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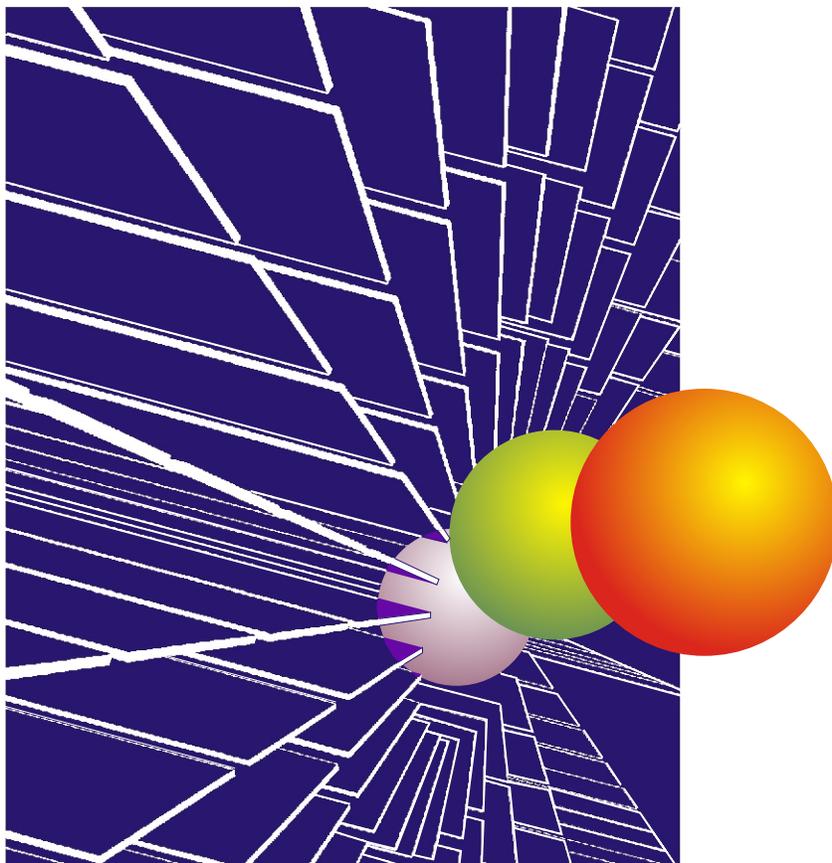
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RDT Library
System Development

RI 98-026

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16. Abstract The report documents year one efforts relating to the analysis, development, and implementation of the Missouri Department of Transportation Research Development and Technology automated research library system. Specific issues include collection assessment and organization, cataloging and classification issues, and the implementation of circulation and operations. Also included are funding and budget information, and recommendations and objectives for year two project development.			
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Final Report

MoDOT Study Number RI98-026

MoDOT Report Number RDT 03-012

"RDT Library System Development"

MISSOURI DEPARTMENT OF TRANSPORTATION
RESEARCH, DEVELOPMENT AND TECHNOLOGY

BY:

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JEFFERSON CITY, MISSOURI
DATE SUBMITTED: date

EXECUTIVE SUMMARY

The primary project objective is to provide expertise in support of the Missouri

Department of Transportation Research and Development division decision to sub-

license Q-Series library software applications from the Information Systems (IS) Division

of the Missouri Department of Transportation. The focus is on the development of the

RDT Library in an open fashion that will support the following areas:

- Analyze and make and recommendations for use of the EOS Q-Series application within the RDT Division.
- Development of a conversion plan for the local collection based upon the size, scope and processing needs of the collection.
- In cooperation with MoDOT personnel, prioritize segments of the collection for conversion based on current RDT user content access processes.
- Support the design and development of digital bibliographic records representing the selected portions of the "library collection" housed within RDT.
- Research and recommend document delivery solutions for RDT end users accessing documents using the Q-Series application.

It is the hope of the researchers that the outcomes of this study provide an effective

digital access point for distribution of RDT journals, reports, and texts. This report also

provides a model for the expansion of similar library information systems to other

departments within the Missouri Department of Transportation. It is recommended that

this initial research be continued with the sustained efforts required to support

operations of a physical and digital library facility, including memberships in any relevant

and beneficial organizations and consortiums. In addition, the research suggests that

an integrated, interoperable system containing MoDOT physical collection documents,

and allowing selective secured access to and from WWW resources is the most

effective future planning course.

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Introduction

In January 2002 officials at the Research, Development and Technology (RDT) Division of the Missouri Department of Transportation contacted Charles Nemmers, University of Missouri Department of Civil and Environmental Engineering, College of Engineering, to provide expertise in support of the RDT decision to sub-license Q-Series library software applications from the Information Systems (IS) Division of the Missouri Department of Transportation.

The challenge was to develop the RDT Library in an open fashion that would support expansion to other departments within MoDOT, by providing a digital access point for distribution of RDT journals, reports, and texts, and a model for the development of similar library information systems.

The research follows the development trend of similar library facilities including those at the Minnesota Department of Transportation Library (http://www.dot.state.mn.us/library/mtl.html), the Northwestern University Transportation Library (http://www.library.northwestern.edu/transportation/), and the Transportation Research Board's Transportation Research Information Services (TRIS) (http://199.79.179.82/sundev/search.cfm) and Research in Progress (RIP) (http://rip.trb.org/) database web sites.

The project addressed a number of concerns regarding MoDOT research and information systems conditions, including:

- The existing electronic reference system was pre MS-DOS with no technical support available.

- MoDOT staff who had run the program had retired and been transferred.

- reports needing to be filed were piling up.

- researchers were not able to effectively and efficiently use the RD&T resources.

- access to related studies individualized with little RD&T support.

- there was limited outlook for additional (replacement) staff.

MoDOT desired to correct this situation by deploying modern information science technology and have charged UM-C to identify this technology, tailor it to MoDOT, and then change / digitize their library and set in place the protocols that will permit the changes needed. When the project began the MoDOT IS department had recently installed the EOS library systems software that would become the basis for information storage and retrieval during the RDT project.

Objectives

Specific tasks for addressing specific outlined in the initial year one plan include:

- Preview existing EOS Q-Series application within the IS Division

- Review current RDT processes that connect users with content and assess the RDT library collection in terms of size and scope. Develop a **conversion plan** for the local collection, and in cooperation with MoDOT personnel, prioritize segments of the collection for conversion.

- Support for design and development of databases of bibliographic records representing the selected portions of the "library collection" housed within RDT, including the need to:

  - Identify standardized bibliographic structures for database conversion of records
  - Work to develop bibliographic skills of part time media conversion specialists
  - Work with RDT conversion team to create bibliographic records selected from the RDT Library collection for input into Q-Series system.
  - Consider authority control efforts relating to improved subject searching for end users

- Investigate and recommend document delivery solutions for connecting end users with RDT documents located using the Q-Series applications.

Present Conditions

At the present time, many year one project objectives have been addressed, and a number of improvements to the general state of RDT information access and retrieval made. When the project began the MoDOT Information Systems department had recently installed the EOS library systems software that would become the basis for information storage and retrieval during the RDT project. Subsequent to that effort the MU design team addressed the following objectives:

- a number of text items and report series including the Transit Cooperative Research Program (TCRP) and National Cooperative Highway Research Program (NCHRP) were cataloged and converted to digital form using the EOS system.

- a standardized circulation procedure, including scanned check in and out procedures, was implemented.

- guidelines for the mark up and cataloging of information were established, including collection inclusion policies

- recommendations and initial planning for an online information portal proving a single access point for research materials were made

- a procedure for distributed production was implemented with points including MoDOT media conversion services offices in Jefferson City, Missouri, the MoDOT Conley road annex in Columbia, Missouri, and two EOS equipped laptops with modem connection to the EOS system database.

In addition, efforts are currently underway to improve library operations including continued cataloging of materials selected from the collection, development of a web portal prototype, and training end users and cataloging assistants.

Technical Approach

The technical approach of the project is targeted on three fronts. First, there are points related to the technical infrastructure of the library system and the distributed cataloging process. Second, there are technical information issues involved with the cataloging and classification of library items. Last, there are issues relating to the operations of the physical facility.

Infrastructure

A major cornerstone of the project technology infrastructure is the EOS Q-Series library information system. The system stores and processes library data using an Oracle back end database management system. Library functions are supported using the EOS software application interface. This application runs on the Windows 2000 operating system, providing professional automated library functions, including modules for circulation, cataloging, and administration. These operations are assisted by a barcode scanner that allows one step tracking of availability and circulation through barcode tags applied to individual items.

Items contained in the system are accessed through a web based interface Online Public Access Catalog (OPAC). The OPAC web pages reside on the MoDOT intranet, and authorized users are able to search the library document holdings from their desktop PC. Bibliographic records are cataloged into the system from three points. Records are cataloged by MoDOT media conversion services in Jefferson City, Missouri. In addition, university team members can perform cataloging and other library operations from a distance in one of 2 ways, by using modem equipped laptops, or via the desktop PC located at the MoDOT Conley Road annex in Columbia, Missouri.

The remote laptop stations are 200 MHz IBM ThinkPad laptops with 56 k modem dialup connectivity, and are equipped with the EOS library software. The laptops connect through the phone line using the Cisco RAS dialup application. Cisco RAS is a MoDOT Dialup Server. It resides inside of the MoDOT Domain and allows authorized users to connect to MoDOT resources over a telephone line. Using the dialup connection results in the EOS software running very slow, and as such is not recommended for extensive production. But the remote stations are extremely useful when troubleshooting system problems from a distance, and for performing internet information scouting on library science related topics, such as (Machine Readable Cataloging Record) MARC record guidelines.

The EOS system can also be accessed from the MoDOT Conley Road Project. The office is connected to a Token Ring Network with a direct connection to MoDOT Headquarters and MoDOT District 5 in Jefferson City by way of a dedicated internet pipeline. This connection allows data to be transferred at a much quicker rate. The main drawback is that there is no officially designated area for library production activities at the Project Office, so use of the facility, while amenable, is on an ad hoc basis.

Physical Operations

The materials and layout of the RDT library physical facility in Jefferson City required reorganization in order to facilitate automated operations. Problems encountered with the physical collection and solutions chosen to solve them include: organization of materials within the limits of the physical space, technical means of item

identification, and support for technical aspects of the cataloging and circulation process.

When the project began there was a lack of shelf space in the library for new materials. There were also a number of materials that were outdated in that they did not reflect current engineering practices, and thus were of limited research use. As the project got underway a decision was made by MoDOT officials to remove all items published before 1990 and relocate those materials to an archival storage. The decision was based primarily on the limited available physical storage space within the RDT Library facility.

Also, there was a concern about space between serial titles and future expansion of the collection. Subsequently, a decision was made to reorganize relevant, requisite publications, such as the TCRP, NCHRP, and Transportation Research Record (TRR) reports in alphabetic order by series. All other materials are tagged and shelved by Library of Congress classification number. This organizational method allows for easy location of serials as well as subject grouping of texts and other resource materials to make browsing easier for users.

The MU Design Team also established a need for marking individual documents with spine labels to locate individual items within a series or classification location. For monographs and texts, the Library of Congress (LC) classification numbers are printed and affixed to the spine labels. For series items, call numbers were printed that reflected the position of the item in the series, (i.e. NCHRP syn.306). This is an extension of the sectioning methods described above. It was felt that it would be easier for researchers to locate series items sequentially within each series. This also makes re-shelving of

series items easier. Similarly, text monographs are ordered by LC classification number, providing an intuitive means for searching through long shelves of loosely related materials.

Perhaps the most important technical issue involves the facilitation between technology and the human component of the library. This includes the circulation procedures in support of end user checkouts, and training and guidance for those assisting with the cataloging of materials. Traditional library services are most often mediated by a librarian or other trained information professional. Due to the fact that there were no allocations for this service in the original project proposal, a self assisted circulation procedure was created.

Explicit guidelines for the circulation procedure were developed including step-by-step procedures for using the barcode scanner, and screen shots to guide users through the circulation module in the EOS system. This provides a means for researchers to check in and out materials without ongoing mediated assistance. Similarly, a Web-based tool was created to aid MoDOT media conversion services persons in the copy cataloging procedure, including:

- listings of online searchable OPAC to reference existing item records
- hyperlinks to MARC record field usage guidelines
- contact information for university team cataloging assistants

Note that while these measures provide an initial minimum level of operational functionality, they should not be viewed as a complete and final solution.

Library Science and Technology

There were several technical project areas relating to the cataloging and classification of items that needed to be addressed, including: the assignments of

subject headings, controlled vocabularies, MARC record field usage, and the degree of data description. Many library facilities use the Library of Congress subject headings to identify document classification. This is less than satisfactory for classifying certain types of technical documents, such as transportation reports, because of the unique and complex nature of the subject matter. Ways of tailoring this information to fit a specific subject include developing an internal classification scheme, like what was done at Northwestern University Transportation Library, or by applying topical terms from an industry specific thesaurus, like the Transportation Research Thesaurus (TRT) developed by the Transportation Review Board.

At the start of the project the team had not decided whether to use subject headings from the Library of Congress (LCSH), subject headings from some other controlled vocabulary, or both. After asking other professionals in the field, we found that subject headings could be drawn from both the LCSH and TRT controlled vocabulary to better serve our patrons when searching for materials from the RDT library. The LC subject headings work best when applied towards broad topics. Conversely, there are subjects that can be defined more effectively by using a TRT thesaurus heading customized specifically for transportation research. For example a legitimate LC subject heading for TRR 594 could be:

650 _0 aRoads |xSafety measures.

A more distinct way to describe the document uses the TRT thesaurus to designate a heading relating to photogrammetry, a major topic of the report:

650 _7 aPhotogrammetry |2trt.

In addition, the team worked towards developing the most efficient and effective schema for cataloging items into the system. The intent was to ensure that enough information was included to accurately describe the items, while maintaining as much uniformity among the records as possible. The documents are cataloged using the MARC (Machine Readable Cataloging Record) format, a world wide, standardized means of creating computer readable information for document records. Through user interviews and research of MARC record examples from more established transportation cataloging systems, the team came up with a MARC cataloging template that targets RDT library user needs as well as allowing flexibility for each individual item (Appendix B). However, when production began we found that there were many items with full MARC records available for copy from existing online catalogs. This fact helped to increase production significantly, but also created issues of maintaining consistency and usability within RDT document records.

First we noticed that records copied from alternate sources varied in level of detail within a given series. For instance a record of a TCRP report in one online catalog might contain thirteen MARC fields while the same record from another source contains only five. This is a common occurrence in library cataloging, as there is some subjective interpretation involved in the process depending on conditions such as time, document purpose, and the person performing the cataloging. In most cases, the inclusion of extra information poses little problem, because the extra information is filtered by the interface of the OPAC (Online Public Access Catalog) into a user friendly format. But when the converse is true, or the information included does not fit usability

requirements, the potential exists for the creation of ineffective records. This could translate into less than effective search results for the end user.

For instance we found that some records from alternate sources did not contain LC call numbers, a MARC field the team deemed necessary for future portability of the RDT system. In addition, different fields may describe the same feature of an item. For example you can combine the 245 and 362 MARC fields to describe the position of an item in a series:

```
245    00 |a Transportation research record.
362    0_ |a No. 1192
```

The documentation is legitimate and found on many records at other facilities but fails the end user on two points desired by the team for effective retrieval of records using the EOS system. First, the use of the 245 field to describe the title omits the option for displaying alternate titles, or in the case of Transportation Research Record 1192, Culverts and Tiebacks. In addition, the 362 field value is not viewable from a simple search on the EOS Q-Series OPAC. A search for "transportation research record" will retrieve the item, but the user must choose it from the entire list of titles and the series number is not visible in the list.   A search on "transportation research record 1192" will retrieve nothing. This makes it difficult for users to narrow and define searches.

An alternative we discovered is to use the 245 and 490 fields to define both the document title, and the series title and number.

```
245    00 |a Culverts and Tiebacks
490    1 |a Transportation research record. |v  no. 1192
```

This format allows the user to search on both variants of the title, as well as by series number. Along these lines a quick reference web page for cataloging assistants,

including procedural heuristics for copy cataloging and links to reference resources, was created (Appendix C). To further address this issue, we are in the process of creating formal guidelines for minimum cataloging requirements, including MARC field inclusion standards and alternative tagging schemes.

Finally, it was helpful to have access to and assistance with resources. This includes ongoing email and phone assistance from professional catalogers in the field, such as those from Northwestern University libraries and the Minnesota Department of Transportation. This collaboration was enabled by RDT's membership in the Midwest Transportation Library Consortium. The consultancy allowed the team to gain a broad perspective of how these types of inconsistencies are identified and addressed in the broader transportation and library information science community. We also use a number of research resources like the Online Computer Library Center (OCLC) and the Transportation Review Board (TRB) web sites, as well as text materials like the Anglo-American Cataloging Rules Second Edition (AACR2), and the Library of Congress Subject Headings (LCSH).

Results and Discussion (Evaluation)

The EOS Q-Series application provides a good initial foundation for building a library services program in the RDT division. The main applications supporting internal technical services are fairly easy to understand and use with minimal training. The same can be said of the front end html searchable online public access catalog, although it is noted that the display fields of the OPAC could be more customizable and allow for more explicit output, like administrator designated MARC fields. The system is capable of processing high traffic requests, mainly due to the strength of its Oracle database

management system (DBMS) back end structure. In addition, with certain limitations the Q-series application can be expanded to include full text documents if desired in the future. Support for the system has been timely and professional, although the updates to the software were more frequent than expected (3 times in year one). This caused short lapses in production and use time of the software, because the laptops used by the MU Design Team must be returned to the MoDOT facility to receive upgrades.

In terms of size and scope, the physical library initially contained about 8000 to 10,000 monographs and serials. In addition, MoDOT desires to include an undetermined number of internal reports in the complete collection. The materials cover a broad range of transportation engineering topics, and span around 70 years of history. Several hundred of the earliest documents, and those thought to be in to poor shape for circulation, were moved to the MoDOT storage facility, where they were archived in marked containers.

At the start of year one, RDT processes that connected users with content included self guided searches and checkouts of the unofficially organized RDT serials and monographs, as well as internet searches of user found sources. Currently the circulation of in-house materials is assisted by the EOS software system, including searchability, and tracking of cataloged documents. However, internet searches, which comprise a large number of research efforts, are not yet addressed systematically by the library project. It is difficult to determine the exact scope and degree that the internet is used for research purposes, although after consulting with many end users over the last year, the trend appears to be that a number of specific resources, such as TRIS and RIP are used extensively. Users have also suggested that there are more potential

online resources that would be used if convenient access was made available without the cost of excessive search time. Currently access is a dual system, with the end user searching the Q-series online catalog for physical holdings cataloged from the in-house collection and Internet access (using direct links to sources, or even Google-type general searches) to resources available via the Web in general.

In cooperation with MoDOT personnel, a conversion plan for the collection was developed. This included prioritizing segments of the collection for initial cataloging, and designating a coding scheme for marking items so they can be easily located and tracked. Prioritization of the collection included archiving all materials published before 1990, and the selection of report series for cataloging based on frequency of use. Archiving seldom used materials allowed the physical facility to be more efficiently organized, and provided space for expansion of future materials. This was important as at the beginning of the project many documents were in boxes or on the floor of the RDT Library, and not properly shelved for end user access. Cataloging for year one focused on those series that were identified by MoDOT researchers as being the most widely and frequently used. Report series deemed high priority in year one included the NCHRP, TCRP, and TRR report series.

The conversion plan was supported by the development of a nationally standardized bibliographic record scheme representing the selected portions of the library collection housed within RDT. The MU team scouted existing transportation library resources to determine current trends in bibliographic cataloging for transportation materials. It was found that the MARC record was most often used to represent these types of materials, and that varying subject classifications schemes

were used including: the Library of Congress Subject Headings, the Transportation Research Thesaurus (TRT), and hybrid versions developed by individual institutions, like the Northwestern University Transportation Library. The team applied these findings to create bibliographic records for documents selected from the RDT Library collection for input into Q-Series system. In turn, the team assisted the MoDOT media conversion services persons in applying these skills to production cataloging as well, through html guidelines and on-site mediation and instruction. In these cases, the MU Design Team serves as high level editors, reviewing the initial cataloging efforts created by the media conversion team within MoDOT, and making changes as needed in accord with standard bibliographic practices.

In addition to developing bibliographic conversion standards, the MU team performed initial research for providing authority control efforts relating to improved subject searching for end users. Authority control supports the end user in searching by offering alternative access points linked to controlled vocabulary terms. This effort included assessment of the authority control function in the EOS system, creating stronger search relevance through controlled vocabularies, and metadata mark up techniques for web accessible documents. Further, an investigation was performed regarding document delivery solutions for connecting end users with RDT documents located using the Q-Series applications. In addition to the EOS based circulation procedures implemented in year one, a number of additional potential delivery solutions were identified. These include use of the Q-Series Open Q module to store and deliver full text documents from within the EOS system, and the integration of the Q-Series

online catalog with a web based information portal providing a single point of access to both in-house and off-site documents and resources.

Conclusions

Research of the EOS Q-Series application yielded a number of discoveries relating to implementation and expandability. The EOS application has fairly simple controls, is easy to use, and requires little in depth training. This was helpful because persons assisting in the copy cataloging process were able to begin effective production in a relatively short period of time. Also, the system contains the Open-Q standard module. This allows non-traditional cataloging schemes to be used to address varying conditions, for instance in cases where the MARC record might be too exhaustive or inflexible. In addition, the system can store and retrieve full text documents and images using the optional Info-Q module. Finally, information in the Q-Series system can be shared with other compatible libraries and databases using version 3 of the Z39.50 protocol.

The features and usability provided by the EOS series are very suitable for the present course of project development. One minor shortcoming is the numerous updates the system requires, but that periodic inconvenience is outweighed by the benefits of using updated software that meets rapidly changing industry and technical standards.

The RDT Library collection contains between 8000 and 10,000 serials and monographs. There are also an undetermined number of internal reports. In addition, there are a small number of video, compact disc, and other multimedia items. Documents were selected for the conversion process by date of material and frequency

of use. Reports were organized by series, monographs by Library of Congress (LC) classification, and media items were grouped together in a single area.

After the reorganization of the physical collection, including the archival storage of older items, the team feels that the current size of the physical facility is large enough to hold items presently housed in the library. Further increase in holdings may require expansion of the physical facility to accommodate additional materials.

Access to the collection is presently supported by a dual system whereby the end user can search the Q-series online catalog for physical holdings cataloged from the in-house collection or use Internet access to locate resources available via the Web. Currently the team is developing a portal to consolidate this process into a single web based access point. In addition, plans are underway to develop a formal technical brief with guidelines and training procedures for cataloging assistants and users.

The team developed a plan primarily using the MARC nationally standardized bibliographic record scheme, Library of Congress Subject Headings (LCSH), and the Transportation Research Thesaurus (TRT). The TRT was also identified as a future reference for improving authority control efforts related to improved subject searching for end users.

The text based tools are used to represent selected portions of the library collection housed within RDT. The team applied these findings to create bibliographic records for documents selected from the RDT Library collection and, as high level editors, assisted the MoDOT media conversion services persons in applying these skills to production cataloging. This production system was successful, with over 2000 documents currently in the RDT Library catalog. Some drawbacks include slow dial up

connections for MU team members who catalog remotely. While there is access to the EOS system from the Conley Road facility, there is no quick remote access in case of technical emergency. For instance, if there is a question about a MARC record field from media conversion persons it can be routed fairly quickly through email. But the process of using a dialup connection to trouble shoot an EOS document or technical issue requires a longer time period than with a high speed connection. Thus it poses a bottleneck to support communications as well as system testing.

Recommendations

In reference to functionality of the EOS Q-Series, further research is needed regarding EOS authority control functions, to enable more effective searches. This includes reviewing the method of inputting authority control records, how these can be applied to existing document records within the EOS system, and training for MU and conversion team members in data entry procedures.

After reorganization, the present RDT physical facility is adequate to house the current library collection in terms of size and scope; and there is a small amount of space available for expansion. However, because further expansion of the collection is anticipated soon and is likely to continue, efforts should be made now for the eventual need for increased physical space to house expansion items.

While the current dual system for accessing materials through EOS and the internet using self guided searches is an improvement it should be considered only as a minimum solution. To maximize potential of library operations, steps should be taken in the following areas:

- access for the EOS system and internet resources should be consolidated into a single point.
- service scope and level for users should be increased by providing for dedicated staffing of the facility by a library professional
- external library development resources such as those provided through consortium memberships should be continued and used to their fullest extent where relevant

The point of access can be best served by creating an html web portal that allows users to search EOS and internet resources from a common site. This portal can be allow either intra or internet access and should reflect the qualities and standards of general MoDOT web development, including appearance, programming, security and accessibility. Operations might best be served by providing dedicated part or full time professional library staffing. This would enable more effective circulation procedures, as well as providing professional technical and resource referencing services for end users and MoDOT conversion and MU team assistants. Finally, it's recommended that MoDOT RDT and the MU team work closely with the Midwest Transportation Consortium to work towards standardization of library services for all member DOT's in order to gain maximum benefits from this and similar library automation and development projects.

Furthermore, conversion for the local collection should continue according to the current plan in cooperation with MoDOT and MU team members. It's also encouraged that MU team members work with MoDOT and OCLC personnel to advise and coordinate future outsourced cataloging efforts. In addition, internal search efforts would be greatly improved through the implementation of authority control records.

Implementation Plan

Implementation Objective

To provide expertise in support of the RDT decision to sub-license Q-Series library software applications from the Information Systems (IS) Division of the Missouri Department of Transportation. The challenge is to develop the RDT Library in an open fashion that will support expansion to other departments within MoDOT.

Affected Business Units and Principal Contact

Research, Design and Technology Transfer
Michael W. Shea
MoDOT/RDT
573-751-0852

Implementation Period

March 2002 –March 2003

Funding

Year one funding for the project came from MoDOT's State Planning and Research (SP&R) program and was then contracted over to the University through a Task Order Contract under the Basic Agreement that UM-C has with MoDOT. Our fiscal code number is: MoCODE # CS636.

Technology Transfer

First year work resulted in a number of technology transfer instances and advances. The library display was enhanced to reflect modern standards including the implementation of a computer driven circulation system, and item and shelf encoding, to facilitate library research. Training demonstrations were given for the operation of EOS systems circulation module using barcode and scanner. Guidelines for copy cataloging were developed and implemented, and training on the guidelines was delivered to MU Team members and MoDOT media conversion participants. Demonstrations of

metadata development and implementation techniques, including the development of

MARC records and controlled vocabulary use was held in August 2002. In addition, MU

Team members and integral MoDOT personnel attended a virtual training session

regarding digital library development held by the MWTL consortium and the Wisconsin

Department of Transportation. The results of these initial efforts culminated in the entry

of functional MARC records into the EOS automated library database, the items in turn

are retrievable through an intranet based online public access catalog (OPAC), and the

implementation of circulation (check out and return) procedures for internal library

documents.

Finally, planning was developed to sustain the efforts of year one research and

production including:

- Designing and providing staff development and training as requested

- Developing an implementing online portal content within the prescriptions of
  Missouri Department of Transportation web publishing standards

- Continuing the conversion of records to national bibliographic standards to create
  a current, complete, and comprehensive database of bibliographic holdings.

- Continuing assistance in the implementation of operational services and
  procedures

Procedure

Primary team member duties

All MU Team members participated in most activities and areas. As the project progresses, individual members are assigned to address specific areas as needed. Towards this end in year one, Sara Pensgard was primarily responsible for implementations in the physical facility including collection assessment and organization, and the physical and technical aspects of circulation and library operations. She also coordinated the cataloging efforts of the MoDOT media conversion assistants Primary cataloging production was facilitated by Lori Bain, assisted by Clara Yaio and members of the MoDOT media conversion staff. Most original cataloging was performed by Lori Bain. Document record structure, including MARC record format and controlled vocabulary usage was developed primarily by Sean Cordes and Lori Bain. Technical issues, such as usability testing for cataloged records, the design of online portal recommendations and prototypes, and technical research, training, and presentation documents were designed by Sean Cordes. Team coordination including workflow and task management, agenda coordination, and progress reporting was performed by Sean Cordes.

It should be noted that while the procedures are outlined by quarter, many issues are ongoing and overlap.

March – May 2002
Previewed existing EOS Q-Series application within the IS Division. It was determined that the backend structure was adequate for the project. However a caution was raised

about retrieval issues due to the IS and RDT collections being housed within a single database and accessed from a shared interface.

MU Team reviewed current RDT processes that connect users with content and assess the RDT library collection in terms of size and scope. A number of meetings and individual interviews were held in the initial stages to obtain feedback from MoDOT end users about their digital research needs, and to determine both the quantity and usefulness of current library holdings.

Developed a conversion plan for the local collection and prioritized segments of the collection for conversion in cooperation with MoDOT personnel. This included the assessment of material for usefulness. Materials felt to be outdated or infrequent use were archived.

June – August 2002
Identified standardized bibliographic structures for database conversion of records using current research knowledge and standardized practices. Research was conducted regarding record types and controlled vocabulary usage for transportation engineering documents. In addition, library conversion tools necessary for the development of digital records were identified.

The general order of conversion was prioritized by report series, and then single text items. Inquiries were made into the conversion of MoDOT RDT internal reports. It was decided that cataloged holdings could be more quickly increased through the assistance of the OCLC cataloging service through our membership in the Midwest Transportation Library Consortium. However this assistance is limited based on membership entitlements.

September – November 2002
Provided staff development and training on the procedures and use of the EOS circulation and cataloging modules, including the development of bibliographic skills of part time media conversion specialists.

MU team members and RDT conversion team members created bibliographic records selected from the RDT Library collection for input into Q-Series system. This was primarily copy cataloging based upon records held in current transportation library holdings, such as the Northwestern University (NuCAT) and MnDOT online transportation library catalogs. In addition MU Team members performed original cataloging for items with no record available.

December 2002- February 2003
The MU Team considered authority control efforts relating to improved subject searching for end users. After reviewing industry standards it was found that the Library of Congress Subject Headings (LCSH) and the Transportation Research Thesaurus

(TRT) would best serve as the base guidelines for the development of authority control record structures.

Also, MU Team members conducted an investigation to determine current practices and methods for the digital distribution of transportation research reference materials and reports, and how these methods might be applied to best assist MoDOT researchers in their efforts. It was found that ready access to materials from the desktop was desired by most state DOT managers, including access to full text databases and documents where available. We found that a consolidation of these resources, including links to established external sources, into a web based portal format was the current standard for many state and other transportation agencies. It was determined that this is the most effective method of integrating these types of resources into a usable research tool for MoDOT researchers.

Budget

The following is an outline of budgets and expenditure items from year one.

Line item	Budget	Expended*
Faculty Salary and Benefits	$19,794	$19,076
Graduate Student Researchers	16,650	23,858
Student Tuition/Fees	8,904	5,694
Travel	2,500	784
Supplies	3,000	560
	_____	_____
Sub total	$50,038	$49,972
Indirect rate at 24.5%	10,276	10,848
	_____	_____
Total	$60,314	$60,820

*Includes the charges submitted through 3-30-03. Adjustments to split the Tuition and Salary items between first and second year contracts to match the correct start and end dates will result in some minor changes that will be accurately reflected in the final version of this table.

Bibliography

EOS International's Q Series products can be viewed at: http://www.eosintl.com/

A profile and overview of EOS products conducted by members of the research team can also be viewed at:
http://www.coe.missouri.edu/~is334/projects/Project_LIS/vendors/eos.html

Kell, Lee Ann. <u>Library System Functional Requirements</u>, (MoDOT, 1999).

Work Plan

Date: February 1, 2002

Investigation Number:

Title: Library Systems Development at the Research, Development and Technology (RDT) Division of the Missouri Department of Transportation

Research Agency: University of Missouri-Columbia

Principal Investigators: Charles J. Nemmers, P.E., Director, Transportation Infrastructure Center, Department of Civil and Environmental Engineering, College of Engineering and Dr. Thomas R. Kochtanek, Associate Professor in the School of Information Science and Learning Technologies, College of Education.

Objective: To provide expertise in support of the RDT decision to sub-license Q-Series library software applications from the Information Systems (IS) Division of the Missouri Department of Transportation. The challenge is to develop the RDT Library in an open fashion that will support expansion to other departments within MoDOT.

Specific tasks include:

- Preview existing EOS Q-Series application within the IS Division

- Review current RDT processes that connect users with content and assess the RDT library collection in terms of size and scope. Develop a ***conversion plan*** for the local collection, and in cooperation with MoDOT personnel, prioritize segments of the collection for conversion.

- Support for design and development of databases of bibliographic records representing the selected portions of the "library collection" housed within RDT:

  - Identify standardized bibliographic structures for database conversion of records
  - Work to develop bibliographic skills of part time media conversion specialists
  - Work with RDT conversion team to create bibliographic records selected from the RDT Library collection for input into Q-Series system.
  - Consider authority control efforts relating to improved subject searching for end users

- Investigate and recommend document delivery solutions for connecting end users with RDT documents located using the Q-Series applications.

- Provide staff development and training as requested

- Provide quarterly reports of findings and progress

- Provide end of year plan to sustain the conversion efforts of Year One

- Continued conversion of records to national bibliographic standards will need to be enabled to sustain the efforts to create a complete database of bibliographic holdings.

Background and Significance of Work:

This year one action research project will focus on identifying the subsets of the collection that are candidates for bibliographic conversion as input into the Q-Series library applications from EOS International, supported by the Information Systems Division within MoDOT. This effort will facilitate the readiness of the RDT Library to perform services based on those objects that are entered into the new system. The advisory team will also investigate document delivery options for the objects stored in the RDT library system.

Action Plan:

The research team will first investigate the existing implementation of the EOS integrated library systems applications within the Information Systems Division. The processing needs and service applications of the RDT Library, as established in the previous study document entitled "Research, Development and Technology Library System Functional Requirements", will be articulated in light of new developments and choices in software vendors (EOS, Int'l).Procedures for creating and entering bibliographic records organized using national standards will be created.

The MU Research Team will need to have dial-in access to the Q-Series

Cataloging Module in order to input bibliographic records from Columbia. Training of the

MoDOT media conversion group will be conducted, facilitating identification of

bibliographic records using the OCLC World Cat database.

Records will be created that are capable of being shared across multiple platforms, both

within MoDOT and in accordance with emerging national DOT standards.

Literature Search:

EOS International's Q Series products can be viewed at: http://www.eosintl.com/

A profile and overview of EOS products conducted by members of the research team
can also be viewed at:
http://www.coe.missouri.edu/~is334/projects/Project_LIS/vendors/eos.html

"Research, Development and Technology Library System Functional Requirements",
prepared by Lee Ann Kell, Client Relations Liaison, dated March 8, 2000.

Method of Implementation:

The MU Research Team, in conjunction with appropriate MoDOT representatives, will
determine tasks to be performed in accord with the stated objectives.

Anticipated Benefits:

MoDOT's RDT library will be part of an integrated system compatible with national
libraries and MoDOT information systems so as to provide easy and ready access to
RDT documents statewide.

MoDOT's Information Systems resources will more fully utilized by providing the
linkages between complementary systems and users.

The foundations of a Web-based library system will be put into place so to better
support the RDT staff in connecting end users with requested resources.

MoDOT, RDT, and MU will be in a position that the University can provide long-term
support, maintenance and upgrades for information system products.

Graduates of MU's program will be excellent candidates for organizing information selected from the RDT collection, to be converted to the Q-Series databases. They can also serve as Information Scouts in identifying relevant materials that might be available through external sources, including licensed databases and quality Web-based resources.

State development and training will add to the knowledge base of the in house RDT professionals with regard to accessing digital information resources and best use of the Q-Series applications.

Staffing – the MU Research Team:

Project Co-Investigators:
Charles J. Nemmers, P.E., Director, Transportation Infrastructure Center, Department of Civil and Environmental Engineering, College of Engineering, University of Missouri-Columbia.

Dr. Tom Kochtanek, Associate Professor, School of Information Science and Learning Technologies, College of Education, University of Missouri-Columbia.

Student support positions (to assist and carry out the plan as described):

(2) Graduate Research Assistants, SISLT, 25% for twelve months

Research Assistant, College of Engineering, 25% for twelve months

Q380 SISLT Practicum students (approx. 320 hours at no cost)

Equipment:

The server housing the EOSi Q-Series applications will be the sole source for

storing bibliographic records. Members of the research team will work with existing

MoDOT technologies to develop conversion procedures and conduct training exercises.

The MU Research Team will require remote dial-in access from Columbia to the Q-

Series server, for purpose of searching and inputting cataloging records linked to

primary source documents.

Budget :

Charles J. Nemmers, P.E., Director, Transportation Infrastructure Center, Department of Civil and Environmental Engineering, College of Engineering. One half month's salary distributed over the length of the project, $4,000 plus 25% benefits ($5,000 total).

Tasks: Coordinate efforts between MU and MoDOT, including:

- Assist research staff/students in dealing with transportation oriented publications, Coordinate MU researchers with national transportation publication providers (NCHRP, TRB, TRIS System, AASHTO, FHWA, USDOT and others),
- Provide transportation perspective in overseeing the overall report quality,
- Participate in development of training packages.

Dr. Tom Kochtanek, School of Information Science and Learning Technologies, College of Education. One month 2002 Summer salary approximately $7,536 plus 25% benefits ($9,420 total).

Tasks: Oversee RT&D transition to an integrated library system (consultant to selection and implementation of said system), including:

- Assist in content conversion
- Staff development (conduct MoDOT training and workshops in information access)
- Identify transportation-related resources available on the Web (Info Scouts)
- Explore Web-based document delivery systems (in support of document delivery to end users)
- Design a set of web pages that can serve to promote RDT Library services to end users

Student support positions (to assist and carry out the above identified tasks):

(2) Graduate Research Assistants, SISLT, 25% for twelve months each at $5,725 for hourly plus $3,960 tuition (total of about $20,920) plus 8% fringe benefits

(1) Research Assistant, College of Engineering, 25% for 12 months plus $3960 tuition, plus 8% fringe benefits (total of about $9,576)

(2) Q380 SISLT Practicum students (approx. 320 hours at no cost; a total value of $4,000 to $5,000)

Travel costs: round trips to Jefferson City and Districts as appropriate, approximately $2,500

Office overhead (correspondence, copying, staff support, communications), approximately. $1,000

GRA office space/ technology infrastructure/supplies/printing approximately $750.

Sub Total: $48,832

MU Admn.&Facilities @23.5% $11,405

Total $59,577

Recap of Deliverables:

The MU Research Team throughout the first year will provide expertise and personnel in support of the RDT decision to sub-license the Q-Series library software applications. It is expected that the main focus of year one will be to develop and execute a plan for conversion of RDT Library holdings to machine readable format. Subsequent efforts will be directed towards providing end user services based on that database of converted documents.

As the Work Plan takes shape over the course of the first year, Co-Investigators will document the investigation phase, the development phase, the laboratory phase, along with a Report of Findings. These findings can be shared with other DOT agencies as they seek to solutions to their particular processing and service needs.

Appendix B

A MARC record template designed to reflect minimum comprehensiveness and flexibility for original cataloging of records into the EOS Q-Series system. The template defines field numbers for use in the MARC, and contains links to complete OCLC descriptions for each field, and supplementary information required to complete fields.

MARC Production Template

008 Control Field (MARC 21) ---

020 International Standard Book Number---0309067049

027 Standard Technical Report Number ---MODOT/RDT/2001
ANSI/NISO Z39 23-1983 Document

040 Cataloging Source---

043 Geo Area Code---n-us
Geo Area Code List

049 Local Holdings---

090 Locally Assigned LC-type Call Number---
LC Classification Schedule
LC Cutter Table

100 Main Entry--Personal Name---

111 Main Entry—Corporate Name—Korve engineering, Inc., University of North Carolina, Highway Safety Resource Center

245 Title Statement---Light Rail Service: Pedestrian and Vehicular Safety

260 Publication Distribution Etc. (Imprint)---

300 Physical Description---vii 141 b ill.

490 Series Statement--- 1 TCRP Report 69 v2002

500 General Note---

504 Bibliography, Etc. Note---

513 Type of Report / Period Covered--- TCRP Report v 2001

536 Funding Information Note---

599 Differentiable Local Note---

650 Subject Added Entry--Topical Term---TRT thesarus

700 Personal Name

710 Corporate Name

830 Series added Entry -- Uniform Title

Appendix C

An HMTL document designed to aid cataloging assistants with internet searches for existing MARC records using currently available transportation library databases. The document also includes links to relevant field titles and their usage, and contact information for MU Development team members for general questions about the procedure. The document can be viewed in full detail online at http://tiger.coe.missouri.edu/~modot/CopyCat.htm.