Literature Review of Digital Libraries and Highlights of Activities in DOE and Contractor Libraries

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ABSTRACT:

Recent efforts to create digital libraries have grown exponentially. A survey of the literature on digital libraries and initiatives offers definitions of digital library and both examples of successful digital library projects and challenges such projects face. In addition, this report highlights electronic library resources at scientific and technical libraries and information centers within the U.S. Department of Energy.

INTRODUCTION

For years, libraries and information services at U.S. Department of Energy (DOE) National Laboratories have flourished as they have fulfilled their mission to support very specialized populations of customers working intimately with scientific and technical information (STI). Recent developments in technology and library resource sharing capabilities have brought about opportunities for meaningful collaborations among the DOE Scientific and Technical Information Program (STIP) partners.

A concept paper presented by Dr. Walter Warnick, director of DOE's Office of Scientific and Technical Information (OSTI), at InForum '98, challenged the STIP partners to work together to develop a National Library for Energy Science and Technology (NLEST). The challenge received many strong reactions, but even among those with initial reluctance, continued interest in developing an NLEST or related collaboration has continued to grow. Information professionals within the STIP community anticipate that resource sharing collaborative efforts will benefit their respective organizations. Current measures may bring a level of formality to more informal collaborative efforts.

In order to develop such collaborations, many building blocks should be set in place in order to build a strong foundation for further collaboration. The goal of this paper is to lay out a blueprint for three of the building blocks. Drawing from the literature, definitions of digital and virtual libraries and selected efforts of digital libraries initiatives outside DOE are presented. Third, respondents among STIP partners to an informal survey resulted in data that highlights efforts at DOE and contractor libraries and information services to implement technology to provide information services to their customers. It is these partners who will form the nucleus of any STI collaboration, so measuring and evaluating what services currently exist is essential.

Definitions, Characteristics, and Purposes

Electronic, digital, and virtual libraries have sprung up so rapidly, and in many ways are still under construction. Why should we take time at this point to hammer out definitions? Coming to some agreements on clear definitions of terms will enable STIP partners to speak the same language as collaboration continues. This can enable the development a framework for management, funding, and promotion of scientific and

technical information resources. Here the author offers selected definitions as beginning points for the STI community to develop useful definitions that fit current developments.

The development of the automated library saw real progress in the 1970's and matured in the 1980's. In order to have a point of reference to compare definitions of electronic and virtual libraries, the following definition by Collier highlights the essence of an:

<u>Automated Library</u>

- Management of traditional library resources with computer technology

The 1990s brought a revolution that made possible the extension of the automated library to a more enhanced electronic library or digital library.

<u>Electronic Library or Digital Library</u>

- A managed environment of multimedia materials in digital form, designed for the benefit of its user population, structured to facilitate access to its contents and equipped with aids to navigation of the global network. (Collier, 1997)

In his *Analytical Review of the Library of the Future*, Drabenstott gives us this enhanced definition of description of the digital library.

- It is not a single entity;
- It requires technology to link the resources of many;
- The linkages between the many digital libraries and information services are transparent to the end user;
- Universal access to digital libraries and information services is a goal;
- Digital library collections are not limited to document surrogates: they extend to digital artifacts that cannot be represented or distributed in printed formats. (Drabenstott, 1994)

The Association of Research Libraries gave credence to the Drabenstott definition by accepting it, verbatim, as their own. (See Tennant, 11/15/97)

Further, the virtual library can be described as the extension of the digital library to a state where there is no single physical access locale and there may be no single point of electronic storage.

<u>Virtual Library</u>

- An electronic library in which the users and the holdings are totally distributed, yet still managed as a coherent whole (Collier, 1997)

Challenges

A review of the literature on digital or virtual library initiatives demonstrates that challenges are not uncommon as organizations build their resource sharing system. It is important to realize that the STIP community is not alone when encountering difficulties, and to take heart that others have overcome initial problems to build the system they envisioned. The following excerpts illustrate a few of those challenges.

Debate about the digital library is clouded by emotion and self-interest. Emotion plays its part because the digital library is seen by some as a threat to the book, and a threat to the book is an attack on culture itself. Self-interest enters the fray because in the instability provoked by the digital library there will be winners and losers.

Depending on your point of view the digital library can be the end of libraries as we know them, or the salvation of libraries as we know them. (Collier, 1997)

"What I never dreamed of yesterday, I can't do without today," U.S. Representative George Brown.

Richard Luce (1998) voices three concerns relative to the impact of the digital library on users: 1) "supplier-centric" solutions, with each new system requiring its own interface, 2) that it is becoming harder for the librarian to integrate information which the library does not manage, and 3) finally, Luce cautioned about the statistical usage data which librarians are being asked to provide to publishers and which can be mined from usage data collected by computers. There is a serious potential for misuse of this data. (Luce, Elsevier Science Information. 1998)

A new library economy will need to be developed. It is not enough to say that electronic information is expensive, without making valid comparisons with the alternatives and measuring the relative cost benefits. These could be intangible.

- Licensing versus ownership, over time
- Payment by usage versus subscription
- Space requirements in the electronic environment
- Equipment and communications
- People, their changing skills and remuneration
- Co-operation with other providers, including the private sector
- Income generation, publishing and charging (Collier, 1997)

The constant care and feeding of information consumers will continue to be challenging. The time gap between novelty or newness of a technology or service and the expectation and even demand of excellence in utilizing that technology and providing that service has grown shorter. Some examples include:

The designer of a successful marketing plan [for libraries] must (1) identify the real values of the organization (in our case our particular laboratory or the broader DOE community) and how those values are described and measured, (2) determine what the web of producer/client relations is and where the library fits best, and (3) work to ensure that the library actually accomplishes what the plan requires. (Trombatore, in Ardis, 1994)

Electronic libraries are often labeled "libraries without walls" because they rely on their connection to other libraries, information centers, and sources of data that are not physically within the library itself. [Some are] more correctly described as a library that has only walls--and a few computer terminals. We function as an information convenience store, trying to supply the largest quantity of goods to the largest number of customers in the fastest manner possible. Not surprisingly, we are concerned only with accessing and delivering information, not with preserving it. (Dupuis, in Ardis, 1994)

The Web Is Not a Library, but it has the potential to change the most basic foundations of knowledge creation, sharing, and application - worldwide. Millions of people are using the Web as if it were a library. Ways the Web is not a library: 1) the information is not all there; 2) the Web is lacking standards and validation; 3) it has minimal cataloging, i.e., collection structure or organization; 4) it does not yield effective retrieval of information.

Predictions of the library's demise coincide with an increase in the use of libraries. It is important to acknowledge that librarians have always had two overriding imperatives: knowledge of the users they serve, and knowledge of recorded knowledge domains. In the expanding knowledge universe, the librarian and information user can be thought of as pioneers exploring new knowledge frontiers. (Griffiths, in Hawkins, 1998)

Digital Initiatives or Harnessing the Web Through Technology

Selected efforts, visibility, accessibility outside DOE

Harvey A. Andruss Library, Bloomsburg University, Pennsylvania.

Editor-in-Chief of *Library Journal*, John N. Berry III, celebrates Bloomsburg University's foresight in building a new academic library that is "employing the newest information technologies without succumbing to the siren song of the technozealots and digital cost-cutters who hold sway" among so many institutions. He goes on to say:

Make no mistake about it, the modern Andruss Library is a step or two ahead of "state of the art." Yet, Andruss is one of the many new academic libraries built on the rational assessment that today, and in the foreseeable future, a library must accommodate a variety of formats, collections, and points of access to bring together, organize, and distribute print, microform, digital and audiovisual resources.

The Bloomsburg planners did not go whole hog and create a library so dependent on digital technology and remote access that scholarship would cease when the systems went down. They did not bet the university's future on the Internet or its successors, but they still built in the capacity to connect fully to those networked resources. They recognized both the immense value of digital technology and its current limitations.

"Totally digital" or "totally virtual" libraries are currently being planned, which proves the seductive power of that cult. Among its attractions is the possible cheap replacement of library buildings, collections, and staff with machines and network connections. Still, no virtual library has the authority to carry the burdens of true scholarly research.

This is not an appeal to abandon the digital future. It is an appeal to librarians to add the rigor of their discipline to the movement to create critical standards, and to speed our ability to test and validate digital information sources. (Berry, 1998)

University of California Libraries, California Digital Library.
http://www.cdlib.org/

"The creation of a digital library is the highest priority in order for the University of California (UC) to maintain its status as a major research library," determined an Executive Working Group of nine librarians. They first presented their conclusions to UC's Library Council in October 1994, with a year 2000 date in mind for completion. The university's budget for 1997 allowed for $1 million in expenditures toward the digital library, with plans for an increased budget of $3 million for 1998.

The California Digital Library (CDL) project is a direct response to the libraries' inability to serve the needs of its almost 200,000 population of faculty, staff, and students, given rising materials costs. The six-point strategy outlined involves: 1) conceptualizing a variety of models for building and accessing networked information resources; 2) undertaking pilot projects that realize and test these models; 3) redesigning the entire UC information delivery service; 4) developing policies and procedures for acquiring information resources in digital format; 5) reviewing and reshaping mutual relationships among stakeholders; and 6) generating financial resources to support investment in the development of the digital library.

All those who have taken on similar projects face the challenge of making the digital library fit into the existing infrastructure. The digital library will provide information preservation, storage, and retrieval; information access and delivery via electronic communications; online publishing of the scholarly and scientific knowledge base or knowledge management; and information management consultation and training. (St. Lifer, 1997)

University of Illinois Digital Libraries. http://dli.grainger.uiuc.edu/

In this article Tennant offers a definition of digital libraries that leaves a great deal of room for diversity. Then he highlights six projects funded with multi-million dollar grants from NSF/DARPA/NASA.

One of these, a University of Illinois project attempts to bring together disparate sources of scientific information and improve search results for federated or joined databases. Its prototype system, Desktop Link to Virtual Engineering Resources (or "DeLIver"), includes a number of engineering journals in full text. Anyone can search it, but to see the articles you must be an authorized user.

Tennant challenges the reader to, "Stick your neck out. Take the plunge. Leave your comfort zone and expand your horizons. Digital libraries are here to stay!" (Tennant, 11/15/1997)

University of Texas at Austin General Libraries. http://www.lib.utexas.edu/

A number of forward-thinking library planners in Austin, Texas contributed to views of libraries of the future. Contributors were from a range of libraries, some corporate librarians, some academic, some managers, some reference librarians, and an information resource entrepreneur.

One conclusion was that the library of the future will not be totally electronic, nor will it even be composed primarily of electronic materials; instead it will be an amalgam of books, journals, databases, images, and other as yet unknown technologies. Just as clearly, the place of electronic materials in the library of the future depends on how well (or poorly) they measure up against the historical library mission to preserve and improve access to recorded knowledge." (Ardis, 1994, p. vi)

DOE Contractor Libraries including National Laboratories, Headquarters Energy Library, and the Office of Scientific and Technical Information

Selected Efforts in Implementing Technology to Deliver Information Services within the DOE Scientific and Technical Information Community

DOE Scientific and Technical Information Program (STIP) partners will form the nucleus of any STI collaboration. In order to assess what information resources and successes already exist among these DOE programs, and informal survey was undertaken in the early months of 1999. Respondents to the survey sent data that highlights efforts throughout DOE to implement technology in order to provide information services to customers. These are listed alphabetically.

Please note that this is an initial effort to gather data. Other data-gathering efforts are under way at the time of this publication, and additional information should be gathered as collaborative efforts continue to grow.

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http://www.pu.org
Beth Perry, Information Resource Specialist

The Center serves the U.S. Department of Energy by conducting scientific and technical research, advising decision makers, and providing information on nuclear weapons materials and related environmental, health, safety, and nonproliferation issues while building academic excellence in science and technology. Open dialog and communication about ANRC programs is essential because its mission has implications for public safety, environmental quality, business, international relations, and continuing research on nuclear materials. ANRC strives to collaborate with the national laboratories and institutions of higher education to optimize cooperation and enhance the effectiveness of our program.

To support these studies, ANRC funds the Electronic Resource Library (ERL), a virtual library of plutonium information. It is both an archive of supporting material for the studies and a means of communicating current research. Its goal is to provide a national archive of unclassified scientific information on plutonium, as it relates to nuclear weapons stockpile issues, by centralizing the information and making it easily retrievable.

The Electronic Resource Library (ERL) is a joint project of Amarillo College (AC), Amarillo, TX, and Tech Tech University (Tech), Lubbock, TX; George Huffman and Dr. Karen Ruddy are principle investigators at AC. Dr. Dale Cluff is principle investigator at Tech. http://plutonium-erl.actx.edu

This entirely virtual library project came on-line in January 1997 with 100 full-text documents and helpful connections to bibliographic databases. By March 1999, the collection included 5,500 full-text publications, a one-stop bibliographic database for plutonium information searches (PuCAT) containing over 40,000 citations, excellent links and full-text technical references. A collaborative agreement with OSTI allows the ERL to digitize original documents to build the historical collection of digitized plutonium information. OSTI, in turn, receives high quality digital documents that can be added to Information Bridge.

Argonne National Laboratory, Information & Publishing Division, Chicago, IL. http://www.ipd.anl.gov/
Kathy Macal, Director

The library system at Argonne National Laboratory (ANL) provides on-line access to STI created worldwide through the Argonne Information Management (AIM) System. The AIM System, which integrates digital information products into the library's traditional collection and services, provides:

- Scientists and engineers at both ANL-East (Chicago, IL) and ANL-West (Idaho Falls, ID) with both web and telnet access from their desktops to the Argonne Libraries Electronic Catalog. Using this on-line catalog, ANL staff can search and request paper and digital materials contained in the ANL library system.

- An interface to ISI's *Current Contents* that links article level information with the journal holdings of both ANL and the contracting institution, the University

of Chicago, and allows staff/faculty at both institutions to easily request circulation of a journal or an expedited interlibrary loan copy of a journal article. Based on identification of subject areas and publications of interest to individual scientists, technology is also pushed to provide title and subject based current awareness services to faculty and staff at both locations.

- *Resources on the Internet*, an evaluated compilation of Internet resources with linked URLs that relate to current research at ANL; at present more than 500 sites are indexed in this compilation.

- A Web-based reference service called *Ask An Argonne Librarian* that provides rapid responses from technical librarians to employee requests for information; the request form for this service is available from the library web page.

- More than 240 full-text electronic journals (from 20 publishers) that can be accessed from researchers' desktops.

- A web-based directory of "E-Journals" that allows ANL researchers to get rapid access to and identification of the titles that are available electronically to Argonne employees.

- Full text of selected technical reports (cataloged and linked).

- Full text of 15 ANL manuals covering a range of subjects from employee handbooks to waste handling procedures.

- Access to a range of databases housed on a CD-ROM network that is accessible from PCs in 10 on-site library locations. In FY98, the library logged more than 23,000 user connections to 21 CD-based electronic products, such as Science Citation Index, Thomas Register, Social Citation Index, Index of Scientific and Technical Proceedings, etc. (The CD-ROM network includes four CD-ROM towers with a 72 bay capacity and a 150 CD-ROM capacity jukebox.)

Efforts to promote these electronic products and services to users include:

- Routinely placing notices and articles in the ANL employee newsletter;

- Distributing selected information to senior management (for example, a reprint from the United Airlines *"Hemispheres"* magazine that described librarians' unique Internet information gathering skills).

- Exhibiting at the annual user meeting held by the Advanced Photon Source.

- Providing information on electronic library services in the packet given to all new ANL employees.

- Distributing bookmarks that describe services and library locations.

- Hosting one-on-one and group demonstrations/training in use of electronic services, both in the libraries and at users' work locations (more than 1,300 sessions in FY 98).

- Making regular presentations at divisional seminars and laboratory policy committee meetings.

In routine reviews of service organizations by internal ad hoc teams of ANL managers and scientists, the ANL library's blend of traditional and electronic

products and services has been consistently commended. A high level of user satisfaction has been a major factor in the library's success in retaining adequate funding for the paper and digital library collection.

Some other labs have linked to Argonne's Resources on the Internet, rather than create something similar themselves. It's said that imitation is a sincere form of flattery or, in this case, recognition!

Upon visiting the ANL Information & Publishing Division website, one notices the delightful graphic at http://www.ipd.anl.gov/. The hot links are animated pieces of a jigsaw puzzle, which sends a strong implied message about the service ANL IPD provides - helping the information seeker complete the puzzle. The shades of lavender, blue, and aqua are visually pleasing, and the subtle jigsaw puzzle background really pulls it all together. It leaves a strong impression that this is a site that really has its act together. --BP

Energy Library, Forrestal Building, Visual Media & Library Services Group, Washington, D.C. http://vm1.hqadmin.doe.gov:80/library/
Denise Diggin, Librarian (Team Leader), and Joanne Graham, Supervisor

The Department of Energy (DOE) headquarters (HQ) Library or Energy Library dates back to the mid-50's when the old Atomic Energy Commission (AEC) was established. The AEC was absorbed into the Energy Research and Development Administration (ERDA) and ERDA later became DOE. Besides ERDA, DOE absorbed the Federal Power Commission and the Federal Energy Administration. The collections of all these entities were brought together (about 1976) and became the Energy Library. Since then, the Federal Power Commission (which became the Nuclear Regular Commission) branched off, though still under DOE's umbrella. Likewise, their collection was deleted from the Energy Library's holdings.

The HQ's Library serves primarily DOE HQ employees and contractors. It also serves the general public who (with some restrictions) can use the collection and check out materials through interlibrary loan. Approximately 11% of Energy Library's activity is for someone other than HQ's employees and contractors.

The Energy Library is funded under the Office of Management and Administration (MA-1) budget. An attempt to get accepted into the HQ's Working Capital Fund was made in 1998 in order to alleviate budget constraints (Program Offices pay for services under the WCF), but Programs determined that the library was a corporate function which should be paid for by Administration. The programs do pay directly for the cost of materials they want for their own office's use (not for the general collection). They fund about $800K/yr in resource materials which are not shared and are for direct office use or for what I call "private use". The library also gets approximately $250K (down from $1.8M) to fund the general collection, the Secretary's office, electronic journals, etc.)

Current Effort:

- The library has about 22 FTE's on board in early 1999 (down from 46 in 1994). Library staff support OSTI and partner with them for consortium purchasing and to support STIP collaborations.

- Library staff, in early 1999, are working with OSTI to set up a pilot for the Web of Science for HQ's users.

- Energy Library staff are revamping the library's home page with updated graphics which will incorporate the new on-line catalog, which is web based, and can link to Internet resources. The target date for launching the new site is June 1999.

Fermi National Laboratory, Information Resources Department, Batavia, IL.
http://www-lib.fnal.gov/library/
Cindy Crego, Manager

Fermilab has provided on-line public access to Fermilab full-text preprints, conference reports, physics notes and technical memos since 1995. The Library serves approximately 50,000 to 75,000 documents per month. In 1995, several e-mail messages a day from customers were received, primarily requesting access assistance. Now, only a handful of requests for assistance per month are logged -- due primarily to the increased sophistication of the users and improved delivery.

One must keep in mind however when discussing the burden placed on a facility when serving the public, that although the reports are publicly accessible, rarely do does a member of the "general public" access Fermilab's technical publications web pages. Customers are primarily scientists, graduate students, engineers and computer professionals. When requests for assistance do come from the general public, 99% of the time the request is very time consuming and ranges from providing assistance with configuring browsers for launching helper applications, to explaining what the applications are and what they do (doing this over the phone is like talking down an inexperienced pilot!), to providing instructions on how to download both documents and applications, to explaining what ps and pdf are, as well as answering a host of technical questions about the content of the documents (which must be handled by the technical staff). Librarians and information professionals at Fermilab, as well as the scientists, graciously provide whatever assistance the end users require, but increased usage by the general public would severely tax resources--far beyond what could be provided, and could seriously damage Fermilab Library's reputation for outstanding customer service.

There is a need to understand the needs of the customer and what level of service is required. Users of an e-print server (like Los Alamos and Fermilab) expect somewhat minimal customer service, users of a library expect much more. The customers of an e-print server are primarily technical professionals and grad students. Libraries serve a very broad population.

Lawrence Berkeley National Laboratory, Berkeley, CA.
http://www.lbl.gov/ICSD/TEID/ and http://www.lbl.gov/ICSD/TEID/library.html
Dennis Hall, Director, Technical & Electronic Information Department, and
Carol Backhus, Berkeley Lab Library Director

The Berkeley Lab Library supports Lawrence Berkeley National Laboratory's mission by providing information resources to Lab employees. We do this by providing quality information services, providing and maintaining an archive of

printed material, and increasingly so, by providing information at the researcher's desktop.

The Library website is the primary means of providing information to the desktop. The website, which averages 6,000 hits a week, provides library FAQs; links to sites that support the Laboratory's mission; journal holdings (with links to over 300 that are available electronically); library forms (including interlibrary loan, acquisition, and book renewal forms); and web interfaces to the Library Catalog and the LBNL Report Catalog. The web-based catalogs make it possible to provide links to electronic journals, full-text reports, and reference materials in PDF, PostScript, and HTML formats from the catalog records. The Library's holdings are also available through the California Digital Library's (CDL) MELVYL catalog.

In addition to providing holdings records to the MELVYL catalog, Berkeley Lab Library also participates in several licensing agreements through the CDL consortium. Among the agreements are access to databases such as BIOSIS, Current Contents, Computer Index, INSPEC, Magazine Index, Medline Plus, and Newspaper Index via the CDL database system. Many of the records in these databases are linked to the full text of the article. As long as the Library has negotiated a site license with the particular journal publisher, Laboratory employees can access these articles. Laboratory employees display approximately 90,000 records a month on these databases. The Library is also a part of a CDL agreement with Academic Press that provides access to the full-text of all Academic Press titles from 1995 forward.

Through the efforts of STIP Goal 2, the library has also been able to provide site-wide access to Science Magazine. This has proven to be very popular.

The Library has had many favorable comments recently about our efforts to bring information to the user's desktop and the usage logs show that the resources are well used. When the Laboratory recently set up a system for employees to create their own personal Intranet pages, the Library website was one of the first modules made available as a resource choice.

Lawrence Livermore National Laboratory Library, Livermore, CA.
http://www.llnl.gov/tid/Library.html
Isom Harrison, Division Manager

LLNL Library hosts a web page which includes LLNL internal reports collection on-line (in full-text). LLNL researchers access this information from their desktops. The system is totally integrated so it doesn't matter whether they are in the OPAC (On-line Public Access Catalog) or the "Documents on-line" database, they have access to the same information which is linked. In addition, access to 935 electronic journals is provided by the Library at the researcher's desktop.

Recognition has come in the form of letters and e-mails touting the many available resources. The greatest recognition has been a 60% increase in budget for FY99 granted by the Laboratory.

Los Alamos National Laboratory Library, Los Alamos, NM. http://lib-www.lanl.gov/
Richard Luce, Director

Although most of the information in this paper has come directly from a staff member at the named organization, information for Los Alamos comes primarily from a March 1999 article published in ONLINE Magazine filled with success stories from the innovative efforts of LANL library staff. Excerpts of that article include:

LANL's innovations and leadership rest on three legs of a tripod. One of those legs is the Library Without Walls, our digital library project. The second leg is the element of service. That's something we measure and feel very strongly about. The third leg is our strategic business management--our process for assessing and improving how we work.

Los Alamos National Laboratory's mission is also its motto : "Science Serving Society." The laboratory has always had a library, and it has a staff today of nearly fifty. More than half hold MLS degrees. Many have strong computer science and database development skills. The organizational structure is flatter than the traditional hierarchy found in many libraries, and the staff members are not bound by rigid job descriptions.

Library products include databases customized with sophisticated search and retrieval features even before the database vendors offered them. The library has integrated resources and moved massive amounts of data to the scientists' digital desktops. In addition, the library serves the general public during business hours. The online catalog and a large collection of unclassified technical reports are available around the clock and around the world through the library's Web site.

The Library Without Walls project's long-term goal is creation of a network of knowledge systems that facilitate collaboration among researchers. It is distinguished by its integration of a broad set of library components that work synergistically.

Customizing Databases

In 1995, Luce sought and received additional funding to enhance the library's initiatives, one-time funding for one year. His objective was to deliver a product back to the laboratory so good that follow-on funding would be demanded by the user community--and, indeed, that's what happened.

An example of a cutting-edge resource the library developed was a customized interface to a database from the Institute for Scientific Information. "In '95, we went to ISI and talked to them about licensing the Science Citation Index," Luce said. "We wanted to make that available through the Web. At the time they told us there would be no Web product. So we licensed the database, brought it in-house, and developed a Web-based full-text retrieval tool. Other institutions in New Mexico started looking at it. Organizations like Sandia National Laboratory, the University of New Mexico, and the Phillips Air Force Research Laboratory said, 'Can we partner with you? We'd like access to that, too.'" Two years later, ISI developed a Web site.

The alert feature lets an individual user create a customized research profile that is checked against the 18,000 journal citations added to the database weekly. New information matching the profile automatically generates an e-mail notification. In

addition, researchers can be notified when others cite their papers, or they can be notified when an important paper in their field is cited.

The library also has created links from the database citations to full-text articles. The database now contains links to more than half-a-million articles. They are full-image, full-text files that can be searched for keywords, viewed on screen, and printed at a local printer.

Digital Collection Management

Digital resources comprise a significant portion of the Los Alamos collections. The online catalog includes almost eighty databases, more than 1,200 electronic journals, over 600 electronic books, and even online video.

The Los Alamos information system also gives researchers access to digitized technical reports authored by laboratory staff members. They provide access to electronic technical reports from other agencies and currently link to over 2,000 of them. The library maintains a collection of 1.4 million classified and unclassified reports in microfiche and hardcopy. About 3,500 classified reports have been scanned and made available online to laboratory employees. More than 25,000 unclassified reports are available to anyone through the Web.

Customer Service

Staff members continually elicit feedback from clients and incorporate the suggestions into library products. Feedback and suggestions are collected via a database that tracks who the customers are, what products and services they use, and what they are saying about those products and services.

To collect customer data, the library uses various "listening posts," including outreach visits, focus groups, e-mail logs of comments and complaints, and focused "voice of the customer" interviews. In spring 1998, the focus on service helped the library win the Quality New Mexico Roadrunner Award for integrating a strong customer focus with visionary planning, for using a well-defined process to manage its business, and for providing distinguished service in support of scientific research. Additional results of customer focus include the following:

- Customized Web pages can be created by employees so that they can display information in ways that best meet their needs.

- Customers can be place materials on hold electronically and in the same way submit requests for books and reports to be sent through the mail. Electronic request forms are available, and a weekly list of new books goes out to patrons via listserv. Overdue notices are sent via e-mail.

- The library works closely with Paul Ginsparg's preprint database (http://xxx.lanl.gov) which gives scientists the ability to comment on the papers. Another model of scientific communication, it's not the final product, but something to make traditional publishers sit up and think.

- Catalog records available through the Web are updated automatically. The staff developed the first production Web interface for the Geac Advance library catalog, which spurred Geac to develop its own commercial version.

Luce's concluding comment summarizes his view to the future. "We're trying to manage the intellectual capital of the laboratory, and we're trying to facilitate scholarly communication. To the extent that we accomplish those goals over the next five to ten years, we're going to thrive." (Pack, March 1999)

The Office of Scientific and Technical Information, Oak Ridge, TN.
http://www.doe.gov/html/osti/resource.html

Dr. Walter L. Warnick, Director, and R. Charles Morgan, Deputy Director/Manager

The Office of Scientific and Technical Information, within the Office of Computational and Technology Research in the Department of Energy's Office of Science is responsible for leading the Department's Technical Information Management Program (TIMP) and for providing direction and coordination for the dissemination of scientific and technical information resulting from DOE research and development (R&D) and environmental programs.

OSTI Sponsored Information Resources

- EnergyFiles - The Virtual Library of Energy Science and Technology

- DOE Information Bridge, Public Web site - (No registration or password required) Searchable and downloadable bibliographic records and full text of DOE research report literature from 1996 forward; see Technical Requirements

- DOE Information Bridge, DOE and DOE Contractor Web site - (Registration and password required) Searchable and downloadable bibliographic records of worldwide energy research and full text of DOE sponsored or acquired scientific and technical information from 1996 forward; see Technical Requirements

- DOE R&D Accomplishments Database - Searchable and downloadable bibliographic records and full-text reports of past DOE R&D accomplishments

- DOE R&D Project Summaries - Current information on over 12,000 Department of Energy R&D projects

- DOE Reports Bibliographic Database - Citations for Department of Energy sponsored scientific and technical reports

- Energy Science and Technology Software Center (ESTSC) - Software funded by the Department of Energy

- Energy Science and Technology Database (EDB) and Nuclear Science Abstracts (NSA) -Bibliographic information and abstracts for energy related information, including international references

- OSTI Government Information Locator System (GILS) Records - OSTI information resource pointers in support of DOE's effort to make information publicly accessible

OSTI Maintained Information Resources

- Congressional Questions and Answers Database (QADB) - Full-text of the Department's testimonies before Congressional Committees and/or Subcommittees

- Current Awareness Electronic and Paper Publications - Bibliographic citations with abstracts within specific Department of Energy R&D areas

- DOE Invention Licensing Home Page - Information on Department-owned patents and patent applications available for license for commercial use and links to its associated databases.

- DOE Technical Standards - Online standards providing methods and techniques for implementing Department of Energy requirements

- Energy Efficiency and Renewable Energy Database (EREN) - DOE sponsored information relating to energy efficiency and renewable energy topics

- Environmental Management Science Program Research Projects - Abstracts and other information about the projects awarded research grants and contracts during 1996 and 1997

- Environmental Management Technical Reports Database - Bibliographic citations of environmental management scientific and technical reports

- Office of Biological and Environmental Research (OBER) Abstracts Database - The Office of Biological and Environmental Research manages The Department's Biological and Environmental Research (BER) program, including the areas of Life Sciences, Medical Sciences, Global Change Research, and Environmental Remediation. The mission of the BER program is to develop the knowledge needed to identify, understand, and anticipate the long-term health and environmental consequences of energy production, development, and use. This mission is carried out through the program's support of peer-reviewed research at DOE national laboratories, universities, and private institutions. The research is also designed to provide science in support of the Energy Policy Act of 1992.

- International Agreements Database - Searchable collection of the full-text agreements between Energy and foreign governments. The current collection consists of bi-lateral agreements. Multi-lateral agreements are expected to be added sometime in 1999.

- OCRWM Technical Publications Database - Recent information pertaining to the management of commercial spent nuclear fuel and high-level radioactive waste

- OpenNet - References to all documents declassified and made publicly available after October 1, 1994

Pacific Northwest National Laboratory, Hanford Technical Library, Admin/Technical & Electronic Communications, Hanford, WA.
http://www.pnl.gov/tech_lib/home.html
Lois Holmes, Department Manager,

<u>Use of Technology that Enables Access to STI</u>

The Hanford Technical Library has been aggressively moving farther into cyberspace. During fiscal year (FY99), library staff:

- Replaced a simple e-mail order forms with Intranet web forms for cost-recovered services (ILL, document delivery, ordering desk copies of books and journals). The user enters their payroll number; the system pulls up name, location, etc.; the user chooses the type of service requested and fills in the information. The request goes to the Reference Desk here in the Library.

- Significantly added to the number of full text electronic journals with desktop access. Current count is over 120 titles from 17 publishers. From the e-journals web page, users can click to view the list by title, publisher, or subject. Several staff members received a PNNL Facilities and Operations Directorate Excellence Award for cataloging electronic journals.

- Revised the DOE Public Reading Room (operated by PNNL) catalog, available on the external web. The new version contains hot links to electronic documents and enhanced search capability. In FY98, there were over 3,000 hits to the Reading Room web page and are well ahead of that trend this year.

- Took over a collection of industry standards, formerly operated by another DOE contractor. Nearly 600 standards were catalog, to enable users to search for and order standards from their desktop. Several staff members received a PNNL Facilities and Operations Directorate Excellence Award for this project.

Over the past several years, library staff:

- Received a Laboratory Outstanding Team Performance Award for developing Statutory and Regulatory Information Service (SARIS). In SARIS are packaged the Federal Register, CFRs, Washington State Codes (RCW), DOE Orders, selected NRC documents, and a local Tri-Party Agreement into a single tool allowing users to search across all these sources in a single search. This service was operated successfully for several years. This fiscal year, an in-house service was replaced with Micromedex's RegsLink, which gives users most of the SARIS information and costs less.

- Worked with the Information Technology group to purchase, test, and implement NTrigue, which allows us to deliver CD-based products to the Mac and UNIX communities, in addition to the PC folks who have received service for several years.

- Built a 50-drive CD tower and three servers that provide desktop access to 30 electronic resources (bibliographic and scientific data products). In FY98, there were 21,000 connections to the CD products. These products are also accessible from the Library's user stations.

- Designed a robust set of Intranet pages that give users access to electronic journals, electronic documents, web forms, instructions on loading OPAC and CD-based products, descriptions of services, maps, hours, etc. In FY98, there were nearly 14,000 hits to the Intranet pages, and a more simplified external web page was built.

- Built an extensive list of URLs containing electronic documents of interest to the DOE and contractor community. This list is on the Library's Intranet and external pages, as well as on the DOE Public Reading Room (managed by PNNL) external web page.

- Networked OPAC so users throughout the Lab and Hanford Site can search for and request material from their desktop.

- Review web sites of potential interest to the user community and distribute *Internet Sites of the Week* to 42 staff, as well as to the Library staff.

Promotion efforts for electronic services include:

- Produced a brochure that is sent to all newly hired PNNL staff, explaining the Library's electronic and print collections and services. The brochure goes out with a cover memo signed by the library director.

- Developed a slogan, which reflects PNNL's emphasis on things electronic: "*Making the Virtual Reality . . . Connecting People & Information for Results.*"

- Printed "sticky pads" with the Library's logo, slogan, and Intranet URL. Staff use these stickies when sending material to Library users and prospective users, to promote use of PNNL's web pages.

- Hosted many demonstrations of electronic services, both here in the Library and at users' work locations. In FY98, 66 tours and demos were given to 346 people.

- Placed notices and articles in the Lab's electronic *What's Happening* and in the printed *Hanford Reach* and *Battelle Way* to announce new products and demos, and to promote those services.

- Hosted a "Virtual Open House" on the library's Intranet pages, complete with virtual cookies (photo and recipe). The Special Libraries Association recognized this effort with an award for promotion.

- Plans are in place to develop infrastructure for an electronic STI and records system. One of its features will be a web-based, external "document" repository of publicly available STI. At this time, no plan is in place to provide information/ documents retrospectively in any consistent or logical way, but only as particular projects or program within the Lab choose to fund the conversion of their materials.

For questions about ERICA (Electronic Records and Information Capture Architecture) and plans for making PNNL's publicly-available STI accessible on the Internet, contact Lois Holmes.

Stanford Linear Accelerator Center Library, Stanford, CA.
http://www.slac.stanford.edu/library/home.html
Patricia A. Kreitz, Director

Currently, SLAC Library receives over 150 e-mail inquiries per week. The statistics below represent a single month's searches of the HEP databases and are rather high, even though January is traditionally a light month for the SLAC

Library. This does not reflect three mirror sites around the globe whose statistics are not collected, at present.

Statistics for the SLAC SPIRES Databases

Report: 01/02/1999 00:00:39 start time
01/31/1999 23:59:56 end time
Tuesday, Feb. 02, 1999 report create date

Totals   345,875 searches
59,000,756 lines sent
170.5840 average lines per request

Conclusion and Recommendations

Digital libraries have become more than just curiosities or experimental projects with short-term funding to get them started. The technology that enabled digital libraries to develop is still relatively new, but is quickly becoming more accessible, reliable, and predictable. Those in the U.S. Department of Energy (DOE) Scientific and Technical Information Program (STIP) community should take advantage of current technology in order to provide the best possible information service to their audiences.

More formal collaboration among DOE STIP organizations may help to ensure that funding to provide electronic access to scientific and technical information remains stable and that agreements help leverage the most effective agreements for information services. Dr. Walter Warnick, Director of OSTI, has proposed that a National Library of Energy, Science and Technology could be a valuable collaboration mechanism for the Department of Energy scientific and technical information. The model of a National Library, with collaboration from the STIP community, is worth considering.

Stephen Covey (1990) indicates that synergy in an organization results from individuals and leaders valuing differences and bringing together different perspectives in the spirit of mutual respect. Participants then feel free to seek the best possible creative solutions to the challenges that face them, to build something larger than just the sum of their various parts. Such synergy is needed in the STIP community to build a level collaboration beyond what has been tried before.

In order to continue to bring the greatest value to DOE customers and perhaps enhanced visibility for DOE, the STIP community should:

1. Continually recognize and evaluate what exists, and find ways to reward excellence,
2. Continue working together synergistically,
3. Focus on current audience for STI, and determine potential audience or customers,
4. Perform cost/benefit analyses before taking action toward providing additional information services, and
5. Communicate the results of our efforts through journals, conference proceedings, and in other publications.

Timing is important. Long-term and short-term goals should be developed, so that progress toward the goals of collaboration can be measured. STIP partners have an uncommon opportunity to develop a partnership that can lead to greater access to unique scientific and technical resources for current customers and others. Let us grab the baton and run with it.

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