# EXPERIENCES IN LIBRARY COMPUTERIZATION AT SPACE APPLICATIONS CENTRE

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## 1. Introduction

SAC Library is Functioning as information centre where technical information is collected and organized for use. The aim is to build up a useful collection of documents meeting present and future user needs and to develop the systems for information retrieval and dissemination. To achieve this it has following functions to discharge:

1. To identify users and their information needs
2. To build a strong collection reflecting the subjects in the field of specific interest, covering the topics of growing importance within the scope of broader disciplines and material of reference and bibliographical nature.
3. To facilitate information retrieval by developing Circulation and Reference Services.
4. To Provide Current Awareness Services.
5. To prepare specific subjects bibliographies.
6. To organize technical processing like Classification and Indexing of books and articles.
7. To provide reprographic services like offset printing, lithography, xeroxing, micrography and binding of in-house reports and other documents.
8. To develop Computer Based Integrated Information System.

Collection development, its organization and information retrieval are the basic functions of the library. To bring about fast improvements in these functions and services, computer applications have been initiated.

## 2. Need of Computerization

The information storage and retrieval problem has become progressively more serious in recent years, especially in the areas of

technology and science, where the volume of data and information is increasing at an unprecedented, nearly exponential rate. Keeping in view the tremendous flow of information, to organize information and to disseminate in systematic way, only computerization is answer. Computer aided system is more convenient, more flexible and more comprehensive and in the long run more economical. Some factors which prompted for automation of library services are as below.

1. Computer is extremely fast in processing information and magnetic tape as storage making, reduce storage space.
2. Many a time we require searching a database with a number of keyboards with different combinations. This requirement makes a manual search very complex and tedious. Such searches can easily be made on computerized system by random accessing of information and rapid retrieval of information by creating proper information database.
3. Computerised database can be accessed in interactive mode as per user requirements.
4. Generates outputs in the form of printed bibliography and multiple copies can be obtained.
5. A single database can provide all possible combinations of services to the users.
6. Database can be maintained either on small disk packs or tapes and can be transported at a very low cost.
7. Human errors minimized for day to day operations which leads to better utilization of human efficiency.

## 3. Planning for Computerization

Deciding to consider computerization for whatever reasons, is just the first step. The next step is to perform a system analysis. Having determined what activities be computerized for several reasons as mentioned below, we must carry out detailed examination of each activity.

1. To identify the data elements.
2. To calculate the total storage capacity required. To ensure that the software (to be acquired/developed) is able to handle the size, number of fields and the records. To estimate the back-up storage required.
3. To identify the various facilities to be computerized.
4. To identify those data elements which are common to several functions.

**4.     Methods to Computerise Certain Activities**

1. Decide various functions of each activity.
2. Identify the input requirements (data elements) for each of the functions.
3. Identify the inputs in terms of records, files and the media, also determine the size of the files.
4. Identify the output required for each of the functions.
5. Identify the output in terms of records, files and the media; also determine the size of the files.
6. Development of programmers (to get the desired output from the given input, using the available hardware) or buying the library commercial software to computerize certain or all functions of the activities.
7. Implementation and evaluation.

**5.     Applications Areas of Library Computerizations**

The applications of computers can be grouped into those concerned with House-keeping routines and Information retrieval.

1.     Library House-Keeping operations.

- Acquisitions
- Cataloguing
- Serials Control
- Articles Indexing
- Circulation Control

2.     Information Retrieval Approaches.

- In-house Catalogue
- Subscribing to magnetic tapes
- On-line Access
- CD-ROM Discs.

3.     Library Network and Networking

- offer a new dimension to library co-operation

4.     Systems Analysis and operations Research

- Applications of modern management techniques.

5.     Office Automation

- Word Processing Applications
- LAN (Local Area Network)

## 6. SAC Library Computerization

The idea was initiated in 1982 to create a database on "Communication Technology" and "Remote Sensing" on experimental basis, program was developed and tested operationally on PDP-11 computer. To design and develop an integrated system including all major library functions was a big task which involved a suitable software and trained personnel to develop programming and also access to a computer.

Therefore, the priorities to computerize the library functions were identified. Keeping in view the following points these priorities were established.

1. To reduce the manpower needs on repetitive jobs.
2. Increase the efficiency of the system.
3. Involvement of all the related staff.
4. Earlier practices and conventions should not be disturbed.
5. Easy to computerize and quickly to show the results to the management and
6. To promote the idea of total computerization in near future.

The analysis quickly resulted to identify that cataloguing systems as the priority for computerization and other functions step bystep. Hence, it was decided to undertake initially cataloguing of books and other documents.

### 6.1. Development of Cataloguing on VAX-11/78

In due course of time an access was provided to VAX-11/780 and library was connected to it by a terminal.

Cataloguing of documents was developed on VAX-11/780 with the help of DATATRIEVE software which was available with the computer itself and we used VAX-11/FORTRAN language for creating, modifying, updating the database and also for preparation of bibliographic lists. The systems was developed in such a manner that has the capabilities of sorting the data and retrieving it by various user approaches.

Soon it was realised that it was difficult to use VAX Computer for long because of disks, space limitation, system non-availability to library as it was mainly engaged for IRS and other project experiments. Discussions were made and decided library should have computer facility in Library to develop computer Based Information System.

### 6.2 CATALOGUE SYSTEM USING PC AND dBASE

In May 1987, a personal computer i.e. HCL PC XT which is IBM

PC compatible was installed in the library. Catalogue system is implemented on PC using dBASE III + an application software.
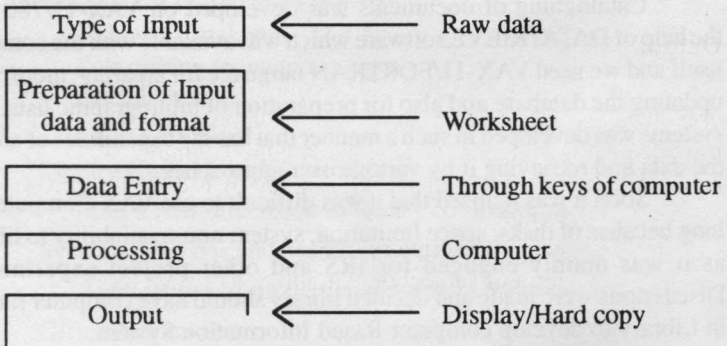
**Functional Design**

The catalogue is a record of books, scientific and technical reports and other reading materials available in the library. It is a record containing the entries of bibliographic elements (data) like author, title, subject descriptors, etc. Mainly following functions are involved in preparing a catalogue.

1. Selection of subject descriptors and classification - NASA Thesaurus is used for vocabulary control and Universal Decimal Classification (UDC) Scheme is used for providing class numbers.

2. Preparation of standard format - AACR-II rules are followed in preparing entry formats. To decide a standard format for storing the bibliographic variables, various formats of scientific and technical libraries and MARC format were studied.

The catalogue can be called a bibliographic database as it has all basic contents of a database, i.e. data, data fields, records and file. Author, title, subject description etc. are data elements and each data has fixed or variable fields. Group of data elements is called an entry or record, grouping of all entries or records constitutes a catalogue or a file, and group of related files is called a database. Input, processing and output are the main functions of cataloguing system or bibliographic database.

Following steps involved in data processing to develop a catalogue file.

| | |
|---|---|
| Type of Input | ⟵———— Raw data |
| Preparation of Input data and format | ⟵———— Worksheet |
| Data Entry | ⟵———— Through keys of computer |
| Processing | ⟵———— Computer |
| Output | ⟵———— Display/Hard copy |

**Input**

To create a bibliographic database (catalogue), a structured file

has been formulated. A sample of data structured file which is used for this is as below along with bibliographic elements identified in terms of length and content for storage media.

**Data input Format**

| | Field Name | Length/Character | Contents |
|---|---|---|---|
| 1. | Class Number (CNOS) | 20 | A symbol applied to a book indicating class to which it belongs. |
| 2. | Author Number (ANOS) | 15 | A symbol consisting of a combination of alphabetic letters and numerals which can identify a given book among others bearing the same class numbers. |
| 3. | Author | 60 | Writer of a book |
| 4 | Title | 60 X 3 | Name of the Publication |
| 5. | Imprint | 60 | Place, Publishers, year of the publication |
| 6. | Collation (COLL) | 60 | Volume, pages, size, etc. and note of the series. |
| 7. | Description (DESCP) | 60X 3 | Subject and other related key words |
| 8. | Accession Numbers | 60 | It shows record of document, it is a unique number. |

**Output**

Format of an output should be compact, readable and satisfying to user need the information from various approaches and it should be provided in the system to achieve the required output.

In general, users require information by following approaches
_ By author
_ By subject descriptors
_ one term of subject or combination of subjects
_ By class number
_ By title, etc.

Moreover, the products as mentioned below can also be obtained from the database.

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1. Catalogue generation according to above approaches.
2. To provide CAS service.
3. To provide SDI services
4. Generating indexing and production of indexes
5. Thesaurus construction
6. Bibliographics preparation
7. To provide retrospective search services.

**Function**

Steps for functional design are briefed here.
1. Creation of catalogue ( Bibliographic database) named SACLIS using CREATE command.
2. Generating records in data base by keying data of documents.
3. Sorting of data by selecting set of records from database for required approaches and storing sorted records in temporary disk file. dBASE III contains excellent commands for adding, modifying, deleting, sorting, etc.
4. "SACLIS" Package in dBase III+ was developed to store and retrieve the bibliographical information in desired manner and also has capabilities to produce catalogue cards, bibliographies, etc.

In addition to computer aided catalogue system the library developed the following other applications also. SAC Library developed menu driven user friendly information system to carry out following activities and information retrieval by various approaches.
1. Information Retrieval System
2. Index of articles selected from the journals.
3. Catalogue of periodicals holding and current subscription lists.
4. Acquisition System.

## 7. 1 Planning for Library Computerization in Multi-User Environment

In 1990, it was thought that Library Information System should be in multi-user environment so that many in-house activities and users can handle the system at a time and also in-house operations should be integrated.

Keeping in view the above requirements, SAC Library procured following hardwares and operating software to start the functions in multi-user environment.

1  WIPRO Genius/386 with
    80386 at 25 MHz
    4MB RAM
    1X 1.2 MB FDD
    1X 380 MB SCSI Drive
    Additional 4 MB Memory
    Intelligent 8 port card
    60 MB CTD + controller card EMS Driver
    14" Color monitor with VGA Card
    380 MB Hard Disk
2.  101 Key Board
3.  HP Laser Printer
4.  Terminals (8 Nos.)
5.  UNIX V 3.2 & "C" with VPI
6.  SCO Foxbase + 2.1
7.  SCO Lyrix 6.0

Above system has limitation of hard disk space and takes more retrieval response time. Hence, library has procured a new system in Sept. 1994 as mentioned below and transferred the entire functions from WIPRO Genius 386 to this system.

Dell OMNIPLEX 560

                    with 60 MHz Pentium Microprocessor
                    16 MB RAM
                    1 x (1.2 + 1.44) MB FDD
                    1 x 1GB SCSI Drive 150 MB CTD
                    External Cache Memory 256 KB
                    Intelligence 16 serial port card
                    IMB Video Memory 1MB
                    14" color monitor with VGA card
                    LAN 32 bit

A list of computer hardwares and peripherals available in Library is attached as Annexure "A".

## 7.2  Library Software

Library system was developed in single user environment using dBase III+ on MSDOS  and now to convert in multi-user environment, it was felt to have an Integrated Library Management Software Package and efforts started to obtain the software which is compatible to multi-user environment. A hunt began for such a software which would cater to

the information retrieval and house keeping requirements of our library. From the available library software, we considered LIBSYS software developed by M/s. Infotek Consultants Pvt. Ltd., New Delhi to be suitable to meet our requirements and opted for the same  Another consideration for opting the LIBSYS  Software is that various Institutions in India were well using and also seen the demonstration and its following features :

- Integrated functions.
- Interactive and screen oriented
- User friendly and menu-driven.
- Minimum possible data entry.
- Powerful data editing facility.
- Doesn't require any programming/trained skill.
- User defined security at sub system and function level.
- Data base recovery procedure.
- Import and Export facility.
- Retrospective Conversion is possible.
- "Help" facility at field level.

## 7.3    Salient Features of Libsys Software

It is an integrated Library Database Management Software and supports almost all activities relating to Library in-house functions and user services.

**Acquisition :** Sub-system of LIBSYS covers initiation of titles for ordering, approval process, placing order, receiving material against firm orders, invoice processing and accessioning, payment requisition, order follow-up, on-line queries by titles, orders, invoices, vendors, and budget heads etc., and generating various reports such as approval request form, order form, overdue notices, budget and expenditure analysis, payment requisition report, accession register, bill register, etc.,

**Catalouging:** sub-system of LIBSYS facilitates maintaining in process titles file, catalogue production either by data import or entering data, catalogue maintenance, thesaurus constructions, authority files maintenance, holdings updates, holding summary by ranges of call No., Printing 3 x 5 catalog cards, current awareness services which may include special bibliographies, list of recent arrivals and SDI facility, and import/ export of bibliographic data (AACR-2 based) in standard exchange (MARC) formats.

**On line Access of Catalogue** provides various catalogues/indexes such as author catalogue, title catalogue, subject/classified catalogue,

KWIC/KWOC indexes, keywords, based boolean searches using logical connectors "OR" and "AND" NOT SDI facility, online Thesaurus, and various authority files.

**Circulation** subsystem of LIBSYS supports front desk operations such as issues, returns, renewals, reserves/holds, membership records keeping, collection updates including monitoring of items on display and in bindery, overdue follow-up and recall facility, inter-library loans, stock verification, flexibility in operations including option for use of bar codes scanner for borrower and material identification comprehensive statistics on circulation, comprehensive query facilities on both borrower and collection, reporting capabilities which include list of highly reserved titles, statistics on number of issues by title/borrowers list of delinquency cases, non-circulating materials list, etc., and keeping log of all the circulation transactions.

**Serials** is an independent sub-system of LIBSYS providing for new subscription, subscription renewal, subscription extension, invoice processing, recording of issues received, claims monitoring which include generating notices for "not received" overdue and damaged/soiled issues, bindery management, back issues recording, reporting of duplicate issues missing issues, various classified and specialised indexes/lists, and online queries on various aspects of serials control including serial holdings, generating article indexing.

## 7.4 Implication of Libsys

(1) Training : LIBSYS was purchased in December 1991 and after installation of LIBSYS on WIPRO Genius/386, in-house trainings were arranged for library professional and supporting staff by software supplier. To make them fully acquainted for performing their task on the system and respective job functions wise training were organised on different modules.

(2) Retrospective Conversion : SACLIS database developed on MS-DOS using dBase III+ on HCL PC AT, about 15,000 entries were transferred to LIBSYS on Genius 386/pc to convert retrospective collection of books in machine readable form was taken up through commercial vendor and retrospective conversion for other documents like bound volumes, were taken in - house by appointment daily wages data entry operators and this way SACLIS database created to provide online services to users in short time.

(3) In-house Activities : Acquisitions, Cataloguing, Serials Control, Articles Indexing, Information Services started immediately after installation of the system.

(4) Software Upgradation : LIBSYS Corp. is taking care in maintaining and upgrading the software as per our requirements. Now, its version 2.2 is installed and version 3.0 is expected to release shortly.

## 8. Present Scenario

PC's and terminals are installed in the library in different work places connecting them to the console (486/PC) and also installed modem to access the computer from remote terminals using dial up. Present SAC Library computer Networking set up is given as annexure

Presently, more than 55,000 records are available in SACLIS database. Following house-keeping operations and services are computerized.

_ Acquisition of Documents.
_ Serials Control
_ Cataloguing
_ Articles Indexing
_ Online public Access Catalogue (OPAC)
_ Circulation services
_ Information services: Services like SDI, Information searching and retrieval by various approaches are providing through computer terminals and SDI services through E-Mail from SACLIS database and also from current contents: Engineering and Applied (Floppy Diskettes).
_ Users Orientation Program: Demonstration were arranged for users make them familiar to the system and to explain how to search information from SACLIS database through terminals. Proper instructions are placed near the terminals and also explained properly in "know your library" A: Guide to Library and Information Services.

## 9. Problems

Initially, we faced several problems to switch over the library operations on computer due to lack of confidence, knowledge and non-availability of system but now we feel comfortable in performing library operations and services. Following problems were faced:

1. Initially, faced difficulties in explaining Library operations to computer experts for converting manual methods to automate to get outputs in desired orders.
2. Non-availability of computer Time on PDP11 and later on VAX-11/780 and allotted disk space was very limited for Library operations.
3. Dependency on other departments hardwares and computer experts to develop library system software and also library professionals hesitated to use computer freely.
4. After installation of PCs in library we felt convenient but the system was developed in dBase and in single user environment and had also various limitations. Therefore, we could not work further.
5. Hardware problems :
   _ Maintenance problems
   _ Corruption of records due to power failure.
   _ Additional hard disk could not be installed on WIPRO Genius 386 due to compatibilities of the system.
(6) Software Problems:
   _ Libsys is an integrated software, if it disturbs in any module whole system be held-up.
   _ Maintenance : LIBSYS is Delhi based software hence sometimes take more time in communication and rectifying the problems and during this period NAD it hampers our work. Therefore, fully depended on the vendor.

## 10. Future Plans

1. Planning to add more terminals.
2. To implement the BAR CODE System for Circulation Services.
3. To establish CD-ROM Database facility.
4. To promote Document Delivery System by using FAX facility.
5. To support in establishing Library Networking for resources sharing of ADINET Libraries, DOS/ISRO Libraries and Aerospace Libraries.
6. To access International Databases through Network.

## 11. Conclusion

SAC Library has developed Computer Based Information Storage and Retrieval System in multi-user environment on UNIX platform using 486/PC and LIBSYS; an Integrated Library Management Software

Package. More than 55,000 records of documents are available in SACLIS databases. In-house activities and information retrieval services are computerized. Efforts are in progress to implement BAR CODE System, CD-ROM Databases and to establish Library networking for resources sharing at Local, National and International level.

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**Annexure - A**

**List of Computer Equipments**

| Sr.No | Name of The Equipment | Specifications |
|---|---|---|
| 1. | HCL PC/XT (Personal Computer) along with multi display colour monitor. | 256KB memory 20 MB Winchester disc,360 MB Floppy disk. |
| 2. | HCL PC/AT (BUSYBEE AT PLUS) along with monochrome Monitor with 101 key board. | Powerful 16 bit Intel processpr, 80286 CPU10 MHz,MBWinchester disc. 2 MB RAM, 1.2 MB FDD, 80386 |
| 3. | WIPRO Genius 386/PC along with 14" colour monitor and 101 key board | CPU 25 MHz, 4 MB RAM 1.2 MB FDD, 380 MB SCST Drive, 1    k380 |

|     |                                          |                                                                                        |
| --- | ---------------------------------------- | -------------------------------------------------------------------------------------- |
|     |                                          | MB hard disk, 8 ports, 60 MB CTD, VGA Card                                             |
| 4.  | Pentium Omniplex 560 (Dell,USA)          | CPU 90, 16 MB RAM1.2+ 1.44 MBFDD, 1GB SCSI Drive, 16 Ports, 150 MBCTD, VGA Card        |
| 5.  | WIPRO PC(P), mononchrome display         | 1.2 MB FDD monitor and key board (using as terminals)...4 Nos.                         |
| 6.  | PCL/PC along with monochrome             | 1.2 MB FDD display monitor and key board (using as terminals)..4 Nos.                  |
| 7.  | EPSON FX-105. Dot Matrix Printer.. 2 Nos. |                                                                                        |
| 8.  | Godrej FX.105 DMP Printer Series II (one) |                                                                                        |
| 9.  | HP Laser Jet Printer Series II )one)     |                                                                                        |
| 10, | Network 208 Electronic Typewriter (Two) can be used as printer with computer. | Data processing, Display, limited memory and quality printing. |
| 11. | Hand held laser Scanner                  | Model PSC 5310                                                                         |
| 12. | Bar Code key board wedge Decoder         | Model SPPL-1310                                                                        |
| 13. | Nomus Modem SA/EE                        | 2400 BPS connected with 286/PC                                                        |
| 14. | Multi modem 224E                         | 2400 BPS connected with 486/PC                                                        |
| 15. | DTI (Data Terminal Interface)            | DTI/IOX                                                                                |

# SAC LIBRARY NETWORKING
# UNIX
# DELL OMNIPLEX