

A Central Digital Archiving Facility for Florida Libraries: Final Report

Award Number: IMLS GRANT LG 0302-0100-02

Awardee Institution Name: University of Florida, Florida Center for Library Automation
Final Report

Period Covered by the Report: From 10/01/2002 to 09/30/2005

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The purpose of the project

The original goals of the project as described in the proposal for funding were:

- 1) to establish a working digital preservation repository for the use of the libraries of the public universities of Florida (the FCLA Digital Archive, or FDA),
- 2) to identify costs involved in archiving library materials with sufficient granularity to support reasonable cost-recovery pricing, and
- 3) to disseminate tools, procedures and results for the widest national impact.

Over time, the goals of the project changed for two reasons. First, it became clear that the repository would not be operational in time to accumulate good cost data. Second, we came to realize that a more sophisticated repository software application was needed than originally envisioned. The revised goals became:

- 1) to establish a working digital preservation archive for the use of the libraries of the public universities of Florida (the FCLA Digital Archive, or FDA),
- 2) to develop generally usable, Open Source software, that would provide digital preservation repository functionality useful in a variety of institutional contexts (DAITSS);
- 3) to disseminate the repository application, procedures, lessons learned and results for the widest national impact.

Activities and services

History

The funding period began in October, 2002. According to the original timetable, the preservation repository system would be ready for use after about nine months of development. The archiving of digital files would begin in production in July of 2003, and the cost of archiving in categories such as computer processing, file storage, and human involvement would be carefully recorded from that time forward.

This quick path to production seemed reasonable initially because specifications for software development were mostly complete at the time the project began and some preliminary coding was already in process.

The architectural model was a very simple system modeled on OAIS, the Open Archival Information Systems framework. Depositors ("Producers" in OAIS terminology) would

submit materials to be archived to the repository in the form of Submission Information Packages (SIP). Each SIP would represent an intellectual entity such as a book, journal article or dissertation. It would contain one or more content data files to be archived and an XML file in METS format describing them (the "SIP descriptor"). The archive system would extract the metadata describing each content data file from the SIP descriptor and from the file itself and store this in the repository management database, a relational database. If an incoming file was not considered to be in a good preservation format, a second version called a "normalized" version would be created in another format, and metadata for that file would be recorded in the management database also. Both the original and the normalized versions would be written to storage as an Archival Information Package (AIP).

Preservation functionality would be implemented for a given file by migrating it to a successor format when the current file format appeared to be in danger of becoming obsolete. Original files, normalized files, and previously migrated files were candidates for forward migration. As originally planned, migration would be done by using the repository management database to identify all files of a particular format, and running a conversion program on these files. The source file would be discarded as no longer needed, having been effectively replaced by the successor version.

The bulk of the processing by the repository software application was therefore format-specific. For each file format accepted by the repository, the ingest application needed to know how to parse the file, what metadata to extract and store, and whether the creation of a normalized version was necessary. The data management application needed to know when and how to migrate the file to a successor format. The bulk of the funding requested from IMLS was for the salary of a formats specialist who would do detailed analysis of each digital file format, decide whether normalization and/or forward migration was needed, and document this in an Action Plan. The repository would accept only materials in formats for which an Action Plan had been written and programmed. The repository would begin archiving files in production as soon as the work for the first format was completed, and support for more and more formats would be added over the remaining term of the project.

As work proceeded according to the original design, it became increasingly clear that the functionality required by the digital preservation repository application was more complicated than our simple model suggested. The first interim report to the IMLS, for the period ending March 2003, predicted that production would begin a month late, and commented, "the project team has found that many issues are more complicated than first appeared, and a great deal of time must be spent on high level design and repeated modeling of events." By the third interim report in March 2004, the original repository architecture, object model, and management database structure were all completely redesigned. The original coding had been set aside, and the newly designed application, now called "DAITSS" (Dark Archive in the Sunshine State), was being coded from scratch. By the final interim report in March 2005, DAITSS development was the entire focus of the project, and proceeding fairly rapidly.

There were many reasons for starting over, but they all arose from a growing awareness that a repository application designed for long-term digital preservation can not be a simple repository system with format-awareness built in. A repository application must be engineered to ensure the integrity, authenticity, viability, renderability and understandability of the digital materials entrusted to it. Until recently, most applications promoted as preservation repository systems were initially designed and implemented to aid in identifying, collecting, describing and storing digital materials, but not actually preserving them, with the expectation that functions supporting digital preservation strategies such as migration or emulation could be added later.

The DAITSS application for the FCLA Digital Archive is one of the first preservation repository systems designed from the start for the sole purpose of supporting long-term digital preservation. As such, we encountered a number of new problems with no models for how to solve them. Also, we came to realize that the significant contribution of this project would not be cost analysis for digital archiving but DAITSS itself. Although we had always intended to make our format migration routines available as Open Source software, we now realized that the entire DAITSS application should be released as a generalized, free, Open Source repository application.

DAITSS differs from the original design in several significant ways. A major change was made in order to conform strictly to the OAIS model, which requires that once an AIP is written to archival storage, it can not be altered. As a consequence, all changes to stored files take place on ingest. Not only are normalized versions created when necessary, but migrated versions are created on ingest as well. If a file already stored in the archive later requires forward format migration, the entire AIP containing the file must be disseminated via the Dissemination function, transformed into a SIP, and re-ingested.

Other changes were made to conform with emerging best practices in the digital preservation community. For example, original versions of files as submitted in the SIP are retained unaltered in perpetuity. This is becoming accepted as a best practice, because originals can be valuable for digital archaeology, as source files for migrations, and for verifying authenticity. As another example, all metadata pertaining to the AIP is stored both in the management database and as an XML document in the AIP. This best practice ensures that objects are self-describing and can be interpreted even when the repository no longer exists.

Some changes reflect increasing understanding of the requirements of long-term preservation. Events affecting objects are meticulously recorded to document digital provenance. SIPs are enhanced during the ingest process when possible to include all files needed to render the intellectual object. For example, DAITSS will attempt to download stylesheets, DTDs and/or XML schema referenced by XML documents. Files that are referenced frequently, such as the METS schema, are treated as "global files," which means they are stored only once, and associated with the AIPs which require them. If an ingested file contains links to other files a "localized" version is created, which replaces the link with an internal reference. Many types of relationships are tracked,

allowing the repository to reconstitute complex objects from their component parts, even when various components may exist in multiple normalized, localized and/or migrated versions.

Status at the end of the project period

The revised goals of the project involve two distinct entities: the FCLA Digital Archive (goal 1) and DAITSS (goal 2). The FCLA Digital Archive is a service of the Florida Center for Library Automation for the use of the libraries of the public universities of Florida and their partners. DAITSS is software developed as a long-term digital preservation repository application. The FCLA Digital Archive uses DAITSS to provide preservation repository functionality.

FCLA Digital Archive (goal 1)

A trusted digital repository is defined as "one whose mission is to provide reliable, long-term access to managed digital resources to its designated community, now and in the future."¹ The FCLA Digital Archive was established as a trusted digital repository and ultimately aims to meet the requirements for certification being developed by the RLG-NARA Task Force on Digital Repository Certification and its successors.²

Key functions of the FCLA Digital Archive and their status at the end of the project period are given below:

Function	Status
Maintain formal, signed Agreements with depositors ("Producers" in OAIS) detailing rights and responsibilities on each side, contacts persons and authorized individuals, and preservation treatment expected for archived materials.	Fully executed Agreements from 4 libraries; Agreements in process with 5 libraries; 2 libraries uncommitted.
Develop FDA policies and procedures.	The FCLA Board serves as the policy board for the FDA; policy discussions are ongoing. Procedures for submission and ingest have been established.
Document FDA policies and procedures.	Documentation available on website.
Instruct depositors how to contribute	Documentation available on website.

¹ Trusted Digital Repositories: Attributes and Responsibilities: An RLG-OCLC Report. Mountain View, CA: RLG, May 2002. Available at <http://www.rlg.org/legacy/longterm/repositories.pdf>.

² See An Audit Checklist for the Certification of Trusted Digital Repositories: Draft for Public Comment, available at <http://www.rlg.org/en/pdfs/rlgnara-repositorieschecklist.pdf>. For most of the project period, this report was under development by the RLG-NARA Task Force on Digital Repository Certification.

materials and how to interpret and use reports.	
Accept materials from depositors for archiving, and ingest materials into the repository.	In process for retrospective submissions (materials already stored at FCLA); not begun for prospective submissions (materials sent to be archived on an ongoing basis).
Maintain integrity, authenticity, and viability of archived materials.	Ongoing; these qualities are maintained through a combination of FDA procedures, system security features and repository software (DAITSS) functions.
Maintain renderability of archived materials through the application of selected preservation strategies.	Ongoing; normalization and forward migration are accomplished through a combination of FDA procedures and repository software (DAITSS) functions.
Provide access to archived materials to authorized requestors.	Not yet supported by repository software. Any requests for dissemination would have to be handled manually by staff.
Provide both standard and ad hoc reports to depositors.	Standard ingest and error reports are sent automatically as part of Ingest process. Any requests for other reports would have to be handled manually by staff.
Meet organizational, procedural, and technical criteria for certification as a trusted digital repository.	Criteria and certification mechanisms are still under development in the community. The FDA is working towards meeting criteria outlined in the RLG/NARA draft report.

DAITSS Software (goal 2)

DAITSS is a software application for implementing a long-term digital preservation repository. DAITSS architecture mirrors the OAIS functional model for an open archival information system. As in OAIS, DAITSS services are Ingest, Data Management (Reporting), Archival Storage (Storage management), Administration, and Access. At the end of the project period the DAITSS application was not complete, lacking parts of Administration and all Access services (dissemination and withdrawal). Plans are to release the entire application as Open Source software when these modules are completed some time in calendar 2006.

DAITSS is characterized by these features:

- 1) It is designed to support preservation repository functions, and only preservation repository functions. Preservation repository functions are those intended to ensure the ongoing integrity, authenticity, viability and renderability of digital materials within the

repository. It does not support the acquisition or description of digital objects, but could be used as a "back end" to a system that does.

2) It is a "dark archive," in the sense that there is no real-time, online, end-user access to the contents of the repository. Materials that have been archived can be requested for dissemination only by an authorized representative of the institution that submitted them.

3) It implements the preservation strategies of normalization and forward migration. Both of these are performed on ingest. Relationships, events and technical characteristics related to these activities are tracked in detail and all of the recordkeeping is stored both in the management database and in the AIP.

4) It was designed to be freely distributed and implemented at other institutions. DAITSS is written in Java, runs under Unix (Linux), and uses a MySQL database. It includes a generic storage interface that can be adapted to run with any storage system. All third-party software used by the system is compatible with a GPL Open Source license except for the virus-checker (which can be replaced if desired).

5) It conforms closely to the OAIS framework. It fully supports the OAIS functional model, and deviates from the OAIS information model in minor respects only. Other key standards implemented in DAITSS are METS (used as the SIP and AIP descriptors) and PREMIS. PREMIS-conformant metadata cannot yet be imported or exported, but is created by the ingest process and maintained within the system

Components of the OAIS functional model, and how they are supported in DAITSS, are given below.

OAIS	DAITSS
Ingest functions -- receive SIPs -- perform quality assurance on SIPs -- generate AIPs -- extract descriptive information from the AIP for inclusion in the archive's database -- coordinate updates to Archival Storage and Data Management	Ingest functions -- receive SIPs -- perform quality assurance on SIPs -- create localized, normalized, and migrated versions of files when appropriate -- generate AIPs -- generate PREMIS-conformant preservation metadata for inclusion in the AIP and in the archive's database -- coordinate updates to Archival Storage
Archival Storage functions -- receive AIPs from Ingest and add them to permanent storage -- perform error checking -- manage the storage hierarchy --refresh the media on which holdings are stored	Archival Storage functions -- receive AIPs from Ingest and add them to permanent storage -- perform error checking, in the form of ongoing fixity checking and ongoing checking for consistency between the management database and storage

<ul style="list-style-type: none"> -- provide disaster recovery facilities -- provide AIPs to Access to fulfill orders 	<p>[note that storage hierarchy management and media refreshing are handled by the enterprise system storage management software rather than by the DAITSS application]</p>
<p>Data Management functions</p> <ul style="list-style-type: none"> -- perform database updates -- perform queries on the archive database to generate result sets -- produce reports from result sets -- maintain schema & view definitions, and referential integrity 	<p>Data Management functions</p> <ul style="list-style-type: none"> -- perform database updates -- perform queries on the archive database to generate result sets -- produce reports from result sets <p>[note that the maintenance of schema and view definitions and referential integrity is done by archive staff interacting directly with the relational database system, not by the DAITSS application]</p>
<p>Administration functions</p> <ul style="list-style-type: none"> -- soliciting and negotiating submission agreements -- auditing submissions to ensure they meet standards -- developing standards and policies -- providing customer support -- many other similar functions are detailed 	<p>Administration functions</p> <ul style="list-style-type: none"> -- allow information from submission agreements to be entered into tables in the system
<p>Access functions</p> <ul style="list-style-type: none"> -- receive requests from Consumers -- apply access controls -- coordinate execution of requests -- generate responses (DIPs, result sets, reports) -- deliver responses to Consumers 	<p>Dissemination functions not yet available; planned for 2006</p>

In addition to the above, DAITSS will support a Withdrawal function, which is not defined in the OAIS reference model. Withdrawal will allow the repository to delete an AIP from the system, retaining only a record of the events pertaining to the AIP as a whole. This is expected to be necessary to correct errors (as when a set of SIPs were ingested with the wrong project code), to remove versions superseded by format migrations, and to respond to requests by contributors. Withdrawal is planned for 2006.

Dissemination (goal 3)

Dissemination applies to two target groups. First, information about the FCLA Digital Archive must be disseminated to the user community. Second, information about DAITSS and FCLA's digital preservation initiative must be disseminated to the community of librarians, archivists and curators interested in digital preservation.

Primary users of the FDA are administrators of the main libraries of the eleven public universities in Florida. Several campuses have law, medical or other libraries under separate governance from the main library system. While these may ultimately be invited to contribute to the archive, to date our target has been the main library, and FCLA-Library Agreements have been established with that library director.

Directors of the eleven university libraries meet twice every quarter, once as the Council of State University Libraries, and once as the FCLA Board. Directors were given an update on the FDA at their quarterly meeting in September 2004 and again at the FCLA Board meeting in March 2005. At the March meeting the P.I. explained the shared responsibility for preservation between the libraries and FCLA, outlined steps required to complete an Agreement and begin archiving, and gave examples illustrating use of the FDA. Following this, all library directors were contacted individually about completing their Agreements. Most directors designated a contact person who continued to work with FCLA staff on finalizing the Agreement. At the end of the grant project period, four libraries had completed their Agreements and five others were in process.

A presentation about the FDA was also given at the 2005 Joint Meeting of the Committees of the Council of State University Libraries. The audience included about 60 staff representatives from the eleven state university libraries.

The FCLA Digital Archive website has quite a bit of documentation for FDA users, including (but not limited to) a sample Agreement, a Policy Guide, instructions for submitting materials, and instructions for interpreting Ingest and Error reports.

The Outcomes Plan includes metrics to measure how successful communication with the user community has been.

The P.I. has been making the preservation and cultural heritage communities aware of DAITSS and the FCLA Digital Archive through writings and presentations. An article in *VINE: The Journal of Information and Knowledge Management Systems*, "Building a digital preservation archive: Tales from the front," detailed how initial assumptions about the preservation repository changed as the archive team learned more about the reality of digital preservation. Presentations on the project were given at CNI (Portland), the Cornell Digital Preservation Workshop, NARA's Partnerships in Innovation Symposium, the OCLC Distinguished Seminar Series, ALA (Chicago), the IS&T Archiving Conference, and the U.K.'s Digital Curation Centre Workshop on Long-term Curation within Digital Repositories. These papers and presentations are available from the FDA website and are listed in Attachment A.

The P.I. and members of the FCLA archive team were also in contact with other digital preservation initiatives. A Memorandum Of Understanding was signed with OCLC, Inc., for OCLC staff to perform a functional and technical evaluation of the DAITSS application; results are expected 1Q 2006. Key developers from the DSpace at Cambridge initiative met with the archive team in 2004 to explore compatibilities between DSpace and DAITSS. The FCLA archive team also met with developers

working on Ex Libris' DigiTool product, another preservation repository, to compare notes on the handling of preservation metadata and other issues.

Another productive interaction occurred because the P.I. served as co-chair of the PREMIS (Preservation Metadata: Implementation Strategies) Working Group. This helped to ensure that the metadata recorded by DAITSS remained as conformant as possible with the PREMIS Data Dictionary as it developed. It also meant that experience with the FDA and lessons learned in DAITSS development were communicated to the Working Group and had some influence on the drafting of the Data Dictionary.

Action plans and background reports on digital file formats drafted by the formats specialist are made available on the FDA website as soon as they are reviewed by the archive team. These have been widely cited and demonstrably helpful to others working on digital preservation. According to web logs, the action plans and background reports were downloaded 4000 times (excluding accesses by robots). In 2005, they have been downloaded 9143 times so far. These action plans, the DAITSS system, and/or the FDA have been mentioned in a number of publications, listed in Attachment B.

Outputs of the project

The table below shows the anticipated outputs according to the Outcomes Logical Model developed for the project, and their measures at the end of the project period.

Outputs	Results
# participants A participant is taken to be a library with a completed FCLA-Library Agreement for use of the FCLA Digital Archive	4 At the end of the project period, 4 Agreements were completed and 5 in process. 2 libraries had not responded. This is documented by the file of paper Agreements.
# documents in archive A document is taken to be a package representing an Intellectual Entity. For example, a SIP containing 500 files representing a 500 page book would be taken to be a document. After Ingest processing,	68 The FDA only went into production at the end of September, 2005, a week before the end of the grant project period. This is documented by the DAITSS management reporting system, and also by copies of the Ingest reports.
# documents ingested annually	unknown Because of the short period of experience with production Ingest, it is not possible to estimate the number of documents that can or will be ingested annually.
# documents disseminated annually	unknown The dissemination function is not expected to become available until 2Q 2006.

# files migrated to canonical form "Canonical form" is now called "normalized form," a more accurate term.	0 The first 68 packages were all page-image books consisting of XML documents and master TIFF images. Both XML and TIFF are considered good archival formats and are not normalized by DAITSS. However, normalization routines have been programmed and tested for PDF and AVI
# files migrated to successor format	0 None of the 68 packages contained files in formats requiring forward migration. This is documented by the DAITSS reporting system and by copies of the Ingest reports.
# files copied off-site This output should preferably be the number of <i>documents</i> copied off-site, since the AIP representing a given document can contain an arbitrary number of files. In any case, the way the FDA works, the Ingest process is not complete until two onsite and one offsite copies of (all files in) the document have been made. Therefore this is not a very meaningful metric.	68 documents copied off-site This is documented by the DAITSS reporting system and by copies of the Ingest reports.
# reports to the profession	11 The FDA website links to one article and 10 presentations made by archive staff to professional audiences within the cultural heritage community. (See Attachment A)
# reports mentioning DAITSS or FDA This was not a metric given in the original outcomes plan, but it occurs to us to be a good measure of the success of outreach activities.	n (See Attachment B)

Outcomes of the project

The Outcomes Logical Model determined the target population to be the directors and high level management of the eleven university libraries. Intermediate and long-term outcomes were listed. Since the FCLA Digital Archive only went into production during the last month of the project period, and since the DAITSS software is still incomplete, long-term outcomes cannot be measured at this time. An evaluation of the two intermediate outcomes follows.

1. *Library management is aware of the service.*

1.a. The # and % of libraries that have entered into achieving agreements with the FDA.

Nine of eleven libraries have archiving agreements completed or in process (81%). This is below our original target of 90%. However, one of the libraries may not have materials to archive at this time. One library has not decided whether to participate or not.

1.b. The # and % of library directors and assistant directors who can describe the service. This was measured in an email survey sent to directors in December 2005. Eight of the eleven directors replied; the other three were unfortunately already on vacation for the holidays. All of the directors who replied were aware of the FDA and were able to describe in a few sentences the essential features of the archive. A similar survey of assistant and associate directors will be conducted in January 2006.

2. Libraries use the service.

2.a. The # and % of libraries who have contributed 10 or more documents for archiving by the end of grant year 2.

The idea of "contribution" requires clarification. Libraries were encouraged to send materials to FCLA for archiving even before the FDA went into production, in the expectation that these materials would be stored safely until they could be formally ingested. All of the nine libraries with Agreements completed or in process have more than 10 documents stored at FCLA awaiting ingest. However, the 68 documents ingested before the end of the grant period were all submitted by a single library. The FDA is working with one library at a time to ingest their retrospective submissions and set them up for ongoing prospective submission. At the end of the grant period, materials from one library had been ingested.

Update to mid-December 2005

At the time of this writing (mid-December 2005), 6 FCLA/Library Agreements have been completed and 3 are in process. The FDA has ingested 2,105 SIPS including 28,215 files from 3 libraries, for a total of 170.9 GB.

FCLA is extremely grateful to the IMLS for funding this project. We believe the long-term preservation of university-produced content is critical for research and scholarship, and that appropriately scaled solutions like the FCLA Digital Archive are feasible, viable, and sustainable. The format analyses made public in FDA Background Reports and Action Plans have been demonstrably useful to a number of preservation initiatives internationally, and we believe that the DAITSS application will be a major contribution to the field. The award from IMLS not only made it possible to implement the FDA in a reasonable period of time, but it gave the project immediate legitimacy within the cultural heritage community.

Certification

In submitting this report, I certify that all of the information is true and correct to the best of my knowledge.

Priscilla Caplan
Assistant Director for Digital Library Services,
Florida Center for Library Automation

ATTACHMENT A

Presentations and Publications

On FCLA Digital Archive

Caplan, Priscilla. Building a Dark Archive in the Sunshine State: A Case Study. Preprint of paper published in the Final Program and Proceedings of the IS&T Archiving 2005 conference, April 2005." http://www.fcla.edu/digitalArchive/pdfs/IS_Tpaper.pdf

Caplan, Priscilla. "Building a digital preservation archive: Tales from the front." First published in VINE: The Journal of Information and Knowledge Management Systems Volume 34 Number 1, 2004, pp 38-42." <http://www.fcla.edu/digitalArchive/pdfs/buildingDigitalPresentArchive.pdf>

Caplan, Priscilla. DAITSS: Dark Archive in the Sunshine State. Presentation to the DCC Workshop on Long-term Curation within Digital Repositories, Cambridge England, July 2005. <http://www.fcla.edu/digitalArchive/presents/DAITSSDCC.ppt>

Caplan, Priscilla. DAITSS (Dark Archive in the Sunshine State). Presentation at the Partnerships in Innovation Symposium, National Archives, November 15-16 2004. <http://www.fcla.edu/digitalArchive/presents/NARA.ppt>

Caplan, Priscilla. The FCLA Digital Archive. Presentation at ALA Chicago 2005. <http://www.fcla.edu/digitalArchive/presents/FDA20ALA.ppt>

Caplan, Priscilla. FCLA Digital Archive. Presentation to the 2005 Joint Meeting of the CSUL Committees, Gainesville, November 2005. <http://www.fcla.edu/digitalArchive/presents/FDAJointMeeting2005.ppt>

Caplan, Priscilla. How to Build Your Own Dark Archive (in your spare time). Keynote talk at the Cornell Digital Preservation Workshop, November 2004. <http://www.fcla.edu/digitalArchive/pdfs/Howtobuildyourowndarkarchive.pdf>

Caplan, Priscilla. Statewide Digitization and the FCLA Digital Archive. Presentation to the OCLC/IMLS Statewide Digitization Planners Meeting, Dublin Ohio, October 2005. <http://www.fcla.edu/digitalArchive/presents/FDAOCLC.ppt>

Caplan, Priscilla. A Tale of Two Archives: Notes from the Dark Side. A Project Briefing given at the Fall CNI Task Force meeting in Portland OR on December 9, 2003, with Jerry Persons from Stanford University. <http://www.fcla.edu/digitalArchive/presents/CNI%20Digital%20Archive.ppt>

On digital preservation

Caplan, Priscilla. Digital Preservation and Trusted Digital Repositories. Presentation to ALA PARS program, Chicago 2005.

<http://www.fcla.edu/digitalArchive/presents/DigitalPreservationandTrustedDigitalRepositories.ppt>

Caplan, Priscilla and Rebecca Guenther. "Practical Preservation: The PREMIS Experience," Library Trends v.54: no. 1 (Summer 2005), pp.111-124.

Caplan, Priscilla. "PREMIS - Preservation Metadata - Implementation Strategies Update 1. Implementing Preservation Repositories for Digital Materials: Current Practice and Emerging Trends in the Cultural Heritage Community." RLG DigiNews v.8:no. 5 (October 2005). http://www.rlg.org/en/page.php?Page_ID=20462#article2

Caplan, Priscilla. Preservation Ruminations. Presentation for the OCLC Distinguished Seminar Series, February 16, 2005." <http://www.oclc.org/research/dss/default.htm>

Caplan, Priscilla. Preservation Ruminations: Digital Preservation and the Uncertain Future. Presentation to the New York Library Association (Rudi Weiss Memorial Lecture), October 21, 2004.

<http://www.fcla.edu/digitalArchive/presents/NYLASMART.ppt>

Goethals, Andrea. Digital Preservation Policies: Technical Considerations. Presentation to the Society of American Archivists (SAA) Boston meeting. August 6, 2004.

http://www.fcla.edu/digitalArchive/presents/tech_consider_pres_bg.ppt

Goethals, Andrea. Preserving Digital Collections. A presentation given at the Digital Libraries for Cultural Heritage: Current Status and Future Needs workshop in Washington DC on August 25, 2003.

http://www.fcla.edu/digitalArchive/presents/Preserving_Digital_Collections.ppt

Attachment B

Publications, presentations and websites mentioning DAITSS or the FDA

COSMIC (Confederation of Scottish Mini Cooperatives) Website.

<http://cosmic.cdli.strath.ac.uk/index.htm>

Digital Preservation Tools and Strategies, DSpace Wiki.

<http://wiki.dspace.org/RelatedWork>

Downing, Jim, and Grace Carpenter. Exploring Strategies for Digital Preservation for DSpace@Cambridge. <http://www.lib.cam.ac.uk/dspace/usergroup2005/descriptions.htm>

Gozetti, Pietro. DSpace: esperienze, nuove tendenze, progetti futuri. <http://dspace-unipr.cilea.it:8080/bitstream/1889/451/1/DSpace-UGM.pdf>

Patel, Manjula. A National Preservation Policy for the UK: Thoughts and Challenges. Presentation at the International Conference on Preservation of Digital Objects, September 2005. <http://rdd.sub.uni-goettingen.de/conferences/ipres/download/A%20National%20Preservation%20Policy%20For%20The%20UK%20-%20Thoughts%20And%20Challenges%20-%20Manjula%20Patel.pdf>

Rosenthal, David S. H., et al. "Requirements for Digital Preservation Systems: A Bottom-Up Approach." D-Lib Magazine v.11: no.11 (December 2005).

<http://www.dlib.org/dlib/november05/rosenthal/11rosenthal.html>

Rosenthal, David S. H., et al. "Transparent Format Migration of Preserved Web Content." D-Lib Magazine v.11: no. 1 (January 2005).

<http://www.dlib.org/dlib/january05/rosenthal/01rosenthal.html>

Surface, Taylor, and Liz Bishoff. OCLC's Digital Archive and OAIS Archival Storage Management. Presentation to the Texas Center for Digital Knowledge.

www.txcdk.org/docs/DigitalArchiveStorageTxCDK20041201.ppt

Walker, Julie. DSpace, Digital Preservation and Business Models. Presentation at the ERPANET Seminar on Business Models related to Digital Preservation, September 20-22, 2004.

www.erpanet.org/events/2004/amsterdam/presentations/erpaTraining-Amsterdam_Walker.ppt

Jannik, Catherine M., Robert H. McDonald, and Gail McMillan. A Practical, Working and Replicable Approach to ETD Preservation.

<http://adt.caul.edu.au/etd2005/papers/092McMillan.pdf>

Lavoie, Brian. Preservation Metadata: Setting the Scene. Presentation at the DPC Meeting on Preservation Metadata, London, September 2005.
<http://www.dpconline.org/docs/events/050908lavoie1.pdf>

Stevenson, Jane. JORUM Preservation Watch Report (draft). July 2005.
personalpages.manchester.ac.uk/staff/jane.stevenson/jorumdpreportfinal_july05.pdf

Wen-Chin Lan. Digital Preservation: A Brief Introduction. Presentation at CONCERT 2005 (Consortium on Core Electronic Resources in Taiwan).
www.stic.gov.tw/fdb/tr/2005/0510-02-Digital_Preservation.ppt

Wheatly, Paul. A way forward for developments in the digital preservation functions of DSpace : options, issues and recommendations. July 2003.
<http://www.dspace.org/news/articles/DpAndDSpace.pdf>

Wheatly, Paul. Institutional Repositories in the Context of Digital Preservation, DPC Technology Watch Report Series 04-02, March 2004.
<http://www.dpconline.org/docs/DPCTWf4word.pdf>