PROJECT NUMBER:
05106

PROJECT TITLE:
Digital Engineering Document Repository Optimization

CO-PRINCIPAL INVESTIGATORS:
Evan W. Duggan, Ph.D.
Associate Professor of MIS
205.348.7688 (Office)
205.348.0560 (Fax)
eduggan@cba.ua.edu

Andrew J. Graettinger, Ph.D.
Assistant Professor of Civil
and Environmental Engineering
205.348.1689 (Office)
205.348.0783 (Fax)
andrewg@coe.eng.ua.edu

David P. Hale, Ph.D.
Director, AISCE and MIS Programs
Distinguished Faculty Fellow
205.348.8909 (Office)
205.348.0560 (Fax)
dhale@cba.ua.edu

PROJECT OBJECTIVE:
The goal of the project is to provide guidance to transportation organizations as they create
digital repositories of their technical engineering documents by prescribing methods for refining
digital storage structures beyond that of hardcopy folders, and retrieval capabilities beyond smart
PDF capabilities. To achieve this goal, the project will detail the meta-structures needed to create
the logical design and the level of granularity needed to maintain digital documents for planning,
design, construction and maintenance bureaus, and operating divisions and investigate and
evaluate the logical structures needed for effective storage and retrieval of documents
organization-wide.

PROJECT ABSTRACT:
Information technology now makes it possible to create digital repositories of previous hard-
copy document archives. The benefit of such a system is to “have data at our fingertips no matter
where we are and what document contains the data.” However such a benefit presumes easy
document retrieval. Prototypes of such systems indicate that as point solutions, rapid direct
retrieval of documents can be achieved. But as the diversity of documents, user groups, and
desired retrieval outcomes increases, the ability to retrieve “the” document and its associated
data becomes less likely. Instead, lists of documents are often found and navigation through these lists is often clumsy at best. Safety concerns require that existing documents be readily available when needed, that such documents are not lost, and that version and ownership control exists. The University of Alabama’s Civil Engineering and Management Information Systems Departments, and The Alabama Department of Transportation (ALDOT) will collaborate on this project to research the issues and prescribe effective approaches for synthesizing leading practices from existing transportation organizations and the information systems/sciences discipline.

PROJECT TASKS
Task 1: Research and review transportation-specific document management systems (at appropriate agencies, workshops, conferences and white papers)
Task 2: Conduct literature review of current IS/CS literature concerning advanced and evolving abstraction techniques and meta tag structures
Task 3: Benchmark state Departments of Transportation for leading practices and unresolved issues
Task 4: Study on-going activities at ALDOT
Task 5: Develop advanced requirements for ongoing and/or historic document acquisition strategies
Task 6: Develop advanced requirements for document retrieval strategies
Task 7: Develop alternative conceptual design for storing and retrieving documents
Task 8: Analyze economics and risk of alternative strategies
Task 9: Develop workshop presentations
Task 10: Prepare final report and journal articles

PROJECT MILESTONES AND DATES:
Tasks 1-4: Jun-Jul, 2005
Task 5: Aug-Nov
Task 6: Sep-Nov
Task 7: Oct-Nov
Task 8: Dec 05-Jan 06
Task 9: May
Task 10: Jun 2006

TOTAL BUDGET:
One-year project: UTCA funds: $49,893; UA-Cost Share funds: $49,983, Total: $99,876

STUDENT INVOLVEMENT:
This project will involve one paid graduate student for the full term of the project, one graduate student and six undergraduate students for nine months as part of their class project, and one first-year doctoral student. These students will use this project to improve their knowledge of engineering, information systems, and knowledge management in the transportation and other areas.

RELATIONSHIP TO OTHER RESEARCH PROJECTS:
This project is not directly related to other projects but serves to establish an integrative platform for future ALDOT projects that involve document archiving and engineering data (including
geotechnical data). Dr. Graettinger defined the need for this project while working on UTCA project 02403, “Development of a Statewide Bridge Database and Data Retrieval System.”

TECHNOLOGY TRANSFER ACTIVITIES:
The project participants will present their research results at state-wide engineering conferences, and UTCA workshops. The principal investigators also plan to publish articles in the *Transportation Journal*, and other IS journals that focus on knowledge management.

POTENTIAL BENEFITS OF THE PROJECT:
The goal is to prescribe the best practices to increase document management effectiveness and minimize cost across several ALDOT bureaus including Materials and Test, Bridges, Construction, Design, Maintenance, and Transportation Planning. This will provide the decision-making effectiveness to directly address the UTCA theme of *Management and Safety of Transportations Systems*. If successful the project will contribute to reduction of the number of miss-hits and no-hits in document retrieval attempts; reduce the time and expense of documentation; increase documentation effectiveness; and increase the completeness and consistency of information required to make sometimes momentous decisions that bear on citizen safety. This project will also generate information synergies across transportation organizations to enable more effective ownership with increased accountability, consistent access, and operational efficiencies.

TRB KEYWORDS:
Asset Management, Bridge Management, Document Management, Knowledge management, Pavement management, Management Information Systems, Geotechnical Data, Information Resource System