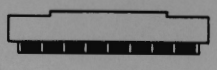
COMPUTER APPLICATION TASK FORCE REPORT

New Jersey Department of Education
Division of State Library, Archives and History



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REPORT OF THE

COMPUTER APPLICATION

TASK FORCE

Prepared by the Computer Application Task Force
under the direction of
the New Jersey State Library,
A Division of the Department of
Education

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REPORT OF THE COMPUTER APPLICATION TASK FORCE: A SUMMARY

In this report, the Computer Application Task Force proposes a number of ways in which computer technology can be used to support development of a Library Network as recommended by the New Jersey Statewide Planning Group and its several task forces.

Recent advances in computer technology now make it possible to consider a planned introduction of computerized systems to benefit the libraries of New Jersey and their users. Computerized systems present a number of potential advantages. These include: releasing time spent on routine tasks for use in giving more service to library customers, enabling a library to provide high level services which would otherwise be impossible or outrageously expensive in staff time, making possible more accurate performance than can be expected from humans, providing an efficient method of networking and resource sharing among libraries, and preventing unnecessary, redundant preparation of records.

Much progress has been made nationally toward the automation of library procedures and the use of computerized systems by libraries. This progress has been marked by the introduction of shared cataloging systems and networking (e.g., OCLC); the growth of on-line literature searching services; and the availability of complete, commercially-developed systems for performing certain routine library tasks, particularly circulation control. Both the bibliographic networks and the commercial vendors are moving and will continue to move into other areas of library activity, e.g., acquisitions, serial control, COM catalogs.

Some 51 New Jersey library automation projects were identified by the task force. Most of these systems were developed individually by the institutions using them. Others were purchased as complete systems from outside vendors. They include circulation control, cataloging, acquisition, financial accounting, computer-produced book catalog and computer-produced union list of serials. These systems were introduced with very little coordination.

The Task Force makes the following specific recommendations:

1. An Office of Library Systems Technology should be established in the State Library to offer statewide such services as coordinating systems, providing advice on library computerization matters and representing New Jersey on library automation matters in national forums.

2. The State Library should build and maintain a machine-readable data base of books, serials and audio-visual materials held by all types of libraries within the State. The MARC-II (or MARC-II compatible) data communications format should be standard for this file. Using this data base, the State Library should produce a COM union catalog of monographic works held by New Jersey libraries and make it available for resource sharing statewide. Libraries should report their holdings to this catalog using a standard minimum set of bibliographic data elements and a standard holdings symbol, both to be specified by the Office of

Library Systems Technology. The initial phase of this catalog will be produced from shared records of OCLC libraries in New Jersey.

3. The computer-aided system presently used to prepare the New Jersey Union List of Serials should be modernized and made more efficient. Also, the coverage of this publication should be broadened to include additional classes of libraries.

In addition to the above, the Task Force recommends that service centers be created and funded by the State Library to provide resource sharing and, possibly, centralized processing services for all types of libraries in the State. This is in harmony with recommendations of other task forces regarding network structure and regional councils. These service centers would be central service points in networks consisting of either all types of libraries in a region, libraries of the same type scattered about the state or a large library having several branches. The initial service supplied by these centers would be provision of a computerized circulation control system. As multiple service centers are created, networking and resource-sharing among them will be possible through use of a proposed telecommunications network. Other systems which may be added later to the service centers and made available to members would be acquisition and serial control systems. Still later, an on-line catalog of books and other materials would be introduced for use in libraries and in home.

Robert O. Stanton
Chairman, Computer Application Task Force
September 1980

REPORT OF THE NEW JERSEY STATE TASK FORCE ON LIBRARY COMPUTER APPLICATIONS

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1.0 INTRODUCTION

The Task Force on Library Computer Applications was appointed by the State Librarian, Barbara Weaver, in January 1980 and charged with responsibility "To investigate, study and make recommendations to make best use of computing/automation/telecommunications for all types of libraries in New Jersey ...".[1] The appointment of this and other related Task Forces was the latest in a series of efforts intended to lead to the creation of a New Jersey State Library Network. Significant relevant studies preceding this one were the "Development of Libraries and Networks: Prospective Roles and Responsibilities for Libraries in New Jersey" (also known as the Musto Commission Report) (November, 1979); the draft "State-Wide Plan for Higher Education" (1979); the "Report of the Subcommittee on Library Automation of the Library Development Committee of the New Jersey Library Association" (March 9, 1979); and "A Developing State Plan for Library Services" (December, 1979) issued by the New Jersey State Library. Each of these reports dealt in some respect with the computerization of library operations (Appendix A).

One does not have to go far beyond the home these days to realize that the computer touches virtually all of us in many ordinary aspects of our lives, for example when we reserve an airline seat, pay charge-account bills, use certain electrical applicances or buy a theater ticket. And this phenomenon is likely to accelerate for at least three reasons. First, the great speed and power of computers enables us to perform otherwise impossible or extremely complex tasks quickly and accurately. Second, the present trend toward lower cost per unit of computing brought about by rapid technological advances is likely to continue. Finally, tremendous strides are being made in reducing the size of computers particularly through the development of miniaturized electronic components. Today, modern computers can perform much more difficult tasks than were possible ten years ago, can do them faster, can do them much more cheaply and occupy a small fraction of the space previously required.

After a slow start, computerized systems began to be used in libraries in significant numbers during the mid-1970's. Today, the rate of introduction of such systems to libraries is accelerating rapidly, particularly in three areas of library activity: circulation control, cataloging, and literature searching. The payoff to libraries and their users by the use of computers to support these activities has been significant. The benefits from computer assistance in other areas of library activity such as acquisitions, serials control, financial management, and online catalog searching, are equally promising, though progress here has been slow.

If we are to build a New Jersey Library Network which will work as a true resource-sharing network and which will meet the rising expectations of the citizens of New Jersey for library services, the powers of the computer will have to be fully exploited. In the report which follows, a program and a series of recommendations which are intended to facilitate the development and enhancement of the State Network through a phased introduction of computerized systems are presented. The Task Force recommends that the State support these proposals through appropriate administrative changes and an adequate level of funding.

2.0 OPPORTUNITIES PRESENTED TO LIBRARIES BY COMPUTERIZATION

New Jersey Libraries are experiencing increasing demands from the public for service. At the same time, pressure on library budgets is growing for a number of reasons: inflation, local government spending caps, and the public revolt against the rising cost of government. In an attempt to cope with the combined effect of these forces, libraries across the country are turning to computerized systems for aid.

Computers are not a cure for all of the financial or service ills of a library. Likewise, computerization just for the sake of computerization frequently turns out to be a serious mistake. However, a computerized system can be very beneficial to a library in cost effective and service-enhancing ways if the need for it is carefully thought out and if all of the consequences of a new system, both financial and operational, are considered. A decision to computerize library functions can:

a. Enable a library to provide a higher level of service to its users. Services can be supplied which would either be too expensive to carry out manually or would be impossible without machine aid. For example, an online circulation control system enables one to determine quickly and easily the availability of any copy of any book owned by a library. Though this function can also be handled manually, it can only be done at great expense in staff time. As another example, an online computerized information retrieval system allows one to conduct complex searches involving multiple subject terms and to retrieve information and citations from very large data bases in minutes. A manual equivalent of this capability would be virtually impossible or, at best, so outrageously expensive in staff time that one would not consider doing it.

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1 Letter dated January 16, 1980 from Barbara Weaver, State Librarian to Task Force members.

b. Relieve library staff members of the necessity of performing certain routine tasks such as preparing catalog cards, book cards and labels; writing overdue notices; typing book orders; etc. This then frees them to provide additional services to library users.

c. Make possible more accurate performance than can be expected from humans. Programmed and operated correctly, the computer files and copies without error, and it does not forget.

d. Prevent unnecessary, redundant preparation of records. This is particularly evident in the case of the national bibliographic utilities which, by maintaining commonly-accessible, machine-readable files of bibliographic records online, eliminate the necessity of literally hundreds of libraries independently cataloging the same item.

e. Through interlibrary loan systems, make it possible for libraries to share resources and thus make available to their users a much wider range of materials.

f. Enable library managers to review services or other operations in highly effective ways which would be impossible in a strictly manual system. A computerized system can monitor work flow in an operation, manage the development of collections, highlight service problems, manage finances, and provide feedback on the response of library customers to services.

3.0 NATIONAL TRENDS IN LIBRARY AUTOMATION

In the mid 1960's, automation of library procedures was an expensive experiment, yielding uncertain results, and only undertaken by very large research libraries. Those early projects aimed at creating total, integrated automated systems comprising acquisitions, cataloging, serials control, and circulation. Although they had mixed success, we learned a great deal from these early ventures. The last ten years have been marked by a rapid advance in computer technology which has introduced a new range of options for all types and sizes of libraries: participation in the OCLC shared cataloging system; choice of vendor developed and maintained turnkey systems for cataloging, acquisitions, and circulation; and the availability of computerized literature searching services. The emphasis during these years has been on the development of single application systems for specific library tasks. The trend of the 1980's, as typified by the turnkey vendor circulation and inventory control systems, will again be toward an integrated, computer-based system which will provide cataloging, circulation control, acquisitions, and online catalog services.

The development and continued growth of the bibliographic utilities - OCLC, RLIN, WLN - has had a great impact on the profession. Librarians recognize the benefits to be gained from automation and the use of machine-readable records; and there is growing acceptance of plans for the development of national and regional computerized resource sharing networks. The bibliographic utilities provide access to large data bases of machine-readable cataloging records input by their own members and the Library of Congress. These data bases have aided in reducing the costs of cataloging materials and of the retrospective conversion of library holdings to machine-readable form for building circulation control data bases and for producing computer-output-microform (COM) catalogs.

OCLC, Inc., which began as a computerized processing utility for the State of Ohio, has become a national network with approximately 2,000 academic, public, school and special member libraries using an online data base of over six million records. The OCLC cataloging system provides records input by members as well as Library of Congress, and CONSER serials records, any of which may be modified by the participating library to produce customized catalog cards and to produce machine readable records for each item cataloged. These records, including the symbols of libraries which have used specific records, constitute what amounts to an online national union catalog. The cataloging data base provides the core records to support subsystems for interlibrary loan, serials check-in, and acquisitions. OCLC is the only bibliographic utility that has developed an electronic message switching interlibrary loan system which allows libraries to request materials from other OCLC member libraries using local computer terminals.

The Research Libraries Information Network (RLIN) has been developed to meet the specialized bibliographic needs of research libraries (principally in universities) and has approximately 21 members located throughout the country. The RLIN data base contains records input by members and the Library of Congress as well as CONSER serials records. Unlike OCLC and WLN, the RLIN systems allows member libraries to maintain their own local records within the data base thereby providing an individual, online catalog for each participant. RLIN also provides an online union catalog and magnetic tapes containing records input by members. An acquisitions subsystem is currently under development.

The Washington Library Network (WLN) serves over forty-eight academic, public and special libraries located in the Pacific

Northwest providing online access to Library of Congress records and those input by members, an online union catalog, an acquisitions subsystem, an author authority system, and services for the production of COM and book catalogs for member libraries. WLN also produces a quarterly COM Resource Directory which contains all titles and library holding information contained in the data base. Unlike the other networks, WLN is not trying to become a national network, but is encouraging groups of libraries to replicate or transfer the WLN system by purchasing its software and installing it on local computer systems.

In order to encourage the three bibliographic utilities to develop cooperative programs, the Council on Library Resources has initiated the Bibliographic Services Development Program (BSDP). RLIN and WLN have received the first grant funded under the BSDP to create a telecommunications system which will link their data base files to allow for both utilities to have access to an online shared authority file. The Council has also signed a contract with Battelle-Columbus laboratories to investigate the feasibility of linking the three bibliographic utilities.

The existence of the bibliographic utilities' data bases has promoted the development and growth of regional networks. There is a trend among OCLC-based networks to take on leadership roles in fostering regional library cooperation. This activity is reflected in a recent NELINET mission statement which states that the network seeks to assist New England libraries to reach their own automation goals; to encourage mutual accessibility of automated systems within the New England area; and to promote cooperative development of automated systems on a regional and national level. Another OCLC-based network, SOLINET, located in the South, has announced that it will purchase the WLN software to develop a regional data base and related support systems. SOLINET has also developed computer programs to produce COM catalogs and to convert MARC data to the CLSI[2] circulation record format. An alternate approach, not involving regional network computer services, has been taken by AMIGOS. This network has negotiated a COM catalog contract for its members with a commercial vendor and has undertaken a feasibility study to link four different circulation control systems located in the state of Texas. These regional networks provide the opportunity for member libraries to develop automated services cooperatively and systems which most libraries could not implement for themselves.

4.0 LIBRARY AUTOMATION TRENDS IN OTHER STATES

Many states have taken active roles in promoting resource sharing among all types of libraries through funding various types of automation projects including the development of COM union catalogs; the selection and purchase of automated circulation control systems; and the use of the OCLC, Inc. automated cataloging and interlibrary loan subsystems.

The wide availability of machine-readable records in the MARC-II[3] (hereinafter MARC) data communications format has made it possible for states to develop data bases of bibliographic holdings and to produce computer-output-microform union catalogs. The following states have COM union catalogs which they have produced through commercial vendor services: Alabama, California, Colorado, Hawaii, Kansas, Maryland, Mississippi, New Mexico (planning stage), Nebraska, Oregon, and West Virginia. Feasibility studies conducted for the states of Connecticut and Missouri have recommended the development of union catalog data bases for resource sharing and for providing source records for building circulation control data bases.

In order to insure the compatibility of automated circulation control systems within a state, several states have negotiated statewide contracts for a particular vendor system and have provided partial funding for the purchase of that system. Illinois was one of the first states to choose a commercial vendor (CLSI), but the state contract has not prevented the emergence of several other circulation control systems developed by vendors and libraries. Illinois, which plans to base its statewide resource sharing system on circulation control data bases, must decide on whether a single system will be chosen or whether interfaces between different systems can be developed. Illinois' experience has been repeated in several other states, including Connecticut. The following is a partial list of vendors and state contracts: Cincinnati Electronics - Wyoming; CLSI - Alabama, Illinois, Nevada, Idaho, and the California State Universities and Colleges; and DataPhase - North Carolina, Washington State. The automated circulation control system provides an ideal vehicle for resource sharing because:

1. a number of libraries can share one circulation control data base;
2. various libraries and library systems throughout a state which have the same circulation control system can have access to each others' data bases.

The online OCLC, Inc. union catalog data base and interlibrary loan subsystem provide other means for promoting statewide

2 CLSI, Inc., is the vendor of a turnkey circulation control system.

3 Marc II is an acronym for *Ma*chine *R*eadable *C*ataloging, editor.

sharing of resources. In using OCLC for this purpose, however, one must remember that most OCLC member libraries have only entered current records into the data base. Yet, use of the OCLC system requires a relatively small investment of money and a library is not locked into the bibliographic format used by a specific vendor system because the MARC records generated as a byproduct of the cataloging system are accepted by a variety of circulation control systems, COM catalog vendors, and other bibliographic utilities and cataloging systems. The following states have systematically provided funding for libraries to join OCLC: Alabama, Illinois, New York, New Mexico, Missouri, Pennsylvania.

5.0 LIBRARY COMPUTER APPLICATIONS IN NEW JERSEY

The central role that university, county, and municipal computer centers have played in developing automated library services has strongly influenced the present state of library automation in New Jersey. Of the 51 projects identified in Appendix B - "Library Automation Projects In New Jersey", 80% or 41 of these projects are in-house systems developed for the needs of one library. Since no standard software packages were available for library procedures, unique programs were developed for each library and were tailored to meet the host computer's specifications. Programs written in a specific computer language and designed for one type of computer are not easily adjusted for replication on a dissimilar computer. The early development of in-house computer programs provided a cost effective method of performing library routines during a period when the compatibility of automated systems was not an issue. At the time that most of these systems were developed, there were few comparable vendor turnkey systems and OCLC services had not been introduced to the New Jersey region. With the growing recognition of the need for networking and expanded resource sharing, many New Jersey librarians are now actively seeking a direction for developing compatible computerized systems that can be used by more than one library or group of libraries and that can exchange data electronically with one another.

In the last eight years, several new Jersey libraries have introduced vendor-produced systems: three libraries purchased automated circulation control systems, three libraries leased acquisitions and book ordering systems; and two libraries contracted for COM catalog services. Also, there are presently 38 New Jersey OCLC member libraries representing the following library types: academic (19); business (10); special (5); and public (4). Of these 38 libraries, 14 libraries use the interlibrary loan subsystem to borrow materials. OCLC services are provided by the PALINET network to libraries located in Pennsylvania, New Jersey, Maryland and Delaware. The Rutgers and Princeton University libraries joined RLIN and several libraries in the state have search-only contracts for access to that data base.

Public libraries and some schools have shown a great deal of interest in automated circulation control systems, but the price and the incompatibility of various vendor systems has discouraged many prospective buyers. A trend toward future developments is evident in Morris County's purchase of a circulation control system and the County's long-range plan to create a shared data base incorporating the holdings of the Morris County Library, the County College of Morris Library, and of other public libraries within the county. Each participating library will have online terminal access for circulation transactions, as well as, for locating materials for interlibrary loan. The approach used for this system appears to be a rational one which might well be emulated by other groups of libraries in the State. The Department of Higher Education has taken a similar approach by soliciting bids for a distributed circulation control minicomputer system which will create a shared union catalog data base for the eight state colleges, the College of Medicine and Dentistry of New Jersey at Newark and the New Jersey Institute of Technology. The State college contract will have a clause allowing other state, county, and municipal agencies to purchase the selected system at the established bid prices.

In an effort to improve statewide interlibrary loan access to their collections, both the State Library and the Rutgers University Library have discontinued the manual microfilming of their card catalogs to produce Micro Automated Catalog (MAC) supplements of their current holdings. Those institutions are using machine-readable records generated by their bibliographic utilities to produce computer-output-microfiche (COM) catalogs. The COM catalog has the advantage that each issue is current and cumulative in these catalogs, and unlike the frozen-in-time microfilm catalogs produced by photographing cards, records can be altered or withdrawn to reflect the current state of a libraries' collections. By 1981, the State Library will expand its COM catalog to include current holdings from the Newark Public Library and other OCLC library participants. This expanded catalog will be the first stage in the development of a planned statewide union catalog data base which will be used to promote increased horizontal borrowing among libraries in an area or region.

The State Library is focusing its Fiscal Year 1980 and 1981 federal and state grant programs on encouraging resource sharing among all types of libraries. The LSCA Title III grant program offers funding:

1. for automated projects which will increase regional resource sharing; and
2. for implementation of the OCLC, Inc. cataloging and interlibrary loan subsystems.

The OCLC system provides an online union catalog of the current holdings of the 38 New Jersey OCLC member libraries which can be used for interlibrary loan referrals.

In summary, the current state of library automation in New Jersey is uncoordinated and fragmentary, although some planning and system implementation is presently underway. The Governor's Conference recommendations and the State Plan indicate that the New Jersey library community has identified the need for the establishment and funding of regional, computerized resource sharing networks as reflected. The passage of the proposed multi-type library networking legislation and the creation of Regional Library Councils will set the framework within which compatible regional computerized networks can be developed.

6.0 RECOMMENDATIONS

In the sections which follow the Task Force presents a series of recommendations which are intended to provide the basis for a program of computerization of New Jersey library operations. The proposals given here do not require breaking new technological ground. However their implementation will bring great changes to New Jersey libraries and make possible substantial qualitative improvements in service to New Jersey library users. They will also provide more means by which libraries can engage in resource sharing on a statewide basis.

No cost data are included with these recommendations. If it is considered necessary to conduct cost studies for any of these recommendations, they should either be done under the auspices of the Statewide Library Planning Group or by the State Library.

Following is a summary of the recommendations:

a. **An Office of Library Systems Technology should be established in the State Library to perform a number of services including providing advice on library computerization matters to libraries in the State and representing New Jersey on library automation matters in national forums. (See Section 6.1).**

b. **The State Library should build and maintain a machine-readable data base of books, serials and audio-visual materials held by all types of libraries within the State. The MARC-II (or MARC-II compatible) data communications format should be standard for this file. (See Section 6.2). Using this data base, the State Library should produce a COM union catalog of monographic works held by New Jersey libraries and make it available statewide. Libraries should report their holdings to this catalog using a standard minimum set of bibliographic data elements and a standard holdings symbol, both to be specified by the Office of Library Systems Technology. (See Section 6.2.1).**

c. **The computer-aided system presently used to prepare the *New Jersey Union List of Serials* should be modernized and made more efficient. Also the coverage of this publication should be broadened to include additional classes of libraries. (See Section 6.2.2).**

d. **"Service Centers" should be created and funded by the State Library to provide resource sharing and, possibly, centralized processing services for all types of libraries in the State. These service centers would be central service points in networks consisting of either all types of libraries in a region; libraries of the same type scattered about the state; or a large library having several branches. The initial service supplied by these centers would be provision of a computerized circulation control system. As multiple service centers are created, networking and resource-sharing among them will be possible through use of a proposed telecommunications network. Other systems which may be added later to the service centers and made available to members would be acquisitions and serial control systems. Still later, an online catalog of books and other materials would be introduced for use in libraries and in the home. (See Sections 6.3 through 6.7).**

6.1 ESTABLISHMENT OF AN OFFICE OF LIBRARY SYSTEMS TECHNOLOGY (OLST) IN THE STATE LIBRARY

The full realization of the substantial resource-sharing and library service benefits that automation can provide for New Jersey depends greatly on the appropriate application of computer-based library systems. Specialized knowledge and technical expertise need to be readily available to aid the libraries of New Jersey in making the transition to the successful use of computer-assisted library functions.

Certain technical and format standards must be established and generally adopted in New Jersey to ensure that compatibility of

systems will make the implementation of long-range plans possible at reasonable cost. Knowledge of computer technology and the current state-of-the art of computer assisted library systems must be available statewide to provide guidance and coordination of this standardization effort in all types of libraries.

To provide this guidance, *the Task Force recommends the immediate establishment of an Office of Library Systems Technology (OLST) within the New Jersey State Library.* The Office's role in aiding and guiding all types of libraries in New Jersey in capitalize on technology is a key one. The appropriate place for this leadership role to be performed is the State Library, because the State Library can best insure that the needs of all library users in New Jersey are fully met. The State Library administers Library Services and Construction Act (LSCA) Title III funds for interlibrary cooperation and is the one agency in the State that can award grants to all types of libraries for purposes of network development and resource sharing.

The OLST should be staffed with individual(s) versed in library computer technology, including hardware, software and telecommunications. The OLST will provide the following services to all members of the emerging New Jersey State Library Network, including academic, public, school, and special libraries, and the proposed Regional Library Councils:

a. Function as a reference, resource-sharing unit or "nerve-center" for information on library automation and systems. Coordinate and maintain a detailed inventory of all computer-based systems operating in New Jersey libraries.

b. Undertake to design, coordinate and contract for necessary statewide bibliographic catalogs and data bases. Develop standard holding library symbols for New Jersey libraries to be used in these catalogs.

c. Recommend performance standards for computerized library systems in New Jersey. Define the minimum output and data-element input standards for computer-based circulation and cataloging systems to insure compatibility within the New Jersey State Library Network.

d. Upon request, provide advice, counsel and assistance to New Jersey libraries on systems and automation projects. Provide consultation and guidance to the State Librarian on the computer-related aspects of library network development in New Jersey. Meet with library planning groups, library boards, the proposed Regional Library Councils, and others to provide information and counsel on vendor proposals so that library automation in New Jersey may proceed in a systematic and compatible manner.

e. Upon request, participate in the preparation of Request for Proposal (RFP) documents and review RFP's for turnkey systems, and other software, hardware and telecommunications projects for libraries in New Jersey.

f. Keep abreast of new developments in the field of telecommunications, computer science and related fields, including trends in library automation under consideration by national and regional networks. Represent New Jersey in national automation forums.

g. Organize and conduct training programs in automated planning and systems implementation for libraries in New Jersey.

6.2 CREATION OF STATEWIDE BIBLIOGRAPHIC DATA BASE AND STANDARDS FOR MACHINE-READABLE RECORDS

The Task Force recommends that the State Library develop and maintain a statewide bibliographic data base containing records of monographs and serials as well as audio-visual and other nonprint materials owned by New Jersey public, academic, school and special libraries. In the first phase of development, there will be two separate data bases:

1. The New Jersey Union List of Serials (NJULS) which contains library specific issue and volume information for each title owned;

2. a statewide union catalog of bibliographic records for all types of materials, containing symbols for participating libraries and their unique call numbers.

Although the statewide union catalog will contain serials records, for the most part these will be current titles and the records will not have issue and volume information. Until such time as it becomes feasible: 1. to merge both data bases; and 2. to provide online access to the merged data base, library holdings information will be distributed in the form of two separate, updated and cumulative computer-output-microform (COM) catalogs. These COM catalogs should be distributed to all libraries requesting them in order to provide New Jersey citizens with expanded access to resources held by all types of libraries within the State. The effectiveness of the proposed Statewide Library Card will depend upon the speed with which libraries and library users are able to locate current and retrospective titles within a given geographic area.

The most cost effective method for merging machine-readable records obtained from bibliographic utilities or commercial vendor or library produced systems, requires the use of the MARC-II data communications record format. *The Task Force recommends that the machine-readable records incorporated in the statewide union catalog data base adhere to the MARC-II or to a MARC-II compatible data communications format for monographs, serials and audio visual materials. It further recommends that records in the New Jersey Union List of Serials be converted to MARC-II format* (See Section 6.2.2).

MARC-II is the national standard data record format used by the Library of Congress and the bibliographic utilities, i.e., OCLC, RLIN, WLN. Records in the MARC-II format are accepted by all major commercial circulation control systems, cataloging systems, and by COM and book catalog vendors. Use of the format, or of a compatible format, insures that a library is not locked into one vendor or library-produced system because the data can be transferred to another MARC-II based system without rekeying records to convert them to an alternate data communications format. Also, the MARC-II records contained in the statewide union catalog can provide a standard source from which New Jersey libraries can obtain machine-readable records to build circulation control system data bases, thereby reducing data conversion costs.

The Task Force recognizes that not all libraries have followed the MARC-II format in their cataloging practices. It does not recommend that these libraries undertake costly conversion projects. The recommended standard applies particularly to state and federally funded automation projects in which machine-readable records will be merged into the union catalog data base. At a later stage in the development of the data base, an investigation should be made of methods to convert selected non-compatible MARC records to the MARC-II format using a computer.

The New Jersey Union List of Serials presently does, and the statewide union catalog will, contain a holding library symbol and a call number for each contributing library owning a particular title. In order to end the present confusion caused by multiple symbols being used for the same library in various monograph and serials union catalogs, *the Task Force recommends that a standard set of holding library symbols, developed by the proposed Office of Library Systems Technology, be used in all union catalogs developed or maintained in New Jersey with State or federal funds.*

6.2.1 CREATION OF STATEWIDE UNION CATALOG

The Task Force recommends that the State Library develop a statewide COM union catalog by 1981 which will be produced through the merging of MARC-II and MARC-II compatible machine-readable records from all types of libraries. The catalog will contain records for monographs, serials, government and state documents, audio-visual materials, maps, films, and other nonprint materials.

In the first phase of the development of the statewide union catalog, the State Library will merge copies of OCLC archival tape records of its own collection, that of the Newark Public Library, and other participating New Jersey OCLC libraries. The State Library should also purchase OCLC archival tape records of the collections of selected libraries which do not subscribe to the OCLC tape service and merge these records into the catalog. Future developmental phases of the catalog will involve the merging of available MARC-II and MARC-II compatible machine-readable records produced as byproducts of cataloging, acquisitions and circulation control systems (See Section 6.4) in order to increase access to holdings of non-OCLC member libraries.

The COM catalog will contain one bibliographic record for an individual title into which all duplicate records will be merged. Expanded access to materials will be provided by a divided author, title and subject catalog, with each record in these catalogs containing the symbols of all participating libraries owning the title and their unique call numbers.

In order to facilitate the computer matching of duplicate records and the merging of holdings information on one bibliographic record, *the Task Force recommends that standards be developed for minimum bibliographic data elements that must be included in machine-readable records for monographs, serials and audio-visual materials.* The standard data elements for each class of material will differ due to descriptive cataloging rules for various materials formats. The exact composition for each format should be determined by the Office of Library Systems Technology.

Recent research on building monographic bibliographic data bases has indicated that certain data elements must be present for a computer to generate a search key automatically for electronically merging duplicate records. Such keys have been shown to operate with greater accuracy than search keys based on Library of Congress number and the International Standard Bibliographic Number (ISBN) which have a seven to fifteen percent mismatch error rate. The search key can also be used to retrieve full MARC-II bibliographic records. If the standard data elements have been included, the records in the data base can be searched, without re-keying, against a source data base to retrieve full MARC-II records which can, in turn, be used for online or COM catalogs providing author, title, and subject access.

6.2.2 EXPANSION OF THE NEW JERSEY UNION LIST OF SERIALS

The Rutgers University Research Information Services (RIS) has current responsibility for the maintenance, production, and distribution of the New Jersey Union List of Serials (NJULS). The NJULS is issued in quarterly cumulations in a computer-output-microfiche catalog. In April 1980, the data base contained over 59,000 titles from 131 libraries. Total size of the data base, including holdings and related information, exceeded 338,000 records. Libraries included in this data base are Rutgers, Princeton, the State Colleges, College of Medicine and Dentistry, New Jersey Institute of Technology, New Jersey State Library, Newark Public Library, Area Library union lists, and other private institutions.

The New Jersey Union List of Serials has been successful and has grown substantially in scope since however its inception, its batch mode operating programs are no longer capable of handling the volume of machine processing required in a cost-effective manner. Current procedures for the maintenance of this data base require huge amounts of keypunch card production, card handling, and storage. A number of large computer printed products are required for the internal control and processing of the data base. A substantial amount of clerical effort is required to encode processing forms manually and to record activity against the data base.

In order to provide for the needed growth of the NJULS data base, The Task Force recommends that an improved system for producing this publication should be implemented which employs online data entry and editing terminals. Such a system would reduce staff effort, eliminate redundant manual operations, and ensure an adequate capacity for data base expansion. Once this improved system has been implemented, the number of libraries contributing to the NJULS should be increased to include other classes of libraries such as community colleges, large public libraries and medical libraries.

In a second phase of development, the Task Force recommends that the data base record format be updated to a full MARC-II data communications format. Steps have already been taken to add International Standard Serials Numbers (ISSN) to records in the data base to allow for a future retrieval of full MARC-II serials records from one or more of the national bibliographic utility data bases. Once the conversion is completed, it will be possible to merge the NJULS serials holdings records with the union catalog data base which incorporates records for all types of materials.

The State Library should assume the responsibility of overseeing the design of a new system and the development and maintenance of the data base through Research Information Services or an alternate service contractor.

6.3 CREATION OF SERVICE CENTERS

The Task Force recommends that service centers be created to provide resource sharing and centralized processing services for all types of libraries in the State. These service centers would be centralized facilities providing for the needs of a network of cooperating member libraries. The number of libraries belonging to a given service center network and the number of networks to be established in the State would be decided by whatever authorities are created for this purpose, taking into account economic and political factors. However, the Task Force recommends that provision be made for at least the following three types of networks, each defined according to the make-up of its membership:

1. Member libraries of all classes (public, school, college, special, etc.) located in a specified geographical area.
2. Member libraries belonging to the same class of libraries, e.g., the New Jersey State College Library Network, which may be scattered around the State.
3. A large library with a number of branch locations which comprises its own network.

6.4 INTRODUCTION OF COMPUTERIZATION TO SERVICE CENTERS

In their first phase of development, service centers will provide a variety of computer-aided services to their members which do not require local, on-site computers. These might include providing members with terminal access to national bibliographic utilities (OCLC, RLIN, WLN, and/or others); aid in doing online literature searches (DIALOG, ORBIT, New York Times Data Bank, MEDLINE, etc.); and some form of interlibrary loan location and delivery service for member libraries.

In a second stage of development a computerized circulation control system will be introduced, taking into account minimum standards set by the Office of Library Systems Technology.

Existing machine-readable bibliographic files from other member libraries will be used, where possible, to create the circulation data base. Additional data will be acquired from the State Library's union catalog data base of bibliographic records. Together, these sources will be used to load an initial data base of all materials held by all member libraries.

The circulation system selected should satisfy the main objective of network automation: it must promote resource sharing among member libraries and thus provide the best service possible to all users.

A diagram of a service center network showing interconnections with other elements of the State Library Computer Network is shown in Figure 1.

A network consisting of circulation terminals installed at each member library and the main computer hardware located at the service center will be put in place. In cases where the data base is very large or anticipated circulation volume is exceptionally heavy, smaller distributed processors may be located at member libraries to maintain terminal response time at suitable levels. In general, the entire network's circulation data base will be located at the service center, but subsets may also reside at member locations as dictated by the requirements of the particular installation. The system should be able to perform message switching between member libraries and the service center to expedite communication of data, notices, etc. Where possible, terminals employed in circulation should be usable for other functions such as searching national bibliographic utilities, doing online literature searching and doing computer-aided text editing.

As member libraries add or alter records in the circulation data base (new acquisitions, shelf-list conversions, corrections, etc.) the service center will send machine-readable copies of these records to the State Library for inclusion into the New Jersey MARC-II file. The data will be sent on magnetic tape and will adhere to minimum standards established by the OLST for MARC-II data (See Section 6.2.1). Service centers will aid member libraries in the acquisition of full MARC-II data where available through the national bibliographic utilities.

An effective circulation control system should include the usual online capabilities which include control of charge/discharge, renewals, holds, recalls, fine/overdue/billing notices and item retrieval on certain data elements. The ability to handle the circulation of reserve or short-loan items would also be desirable. The Circulation data base should be a total holdings inventory with ability to respond to user's requests about the availability of any item and to accumulate historical loan data. A borrower file containing address and telephone information for all registered borrowers should also be maintained.

The system must be capable of tracking and accounting for circulation of materials by users outside of the network's normal user body. This information permits reporting of statewide library card transactions to the State Library. To facilitate such reporting, the user information file must be capable of accumulating loan transaction data under a unique identifying number. The circulation system should be capable of supporting and tracking interlibrary loan transactions between member libraries and on library users outside the network.

Ideally management reporting should include information about circulation by item, classification, location, etc. Reports should also be available to supplement billing for overdue or lost materials and to record collection of fines and replacement costs.

6.5 FORMATION OF THE SERVICE CENTER NETWORK

As multiple service centers are brought into operation, (each following the pattern discussed in Section 6.4), the possibility of being able to offer a new and exciting dimension of service to member libraries and their users arises. What makes this possible is the creation of a telecommunications network (See Appendix C) linking the service centers and their members to each other, to the State Library, to the national bibliographic utilities and, perhaps, to certain of the larger libraries in the State, e.g., Princeton University and Newark Public. This network will handle both voice and data traffic.

Using the statewide COM Union Catalog, discussed earlier, a library user needing a book or other library material not held in the local network will be able to determine which other libraries in the State own it. In order to discover if the item is available or out on loan, however, the user's local library will consult the owning library's service center circulation control system. This will be done on a computer terminal by giving commands which are automatically transmitted over the telecommunications network to the remote service center computer. Once connected to this computer the inquiring library can determine the availability of the needed title; place a reserve in the name of the requesting service center if all copies are on loan; or issue a delivery request if the item is available. The remote system will also keep track of such kinds of transactions in order that a periodic report may be submitted to the State Library regarding such statewide library card transactions. Providing such services will further encourage

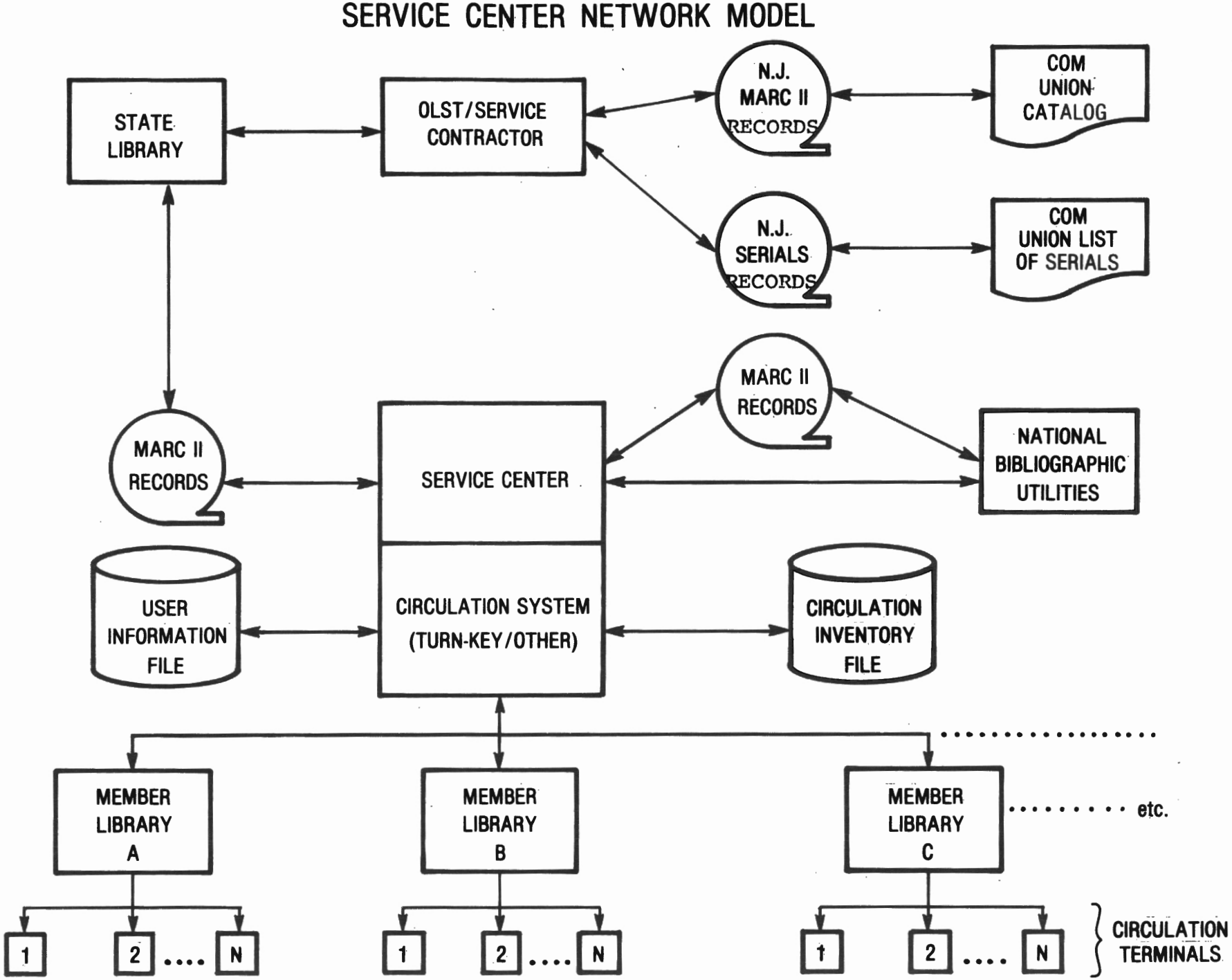
SERVICE CENTER NETWORK MODEL
STATE LIBRARY
OLST/SERVICE CONTRACTOR
N.J. MARC II RECORDS
COM UNION CATALOG
N.J. SERIALS RECORDS
COM UNION LIST OF SERIALS
MARC II RECORDS
SERVICE CENTER
MARC II RECORDS
NATIONAL BIBLIOGRAPHIC UTILITIES
USER INFORMATION FILE
CIRCULATION SYSTEM (TURN-KEY/OTHER)
CIRCULATION INVENTORY FILE
MEMBER LIBRARY A
MEMBER LIBRARY B
MEMBER LIBRARY C
etc.
1
2
N
1
2
N
1
2
N
CIRCULATION TERMINALS

FIGURE 1

resource sharing and give the average library user an unprecedented degree of access to the holdings of libraries statewide.

6.6 INSTALLATION OF ADDITIONAL COMPUTERIZED SYSTEMS IN THE SERVICE CENTERS

Once its circulation control system has been in full operation for a period of time long enough to become well established, a service center network can then turn its attention to the installation of other computer-aided systems, particularly online acquisitions and serial control systems.

An acquisition system would handle the processing of all orders for monographic works in all formats placed by members of a service center network. A data base file of items on order or otherwise in process would be maintained online and accessible for searching by all members. A library contemplating the purchase of an item would have at hand both this file and the COM Union Catalog described in paragraph 6.2. Knowing from these sources which libraries hold or have on order a given item will assist libraries in deciding on purchases and will encourage resource sharing, particularly for expensive items. Once an order has been decided upon and entered into the system, the system will prepare order forms, issue claim notices for late orders, keep track of the status of ordered items, provide statistics on vendor performance, and maintain records of expenses and encumbrances. With such a system a library can have its orders processed and monitored efficiently, keep its users informed about the status of outstanding orders and provide library administration with management information on acquisitions operations which is not currently available on manual systems.

By bringing the powers of the computer to bear on what is recognized to be one of the more complex library operations, a serial control system would enable a library to manage its serial collection more effectively, control its expenditures for these materials better, and give its users a higher level of service. Such a system would provide library users and staff with up-to-date, online information on the serials holdings of member libraries; introduce an efficient means of recording the receipt of current issues; provide a time-saving method of following-up with vendors when an expected issue is not received; maintain accurate subscription billing records; issue renewal lists; and assist member libraries in identifying serial volumes which are complete and ready for binding. As with the acquisition system, the serial control system would provide information to library administrators on financial and other aspects of serial operations.

6.7 THE LIBRARY OF THE FUTURE

Within the next five to ten years ti will become feasible to provide full online catalogs of library materials with search capabilities similar to those available now from commercial search services. However, it is unlikely that the national bibliographic utilities will provide such capabilities on their present data bases for use by both member libraries and their users. The computing load resulting from this searching, when combined with that from other on-going services (cataloging, interlibrary loans, etc.) would far exceed the capacity of any of these systems to meet it. The trend will more likely be toward providing access to decentralized data bases serving smaller numbers of users. *The Task Force therefore foresees the desirability of providing the libraries in New Jersey with an online catalog of books and other materials held by New Jersey libraries.* The system, which will be built around the statewide bibliographic data base (See Section 6.2), will become increasingly feasible as this data base grows in size and coverage and as technological advances further reduce the cost of computing. The system will provide the user with a full range of search capabilities, including the ability to search under virtually all MARC-II fields, (e.g., titles, subject headings, bibliographic notes, etc.), under any words in those fields and in various logical combinations. In the first stage, this capability will be made available to the service centers only. In the second stage all of the libraries in the State will have such access. Later, library users will be able to do their own searching in the library using library terminals and, still later, using personal terminals in the home. When this point occurs (well before the year 2000), the card catalog as we know it today will become unnecessary in many libraries.

The advantages of such a system are that it is very fast; it provides an up-to-the-minute record of available materials; it permits searches under a variety of data elements; and it permits logical combinations of search command and terms which in turn generate very specific answers. None of these capabilities can be duplicated with either the card catalog or a computer-generated microform catalog. Full capability, online searching systems are today available and in widespread use for periodical and technical report literature. To provide this same capability for monographs, therefore, would not require breaking new technological ground.

Though seemingly futuristic, limited experimental programs of automated library service through home video terminals are being conducted today. The technological problems of extending an online catalog service into the home are well understood. The problems which remain are largely human factors and financial problems. An on-going program of school and public education, coupled with the use of hospitable system programs which lead the searcher in easy steps through a catalog search, will facilitate the acceptance and use of such systems.

APPENDIX A

AREAS OF AGREEMENT ON LIBRARY AUTOMATION CONCEPTS IN THE MUSTO REPORT, STATE PLAN, LDC SUBCOMMITTEE ON AUTOMATION REPORT AND THE STATE-WIDE PLAN FOR HIGHER EDUCATION

TOPICS	*MUSTO*	STATE *PLAN*	*LDC*	HIGH *ED*
Develop of Bibliographic Access Center(s) to identify resources through building and providing an online data base of holdings and online reference services	X	X		
Develop a statewide union catalog of monographic holdings	X	X	X	X
Expand and modernize New Jersey Union List of Serials	X		X	X[1]
Develop periodicals centers and improved bibliographic access to serials holdings		X		
Establish an Office of Library Systems in the State Library for introduction and selection of new automated systems		X	X	
State Library shall assume central leadership role in the study and introduction of automated systems, establishment of contracts for service, and development of compatibility standards	X[2]	X	X	
State Library shall encourage the development of local area networks for the purpose of operating computerized systems	X[3]		X	
State Library shall insure development of compatible automated systems		X	X	X[4]
State Library shall develop telecommunications network for online access to materials	X	X	X	
State Library shall make online reference search services available to all libraries requesting these services	X			X[5]
State Library shall offer technical assistance to New Jersey libraries considering automated circulation systems		X	X[6]	

1 All new academic libraries should contribute their holdings to the union list of serials

2 In relationship to the development of the Bibliographic Access Center (BAC)

3 In relationship to development of Library Service Cooperative (LSC)

4 Agreement with need for compatible systems within the state, but no fixed responsibility for implementation of standards

5 All New Jersey state-supported academic libraries should offer online Reference Services

6 State Library should assist libraries in data conversion for building circulation data bases

APPENDIX B

LIBRARY AUTOMATION PROJECTS IN NEW JERSEY LIBRARIES[1]

1. Circulation Control Systems

Montclair Public Library
East Brunswick Public Library
Teaneck Public Library
Stockton State College
Rutgers University
Ocean County College
Brookdale Community College
New Jersey State Library: Library for the Blind and Handicapped
Hunterdon Central High School
Bell Laboratories
Ocean County Library
Morris County Free Library and the County College of Morris
Atlantic County Library

2. A. Cataloging Systems

OCLC Libraries, through PALINET (38)
RLIN Libraries, Rutgers and Princeton University Libraries
Bell Laboratories
Ocean County Library (in development)
Rutgers University Library
Paterson Public Library (catalog card production system)

B. Computer Produced Printed Book Catalogs

Burlington County Free Library
Monmouth County Library
Bell Laboratories

C. Computer-Output-Microform (COM) Catalogs

Rutgers University Library
New Jersey State Library
Stockton State College
County College of Morris
East Brunswick Public Library
Rutgers Institute of Jazz Studies

3. Acquisition Systems

Rutgers University Library
Bell Laboratories
East Brunswick Public Library
Atlantic County Library
Ocean County Library (in development)
Morris County Free Library
William Paterson College

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1 A partial list compiled for the Task Force on Computer Applications for Libraries.

4. Accounting Systems (stand-alone)

Hunterdon County Library
Teaneck Public Library
Ocean County Library

5. Serials Union Lists

New Jersey Union List of Serials
Atlantic-Cape May Counties
Libraries Unlimited

6. Computerized Literature Searching (via vendor services)

New Jersey State Library
Rutgers University, Research Information Services
Monmouth County Library
Jersey City Free Public Library
Stockton State College
Stevens Institute of Technology
Bell Laboratories
College of Medicine and Dentistry
Princeton University Library
Air Products
American Cyanmid Company, Princeton
Merck and Company
Education Testing Service
Bristol-Meyers Products
Colgate-Palmolive Company
Hoffman-LaRoche, Incorporated
Union Carbide-Chemicals and Plastics
Sun Chemical Corporation

NEW JERSEY OCLC MEMBERS (38)

*American Cyanamid Company, Princeton
American Telephone and Telegraph Company, Basking Ridge
Atlantic Community College
Beecham Products
*Bell Laboratories, Holmdel
*Bergen Community College
Bloomfield College
*Brookdale Community College
Caldwell College
*Camden County Library
Cherry Hill Public Library
College of Medicine and Dentistry
College of Saint Elizabeth
*Drew University
Essex County College
FMC Corporation
Fairleigh Dickinson University, Rutherford Campus
Fairleigh Dickinson University, Teaneck Campus
*Glassboro State College
*Jersey City State College
Kean State College
Mobil Oil Corporation, Princeton
Mobil Oil Corporation, Toxicology Division
Mobil Research and Development Corporation, Paulsboro
*Montclair State College
Morris County Free Library
Newark Public Library
New Jersey Institute of Technology
*New Jersey State Library
*Princeton Theological Seminary
Prudential Property and Casualty Insurance
Ramapo College of New Jersey
Rutgers Institute of Jazz Studies
Saint Peter's College
E. R. Squibb and Sons
*Stockton State College
*Trenton State College
*William Paterson College of New Jersey

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* Libraries participating in OCLC Interlibrary Loan Subsystem

NEW JERSEY STATE LIBRARY NETWORK
TELECOMMUNICATIONS FACILITIES