Automation
at the
British Library
Document Supply Centre

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A brief description of the range of automated systems in operation at the British Library Document Supply Centre (BLDSC).

Relocation of staff and processes from the British Library in London to Boston Spa over the next few years is being undertaken to rationalise the Library's operations in preparation for the move of the remaining London-based staff, processes and stock to the new BL building at St. Pancras.

As a result, the Boston Spa site of the British Library is no longer exclusive to the Document Supply Centre. It will also house some or all of the Administration, Computing and Telecommunications, National Bibliographic Services and Acquisitions Processing & Cataloguing directorates.

This document deals primarily with the systems within BLDSC, but it is hoped that a future edition will cover systems site-wide or BL-wide.

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VAXstation 3100

BLDSC Computer Room - December 1987
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Introduction

The British Library Document Supply Centre (BLDSC) offers a national, and indeed international, service in response to a very large number of requests for documents (3,289,399 requests were received between April 1990 and March 1991). This amounts to about 13,200 per working day on average, peaking on some days to as many as 25,000. It therefore has to look continually at its activities and procedures to ensure that they are speedy, efficient and economic. With such a large-scale operation, automation clearly has a part to play, although the largest single element - matching requests against stock, extracting the relevant items and copying them or sending them as loans - is singularly intractable to automation and likely to remain so until the stock itself is in machine-readable form.

 Nonetheless, automation has been applied to some operations of the BLDSC for many years. The first computer was installed in 1976, and before this, records had been stored and sorted on punched cards since 1962. BLDSC’s automation programme has been influenced by many different factors including the following:

- The need for cost-effectiveness which has meant, for example, that the automation of the Union Catalogue of Books (UCB) is limited to post-1979 stock.
- External forces: de facto union catalogues produced by cataloguing co-operatives have led the BLDSC to produce a publicly accessible catalogue of its monograph holdings.
- The rather special needs of the BLDSC, which have made it cautious about adopting ready-made standard systems. For example, the BLDSC’s internal need is for very simple bibliographic records which can be created very quickly and without using specialist staff.
- Increasing awareness by BLDSC staff at all levels of the possibilities for automation within their own areas, in particular, its ability to increase their effectiveness and reduce drudgery.

A determined advance in the BLDSC's automation plan was made in 1983 by the installation of more powerful minicomputers and manufacturer’s software, which provided a sound foundation for the automation of house-keeping activities such as acquisitions and cataloguing.

In recent years this basis has been further strengthened by the installation of a further four minicomputers which are interlinked and accessed by a local area network. The extra processing capacity has not only improved performance but permits significant development of automation to support BLDSC services such as request processing. Improvements in data communications links have also been made so that the transmission of data to and from BLDSC is more efficient and effective, and communication with remote systems is facilitated.

Automated Request Transmission

ART is the generic term for the various methods by which users of the loan and photocopy services can send requests to the BLDSC using telecommunications facilities. The requests received by ART currently account for over half (56%) of all the requests received by the BLDSC.

The processing and handling of ART requests was moved during 1989-90 from a Digital Equipment Corporation (DEC) PDP 11/44 computer to our DEC VAXcluster system. This has enabled us to increase the effectiveness of the service and integrate its functions with other systems at BLDSC. It also allows us to enhance the existing service and make the development of additional services feasible. This development work on ART is part of the larger project for Automated Request Processing (See Section 3).
2.2 ARTTel

ART by Telephone (ARTTel), offers cost and functional advantages to the user compared with telex. The user connects a terminal or computer to the BLDSC minicomputer via either a dial-up line on the Public Switched Telephone Network (PSTN), or an addressed number on the Packet SwitchStream (PSS) - the British Telecom public data network (PDN) which is now part of their Global Network Services (GNS). The three ARTTel services together accounted for about 1,191,000 requests in 1990/91 - approximately 72 per cent of total ART input.

2.2.1 ARTTel/PSTN

On this service, the user connects to the VAXcluster via a modem and a single dial-up line. Once connected, the session is handled by a suite of programs which allows the user to send his requests using the standard format outlined above, store them on disk for subsequent processing, and also to review the last message sent via ARTTel/PSTN. Currently access is restricted to 300 baud full-duplex asynchronous character mode (teletype standard) on one line. The limitations of this access and the transmission faults that can occur have given rise to intermittent problems for users of ARTTel/PSTN, which are often difficult to resolve. ARTTel/PSTN currently accounts for about 2% of ARTTel requests.

2.2.2 ARTTel/PSS

The transfer in December 1983 of the ART system from a DEC PDP-11/34 to the larger and more powerful PDP-11/44, allowed the implementation of software for users to transmit requests via PSS. The PDP-11/44 was linked to the Packet Switching Exchange (PSE) at Leeds via a Dataline 2400 connection supporting up to eight logical channels, a considerable improvement over the single line for PSTN access.

Since August 1989 however, this service was transferred to the BLDSC VAXcluster with the communications links being supported by the VAX PSI software, a DEC X.25 Router, a Camtec X.25 switch and a Dataline 9600 via a BT 4960 PSS modem. This supports up to 12 logical channels and the whole packet-switching set-up has given substantial improvements over the old PDP based system. We have improved monitoring and tracing facilities, better control over the reception software.

2.1 ARTTelex

The history of automated request handling at BLDSC goes back to 1975. At that time we acquired a DEC PDP-11/40 minicomputer to process large volume telex requests. For several months, the computer was used to read in the paper tapes from TP15 telex machines, to process the requests then print them out onto loan/photocopy forms. Then a handler was developed for the system, so that the telex lines could go directly into the minicomputer, by-passing the paper tape stage. Since that time the telex processing system has been through several enhancements and phases, but remaining essentially the same in principle. The system now receives requests from six telex lines. The telex lines are connected to a Cipher ATS Telex system, which is connected to the DEC VAXcluster via a terminal server port. The ATS organises the reception and temporary storage of messages on disk, as well as allowing sophisticated facilities for outward-bound messages. It then forwards the request messages to the VAXcluster for processing. The BLDSC's public telex number is not used for the receipt of telex requests, instead we have a bank of four ex-directory lines reserved for this purpose.

The ATS system can also handle outward calls to the Telex network from the BLDSC VAXcluster (necessary for the automated routing of replies to Telex customers).

To transmit ARTTelex requests the user transmits a batch of requests in a specific format containing a header (with the BLDSC user's code number and a password), a series of requests (each with the details of the item required plus a request number) and a trailer to terminate the batch.

Telex accounted for about 326,000 requests in 1990/91 - approximately 20 per cent of total ART input.
and settings of remote PADs, improved reliability of the lines - with backup via the Camtec switch and our link to the BL PSS connection in London, and more flexibility in the forms of services we can support over X.25. Customers are able to link into the PSS network at the line speed, and with the protocols, that suit their wider needs, and not simply to interface with the ART computer.

Once a user has connected through PSS the VAX PSI system invokes the X.29 object ARTTeI-PSS to deal with the transaction. Specific commands can be issued to call up different facilities. RECALL will invoke the module to review the last message transmitted by that user, NOECHO the module to receive requests without echoing the characters back to the user, TEST a module to allow the user to experiment with the system, and a carriage return, the module which receives requests and stores them on disk. The message is checked during transmission to see if a recognizable user code can be seen within the first 20 lines, and if so, a backup file is given a name based upon the user code - this is used later by the RECALL facility if required. If a user code is not found then no such naming can occur, and thus the RECALL facility would not be able to extract that message. In this case, if we can unambiguously confirm ownership, the requests may still be processed by manual intervention. Alternatively we may contact the customer we suspect transmitted the requests and ask them to confirm ownership and retransmit the message with the correct user code. ARTTeI/PSS currently accounts for about 49% of ARTTeI requests.

2.2.3 ARTTeI/JANET

Access to the ARTTeI service via JANET (Joint Academic Network) is also available. There is a gateway from the JANET network to the British Library in London, and a connection from London via a BT Megastream link and X.25 to the BLDSB VAXcluster (in a similar way to ARTTeI/PSS calls). This enables users with access to JANET to use the ARTTeI system without having to incur additional costs over the British Telecom PSS network. This service became available in the autumn of 1987, and provides similar facilities for BLDSB customers to the ARTTeI/PSS service - however there are a few minor differences in the access method and commands. ARTTeI/JANET currently accounts for about 49% of ARTTeI requests.

2.3 ARTHost

This name describes the services available to users to send requests to the BLDSB via the document ordering systems available on external bibliographic database hosts. These are offered as services to users of the hosts so that they can save requests (orders) for documents in a special file in the host. We can then access, retrieve and download this file onto our system at BLDSB. These requests are of two kinds: those where the user has performed a search of a database to identify the required document, and those where the user keys in the citation from some other source. With DIALOG, ESA and SDC, the user has a choice of document suppliers. The requests ordered from BLDSB are downloaded onto an IBM PC microcomputer using automated command procedures within the commercial communications package Procomm. This PC is also networked to the VAX via the DEC Pathworks for DOS software. The downloaded files of requests are transferred across to the VAX via this link.

The connection to the host is set up via the BL Wide Area Network with a backup facility using a 1200 baud modem if the network is unavailable. Once the requests are stored on disk and transferred to the VAX, they have to be reformatted to the BLDSB's standard request format. This is done by software that also produces statistics of the transmission and replaces database host usercodes with BLDSB ones. The requests can then be processed by the main Request Processing system.

The current "flavours" of the ARTHost service are as follows:

- ARTHost/BLAISE - the ORDER! system on the BL BLAISE-LINE host
- ARTHost/DIALOG - the DIALORDER system on the Lockheed DIALOG host.
- ARTHost/ESA - the PRIMORDIAL system on the European Space Agency ESA-IRS host.
- ARTHost/DIMDI - the ordering system on the Deutsches Institut fur Medizinische Dokumentation & Information (DIMDI) host.
- ARTHost/ORBIT - the ORBIT SEARCH SERVICE (a division of Maxwell Online)
- ARTHost/OCLC - the OCLC system on the Online Computer Library Center host. This system operates independently from the rest of ART on a stand alone IBM PC with a direct connection to OCLC. The requests are dealt with manually and it is hoped to integrate this with the rest of ART in the future.

ARTHost accounted for about 125,000 requests in 1990/91, or 7 per cent of the total ART input.
2.4 ARTDocline

This is another ART service, whereby a special centre acts for a group of institutions whose requests are accumulated on the centre's computer file. At regular intervals the BLDSC logs onto the centre’s computer and prints the requests directly onto request forms. Each request must include a full address as there is no connection with the mainline Request Processing or ART systems, and thus no processing or address extraction involved. The current Docline system in operation is as follows:

- ARTDocline/CUT - the Docline service provided by the Chalmers University of Technology in Gothenberg, Sweden, with users in all the Nordic countries. The centre involved sent about 15,000 requests via ARTDocline in 1990/91, or 1 per cent of the total ART input.

2.5 Inter-Library Loan Packages and ART

There are a number of automated interlibrary loan management systems or software packages available on the market. Some of these are true commercial products, the rest have been developed within libraries and made available to others. The systems noted below are all capable of sending requests to the ARTTel system at BLDSC. In addition, each system, depending on its complexity, may have the ability to handle local inter-library loan (ILL) data, receipts, user data etc. However, BLDSC makes no recommendations as to the suitability for individual library applications of any of these systems. A list of known packages, together with contact names and addresses, is given in Appendix F.

2.6 FAXline

This is a service for the transmission of requests for document supply to BLDSC via facsimile. Up to 10 requests can be accepted in a facsimile transmission, provided the customer's user code is quoted, the requests are formatted correctly and either a request form number is quoted for each item (for UK customers) or a deposit account exists (for overseas customers). The transmission must be headed FAXLine to differentiate it from normal fax messages.

3 Request Processing System

The majority of automated request transmission (ART) requests are processed by this system on the BLDSC DEC VAXcluster.

Processing of requests so that they can be printed onto request forms has been in operation since the first telex requests were received in 1975. The initial format processing has not changed significantly since then. However a major upgrade of core Request Processing is now taking place, centred around the barcoding of request forms and the production of coded replies. The first phase of this has been operational since August 1989. Further developments have been implemented and others are planned.

3.1 Format Processing

For the initial format processing the VAXcluster uses the codes in the header to access a disk file for the user's full postal address which is added to each request as it is printed on to standard request forms. Any format faults found by the computer are corrected on a terminal by an operator before the forms are printed.

The computer processing is controlled by one main program PROCES which operates all the various facilities available. The operator works upon a file containing raw requests which are passed to the program CPFNEW for format checking. If the format is bad or there are other problems, the file is labelled a BUG and has error messages embedded within it. This has to be edited using a specially tailored version of a screen editor. If the requests are free of errors then an output file is created - different ones for UK and overseas users which is ultimately sent to the printers to be output onto loan/photocopy request forms. CPFNEW extracts the appropriate address for the user from the ART address file.

3.2 Core Processing

Once the received ART requests have been checked, and formatted they are ready for printing onto
barcoded request forms by the core ARP system under the control of operations staff. These printed requests are then passed to the storage areas within BLDSC where they are processed together with the conventionally received (postal) requests.

As the requests are printed the ARP system stores a master file record of each request. As well as the bibliographic details of the request other data such as the barcode number on the request form is stored. Postal forms also have barcodes so that they can be included in the future control of circulation and monitoring of requests.

3.3 Despatch

Once the requests have been dealt with in the storage areas, the request form barcodes are wanded to register the fact that the request has been satisfied and despatched.

The ARP system has links to the User Information and Unit Accounting systems (see sections 4 & 5) so that it can extract the information relevant to a particular request. Wanding of request barcodes at despatch time is performed by a network of satellite wands attached to barcode readers in the Despatch area. These are networked to a port concentrator which is in turn linked to the VAX system.

3.4 Generation of Replies

If BLDSC are unable to satisfy a request immediately a reply must be sent to the customer. There are over 50 possible replies, for example: "Your request has been placed on a waiting list" or "We do not hold the item at DSC but are sending locations".

All of these possible replies have been given a standard reply code. A member of BLDSC staff wishing to send one of these coded replies simply selects the code on their terminal and then passes a wand over the barcode on the form. The ARP system uses the barcode to access the master record and thus identify who has sent the request. It then adds the coded reply to that customer's Request Status Report. These reports are printed and posted out to customers daily. The status of each master record is updated and the reply that was wanded is also stored. Barcode wanding to record replies to unsatisfied requests is performed from readers connected to VAX terminals.

3.5 Replies Intray

A further advance on the printed and posted Request Status Reports has been the Replies Intray Service. Customers can use their own computer to access this service on-line via ARTTel and see their replies immediately without waiting for their request status report. Over 200 BLDSC customers now make regular use of a Replies Intray.

3.6 Postal Requests

UK Postal requests are also dealt with by the system, but no bibliographic data is captured for these requests. For replies, the barcodes are wanded and customer details extracted from the Form Sales module to provide a skeleton record for the replies files. At despatch time, the forms are wanded to produce a skeleton record of the request's satisfaction via a loan or photocopy.

3.7 Streaming and Sorting of Requests

An important development currently underway is the streaming and sorting of requests before printing. This is making use of the BLINE software developed for the Library by an IT consultancy. This software has the ability to identify the bibliographic content of the request according to a number of rules and decide if the request is for a monograph, conference or serial. If the request is identified as a serial the system cross matches this against our serials database in order to identify the BLDSC serial shelfmark and store flag. The system also attempts to identify the date of publication cited.

Using this information the streaming and sorting software is able to allocate requests to print streams that relate to specific storage areas. Before each stream is printed the software orders the requests within each stream according to rules laid down by the storage areas: for example the serial streams are sorted by shelfmark. It is hoped to implement this system by the end of 1991.

3.8 Future Developments

A number of further developments are planned for the system, which include:

- Improvements to the existing ARTTel software to offer increased functionality to the file transmission and recall services (eg. confirmation of file receipt and request file status information)
- Other automated routes for replies (eg. via Telex or PSS). Now that replies to requests are
generated by the system, it is only a matter of time before we can offer a number of different methods by which they can be despatched to the customer. Automatic reply routing will not only speed up the delivery of replies but will also make the service more efficient.

- Developments in the formatting and structuring of automated requests - to receive requests with a greater degree of structure eg. placing identifying tags before the author, title etc. - and to comply with the emerging OSI ILL protocols and standards (it is planned to implement the OSI ILL protocols in a demonstration project with the National Library of Canada). It is important that request formats are controlled so that form layouts required within the BLIDSC manual processing system can be reproduced, and that we can more readily identify the key fields in any request to speed its processing. Structured requests would also allow us to more easily match and sort requests to make the routing of requests to the different storage areas more efficient.

- Additional communications channels and facilities. BLIDSC continues to explore various telecommunications paths that might be suitable for users to transmit requests. One such possible transmission route may be provided by electronic-mail systems such as BT GOLD (from British Telecom) or DIALMAIL (from DIALOG).

- Additional methods of data transmission will also be investigated, using file transfer protocols such as Kermit, Colour-book software, OSI standards and EDI electronic data interchange mechanisms.

- Design of a circulation control system, to automate Waiters and Recalls. This would also give greater control over the monitoring of requests and provide useful information about patterns of demand and other statistical data.

4 User Information System

The User Information System is a database of records about BLIDSC's customers in the UK and overseas. It has been developed using a general database software package called System 1032, produced by CompuServe Data Technologies, and replaces a much more limited address system which ran on the PDP-11/44. It can be used from the VAX 8250 and the VAX 6000-410 (parts of the VAXcluster) and from some of the workstations in Computing Section.

The information kept includes:

- customer addresses for despatch, invoicing, and other purposes
- individual contact names
- telephone, fax, electronic mail, and telex numbers
- membership of UK transport schemes
- overseas postal despatch zones
- codes for classification by type of user.

A separate part of the User Information System records sales of UK request forms. This is an important part of the link with the Automated Request Processing system, which links a request form number to the user code for the customer who bought it, and uses this code to retrieve the despatch address. This system is still being developed. Enhancements planned include:

adding information about access methods used by individual customers (post, ARTTel, BLAISE Order, etc.)

incorporating more variant addresses used for printing on ART request forms and for other purposes

automating the customer registration processes

providing a more sophisticated marketing tool.

BLIDSC sections with connections to the User Information System include Customer Services, Marketing, Finance, Waiters, and Data Processing. These end-users mostly have access to display screens through which they can interrogate the database, with known or partly known information including words in addresses, or through which they can enter new and revised information. In most cases a screen display is adequate, but address labels can also be produced under end-user control. Bulk label runs and the more complex queries are handled by the Computing section.

UIS was also accessed by the ADONIS system to retrieve customer addresses for printing on individual requests. It has also been used to produce data on magnetic tape for two publications, Directory of Library Codes and Inter-Regional Transport Scheme Directory.
5 Unit Accounting System

BLDSC has for some years allowed overseas customers, especially those sending requests by the various ART methods, to have deposit accounts to pay for services used - money credited is translated into a number of "units of service" equivalent to the photocopy coupons used for the postal service, and these accounts are debited as material is supplied.

This deposit accounts system was entirely manual, but was replaced by the automated Unit Accounting System in April 1989. Like the User Information System, it runs on the VAX 8250 and uses System 1032 database software. There are about 2000 overseas customers with deposit accounts, some being managed by agents, and the Unit Accounting System stores essential data about these accounts and enables information about customer credits and debits to be keyed in. An important enhancement, currently in development, is to capture debit information using barcode readers as items are despatched.

A key product of the system is the output of regular detailed customer statements, accompanied where necessary by invoices or similar reminders: these enable our customers to see how their accounts are being handled far better than before. It will allow deposit accounts to be extended to our UK customers if this becomes BLDSC policy.

6 Serials Systems

6.1 BLDSC Serial System

A serials ordering system was the first example of automatic data processing at Boston Spa, dating from the first days of the National Lending Library for Science and Technology (NLLST). Originally, three files were held on punched cards, but eventually they became too large to sort on the IBM card sorters and were converted to machine-readable records held by a computer bureau and the files maintained by batches of update information sent from the Lending Division (as we were then called). This update data was initially produced on punched cards and later, in 1978, by keyboarding the data into the original PDP-11/40 and creating a magnetic tape of the update transactions.

In 1980 we acquired the hardware (PDP-11/34 and RM02 disk drives) necessary to bring the serials files in-house and provide an online system allowing access by internal departments to whatever data they required. Since that time, the hardware has been upgraded several times, first to a PDP-11/44 then in 1983 to a VAX 11/780, and in May 1988 to a dual VAX 8350 Cluster system.

The system at the present time holds about 440,000 serial titles of which 225,000 are held in stock at BLDSC. Of these about 54,500 are currently received.

The Serials system produces many different working tools from the maintained files. These include:

- the annual lists of serials ordered through each subscription agent
- the files on magnetic tape for dispatch to the printers to produce Current Serials Received
- the data for the production of the microfiche Keyword Index to Serial Titles (KIST)
- the data for magnetic tapes to be loaded onto
external databases and for the production of the
CD-ROM Boston Spa Serials.

A significant advantage provided by online access is
that records updated as the result of a transaction,
are available immediately instead of anything up to
three weeks later as was the case with the old
batch/bureau system.

Serial Records staff maintain the files directly and a
special program, the Automatic Title Locator and
Selector (ATLAS), allows them to browse through
serial titles on the file to locate the correct position
in the alphabetic/shelfmark sequence for the
insertion of new titles and location information
covering the BLDC's major back-up libraries.

These libraries, whose holdings are maintained on
the system, are:

- BL Science Reference and Information Service
  (SRIS)
- BL Humanities and Social Sciences
  Department of Printed Books (H&SS DPB)
- Cambridge University Library (CUL)
- Science Museum Library (SML).

Read access is granted to all internal users, with the
method of retrieval and display tailored to fit
requirements. Retrieval of serial titles by keyword is
achieved via the Periodicals On-Line Keyword
Access (POLKA) software which allows staff to
search for titles by entering keywords or word roots
and combining them to identify the periodical. This
facility is of great use in determining the exact title
for a request which has abbreviated, missing or
incorrect information. The keyword information
used by POLKA is updated every night.

There are currently some 80 user points for POLKA
within BLDC and SRIS.

KIST is published quarterly for users outside
BLDC and also provides a backup for the online
POLKA system. The production of the indices and
tapes for KIST is handled in-house, the COM
masters production is contracted to a microfiche
bureau, and the reproduction of the KIST fiche from
the master is performed in our Reprographics
section.

The Serial Acquisitions section performs selection
and ordering based on the on-line system, maintaining
the appropriate records in the files. The
On-order subsystem generates order records for new
serial titles and produces various pieces of
stationery for use in the acquisitions process. Order
information is keyboarded by Data Processors from
data sheets prepared by Serial Acquisitions. Batch
programs produce various printed outputs including
subscription order forms, weekly listings of newly
ordered titles in source (supplier) and country code
order, listings of all titles that have been on order for
sixteen, thirty-two and fifty-two weeks (used for
chasing purposes) and listings of all new titles
placed on order each week with the publisher's
address. A separate subsystem maintains records of
British titles which are sent on exchange to various
suppliers.

Serials check-in automation is now operational at
BLDC. This involves facilities to record the
receipt of individual serial issues (around 330,000
issues per annum) and allow retrieval of information
about their status. The system is known as Serial
Accessions Check-in of Titles (SACHET). It allows
the staff to record issues received and predict
subsequent issues. As each issue is recorded, a
bar-code label is automatically printed to be
attached to the journal part. The bar-codes are used
for analysis of serials usage at BLDC and will also
be used in a future circulation control system. The
system also performs automatic claiming and
chasing for serial issues, based on rules set up
within the database. Claims for two subscription
agents are now sent in machine-readable form, ie.
floppy disk. This allows direct loading of the claim
data onto their computer systems.

An access method, called Acronymic Derived
Extraction of Periodical Titles (ADEPT), has been
developed to improve access to the required serial
record for check-in. This was necessary since
retrieval via POLKA was not as efficient a method
as desired. For titles on the physical issue which do
not match the title in the database, a user-defined
ADEPT code can be generated in addition to the
computer-generated one.

Sample of a Serials Barcode Label

11-SEP-1991 BLDC BOSTON, USA
MATHEMATICAL INTELLIGENCER
55402 250000 VOL 13 PART 3
AC
6.2 Other directorates

Automation of serials acquisitions and accessions functions for most of the BL London serials areas is also in hand. The systems will be developed in-house by our software teams and mounted on the extended DEC VAXcluster system at Boston Spa. The main central database will probably make use of a commercial database management package and the accessions software will be based on the existing BLDSC SACHET system. The first stage of this project is to produce interim systems for the areas concerned. Two of these are currently operational - the Legal Deposit Office and SRIS. These systems were based on the SACHET software but have been significantly enhanced and improved, providing extra functionality over the original system.

Although the initial phases of the systems support services and staff in London, most of the serials processing activities are moving to Boston Spa, to the new Acquisitions Processing and Cataloguing unit (AP&C), as part of the relocation of functions and services from London to Boston Spa over the next six years.

7 Monograph Acquisitions and Records System (MARS)

In April 1982 the British Library ad hoc Working Party on Union Catalogues submitted its report. The working party was set up to examine the impact of library automation on existing union catalogues and to propose a pattern for future provision.

One of the working party’s recommendations was for the establishment of a catalogue of BLDSC’s monograph accessions. The publication of the BLDSC monograph stock catalogue should help both to ensure that maximum use is made of the BLDSC’s central loans stock and to avoid the overloading of other libraries that might result from the wider availability of location information through automated systems.

An investigation into the BLDSC’s requirements for automation of the relevant activities in the Monograph Acquisitions and Records sections and into systems available on the market resulted in early 1983 with the signing of a contract with Geac Computers for the provision of computer equipment and software. The central computer system and terminals were delivered in mid-April 1983.

Demonstration systems of the Cataloguing and (later) Acquisitions and Online Public Catalogue (OPC) packages were installed to enable staff to gain an understanding of the facilities and functions provided and so specify the amendments necessary to be made to the software and working procedures. These investigations revealed that there was much more work to be done than originally envisaged. The decision to perform retrospective conversion of stock records in-house and mainly on the Geac system also resulted in reducing the system’s availability for demonstration and development.

However, Cataloguing activities went live as originally planned in January 1984, albeit without all of the software amendments required to meet the BLDSC’s specification. A subset of post-1981 UKMARC and LCMARC data is maintained on MARS for derived cataloguing. Retrospective conversion of post-1979 stock records started in early 1983 and all post-1980 records were mounted online by summer 1985. Magnetic tapes are produced every two months to send to Bibliographic Services Division to update the Regional ISBN locations list. The COM catalogue, Books At Boston Spa, is produced every two months, and the update tapes for the file on the BL BLAISE-LINE database and other database hosts is produced monthly - thus fulfilling the working party’s recommendation.

Analysis and specification work identified the changes required for the Acquisitions package and development work by Geac was eventually completed to enable the ordering and receipt aspects to start up in February 1986. The second phase covering Financial aspects were live at the beginning of April 1987, after a period of parallel running. The loading of machine-readable bibliographic records, from booksellers, went live in 1987. Invoice data for payment was transferred to the BL Central Finance System in London on magnetic tape. The loading of machine-readable invoice data from booksellers went live in June 1989.

Online record creation, for all Conference Proceedings material, started in November 1986. All the retrospective conference stock records have been loaded onto the MARS database. The remaining activities, which were handled by a bureau, were transferred in-house in late 1987. The conference records are publicly accessible on-line (via BLAISE-LINE) and have been included, as a
separate file, on the BLCMP system.

Current Slavonic material and current Official Publications have been included in the MARS database since October 1985 and November 1988 respectively. British reports have been included in the MARS database since December 1989.

Retrospective conversion of British reports back to 1980, in line with the monographic stock records, was completed in early 1990. Official Publications records, back to 1980, are under consideration for inclusion in the MARS database.

Keyword access (for author and title) was made available in January 1989. After a trial period, it was found that maintaining the currency of these indices was degrading the existing provisions of the system. Therefore, keyword access has been abandoned on the present system.

There are no firm plans as yet for the implementation of the Geac circulation control package on MARS.

To improve response times, the second 8000 processor, installed to provide full Boolean searching, has been used to support the Acquisitions package.

The system now supports about 1,240,000 bibliographic records available online via any of the 28 enquiry and 56 cataloguing terminals and 3 PCs running emulation software. The dual linked 8000 processors have a total of 8 x 160 megabyte and 10 x 340 megabyte Winchester disk drives attached. The Geac is connected to the BLDSC LAN which allows wider access to the OPAC within the BL and outwards from Geac terminals.

8 Grey Literature Systems

8.1 BRTT

BRTT is a monthly BLDSC publication which lists British report literature and translations produced by British Government organisations, industry, universities and learned institutions, together with most doctoral theses accepted at British universities since 1970. It also covers reports and unpublished translations from the Republic of Ireland, and selected non-HMSO official publications of a report nature. The monthly publication includes a keyterm index. Quarterly cumulating author, report number and keyterm indices are produced on COM.

The publication used to be prepared on a DEC WD82 word processor with the full indices being produced on the PDP-11/44. This involved a certain amount of double keyboarding which could result in discrepancies in the data, and the link between the word processor and the PDP was not ideal. During 1987 the whole BRTT system was reviewed, rationalised and re-written, and is now operational on the VAX 8250 computer.

8.2 SIGLE

The reports listed in BRTT form part of the input to the System for Information on Grey Literature in Europe (SIGLE). Until mid-1984 the input from the BLDSC was prepared on work sheets which were keyboarded at one of the national centres for production of the magnetic tape for processing at the database centre. This approach had many disadvantages, notably the lack of any data validation at the time the entries were created on the work sheets.

The SIGLE system at BLDSC enables staff to enter the data online into the VAX 8250 minicomputer. Magnetic tapes are produced monthly and sent directly to the main processing centre. A SIGLE corporate authority file has now been mounted on this machine and software developed to allow keyword access to the file as well as maintenance procedures. The BRTT and SIGLE systems at BLDSC are now fully integrated into a single cohesive automated system using shared software. Some catalogued grey literature data is mounted onto the MARS system via the weekly production of a MARC formatted data tape.
9 Publications Sales Unit (PSU)

The PSU operates an Nokia Data (formerly Ericsson) 2500 computer with eleven workstations and three printers to process all the orders for all priced publications produced by the BLDSC, Humanities and Social Sciences Division (H&SS), Science Reference Information Service (SRIS), Research and Development Department (R&DD) and the BL Press Office. There is also a remote workstation in the BL H&SS Publications unit in Russell Square in London which is linked to the system via the BL FABX and the BT Megastream link to London.

The software for the system consists of ODIN - Orders, FREY - Finance and SAS Subscription Accounting System. The concept is that ODIN links together several basic file entries to produce an order, i.e. customer (and possibly a consignee or dispatch address) is linked with article(s). The order is processed to produce an invoice and the debt is transferred to the customer's ledger in FREY. Eventually the debt is settled using the payment programs. Printouts are produced to record the stages of the process and create an audit trail. A series of search and query programs are available to identify customers, articles, orders, ledger, stock levels etc. A series of reports, basic statistics in ODIN and follow-up reports in FREY, give more management information on the performance of customers and articles by various pre-selected parameters. General statistics in ODIN give a more detailed breakdown of sales performance by pre-selected parameters.

The basic files used are the customer, consignee, article and article description files. In addition to these, there are a number of others for other functions.

The ODIN software consists of several functions including order entry of customer details and order details, invoicing with printing of invoices, address labels, order lists, invoice updating, invoice journaling and generation of sales vouchers.

SAS maintains subscription files, allows alpha search functions, subscriptions enquiry, list printing and address labels for dispatch, subscription renewal and transfer of renewal orders to ODIN.

FREY performs two functions: it posts debts created by ODIN and SAS produced invoices onto the customer sales ledger, and it provides the programs to process the settlement of the debts on the customer sales ledger.

The National Bibliographic Service (NBS) Accounts team within PSU process orders and subscriptions directly related to the publications and on-line services provided by NBS. They use terminals connected to a DRS-300 microcomputer which in turn links via the networks to the ICL 3980 computer in London housing the BL Finance System. The software used is called SNAP and it interfaces with the main finance system Sales Leger system.

10 Telecommunications

10.1 British Library Wide Area Network (BL WAN)

The BL WAN is operated by the BL Computing & Telecommunications directorate. It enables terminals and computers within the British Library to communicate more easily with each other and to have access to various outside services, specifically BLAISE on a bureau service and other online remote database hosts. It is a CASE DCX network based on a range of statistical multiplexers and offers mainly asynchronous communications, with a synchronous transport capability. It is basically a "star" topology network, with most links passing through a central node in London. The traffic capacity is limited, as are the numbers and types of terminals that can be attached. However the system can be enhanced and expanded as necessary or desired.

At the present time, the London segment of the network links most of the BL buildings together and provides links to the BLAISE mainframe computers in Harlow (BLAISE-LINE), and to the National Library of Medicine in Washington (BLAISE-LINK), as well as gateways to the British Telecom PSTN and FSS networks and the JANET network. This provides the capability for BL staff to access a large number of remote systems in the UK and overseas. An electronic mail system is also available through the BL WAN which allows staff throughout the British Library to send machine-readable documents to each other.
An extension of this network to the BLDSC was installed and commissioned in early 1984. This link operates via a British Telecom Megastream link at 19,200 bits per second. The 25 terminals now connected to it are mainly used for searching on bibliographic database hosts. The VAXcluster system at BLDSC has been directly linked to the BLWAN to enable a number of terminal users in the British Library in London to have access to the POLKA keyword access function for serials and other systems where necessary. (See Appendix C for a diagram of the DCX network).

10.2 British Library Digital PABX

At the end of August 1986, a new digital private automatic branch exchange (PABX) came into use in the BL and since that time the various divisions and buildings in the BL have been converted to the new system. It provides an integrated voice network covering all the BL sites and is based on the Plessey IDX series of exchanges. It has given, for the first time, a common telephone number for the majority of BL staff in London together with the ability to have direct dialling inward (DDI), whereby selected extensions can be contacted directly without having to go via the switchboard operators. This has improved the speed and ease of incoming call and reduced congestion on the switchboard.

The new PABX also has the ability to transport data on its circuits. Some of the BLWAN’s data circuits can be carried from point to point in this way. It should also make the addition of new data circuits a simpler and quicker operation. The use of the PABX further strengthens the commitment of the BL to improving and integrating its voice and data communications.

10.3 British Library DCS Local Area Network (LAN)

An Ethernet-based local area network was installed at BLDSC to provide connections between the existing DEC computers and allow terminals connected to the LAN to access any one of the machines. At the present time it connects the VAXcluster with over 200 terminals, and we are currently extending the network to include connections to various microcomputers at BLDSC. The LAN is built around a base-band "thick-wire" Ethernet cable with various "thin-wire" Ethernet segments connected to it to serve workstations, PC’s and individual departments.

Terminals are connected via a single data cable to a terminal server, which in turn is connected to the Ethernet. Thus, potentially, any terminal on the network can gain access to any machine on the network, through a single data cable. It also allows the fast, efficient and easy transfer of information between machines, where this is required.

Some LANs have been established in the London divisions of the BL to serve their local needs. These LANs are being linked to the BLDSC LAN via various gateways and routers so that systems at Boston Spa can support users in London. (See Appendices A & D for diagrams).

10.4 Packet Switching (X.25)

Packet-switching (X.25) services are supported on the BLDSC DEC and Geac computers via various packet-switching software packages and a number of hardware components. The DEC VAXcluster connects to X.25 via the Ethernet LAN and a DEC X.25 Router. This has four lines (of up to 64K line speed), although only two are used at present. The X.25 router connects to the BLDSC Camtec X.25 switch which provides route switching for X.25 calls to and from the BLDSC machines. The connections to the Camtec switch are:

- Two from the DEC X.25 router serving the VAXcluster
- One from the Geac computer
- One from a BT PSS modem for direct PSS connections
- One from a channel on the Megastream link to a second Camtec switch in the BL in London

(See Appendix B for a diagram of the X.25 network).
11 Word Processing

There are currently two main word processing systems installed at BLDSC. These are essentially microcomputer systems consisting of a processor with some floppy disk storage and a high-quality printer, together with some specialised word processing software for text preparation, editing, formatting, storage and printing. One of these (an Xios 7200) is used within the Typing Centre for preparation of documents and reports. The other machine (a Wordplex 80-4) is sited in the BOOKNET office and is used for the maintenance of the lists of donations and exchange material on offer to other libraries. There are also a number of Xios word processor workstations used by secretarial staff. Much of the routine and bulk work is performed on these machines, but increasing use is being made of word processing facilities on departmental microcomputers.

12 Microcomputers

The growth of the microcomputer market, together with advances in technology and significant reductions in the cost of machines has made the acquisition of microcomputers within individual sections a viable prospect, and the number of microcomputers installed at BLDSC is increasing steadily. At the present time there are about 80 machines installed throughout BLDSC. Some of the microcomputers are used for general applications (word processing, spreadsheets, database etc.) and others for more specific, dedicated applications. A few examples of the latter are outlined below:

- A Novell LAN has been installed for use by the Management Information, Marketing, Public Relations and Conference sections, with connections in the near future for individual managers. This allows users access to word processing, spreadsheet and database software. Electronic mail software can be used to send and receive e-mail messages and transfer files to the other two LANs on site (used by the BL Central Administration and BL National Bibliographic Service) and to users on the four Novell LANs used by London-based directorates of the BL. Software will soon be available to provide facsimile services to LAN users.

- Two microcomputers have been acquired by the DSC Reprographics Section in order to provide Desk-Top Publishing facilities for the Directorate.

- The Popular Song Index (POPSI) system is mounted on a PC in the Music section, this is being converted to a disk-based version for commercial release in the near future.

- The Medical Information section, which is concerned with indexing medical literature and performing searches of medical information databases, uses its two IBM PCs and a MicroVax 2000 for online database searching and searching databases held on CD-ROM. They also contain bibliographic databases and address files of customers. A database of bibliographic citations begun in 1985 is used for producing the monthly Current Awareness Topics Services (CATS) bibliographies - Physiotherapy Index, Rehabilitation Index, Complementary Medicine Index, Occupational Therapy Index, and Terminal Care Index - published by the section.

Future plans for microcomputers include increasing the productivity of the staff who use them through effective training, and tighter integration of the Novell LANS with the minicomputer systems on the Boston Spa site.
13 Electronic Document Delivery

Facsimile transmission (FAX) has been used for document delivery purposes since 1984. Because the present standard (Group III) of FAX is not ideally suited for document delivery, its use has been limited to those items required urgently. The limitations are caused by the large amount of data on a typical page from a journal compared to a business letter. There is also the problem of integral diagrams, pictures etc. The latest standard of FAX (Group IV) overcomes many of the problems. It has a resolution comparable to office photocopy machines, transmits at much higher speeds and prints onto standard plain paper. The machines require the use of a digital, as opposed to analogue, telephone network. These, called Integrated Services Digital Networks (ISDN), are being actively planned and installed by Post, Telegraph and Telephone administrations (PTTs) all over the world. In the UK British Telecom has installed a pilot ISDN, called the Integrated Digital Access service (IDA), and trials began in September 1986 between BLDSC and University College, London. The network caused several teething problems but results to date are very encouraging. In May 1989, BLDSC launched a full scale, trial document delivery service with a major industrial customer. Results thus far suggest that Group IV will be a viable mechanism for document delivery in the coming years.

It will be some time before ISDN's are connected internationally. One way to overcome the delay is to use satellite transmission. For some time BLDSC has been involved in the joint CEC/ESA APOLLO satellite delivery system. This project now seems unlikely to come to fruition but the advent of direct broadcasting satellites presents further opportunities. Plans also exist, and some trials have taken place, with satellite based delivery systems to North America and Japan.

In January 1991 a pilot experiment with British Aerospace utilised satellite for document supply between BLDSC and four of its major industrial customers. The trial was a technical success, but further work will be required to establish a commercial service based on satellite transmission.

14 Electronic Document Storage

14.1 ADONIS

The ADONIS project was a two-year trial that supplied 225 biomedical journals on compact disk read-only memory (CD-ROM). Each week the contents of the journals were indexed at Excerpta Medica in Amsterdam, and each item identified by a unique ADONIS article number. The index data was sent to a bureau in the UK where the contents of the articles were scanned. The scanning resolution used is 300 x 300 pel for pages with half-tones and 300 x 150 for text-only pages. The scanned contents together with the index were pre-formatted and a weekly master disk was produced by Philips & DuPont Optical Co. in Hannover, from which copies were prepared and dispatched to the participating document supply centres.

The ADONIS workstation was developed by BLDSC, with the help of funding from the CEC, and comprises a NEC microcomputer, a 40 Megabyte disk, a Hitachi CD-ROM drive, a high resolution A4 size screen and a Ricoh laser printer. It also has specially developed retrieval software. BLDSC has two workstations one is situated in one of the current serials storage areas, the other is used for demonstrations within BLDSC and at exhibitions.

The system performs three main functions - index management, retrieval and printing of articles, and the logging of usage data. The disks are received weekly by BLDSC and other major document supply centres in Europe, USA, Mexico, Australia and Japan. On arrival the index from each disk is downloaded onto the workstation's hard disk cumulative index.

A simple search screen allows the user to search the index using a combination of the ADONIS identifier, ISSN, journal title, article title, author(s), year of publication, volume, issue and page range. Titles matching the search are displayed on the screen. The bibliographic details are displayed automatically for one matching title or can be selected if there is more than one. This allows the user to decide whether the article matches the request and to display or print it. The system normally batches the requests in a print queue for printing at a later stage, but urgent requests may be printed out immediately after retrieval.

The capacity of a CD-ROM is around 6,500 pages.
of journal literature, depending on the half-tone content. A Voyager "juke-box", to load and unload the disks automatically, has been installed. More correctly known as a carousel, this has the capacity to hold over 250 CD-ROMs (over 175,000 megabytes of data) and has led to a much faster operation - taking about 10 seconds to change over discs. Another enhancement will be a FAX link to the workstation. This will make it possible, after processing the request, to transmit the image for printing out on the customer's premises.

In addition to participating in the trial and developing the workstation, BLDSC collates the usage statistics automatically recorded by the system. All participating centres send their usage figures to BLDSC every quarter where they are analysed and a report produced.

The ADONIS project opens up many possibilities for automating the delivery of documents. However, efficient use of such a system depends on matching requests automatically to the index entries for the documents required, and document citations cannot be fed directly into ADONIS-type systems at present. BLDSC is collaborating with the University of Bradford on the Docmatch-2 project. This aims to develop an algorithm that produces a unique identifier for the same document even when it is cited differently by different bibliographic databases or ILL systems. This identifier can then be used to extract the document itself. Docmatch-2 will also test other document numbering systems including ADONIS article numbers and those proposed by the American Serials Industry Systems Advisory Committee (SISAC).

The ADONIS trial finished in 1989. No journals were scanned during the year. On the basis of the trial, the ADONIS consortium decided to proceed with a commercial version of ADONIS.

ADONIS 2 was released as a commercial product in April 1991. BLDSC has been one of the first sites to test this system. Major differences are that the new ADONIS system requires no proprietary hardware - it will run on any 286/386 based PC, the system is much more user-friendly - based on Windows, and the number of journals has increased from 225 to 369. BLDSC will be carefully investigating the role such a system can play in document supply - if any.

14.2 Other optical storage systems

Use of CD-ROM at BLDSC, other than ADONIS, includes some bibliographic databases published in that format (eg. Whitakers BookBank, Ulrich Plus, Medline). We have also investigated the possibility of loading some of our databases (eg. Serials, MARS) onto CD-ROM for distribution to customers and external library systems, and the first two of these, Boston Spa Serials and Boston Spa Conferences, are now available. A third CD-ROM, Boston Spa Books, is due to be released in 1992.

Other than the "standard" CD-ROM optical disk, there are two other types which BLDSC is investigating. The first is the WORM or "write once, read many times" disk. This allows users to record data once only and then read it back and retrieve it many times via their computers. The advantage to this is that end-users can write their own data to the disk, rather than have it "mastered" by an expensive bureau process. The main use seen for this type of storage at BLDSC is in the area of bulk archiving of bibliographic and other data. Investigations are in hand to look at the feasibility of a WORM archive device for long-term archive of request data from the ARP system as well as from other systems.

The second type is a larger optical disk, about 30 cm in diameter, which can hold a very large amount of data and be utilised in a similar way to CD-ROMs. These are more likely to be used for text and picture/video data and have already found applications in some areas - notably the Domesday Project. There are no definite plans or proposals yet for the use of this particular medium at BLDSC.

15 Current Research in Britain (CRIB)

Current Research In Britain (CRIB) is an annual publication produced by BLDSC as a four-volume directory compiled from voluntary returns from over 540 British universities, polytechnics, colleges and other institutes encompassing over 3800 departments. The volumes cover the Physical, Biological and Social Sciences and the Humanities. The system is mounted on a DEC MicroVAX II computer using an enhanced CAIRS database software package. Approximately 72,000 records are maintained on the system with about 19,000 new entries and 40,000 existing entries amended each year. Various indices (eg. Study Area Index, Keyword Index, Author/Investigator Index) are maintained and internal reports generated. The completed publication is produced and sent via magnetic tape to a typesetter for pagination and subsequent printing. Online search facilities for CRIB are hosted on PFDS Online.
16 Systems Development

16.1 Software development

All of the applications on the main DEC machines have been developed in-house. These are written in VAX BASIC, VAX C and VAX MACRO assembler under the VMS operating system. A number of software development tools are being used, as well as the System 1032 database package. 17 VAXstation 3100 software development workstations are used for the development of applications, offloading work from the main machines onto the workstations with their enhanced features - they are WIMP (Window, Icon, Mouse, Pointer) systems with graphic screens running in the DECwindows environment.

16.2 Staffing

The BLDSC Computing section transferred to the BL Computing & Telecommunications (C&T) directorate in April 1991. It now forms the core of BL C&T (Boston Spa). As a result of the relocation of staff and processes from London to Boston Spa over the next few years, the staff and systems at Boston Spa will increase considerably, supporting applications for users on the Boston Spa site and in London, and ultimately for the new BL building at St. Pancras.

The BL C&T (Boston Spa) teams responsible for the support and development of BLDSC systems consist of 36 people. The structure of the section is as follows:

John Mahoney
Director of Computing & Telecommunications

Mike Wheatley
Assistant Director (Boston Spa)

Gavin Holman
Systems Development Manager

Andy Ekers
System Manager (ARP)

Tim Lee
System Manager (Serials)

Paul Woofer
DEC Systems & Networks Manager

Vanessa Harris
System Manager (MARS)

Keith Merry
Operations & Support Manager

4 Staff

4 Staff

2 Staff

4 Staff

15 Staff
17 Computer Hardware

The diagram in Appendix A shows the existing systems in operation at BLDSC, together with an indication of current and future links between them.

17.1 Minicomputer details

- DEC VAXcluster
  -- CASTOR - VAX 8350 processor, 32 Mb memory
  -- POLLUX - VAX 8350 processor, 32 Mb memory
  -- ALTAIR - VAX 6000-410 processor, 32 Mb memory
  -- HADRON - VAX 8250 processor, 24 Mb memory
  -- RIGEL - VAX 6000-310 processor, 32 Mb memory
  -- 17 VAXstation 3100 software development workstations each with 16 Mb memory, most with 104Mb local disk drives
  -- 13 x RA82 disk drives (622 Mb each)
  -- 1 x RA81 disk drive (456 Mb)
  -- 5 x RA92 disk drives (1.5 Gb each)
  -- 2 x TA81 tape drives (2400' - 1600/6250 bpi)
  -- 1 x SF200 18 Gb unattended tape backup system
  -- supports over 200 terminals via the Ethernet
  -- LAN and DECServer terminal servers
  -- Applications: Serials Systems, ART, Request Processing, UIS, UNACS, SIGLE, BRTT and software development

- Geac 8000
  -- 896 Kb of memory
  -- 8 x Winchester disk drives (each 160 Mb)
  -- 10 x Winchester disk drives (each 340 Mb)
  -- 2 magnetic tape drives (2400' - 1600/6250 bpi)
  -- second 8000 processor (dual-linked)
  -- supports 100 terminals
  -- Applications: turnkey Monographs system (MARS)

17.2 Computer Rooms

The present computer room at BLDSC houses the six minicomputers used for the bulk of the automated systems. In the area adjacent to this room are a terminal room for software development, a "burster" room for stationery handling, a "telex" room which houses the telecommunications modems, multiplexers, telex, X.25 packet-switching and BL Network equipment, and a general computing office and data processing area. The computer room itself is air-conditioned to maintain a standard range of temperature and humidity and to keep dust to a minimum. It is also a secure environment with coded combination locks on the three access doors. It is protected with an independent fire detection and Halon gas extinguishing system.

As a result of the relocation of London staff and systems in the Computing and Telecommunications (C&T) directorate from London to Boston Spa over the next few years, new accommodation is being built on the site. This consists of a building to house the Boston Spa C&T staff, including a new computer room, and the creation of a second new computer room on the other side of the site in an existing building. The second room will be a "dark" lights-out room operated remotely from the C&T building. Systems and staff are planned to transfer to the new building early in 1992.
Appendix A - BL Boston Spa Systems Chart

British Library (Boston Spa) COMPUTER SYSTEMS

September 1991

Key
- Block Drive
- Serial Interface
- Parallel Interface
- Tape Drive
- Serial Interface
- Parallel Interface
- Computer

Diagram of BL Boston Spa Systems Chart
Appendix B - BL X.25 Network
Appendix C - BL DCX Data Network

British Library - DCX Data Network
1991
Appendix D - BL Local Area Networks (LANs)
# Appendix E - Glossary of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>1032</td>
<td>System 1032 Database system</td>
<td>FAX</td>
<td>Facsimile transmission</td>
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<td>ACQ</td>
<td>Acquisitions module (MARS)</td>
<td>GRS</td>
<td>Great Russell Street</td>
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<td>ADEPT</td>
<td>Acronymic Derived Extraction of Periodical Titles</td>
<td>H&amp;SS</td>
<td>Humanities and Social Sciences</td>
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<tr>
<td>ADONIS</td>
<td>Article Delivery Over Network Integrated Systems</td>
<td>IDA</td>
<td>Integrated Digital Access service</td>
</tr>
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<td>APC</td>
<td>Acquisitions Processing and Cataloguing</td>
<td>ILL</td>
<td>Inter-Library Loan</td>
</tr>
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<td>APOLLO</td>
<td>Article Procurement with OnLine Local Ordering</td>
<td>IOLR</td>
<td>India Office Library &amp; Records</td>
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<td>ARP</td>
<td>Automated Request Processing</td>
<td>ISDN</td>
<td>International Standard Book Number</td>
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<td>Automated Request Transmission</td>
<td>ISSN</td>
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<td>ART via Telephone</td>
<td>LASER</td>
<td>Local Area Network</td>
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<td>ART Tel via PSS</td>
<td>MARS</td>
<td>London &amp; South East Region library system</td>
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<td>ART Tel via PSTN</td>
<td>MRMS</td>
<td>Monograph Acquisitions and Records System</td>
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<td>ART Tel via JANET</td>
<td>MRCS</td>
<td>MARC Record Management System</td>
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<td>ART via Telex</td>
<td>NBS</td>
<td>National Bibliographic Service</td>
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<tr>
<td>ATLAS</td>
<td>Automatic Title Locator And Selector</td>
<td>NLM</td>
<td>National Library of Medicine</td>
</tr>
<tr>
<td>BABS</td>
<td>Books At Boston Spa</td>
<td>NSA</td>
<td>National Sound Archive</td>
</tr>
<tr>
<td>BLAISE</td>
<td>British Library Automated Information Service</td>
<td>OPAC</td>
<td>Online Public Access Catalogue</td>
</tr>
<tr>
<td>BLAISE-LINE</td>
<td>BLAISE system at Harlow</td>
<td>OPC</td>
<td>Online Public Catalogue</td>
</tr>
<tr>
<td>BLAISE-LINK</td>
<td>Link to US NLM database system in Washington</td>
<td>OSI</td>
<td>Open Systems Interconnection</td>
</tr>
<tr>
<td>BLCMP</td>
<td>Birmingham Libraries Co-op Mechanization Project</td>
<td>OSS</td>
<td>Online Serials System</td>
</tr>
<tr>
<td>BLWAN</td>
<td>British Library Wide Area Network</td>
<td>PABX</td>
<td>Private Automatic Branch Exchange</td>
</tr>
<tr>
<td>BRTT</td>
<td>British Reports Translations and Theses</td>
<td>PDP</td>
<td>Public Data Network</td>
</tr>
<tr>
<td>C&amp;T</td>
<td>Computing &amp; Telecommunications</td>
<td>PSS</td>
<td>Programmable Data Processor</td>
</tr>
<tr>
<td>CASE</td>
<td>Computer-aided Software Engineering</td>
<td>PSTN</td>
<td>Periodicals On-Line Keyword Access</td>
</tr>
<tr>
<td>CATS</td>
<td>Current Awareness Topics Services</td>
<td>PTT</td>
<td>Packet SwitchStream</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>Compact Disk Read-Only Memory</td>
<td>R&amp;D</td>
<td>Public Switched Telephone Network</td>
</tr>
<tr>
<td>CRIB</td>
<td>Current Research In Britain</td>
<td>RHM</td>
<td>Post, Telegraph &amp; Telephone administrations</td>
</tr>
<tr>
<td>CSR</td>
<td>Current Serials Received</td>
<td>RMS</td>
<td>Research &amp; Development</td>
</tr>
<tr>
<td>DDI</td>
<td>Direct Dailing Inward</td>
<td>SACHET</td>
<td>Rank Hovis MacDougall</td>
</tr>
<tr>
<td>DEC</td>
<td>Digital Equipment Corporation</td>
<td>SIGLE</td>
<td>Record Management Services</td>
</tr>
<tr>
<td>DECnet</td>
<td>DEC Network</td>
<td>SIGLE</td>
<td>Serial Accessions Check-in of Titles</td>
</tr>
<tr>
<td>DELNI</td>
<td>Ethernet Network Interface</td>
<td>SRIS</td>
<td>Science Reference and Information Service</td>
</tr>
<tr>
<td>DLC</td>
<td>Directory of Library Codes</td>
<td>TCP</td>
<td>Terminal Control Program</td>
</tr>
<tr>
<td>DSC</td>
<td>Document Supply Centre</td>
<td>UIS</td>
<td>User Information System</td>
</tr>
<tr>
<td>DSCM</td>
<td>BLDSC Monographs file on BLAISE-LINE</td>
<td>UNAC</td>
<td>Unit Accounting System</td>
</tr>
<tr>
<td>EDD</td>
<td>Electronic Document Delivery</td>
<td>VAX</td>
<td>Virtual Address Expansion</td>
</tr>
<tr>
<td>EDDS</td>
<td>Electronic Document Delivery &amp; Storage</td>
<td>VMS</td>
<td>Virtual Memory System</td>
</tr>
<tr>
<td>EDI</td>
<td>Electronic Data Interchange</td>
<td>WAN</td>
<td>Wide Area Network</td>
</tr>
<tr>
<td>EDS</td>
<td>Electronic Document Storage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix F - List of ILL Packages

Note: The BLDSC can make no recommendation as to the suitability or otherwise for individual library applications of any of these packages. This list is merely an indication of software that is known to be available.

AIM (IBM PC)
IAN BEST
DAWSON TECHNOLOGY LTD
CANNON HOUSE
PARK FARM RD
FOLKESTONE
KENT
CT19 5EE
0303-850537

AIM 2 (IBM PC)
ROY ADAMS
LEICESTER POLYTECHNIC
PO BOX 143
LEICESTER
LE1 9BH
0533-551551

BILL (VAX, IBM, WANG)
JANICE JONES
INFORMATION DIMENSIONS (UK) LTD
15 HANOVER SQUARE
LONDON
W1R 9AJ
071-409-1443

BILLplus (VAX, IBM, WANG)
SHELLEY FACIUS
INFORMATION DIMENSIONS (UK) LTD
CENTRE POINT, 103 NEW OXFORD STREET
LONDON
WC1A 1QT
071-497-1403

BLS (DATA GENERAL MINI)
HELEN ILES
BLCMP LIBRARY SERVICES LTD
UNIVERSITY OF BIRMINGHAM
BIRMINGHAM
B15 2TT
021-471-1179

EXILE (PRIME MINI)
MARTIN MYHILL
EXETER UNIVERSITY LIBRARY
 STOCKER ROAD
EXETER
EX4 4PT
0392-258572 EXT 2022

INTALONE (BBC B)
ROBIN PHILLIPS
HALLWARD LIBRARY
UNIVERSITY OF NOTTINGHAM
UNIVERSITY PARK
NOTTINGHAM
NG7 2RD
0602-484848 EXT 3418

LANCASTER ILL MANAGEMENT
SYSTEM (IBM PC)
IAN STUART
UNIVERSITY OF LANCASTER
LIBRARY COMPUTING
BAILRIGG
LANCASTER
LA1 4YH
0524-65201 EXT 2540, 2528, 2541

LIBERTAS (VAX)
SLS INFORMATION SYSTEMS
14 PORTLAND SQUARE
BRISTOL
BS2 8SJ
0272-420613

LMS (IBM PC)
DEE MARRABLE
LEATHERHEAD FOOD RESEARCH ASSOCIATION
RANDALLS ROAD
LEATHERHEAD
SURREY
KT22 7RY
0372-576761

MILL (IBM PC)
ANDREW BARROW
FREWEN LIBRARY
PORTSMOUTH POLYTECHNIC
CAMBRIDGE ROAD
PORTSMOUTH
PO1 2ST
0705-843235

SOUTRON (IBM PC, MAC, VAX)
SYDNEY MICRO LIBRARY
12 PLESSER BUSINESS PARK
TECHNOLOGY DRIVE
BEESTON
NG9 2ND
0602-253677

TINLEND (IBM PC)
GEORGE BINGHAM
INFORMATION MADE EASY LTD
14-16 FARRINGDON LANE
LONDON
EC1R 3AU
071-253-1177
### Appendix G - BLDSC Facts & Figures (1990/91)

<table>
<thead>
<tr>
<th>Requests received</th>
<th>3,289,690</th>
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<tbody>
<tr>
<td>Shelf capacity</td>
<td>127 miles</td>
</tr>
<tr>
<td>Staff</td>
<td>862</td>
</tr>
<tr>
<td>Total number of customers</td>
<td>15,643</td>
</tr>
<tr>
<td>Shelving occupied</td>
<td>93 miles</td>
</tr>
<tr>
<td>Site area</td>
<td>60 acres</td>
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#### STOCK

<table>
<thead>
<tr>
<th>Holdings</th>
<th>Annual Intake</th>
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</thead>
<tbody>
<tr>
<td>Serials</td>
<td>223,000 titles</td>
</tr>
<tr>
<td>Monographs</td>
<td>2,863,000 volumes</td>
</tr>
<tr>
<td>Reports</td>
<td>3,400,000</td>
</tr>
<tr>
<td>Theses</td>
<td>520,000</td>
</tr>
<tr>
<td>Conferences</td>
<td>285,000</td>
</tr>
<tr>
<td>Translations</td>
<td>512,000</td>
</tr>
<tr>
<td>Local Authority stock</td>
<td>23,600</td>
</tr>
<tr>
<td>Music</td>
<td>122,000</td>
</tr>
<tr>
<td>Russian Monographs</td>
<td>205,000</td>
</tr>
<tr>
<td>Microfilm</td>
<td>1,700 miles</td>
</tr>
<tr>
<td>Microfiche</td>
<td>300,000 (non-report)</td>
</tr>
</tbody>
</table>

#### Catalogues

<table>
<thead>
<tr>
<th>Records</th>
<th>Annual additions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union Catalogue of Books</td>
<td></td>
</tr>
<tr>
<td>Main sequence</td>
<td>4,332,000</td>
</tr>
<tr>
<td>Government publ.</td>
<td>373,000</td>
</tr>
<tr>
<td>Music</td>
<td>225,000</td>
</tr>
<tr>
<td>Slavonic</td>
<td>815,000</td>
</tr>
<tr>
<td>MARS Total records</td>
<td>1,223,000</td>
</tr>
<tr>
<td>Serials file</td>
<td>441,000</td>
</tr>
<tr>
<td>BRIT</td>
<td>200,400</td>
</tr>
<tr>
<td>Translations Index</td>
<td>522,000</td>
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</table>

#### Sources of requests to BLDSC

<table>
<thead>
<tr>
<th>UK</th>
<th>Overseas</th>
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<tbody>
<tr>
<td>Academic libraries</td>
<td>40%</td>
</tr>
<tr>
<td>Public libraries</td>
<td>14%</td>
</tr>
<tr>
<td>Government libraries</td>
<td>17%</td>
</tr>
<tr>
<td>Industrial/commercial</td>
<td>28%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
</tr>
</tbody>
</table>

#### Forms of material requested

<table>
<thead>
<tr>
<th>Subjects requested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serials</td>
</tr>
<tr>
<td>Monographs</td>
</tr>
<tr>
<td>Other (Conferences etc.)</td>
</tr>
<tr>
<td>Science and Technology</td>
</tr>
<tr>
<td>Humanities</td>
</tr>
<tr>
<td>Social Science</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

#### Satisfaction rate

| From stock | 88.2% |
| From locations | 2.6% |
| From backup libraries | 2.3% |
| Applied abroad | 0.2% |
| Unsatisfied | 6.7% |
VAXcluster

The DEC VAX range of computers, which started in 1978, allow users to run the same, identical software on any of the machines - from the smallest MicroVAX to the largest mainframe - as the range is based on a single architecture. In DECSpeak, "A VAX is a VAX is a VAX!". The most powerful operations concept, that of clustering computers together, has been used at Boston Spa since 1988 when the twin VAX 8350 VAXcluster was installed to run the DSC Serials system. The VAXcluster now contains 21 nodes, or machines - 5 main VAX minicomputers and 16 VAXstation workstations.

The VAXcluster environment is a highly integrated organisation of VAX systems. Members of the VAXcluster can share processing resources, print, batch and other queues, and disk and tape storage under a single security and system management domain. They all run the same operating system (VMS) and can boot, or fail, independently. There are various ways of configuring VAXclusters, but the most effective is to have a homogeneous cluster - where all the systems share a total common environment (software and data). In this case a user can log on to any of the systems and be provided with the same services. The only difference experienced would perhaps be one of response time as some machines may be more heavily loaded than others (but even this can be overcome to some extent by "load balancing" when new users log in).

At Boston Spa, we have a homogeneous VAXcluster, but it has been artificially partitioned so that not all services are available from all systems (although in theory they could be). This has been done for several reasons, including the fact that some services depend on software that is only licensed for certain processors. However, we still have the ability to transfer users from one machine to another, with little impact in most cases, in the event of a machine failure.

The major computers in a VAXcluster are connected together by Computer Interconnect (CI) cables and a connection box called a Star Coupler, and also linked with the rest of the world and the minor cluster members via Ethernet. Sharing of data storage is provided by Hierarchical Storage Controllers (HSCs) which connect the disk and tape drives to the cluster and control access to them. Using disks on the HSCs means that users on any machine can read/write data to any file on the disks as if the disk was local to their system.

An extra facility that we use in the VAXcluster is Volume Shadowing. By installing duplicate disk drives and setting up pairs of disks in Shadow Sets we have ensured that there is minimal chance of service disruption from disk problems or failures. Data is written to both members of the set as if they were a single disk and can be read from either. In the event of a disk failing, the other member can continue to provide access, and the users do not notice any disruption.

Overall, the VAXcluster environment provides flexible, secure, reliable high availability systems that are crucial to the automated systems at Boston Spa.

For further information about the VAXcluster, contact Paul Woofer or Gavin Holman. Copies of Automation at BLISC (5th ed.), which describes systems at DSC, are available from Gavin.
The Ethernet Network at Boston Spa

Gavin Holman

The network which links all the computers together at Boston Spa and enables connections to the outside world (including BL London) had its humble beginnings in a DELNI (DEC Local Network Interconnect) box, together with a terminal server, which sat between our VAX 8250 and its user terminals. This was our first computer to use Ethernet as the standard connection for terminals rather than direct-cabled links.

As we acquired more VAX computers and supported more terminals the "network" grew until we felt we needed to lay some real Ethernet cable. A back-bone "thick-wire" co-axial cable was run from the top floor of building 6a to the computer room on the ground floor and thence, via a more or less direct route to the PABX room in Building 1. At various points along its length we installed Sarel boxes which contained loops of the cable to enable us to attach several transceivers for the connection of terminals servers etc. to the network.

Over the last few years we extended the network by adding some "thin-wire" segments to it, and by attaching various communications devices to link the network with London and the outside world. We also continued the gradual process of re-connecting user terminals to local terminal servers to reduce the number of direct cables. The only other Local Area Nework (LAN) on the site, until recently, was one linking the Apricot workstations in the DSC Management Information section.

Then came Relocation and the dramatic increase in the numbers of networked PCs on the site. Several new "thin-wire" Ethernet segments were installed to support the PC populations of NBS, Admin, AP&C and sections within DSC. A fibre-optic link between the PABX room and Building 25 (housing NBS & AP&C originally) connected the LAN there with the main back-bone network.

However the main change took place as part of the relocation of C&T to the new building (the Hookway Building). Fibre-optic cables were laid around the site, connecting the main buildings which had computers and networks already installed (or planned). These cables are connected to Multi-media Access Centres (MMACs) which provide the interface between the fibre-optic cables and the more traditional Ethernet cabling.

There is redundancy built into the fibre-optic cable runs by having dual links available for each particular path. Data is transferred over the fibre at 100 Megabits/second (compared to 10 Mbits/s for ordinary Ethernet).

The MMACs have "patch-panels" which allow simple connection of cables and devices to the network. These, together with the floor-box connections in the new buildings have eased the process of installing and configuring the network components.

The network is still growing and being populated and currently consists of 24 physical segments (although not all are active yet). The number of nodes (PCs, VAXen, communications boxes, terminal servers and other devices) on each segment varies from 0 to around 20.

The diagram opposite describes the layout of the network at present.
Punched card machine - early 1970s

The BL's first Prestel service teletext terminal
Data processing and telex operators

Computer room - mid-1980s
Computer room - late 1980s