Computer Network (NALCON).

The report identifies specific automation opportunities in offices of record for historically significant records series, since the automation of their information control functions would facilitate future historical control. It defines the basic data, functions and technical specifications for the archives information system and recommends the use of existing software in the Naval Research Laboratory (NRL) library - the Integrated Library System ILS system - to build the archives database and serve as its authority file construction and information retrieval system. The report also identifies some problems for archival management of records which will confront the laboratories when the currently experimental office automation systems are more fully operational.

1. LEGAL CONTEXT AND BACKGROUND OF STUDY

The Naval Laboratories History Program was established in October 1981 to "improve corporate memory of the Navy Laboratory System." Achieving this goal requires improved management and preservation of historical records. A professional archivist has been employed to assist the individual laboratories records preservation programs and to provide a central focus for records management throughout the Navy Laboratories Community. This study was commissioned to determine how best to employ automation to control information about the historical records and convey it to potential users.

The mission of the Naval Laboratories History Program, and the archivist within that program, is linked with a legal responsibility imposed on the Navy by Title 44, USC, Chapters 29, 31, 33 and the FPMR, Sub Chapt. B, concerning archives and records (41 CFR 101-11). These statutes define any records created in the course of official activity as Federal records and prohibit the destruction of any such records without authority from the National Archives and Records Service. Their purpose is to protect historically valuable records so as to meet the future needs of administrators of Federal programs and to satisfy the interests of citizens of a free country in information concerning the operations of their government.

DOD DIRECTIVE 3020.26 on the "Continuity of Operations, Policies and Plans" and DOD DIRECTIVE 5015.2 on "Records Management Programs" acknowledge these responsibilities. SECNAV INST 5212.5B concerning the "Disposal of Navy and Marine Corps Records" is an implementation of this responsibility, establishing a records schedule which governs the retention and destruction of all Navy records. Unfortunately, SFCNAV INST 5212.5B is 21 (twenty one!) years old.

Overall responsibility within the Navy for carrying out this mission rests with Chief of Naval Operations, Naval Records and Information Division, which has not issued a new records schedule since 1961 (SFCNAV INST 5212.5B, 21 June 1961). NARS called attention to this failure on the part of the Navy in its review of Navy records management and procedures in December 1979. For purposes of this project the failure to identify permanently valuable record series is serious since it makes the task of saving these records both practically and administratively more difficult. Even if a good, current Navy records schedule existed, however, problems would remain, for a Navy-wide schedule is by necessity too broad to be easily and consistently interpretable at the laboratory level. Adequate implementation of the Navy records program in the laboratories requires strong professional guidance.

Recommendation: The Navy Laboratories should assign responsibility for identifying permanently valuable record series and assuring their adequate documentation to the Naval Laboratories History Program, and more specifically, to the archivist in that office. To be effective in the absence of strong guidance from above, the Historian and Archivist will need to be involved in the review of directives defining permanent record series to define the responsibilities of cognizant offices for those records and information about them.

2. METHODOLOGY

2.1 Assumptions

Prior to contracting for this study, discussions between the historian and the contractor defined a number of basic options for the automation of Naval Laboratories archives functions. An evaluation of these options resulted in the choice of probable ideal configurations for an information system for historical records of the Navy Laboratories, which, in turn, shaped the methodology of this study.

The options which were considered theoretically available to achieve the mission of the historian and archivist of Navy Laboratories were defined in these preliminary discussions as the product of a matrix of characteristics of the location of the database, its proposed uses, and the input agents.

The dimensions of the matrix and values of each dimension were identified as follows:

LOCALIZATION	a) Centralized b) Decentralized to Laboratory Level c) Decentralized to Office Level
INPUT	d) Largely in the active environment e) Largely in the historical environment
USES	f) Active and Historical g) Historical alone

In the theory, this 3x2x2 matrix would produce 12 options, but four of the resulting cells are internally contradictory or unreasonable on the surface (e.g., "aef," "cef," "ceg," "bef,"). Options which were considered seriously included:

"adf" - A centralized data base, with input largely in offices of record, serving active and historical needs. (1)

"adg"- A centralized data base with input largely from offices of record, serving historical needs. (2)

"aeg" - A centralized data base with input largely from the archivist, serving historical needs. (3)

"bdf" - A data base decentralized to the Laboratory level with input largely in offices of record, serving active and historical needs. (4)

"bdg" - A data base decentralized to the Laboratory level with input largely in offices of record, serving historical needs. (5)

"beg" - A data base decentralized to the laboratory level with input largely by the historian and archivist serving their records. (6)

"cdf" - A data base decentralized to the office level with input largely from offices of record serving historical and active needs. (7)

"edg" - A data base decentralized to the office level with input from offices of record serving historical needs. (8)

A centralized database with input from offices of record (options 1 and 2), would require an unprecedented degree of cooperative development and hardware/software integration between laboratories and is considered impractical. A centralized data base with input from the Archivist serving historical retrieval needs alone (3), while not out of the question, represents a substantial investment in historical records retrieval and in personnel for archival control without equivalent benefits. A data base decentralized to the laboratory level with input in offices of record serving active and historical needs (4) recognizes that hardware/software capabilities reside at the laboratory level, that the information required to serve historical needs is largely generated in the control of active records, and that the archival program could benefit on-going office information systems by establishing authority control. A data base decentralized with input in active offices best serving only historical needs (5 or 7) would be an unacceptable add-on expense, while one which required input by the archivist would be totally impractical. A data base decentralized to the office level would produce indexes to historical records series, but these in turn would have to be placed into a larger system controlled by the archivist in order to provide Navy wide control over the historical records.

In our preliminary discussions, therefore, we leaned strongly towards option 4, and, by adopting it as a basis for planning, shaped the methodology of this study. Under that option the archivist would need to take an active role in satisfying the information and record control needs of offices of record for each historically significant record series in each office of record in each laboratory. This would be accomplished by defining data required for historical control, establishing a system for controlling authority terms, and providing a mechanism for querying a decentralized data base, including cross-laboratory queries.

It was further assumed that it was unlikely that cost benefits could be obtained by designing an information system which served only the needs of the archives and into which all data would be input by the archivist. It was considered possible that benefits could be obtained by a system which relieved most of its input from the information systems of active offices and provided most of its retrieval through the library.

Given the plan to utilize data largely from offices which managed historically significant records during their active life-time it was considered essential to the success of any plan for automation of the archival and records management functions that it be possible to implement it using existing personnel and conforming to existing offices perceptions of their needs. This necessitated a study of existing records systems for those series which almost certainly would require longterm retention. It meant that the report would need to consider how to automate systems in which those records reside, and how to integrate those data bases and provide access to them through existing library data bases.

Finally, we assumed that we were planning an information system for an operational archives, not a permanent repository. Such an information system would hold data about permanently valuable records in active records offices and about records of longterm value transferred to the National Archives and Records Service. When records were transferred to NARS, such an information system should be able to communicate with NARS' information system so that researchers at NARS could know as much about the records as the Naval Laboratories archives program knows. At the same time, since the program envisioned for the Naval Laboratories is not seen as a repository, but as a database, its information system would be oriented towards intellectual control rather than towards processing and physical holdings control.

2.2 Scope

This study of the feasibility of employing automation in the archival control of records of the Navy Laboratories was limited to firsthand observation of the situation at the David Taylor Naval Ship Research and Development Center (DTNSRDC) and the Naval Research Laboratory (NRL), but its recommendations are intended to apply generally to the eleven major RDT+E laboratories the Navy:

NCEL (Port Heume, CA)	PRINCIPAL NAVY RDT+E CENTER FOR SHORF AND FIXED SURFACE AND SUBSURFACE OCEAN FACILITIES
DTNSRDC (Carderock, MD)	PRINCIPAL NAVY RTD+E CENTER FOR NAVAL VEHICLES AND LOGISTICS AND PROVIDE SUPPORT TO US MARITIME INDUSTRY
NADC (Warminster, PA)	PRINCIPAL NAVY RTD+E CENTER FOR NAVAL AIRCRAFT SYSTEMS OTHER THAN LAUNCHED WEAPONS
NCSC (Panama City, FL)	PRINCIPAL NAVY RTD+E CENTER FOR MINE, TORPEDO, SONAR, COUNTER-MEASURES DIVING, SALVAGE, AMPHIBIOUS AND COSTAL OPERATIONS
NORDA (NSTL Station, MS)	PRINCIPAL NAVY RTD+E CENTER FOR OCEAN SCIENCE AND TECHNOLOGY
NOSC (San Diego, CA)	PRINCIPAL NAVY RDT+E CENTER FOR COMMAND CONTROL, COMMUNICATIONS, OCEAN SURVEILLANCE, SURFACE AND AIR LAUNCHED UNDERSEA WEAPONS, SUBMARINE ARCTIC WARFARE.
NPRDC (San Diego, CA)	PRINCIPAL NAVY RTD+E CENTER FOR HUMAN RESOURCES.
NRL (DC)	BROAD BASED BASIC RESEARCH PROGRAM
NSWC (Dahlgren, VA)	PRINCIPAL NAVY RDT+E CENTER FOR SURFACE SHIP WEAPONS SYSTEMS, ORDNANCE, MINES, AND STRATEGIC SYSTEMS SUPPORT

NUSC
(Newport, RI)

PRINCIPAL RDT+E CENTER FOR SUBMARINE WARFARE
AND SUBMARINE WEAPONS SYSTEMS

NWC
(China Lake, CA)

PRINCIPAL RDT+E CENTER FOR AIR WARFARE
SYSTEMS AND MISSILE WEAPONS SYSTEMS AND THE
NATIONAL RANGE FACILITY FOR PARACHUTE T+E.

2.3 Sources

2.3.1 Interviews

The study involved interviews at both laboratories with librarians, records managers, historians and others, such as management analysts, systems administrators, and information managers. In each office, two types of information were sought: 1) What records of historical significance were managed by that office and how they were used and 2) what the operating information needs of the office were and how they were being met. The object in each case was to determine whether the needs of each office could be better met with automation and whether such automation could at the same time satisfy the needs of the Historian and Archivist of Naval Laboratories for information about historical records.

The persons interviewed and offices identified for detailed study included:

AT DAVID TAYLOR NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER:

PERSONS INTERVIEWED

David Allison,
Historian of Navy
Laboratories, and
Marjorie Ciarlante,
Archivist of Navy
Laboratories.
Code 504

TOPIC OF INTERVIEW

Preservation of significant historical
documentation

Abel Camara, Head
Technical Office
Automation and Communi-
cations Systems Office.
Code 1181

Design and implementation of Technical Offices
Automation and communications Systems Office
(TOFACS) throughout Navy Labs.

Michael Dankewych, Head
Librarian, Joanne
Lappin, Reference
Librarian, and Norma
Dobay, Head, Cataloguing
Section.
Code 522

DTNSRDC Libraries, methods of information storage
and retrieval; reference collection of DTNSRDC
formal and departmental reports.

Sarah Porter, Head,
Administrative Services.
Code 523

Directives system; mail distribution; central files of classified and unclassified correspondence, NATO documents and naval messages; forms management; official addresses; records maintenance and disposal.

Sharon Sells, Directives,
Forms and Reports
Management.
Code 523.1

Notices and instructions, forms management.

Shevra Martin, Data
Systems Franch.
Code 6082

RASIS databases including the library database.

AT THE NAVAL RESEARCH LABORATORY:

Dr. A. H. Aitken, Head
Management Information
Division.
Code 1400

Management information requirements.

Edward Man, Research
Program Administration.
Code 1410

Records pertaining to technical work performed; Lab reports on technical programs.

Bob Guest, Management
Information Systems
Code 1435

Management Information Systems design and administration.

Lil Warder, Head,
Records and Correspondence
Franch.
Code 2021

Records and correspondence management.

John Pitts, Historian
Code 2604

Historical questions, historical files, oral history.

Peter Imhof, Head
Librarian. Code 2620,
and Pat McConnell,
Deputy Librarian.
Code 2623

NRL library, NRL Reports, NRL Memoranda, Miscellaneous reports and periodicals issued by NRL, on-line queries to DTIC, and the ILS system.

2.3.2 Documents

The following documents were provided as background to the study:

Allison, David K.	Evolution of Missions and Functions of CNM - Commanded Laboratories and Centers November, 1981, 7pp.
	Records Systems of the Naval Research Laboratory: Central Records and Directives Systems Records NRL Memorandum Report 4464, February 24, 1981
	U. S. Navy Research and Development Since WWII August 1982, typescript 44pp.
Dept. of Navy	Standard Subject Identification Codes (SSIC) Sec Nav Inst 5210.11B 28 December 1977
	Disposal of Navy and Marine Corps Records SECNAVINST 5212.5B 21 June 1961 latest
Dept. of Navy Naval Material Command	An Intro to Navy RDT+E: with suggested info sources 08T4/MP Ser 119 30 January 1980 (Contains flow charts of documents and decisions in Navy RTD+E planning, research and acquisitions process.
GSA-NARS	WASHINGTON NATIONAL RECORDS CENTER ACCESSION # MASTER LIST R681
Martin, Shevra L.	David W. Taylor Naval Ship R+D Center Automated Technical Library System Users Manual DTNSRDC/FMD 79/01 December 1979
GSA-NARS	Managing the Records of the Department of the Navy December 1979
-----	TOFACS Users Manual, n.d.

3. FINDINGS

3.1 Mission and Needs of Functions Involved with Historical Records

3.1.1 The Archives of Navy Laboratories

The role of the office is to 1) identify historically valuable records, track their physical location, and assure their preservation and 2) assure access to such records in ways required by users and by a method which ensures that those who have use for them will be aware of them.

The archives is to be an operational archives, not the ultimate repository; that function is reserved to The National Archives and Records Service (NARS). The Navy Laboratories archives will rarely serve as a physical repository and does not generally seek to acquire records when the offices of origin or the Federal Records Center are available for their storage. The archives will, however, maintain a central collection of key documentation on the Navy Laboratory system for ready access. The archives does not have an interest in records management per se, or in records scheduled for periodic destruction except to assure itself that they have been properly scheduled and that the schedules correctly identify such records as having no longterm historical significance. The archives will maintain an information system which will identify all permanent records of the Navy laboratories including those which have been physically or legally transferred to NARS.

The potential users of historical records of the Navy Laboratories have rarely used these records in the past because their information-seeking does not bring this type of source to their attention. Uses cited for information about controlled correspondence were almost solely from offices which had misplaced their copies or were inquiring about the routing of incoming or outgoing materials. Users of forms, directives and reporting requirements information were almost exclusively offices which knew vaguely about the requirement and were seeking the details. Old laboratory notebooks and patent records were used almost exclusively by historians. Of the permanent records series, only formal departmental, and technical reports were used without their users having consciously identified them as a source of information prior to seeking information about the topic of their inquiry. The reason is not obscure: only information about formal, departmental and technical reports is currently integrated into the library information system which serves as the primary formal information retrieval tool of the laboratories.

3.1.2 The Correspondence Control Function:

Correspondence control encompasses all mail sent through the U.S. Post Office or intra-Navy mail addressed either to the command or to an office of the command and any insured, classified, special handling mail. Present operating procedures at NRL and DTNSRDC are very similar.

Incoming mail is sorted into controlled and uncontrolled correspondence in the mailroom. Uncontrolled correspondence is sent directly to the addressee. Controlled correspondence is sent to the correspondence control office, where it is opened and sorted into classified and unclassified. Classified and unclassified mail are handled separately but with generally similar procedures. The first decision point is to determine where the mail

should be sent. This involves identifying office functions and checking problem area responsibilities of different units. At present, each correspondence control office uses its own informal indexes and an assortment of command publications to make routing decisions. Office estimates of the time devoted to activity range from 25% to 50% of personnel time.

Once it is determined who needs to see the mail, a routing sheet is prepared in numerous copies. This identifies the item and sometimes (mostly for classified correspondence) its enclosures. The routing sheet notes whether a reply or action is required, and if so, one copy of the routing sheet is inserted into a tickler file. Offices receiving controlled correspondence are expected to return originals to the correspondence control office either directly (and that is always the case with classified correspondence) or via the routing. Normally, therefore, the certain offices copy the material for their own use and file it in their own office files.

When correspondence is returned to the controlled correspondence office it should be (but is not always) accompanied by a copy of the routing form which is then used either to identify the next office to which the materials (if classified) must be sent, or to identify the file copy of the routing sheet which is then pulled. Completed correspondence files are organized either by Navy Standard Subject Identification Codes (SSIC) or project. Projects may be represented by a full complement of product area/product time/work unit numbers or by only one such number. They must be assigned on the basis of the information which the controlled correspondence office can determine. The decision point here involves more informal files, the use of the SSIC list, and, by one office's estimate, an additional 25% of staff time. Filing itself consumes an additional 25% of time, with all other handling activity consuming the remaining 25%.

Outgoing correspondence is provided to the correspondence control office in multiple copies made at the originating office. One copy is assigned an SSIC or problem number and filed. At least one becomes part of a reading file. Copies to be sent are enveloped and addressed. Time involved in assigning the filing classification and in determining the correct Navy designation for offices to which the outgoing correspondence is addressed is less than for incoming mail, since this obligation falls mostly on the offices of origin, but the failure of Navy to maintain its OPNAV P09B2.705 (Standard Naval Distribution List) in machine readable form requires controlled correspondence office to update its master copy regularly and check outgoing mail for proper addresses.

In the control process, registered and classified mail registers are maintained and annual inventories are created for classified materials.

Records are retained in the controlled correspondence office for 2 to 5 years (usually 5) but very few requests are made for them (fewer than one per week). What information requests are received by this office usually pertain to outgoing correspondence being routed for signoff purposes. Before the records are transferred, they are weeded to eliminate transactional records of minimal value, a process which reduces their overall bulk by 25% on average (in one lab the weeding eliminated as much as 85% of certain files and as little as 10% of others). The index entries for all discarded records are then identified and also removed.

3.1.3 The Laboratory Notebook Control Function

At NRL, laboratory notebooks are issued to employees by the correspondence control office and are required to be returned to that office before an employee leaves the laboratory. Many employees keep the same notebooks for their entire careers, and few new notebooks (less than 250 p.a.) are issued.

3.1.4 The Directives Control Function

The directives control function at NRL and DTSRDC is divided between offices responsible for editing, distributing and monitoring directives and those responsible for the content of the directives. While operationally this arrangement is satisfactory, it is somewhat dysfunctional from an historical point of view, because it generates two sets of records about each directive. The historical case file, which documents who was involved in developing a directive, the positions they took on it, and how the directive changed during its evolution, is maintained in an office at NRL which is independent of the directives control process. At DTNSRDC these records remain largely with the cognizant office and are not separately retained. Final directives are retained by the office of distribution at both laboratories.

The office of distribution receives all external directives from controlled correspondence, routes them to cognizant offices selected from keywords in a self-maintained index to office functions and missions, and notes when action (i.e. issuance of internal directives) is required. It monitors internal directives to trigger their timely updating. However, there is no direct linkage maintained by classification coding or keyword indexing between external and internal directives.

Directives are the source of most forms requirements, reporting requirements, and all changes in the organization, missions, functions and personnel of the laboratories. At DTNSRDC directives are created in machine readable form (on word processors) and have been since 1978. This has not yet been fully exploited to generate cross indexes from forms to directives and from reporting requirements to directives.

Both directives control offices issue annually a list of internal directives with indexes by keywords (in controlled vocabularies) but not by cognizant offices. Neither keeps a tickler file to see if external directives are implemented. The basic method of organization of the directives is the SSIC, but the essential retrieval access point is functional keywords.

3.1.5 The Forms Management Function

At both laboratories an office is responsible for approving forms. In both this office lacks sanctions, but non-approved forms would, apparently, not go outside the laboratory. Both keep copies of DOD forms and OPNAV forms. Neither office maintains a data element dictionary, but both make an effort nonetheless to limit the duplication of data collection by identifying existing forms which could satisfy the needs of proposers of new forms. Neither office has files linking forms with directives. Both issue lists of approved forms by cognizant office. Forms development case files are not retained in one laboratory at all.

3.1.6 The Records Management Function

Neither laboratory maintains an active, effective, program to control all records, to design record systems or to dispose of inactive records in the laboratory. Both labs are frustrated by the uselessness of the existing (21 year old) records schedule and the absence of an active, Navy mandate for records retention, which neglect of the records schedule reflects.

The records management functions as currently performed involve little more than providing technical assistance to offices desiring to transfer records to the Federal Records Center so that the SF 135 forms which they send are accurate and will not be returned by NARS. Both offices also handle retrievals from the FRC's, but neither maintains any real control over records that have been transferred. At times this may endanger transferred records, such as the magnetic tapes that have been transferred by DTNSRDC, but not rotated back to the laboratory for care.

3.1.7 Maintenance of Formal, Technical and Contractor Reports, Published Papers and Talks

At both DTNSRDC and NRL, formal and technical reports are controlled by the library and comprise a substantial portion of its collections. However, neither laboratory has a system which assures that record copies of all reports will, in fact, go to the library.

At DTNSRDC, the library believes that center instructions require that a copy of every formal, departmental or contract report and every technical memorandum come to the library, but library staff feels that some are missed. The library gets copies of the lists of papers cleared by DTNSRDC staff from public relations, but not the papers themselves. It does get copies of lectures. The library is the office of record for all reports classified as secret or lacking a distribution list (i.e. those which will not be sent to DTIC). It does not receive copies of letter reports, but would like to.

At NRL, technical notes, working papers and letter reports do not come to the library. Contractor reports come only when the library is on the distribution list (which it should be, but may not be). Technical reports come to the library only because the library is part of the division responsible for printing them. Publication release requests and papers are discarded by the library, but page charge orders come through it, thus providing a partial bibliography of items in print. The library does collect reprints and conducts searches for publications by NRL staff.

Both libraries retain copies of all their reports and presume they will keep them indefinitely, but neither has a policy to identify or to protect the "record" copies at this time. Both libraries employ enhanced versions of standard subject thesauri (TEST and DTIC) along with author/title access to report literature, but neither provides access by generating office or by/product area/line/project/work unit. Both provide access to the DTIC maintained data base of forms 1498 and 1634, which serve to partially overcome the internal cataloging limitations. Both libraries' staffs were enthusiastic about providing access through the library to all archival materials, including the technical and report literature.

3.2 Automated Library Systems at DTNSRDC and NRL

3.2.1 BASIS at DTNSRDC

The library cataloging and information retrieval system at DTNSRDC is a database designed and administered by Shevra Martin (Code 6082) for the library in BASIS, a database management system developed by Battelle Memorial Laboratories. It currently runs on an overloaded CDC mainframe, but the staff hopes that a planned mini-computer acquisition will improve the current response.

The BASIS software is exceptionally powerful and would easily meet all of the archives needs. The existing library database design is not suited to the archives, but could be redesigned by an experienced BASIS system administrator. The system is not sufficiently "friendly" to permit the archivist to design an application and may not, without considerable interest on the part of the archivist, permit day-to-day administration from the archives either. The library system's administrator is not able to provide a new database design because her current schedule is full.

Despite its flexibility, BASIS has a number of drawbacks for the archives. It does not provide automatic authority generation or automatic updating of records to reflect authority changes. It does not accept input in the MARC formats nor generate output in those formats, although it would be possible to write a routine to perform these tasks. Finally, the database is not user friendly or menu driven and the existing input routines do not permit within field correction of input errors, which means that the entire field must be corrected if any input is wrong.

The current library staff would like to see the archives database in their system but could probably not provide much if any technical support. Their own applications do not utilize most of the features of BASIS and their existing authority files are seriously dated.

3.2.2 The Integrated Library System (ILS) at NRL

Acquisitions, cataloging, information retrieval, circulation and administrative data collection are handled by the ILS software system at NRL. ILS was developed by the National Library of Medicine to be a flexible, integrated, and friendly system sufficient to all the needs of a library. The existing system is a relatively new acquisition, and although not fully implemented, it promises to meet all NRL library needs.

The ILS software would meet all the needs of the Navy Laboratories archives. The existing database design is functionally equivalent to the archives' needs and its internal "help" language and the initialization of the system to expect and manipulate archival records could be carried out by the archivist with little training. The existing library staff would like to see the archives database in ILS and has the technical expertise to assist in establishing this capability. Staff at the National Library of Medicine's Lister Hill facility which developed ILS would like to see an archival capability built into ILS and the staff of NLM's History of Medicine Division is interested as well.

3.3 The Potential Impact of Automated Office Systems

Based on evidence from the DTNSRDC pilot project, TOFACS, the Navy Laboratories can expect to see integrated office automation capabilities extended to all offices with five years. Under the TOFACS plan, everyone at DTNSRDC will have a terminal within 3 years which has capabilities for word processing, message handling, limited private file maintenance, graphics and statistical analysis, calendar, telephone log and tickler file maintenance. The system is being expanded as rapidly as installation of networked mini-computers and intelligent terminals makes possible, with the aim of reducing the passage of paper and increasing the availability of word processing and private file software. The system will carry only unclassified data for the foreseeable future. DTNSRDC's system will be fully integrated between its various facilities and will employ NALCON (Naval Laboratories Computing Network) to interconnect with other laboratories. Within DTNSRDC, TOFACS will provide a link to other data processing capabilities used for larger databases and office files (such as the BASIS databases).

As currently planned the automated office concept holds few promises for archival control (other than that by providing intelligent terminals it will reduce one cost of data base utilization) and creates numerous problems. The most serious problem is that the systems developers are placing an extremely low value on providing for off-line ("archival") storage. Use of the "electronic filing system" (EFS) which will provide this capability is being discouraged and will be discouraged until such time as the laboratory can provide more than enough capacity to serve all on-line needs. EFS itself is cumbersome to use and saves only "documents." Thus mail can only be saved if it is recreated as a document, and then, apparently, without its routing, signoffs, or actions. There is no way in TOFACS to indicate who is responsible for a record copy of messages and no vital record capabilities are present in the system. There will be almost no way to reconstruct "private," undocumented files even if they are saved off-line.

If TOFACS were used strictly as a desk file and internal memorandum system, these drawbacks would be only slightly bothersome to the archival mission. Discussion with Abel Camara, however, revealed that TOFACS is clearly going to be used far more. Camara believes that directives and controlled correspondence will probably be up (in full text) on TOFACS with correspondence captured by OCR in machine readable form. Since TOFACS is to be linked to supply, personnel and management data bases, it is clear that DTNSRDC staff will download parts of these for computations on TOFACS, in effect generating reports from those data bases. Since NALCON has an electronic mailbox and message capability as well as time sharing already hooked into TOFACS, inter-laboratory communications by TOFACS are certain to bypass controlled correspondence in the near future. The DTNSRDC command is already expressing impatience over not being able to issue orders via TOFACS until Annapolis gets on-line (in a few months); important management decisions will shortly be made on TOFACS without permanent records being generated.

4. RECOMMENDATIONS:

4.1 The Administration of an Operational Archives

4.1.1 Identify Records of Historical Value

The archives must identify records of historical value. The list below, representing those records identified for this study, should not be considered an exhaustive list. It should be cross checked against the official Navy record schedule. In addition, the archivist and historian together should seek to identify functions likely to have generated other historically valuable documentation and to survey holdings in those offices.

The record series of potential permanent historical value considered in this study were:

- a) Formal reports
- b) Departmental reports
- c) Technical reports
- d) Letter reports
- e) Contractor reports
- f) Public (and public relations) materials
- g) Controlled correspondence
- h) Naval messages
- i) Patent records
- j) Laboratory notebooks
- k) Directives (incl. directives case files)
- l) Forms (incl. forms case files)
- m) Program analysis record
- n) Records of laboratory top management, including the Research Director
- o) Summary fiscal records by project/work unit
- p) Professional papers of scientists and engineers

When the archivist identifies historically valuable record series not already identified as "permanent" by the existing records schedules, descriptions of them should be sent to the NAVMAT office responsible for records management with the strongest possible request that they be included in the official records schedule so as to make it possible for the Navy to transfer these materials to NARS.

4.1.2 Establish Office of Record

For each historically valuable series of records, the archivist should identify an office of record and officially assign responsibility for the physical and intellectual control of the records to that office as long as the records remain in the legal custody of the Navy Laboratories (i.e., until turned over to NARS). Offices so designated should have the responsibility incorporated into their mission. Records thus defined should have a clause inserted into the directive governing their creation that identifies the office of record and assigns responsibility to generators of such records for assuring that a copy reaches the office of record. Ideally the office of record should be an office situated in the transaction path either as generator or physical transmitter of the record (as in formal reports, when the library is linked to the print shop). Artificial links between offices of

record and the record series will tend to ossify. For example, the laboratory notebook control system at NRL is currently irrelevant to retention of records of historical value and is unlikely to become relevant unless the controlling office is either the office of the director of research or the patent office, both of which have interests in seeing this record preserved.

4.1.3 Institutionalize Sound Record Retention Practices

The archives should seek to institutionalize the following record retention practices:

- a) Retention, for active life, in the office of record.
- b) Creation of finding aids during active life which also satisfy historical use requirements.
- c) When and if records are weeded, indexes should not be altered.
- d) If records are ultimately to be copied, they should be copied at earliest possible point in life cycle, in most centralized context possible, with attention to archival technical quality and storage requirements, and , if possible, in the office of record.
- e) Records which will be retired to the National Archives should be transferred to storage in Federal Records Centers as soon as they become inactive.
- f) Records, such as professional papers, which will not be retired to NARS should come to Naval Labs Archives as soon as their active life is over, preferably in batches throughout the careers of working scientists.
- g) Records, such as reports, which will be used primarily in the library, should be captured on microfilm at the time of publication or release and kept permanently in the custody of the National Archives, relieving the library of the need to keep extra copies or record copies. DTIC should not be considered an archival repository unless it commits itself to such a role in conjunction with NARS.
- h) Records retained by offices of record should, as nearly as possible, include all transactional and generational documentation (routings and prior drafts; comments and sign offs).

4.1.4 Establish a Preservation Program

Records tied to significant functions or records which are retained in a compact, convenient and informationally accessible form are less likely to fall victim to accidental destruction than records which are not related to missions of the office of record or which are retained in cumbersome and chaotic form or are stored distant from daily activity. As a result, the archivist needs to work to establish a system for preservation of permanent records which assures that they will not expand to inconvenient bulk, be

susceptible to disordering or lose accessibility through loss of information during their inactive life.

The best method for assuring the preservation of information in modern records is to microfilm them at the earliest possible point in their life cycles. This method will permit destruction of bulky records, retention of order and indexes to that order, and identification of record copies. It will facilitate subsequent use of records and their physical storage and retrieval. And it will save substantial money. Until digital mass storage costs are drastically reduced and virtually all records are created in machine readable form, microfilm will hold a substantial cost advantage over any machine readable medium. Since "permanent" is a very long time, microform will ultimately pay for itself in cost of storage alone, but before it does, the technique will probably have paid its way several times over:

- a) For records such as controlled correspondence that are retained by an office other than the cognizant office, a source microfilming project would concentrate copying where it can be done most efficiently and reduce routing/mail handling by half immediately (copies need not be returned). Jacketting and computer assisted retrieval (CAR) would increase retrieval efficiency. With the elimination of return routing of incoming documents, separate decisions would no longer be made on routing and classifying since both could be done at once. The reduction in storage costs in the correspondence office and the increase in efficiency of subsequent retrieval would eliminate the need to weed records or indexes before retiring the files. If microform to hard copy blowback were available, a variety of reading files could be generated after microfilming. Copies of microfiche of some or all controlled correspondence could be kept within the laboratory library even after transfer of record copies to NARS.
- b) For records such as reports and directives, which will be requested by users for reference purposes quite frequently during their active life, both distribution and copying costs could be substantially reduced by a source microfilming program.

4.1.5 Improve the Information Systems in the Office of Record

The archivist should become involved in improving the information systems for that permanently valuable information generated by offices of record which can be utilized by the archives once the records' active life is over.

- a) The maintenance of a data element dictionary by the forms management function would enable it to move from improving forms to improving information collection and usage patterns. The potential significance of cost savings if over-applying data collection were eliminated is extremely high: personnel, security, the library, the telephone and code directories, payroll and other offices all collect a core of data concerning employees which could be gathered on a single form or in a single data base. The costs of separate collection include the time involved in filling out the multiple forms,

and in filing them, the costs to each office of updating its own database, the costs of multiple form design and production and the costs involved in having different data bases constantly out of agreement with each other, leading to actions based on false information.

- b) An automated form control system which provided access to forms linked to directives and linked to a controlled "functions" authority list would be useful in itself for the office maintaining forms control and exceptionally valuable for historical research purposes.
- c) Each form of material for which the library is to be the office of record should be identified in the instruction or directive which defines it and a clear obligation should be placed on record creators to deposit a copy with the library and upon the library to retain it, or retire it to NARS.
- d) Automate the routing and classification system. At present the routing slip attached to a piece of controlled correspondence is filed in several different places for retrieval at least by date of required response or action and office, then attached to the returned items and filed with the item and by subject. If the system were automated, a machine record could be created for each controlled document which identified item number, office of origin, office of destination, subject or program area/work unit code, action/response and other data. Such an automated record would permit the tracking of the documents, provide access by a number of terms, create tickler files and maintain records of all documents going to and from various offices. With a computer and retrieval microfiche system, the entire bulk correspondence, including contractor reports and letter reports, would be available on fiche or blowback to hard copy at a moment's notice and by several different access points. Inventorying of classified records could be fully automated.
- e) The archives could assist in maintaining online keyword index to functions and programs or offices which would be used for routing and classification decisions by both the directives and correspondence control functions.
- f) The archives could work to get the Standard Naval Distribution List provided on-line, and to have laboratories maintain their internal addressing codes on-line.

4.1.6 Capture Information and Disseminate It Effectively.

In order for historical records to serve the Navy laboratories management, planning and technical needs well, information about them must be integrated into existing information retrieval pathways and brought into future information seeking behaviors as they evolve. Concretely this means that the archives must provide access to historical records through library

information systems and the evolving data bases accessible through office automation terminals and that a continuing function will be to monitor information seeking behavior in the laboratories.

4.1.6.1 Classified Information

There is no economical way to protect classified data in a database open to on-line searching. However, knowledge of the existence of classified records series and indexing language sufficient to point to classified holdings is not, usually, classified in itself. While unclassified control records should be integrated into records holdings information systems, control records about classified holdings should not.

In a decentralized system, offices would have access to their own data concerning active records and only to those data elements which the archives brought into its own inactive records control system. The documented materials themselves would remain under their usual security. Concepts, projects, offices whose very existence is classified should be isolated into unintegrated database with a parallel structure.

The advantages to automated control over classified records are substantially greater than those from control over unclassified records. All the former benefits apply equally and, in addition, classified holdings must be accounted for regularly, tracked throughout their distribution from office to office and, if kept long enough, declassified. When records are declassified they revert to the overall control system and the advantages of having had basic control in that system already are that machines can then "fill" the record automatically rather than having to get humans to re-input the data. In the simplest case, when the historical documents were classified but control data concerning them was not, all that is required is to update the value of the "restrictions on access" data.

4.2 Establishing an Archival Information System

Within the archives, an information system should be maintained which:

- 1) Receives data from automated information systems for active records from the office of record.
- 2) Provides offices of record with controlled vocabularies with which to index those records for which they are responsible.
- 3) Provides libraries at each laboratory with indexes to the historical records of that laboratory in whatever form (hardcopy, microform or machine readable form) they desire.
- 4) Reports information about Navy Laboratory holdings to NARS whenever the historical records are transferred to the National Archives or a Federal Records Center, and receives information from NARS and other depositories regarding their holdings relevant to the Navy Laboratories.

4.2.1 Receive Data in Machine Readable Form from Offices of Record

If the archives can assist offices of record to obtain automation for their internal needs, they will effectively be inputting data for historical control purposes as well. Using the local hardware configuration and the inter-laboratory computer communications network, the archives should be able to receive data directly from the offices of origin, on-line or on tape, add the data to its own database, and augment the data with additional pointers or location information. The archives database would build standard MARC format records which could be redistributed to others inside and outside the Navy.

Users coming to the archives directly would be pointed to office of record or to the library of the laboratory where final detailed search and most management manipulation of data takes place in a local control mode. Input to the system is totally distributed, document retrieval and search is largely distributed.

4.2.2 Provide Offices of Record with Authority Controlled Vocabulary

To maintain an integrated information system the archives will need to maintain authority controlled access. In keeping with the decentralized input approach the best way to achieve such control is for the archives to establish and provide to offices of record, those authority controlled vocabularies which serve as index points to each function. The archives will need to add discrete identifiers to distinguish index terms in different laboratories and across time (as, for example, when organization codes are used). One mechanism might be to provide a prefix or suffix on each term (instead of code 1403 we have code 11-1403 for laboratory 11). Secondly, the archives needs to providediachronic uniqueness and will therefore require authorities which are time independent. Again, the simplest mechanism is through the provision of a prefix or suffix (hence, 11-1403-1962-65). Thirdly, some prefixes and suffixes have already been established to place terms within DOD-wide or Navy-wide contexts; these should be preserved (for example DOD LPS# and program element sequences are natural prefixes for work units, existing Navy wide codes for the laboratories are preferable to artificial codes such as Laboratory 11). The reasons for using such standards include their widespread recognition and the opportunity they and other standards present for eventually integrating Navy laboratories data with other historical records data bases, as yet to be constructed, within the Navy.

Authority files need to be thought out with attention to all the data elements which together can establish the uniqueness of an entity and with attention to authority files as linked multiple access point databases in themselves. Thus an authority file for organizational units could consist simply of organization name, active dates, and organization codes(s) but if it consisted additionally of mission and function statements it could be searched by someone who did not know the organization in advance. If an authority file of functions is linked to product area and product lines on the one hand and to SSIC's on the other, other methods of access will eventually lead to organizational units. If an SSIC based authority is linked to directives and directives to forms and reporting requirements and these in turn to cognizant offices the search comes full circle. In theory, a fully linked authority system could provide access by any one authority term to any historical

records with at least one standard controlled access point. In practice the archives should aim for two authority controlled access points per historical record in the information systems of active offices to ensure flexible access.

The adequacy of retrieval is a factor of recall and precision, both of which are consequences of the richness and accuracy of index terminology assigned to record units (and their authority controls). Typically an increase in indexing depth can only be obtained by increasing the investment in man-days of indexing. In this archival information system, however, where most of the data is item-specific, while the archival information is sub-series-level specific, all we need to do to get richer indexing is 1) dispose of less of the indexing already done for day to day control of active records and, 2) control terminology assignment through better application of authority controls.

Since the basic structure of the proposed system is simply a series of indexes with entries posted against terms, the system will avoid the cost which archival information systems incur by over-content designation of non-indexed data, especially physical description data. From the user's perspective, this information is simply part of a whole and will not be acted upon as discrete data elements. Except as essential to the archives information holdings and records management, data should not be content designated.

The archival information system should seek to index records according to the following practices:

- a) Consistent authority control over values of access points in offices of origin/record will make historical control possible.
- b) Responsibility for historically consistent authority files must be assumed by the office of the Archivist of Navy Laboratories.
- c) Offices of origin should use whatever access points their particular work requires but must use them as defined.
- d) Offices generating authorities (such as organization codes, project and work unit names, directives, SSIC's, other subject thesauri, and forms of materials) should create them in machine readable form, update them regularly and, so far as possible, provide them to other offices which use them in machine readable form and on-line.
- e) The Archivist of Navy Laboratories must be involved in monitoring authority maintenance practices and office automation which facilitates them.
- f) The Archivist of Navy Laboratories should define data elements required for the historical control of records and work to see that these data, when created in offices of origin, conform to the standards.

- g) The Archivist of Navy Laboratories should work to see that automated control systems in offices of origin can report data to the archival information system in a machine readable form acceptable as input.

4.2.3 Provide Access to Data base through Libraries at Each Laboratory

The archives should attempt to provide access to the archival information system according to the following principles:

- a) The archivist of Navy Laboratories should work with the libraries at each laboratory to provide access to a data base concerning historical records which is integrated as fully as possible into existing library information systems.
- b) The archivist should maintain a complete data base on all historical records materials of the Navy Laboratories regardless of the location of the physical records (i.e. in office of record, FARC, NARS, Libraries or Navy Laboratories Archives). The data base should be maintained in machine readable form in order to facilitate updating and to make possible the generation of special products and reports. It need not, however, be available on-line.
- c) End users will generally use library, not archives systems.

4.2.4 Report Data Concerning Historical Records to NARS and Others

The information system maintained by the archives should be capable of inputting and outputting standard format records to communicate with NARS about records holdings transferred to the National Archives or the Records Centers and to obtain information from other repositories about records relevant to the history of the Naval Laboratories which reside in their repositories. For example, NARS information concerning ONR records could eventually be brought into the system this way as could information from other archives such as those of Universities where ex-Naval Laboratories staff deposited their professional papers.

4.3 The Functions and Configurations of an Archival Information System

4.3.1 Functions

The archives information system should serve the following functions:

- a) Provide points for access to documentation of the organizational structure and function, by office names and codes, missions and function statements, product areas/product lines/work units, and standard subject indexing codes (SSIC).
- b) Serve as a processing tracking system recording processing stages executed through a controlled action vocabulary, and date and agent of action. It should provide reports on work to be done: a) by action and record series, b) by date and by employee.

- c) Maintain a record of storage locations of historical materials by defining space, addressing materials to spaces, and permitting queries by space, space available, and materials.
- d) Permit tracking of materials by defining users, linking users with materials, and permitting queries to identify users by materials and to locate materials by users.
- e) Permit information restrictions to be identified to control employee or user access by restriction level and subset the file to display information only at that level.
- f) Provide a patron file which maintains mail address, phone, research interests, access terms used, archival records seen and products or publications resulting from or using historical records.

4.3.2 Data

4.3.2.1 Elements

The Naval Archives Information System should contain the data defined according to the standard definitions of data elements adopted by the Society of American Archivists NISTF in October, 1982.

4.3.2.2 Level of Control

Archival records are controlled in more detail in active environments than in historical ones. The archives should aim not to lose knowledge about historical records in the process of transferring them to archival custody and not to impose additional control burdens on offices maintaining records which are not relevant to their needs. At the same time, the archives should not strive to control records at levels of detail below the record unit.

From a practical point of view this means that archival sub-series will be the principal level of control, except in semi-published series which will be treated as library series with items as the record unit of choice. However, rich indexing terminology will be the norm for many archival series. Facetted indexing terminology makes possible such internal depth of control -- the facet for "materials specified" has particular possibilities in this respect since it permits pointing into the series at will.

For purposes of integrating records with organizational structures, record units should be constructed of one form of material, from one office of origin/record, with one arrangement. Thus organizational code, form and an internal logic supporting the "materials specified" pointer will always be unique to a record unit. In the case of record materials with bibliographic titles, item level records may be appropriate. In all cases, non-archival bibliographic records may comprise a significant part of the database (as in historical articles and books, reference works, etc.).

Since archivists describe historical documents at a variety of levels of aggregation, linkages between levels are frequently employed in archival information systems. Individual documents are portions of files, files parts of series, series parts of record systems, record systems parts of the overall

records of an office, the records of an office part of the records of a division, department, agency, branch of government, etc. Control systems which make it possible to link such levels of aggregation and disaggregation are all considered to have "hierarchical" capabilities regardless of the method of linkage they employ.

The contract specifically asked how the archives should handle hierarchical relationships between records in its information system. The two simplest linkage techniques involve 1) defining a data element for "archival level" which is an absolute value assigned to any given control record and thus defines its place in the control system; and 2) defining data elements for "linked record" and "record linkage note" in which a directional pointer is provided with prose clarification of its specific role when the linkage is other than part to whole.

However, the value of segregating control records depending upon their archival level has not been adequately demonstrated. In my view, if the correct record unit is controlled in the system (i.e., that record unit which is the largest aggregate which is a discrete series and has intellectual coherence) then all such records should be searched in a single system.

4.3.2.3 The Control Record

For each archival record unit, be it a report, file unit (folder, case file, etc.), series, sub-series, or collection (in the case of personal papers), the archival information system will have one surrogate control record. Each control record will possess those data elements identified above which serve to describe the record unit and will contain data elements defining at least two of the five authority files. No surrogate will be created without a unique record unit identifier serving as the local system control. This identifier will remain with the records throughout their life-cycle and serve as the referent in all index files generated by the control system. All control records will contain physical locations data.

Emphasis in creating archival control records should be placed on enhancing access points and providing data which enriches retrieval rather than upon the descriptive portion of the control record, except for minimalist information such as the physical extent or the inclusive dates. Extended scope and content notes serve less of a purpose than additional access points in a Boolean retrieval system. Arrangement notes, analysis of bulk dates and detailed specifications of the medium serve few purposes and absorb extensive staff efforts.

4.3.3 Authority Files

The information system envisioned for the Navy Laboratories archives consists of a set of five authority files with overlapping data elements against which records series identifiers have been posted. Together, these lead to the archival control record and to more detailed internal information systems in each laboratory which are maintained by the libraries. To succeed the archives must maintain, and assure the availability and use of, authority files for corporate entities and functions, persons, forms of material, work units and subjects. The files contain the following data:

Corporate Entities:

Corporate name, Institutional Division; Office, Standard Naval Code (when this exists); Internal Organizational Code, Functions keywords; Affiliation (persons holding office), Active Dates, History.

Persons:

Personal Name, Affiliation, Affiliation Role (title), Organizational Code (if Navy Laboratory), Active Dates, Biography.

Form of Material:

Form of material/office of record/(office code if Navy material)/directive number (SSIC) establishing form if governed by directive.

Work Designators:

Program area, product line, project number, work unit, year, office, code (if Navy material), subject category.

Subject:

Subject term, SSIC, Functions keywords, office codes (if Navy material), forms and report requirements.

These authority files would be integrated as follows; note that these are not all the data elements to be used but only those to be under authority control.

Authority Files

Data Elements

	<u>Corporate</u>	<u>Personal</u>	<u>Form</u>	<u>Work</u>	<u>Subject</u>
Corporate Name (or affiliation)	x	x			
SNDL	x		x	x	x
Internal code	x	x	x	x	x
Personal Name (or affiliation)	x	x			
Dates	x	x		x	
Functions	x				x
Subject Terms			x	x	x
Form			x		
Work Designators				x	
SSIC (or directives) Number			x		x

4.4 Technical Specifications

Technical specifications developed with the historian and archivist identified the following as characteristics of the proposed system as essential:

Hardware

- interactive
- in-house letter-quality printer
- remote COM
- intelligent terminal
- multi station logic
- communications

Software

- Boolean capability
- selective free text search
- authority browsing
- stem & phrase search
- stopwords
- automatic authority construction
- record update from authority
- menu driven
- MARC in/out
- word processing - workspace
- generalized report writer

The administrative desiderata for the system are defined in order of preference for each option, as follows:

- | | |
|---------------------|--|
| Library Integration | <ol style="list-style-type: none">1) full integration at sub-series level2) separate data base with unified search terms3) catalog output available to library reference staff |
| Authority Update | <ol style="list-style-type: none">1) update without clearance2) separate authorities3) update through library |

4.5 A Recommended Configuration

The information system for the archives should include:

- a) An intelligent terminal with floppy or hard disc storage to serve as a stand-alone input device, to receive records from active offices via networks, and to maintain historical authority controls.
- b) Communication capability to a mini-computer or mainframe.
- c) Output from a letter-quality printer in the office of the historian and archivist; and from high speed line printers and COM with fiche and reel formats in a remote location.

- d) Input software which permits input from the archives work station keyboard, MARC formatted tapes read into the remote CPU and downloaded, and on-line input to the remote CPU downloaded.
- e) A working memory available to the archives work station of at least 1 megabyte.
- f) Memory in the remote CPU, capable of being addressed and manipulated on-line, of at least 60 megabytes.
- g) Capability to communicate from the remote CPU to computers in all the other Navy Laboratories.
- h) Capability to output data in MARC format.
- i) Capability in the remote software to create specified records, search them by data element and in free text, to generate and maintain authority files automatically with automatic updating of records when authorities change. Friendly menu-driven input and interaction modes, generalized report writing capability and a basic design suited to describing, retrieving and compiling the statistics for archival and bibliographic materials.

This recommended configuration and the administrative and technical capability to support its use by the archives currently resides in the ILS system and in the NRL library. Rather than look for another mechanism, it is recommended that the historian and archivist plan to develop that capability.

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