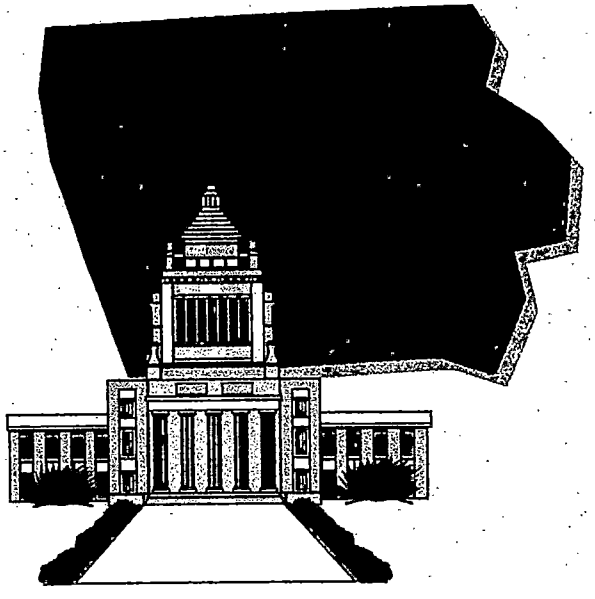
Universal Systems Inc.

State of Iowa
Department of Transportation

Strategic Plan
Document Management System



October 25, 1996

State of Iowa
Department of Transportation

Strategic Plan
Document Management System

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This report was prepared by Universal Systems Incorporated

TABLE OF CONTENTS

EXHIBITS

1. INTRODUCTION

This section is an introduction of the Document Management System (DMS) Strategic Plan proposed for the Iowa Department of Transportation (DOT) by Universal Systems Inc. (USI). Included in this section are mission statements and the DOT's Goals and Strategies. Additionally, a complete list of references is provided, including a list of the DOT employees that participated in the DMS interviews, and documents that were analyzed to develop this strategic plan.

1.1 OVERVIEW

This Strategic Plan provides the Iowa Department of Transportation with guidelines for defining the acquisition and implementation of a document management system to automate current manual methods of document handling and distribution. In preparation for the production of the Strategic Plan, the USI Team conducted a series of user interviews at the DOT Ames and East Central Iowa Transportation Region facilities, and reviewed various documents relating to day-to-day operations.

The DOT has many different business processes involving a great deal of paper intensive activities. The need for an automated document management system varies from Division to Division. Document management practices are generally the responsibility of each Division and can vary significantly between offices and even sections within the same office.

The focus of the study and production of the Strategic Plan has been to provide direction for establishing an agency-wide DMS framework. This framework in turn must ensure consistency among Divisions while maintaining a degree of flexibility and autonomy for each Division, or business unit, to operate within. Additionally, the Strategic Plan has been generated with the understanding that some business processes fit the agency-wide model while others may not. An effective program should not restrict workgroups from pursuing "best of breed" solutions. Standalone document management systems that effectively serve a workgroup may offer cost benefits in some areas. However, those offices who manage documents which are accessed by other offices must use a document management solution that conforms to standards that will promote an agency-wide system. Using the guidelines presented in this Strategic Plan and those guidelines yet to be developed, the DMS Team will be in a good position to determine agency-wide participants

Exhibit 1-1 provides a top-down flow of the information within the Strategic Plan. Please note the Department's Vision and Mission statements are not stated in this Plan, however it is important to show that the DMS Team Mission Statement must be in concert with the Department's overall vision and mission. Additionally, USI is providing an initial DMS Team Mission Statement that will require further input as the DMS initiative progresses.

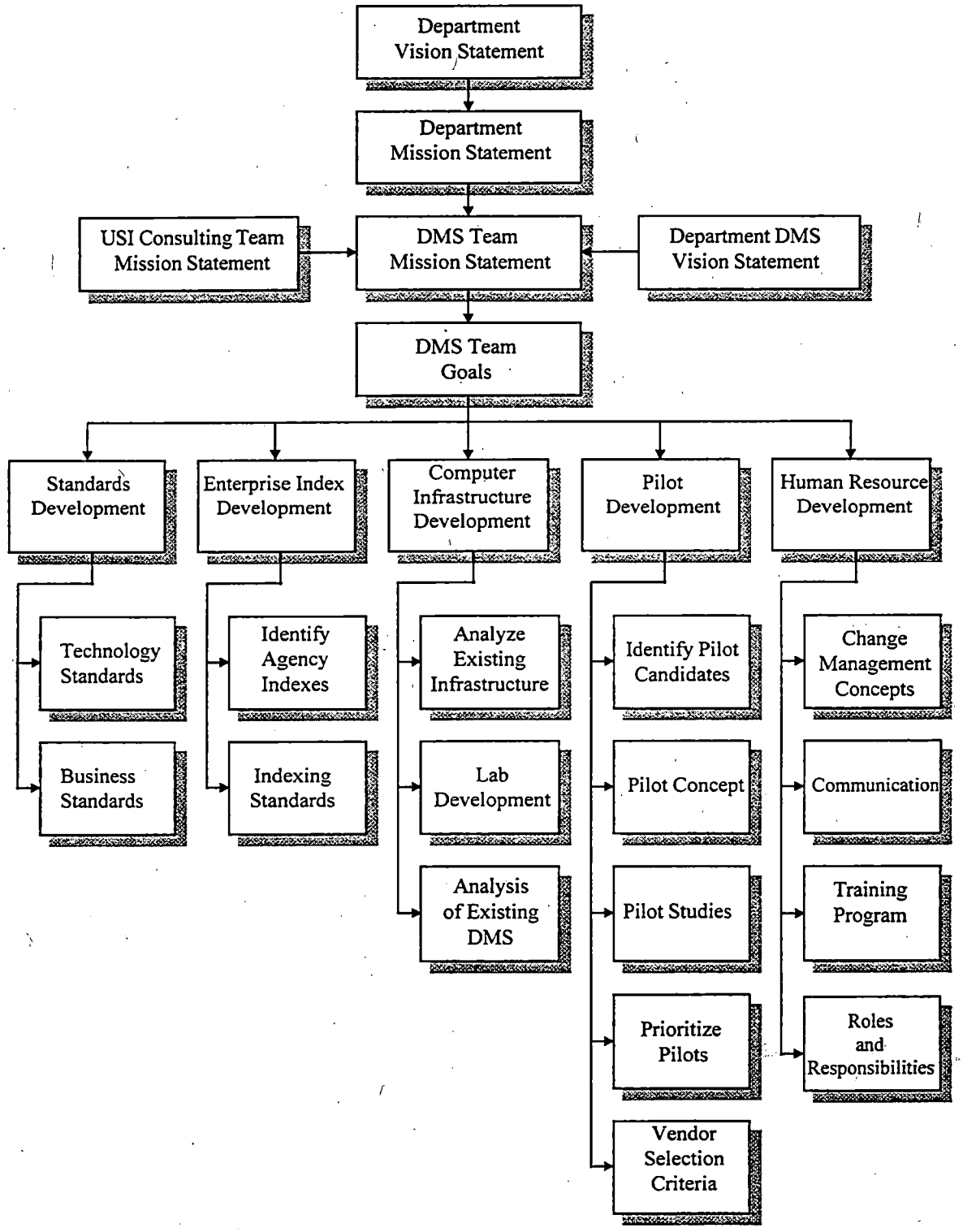


Exhibit 1-1 Strategic Plan Information Flow

The remaining Strategic Plan sections and appendices contain the following:

- **Section 2: Standards Development** - Discusses issues related to standards development that will be important for the development of an agency-wide system. Business and technical standards will establish a framework for the strategic direction of the Department related to pursuit of an agency-wide document management system.

- **Section 3: Agency-wide Index Development** - Discusses issues that relate to developing an agency-wide index for the Department. This includes discussions on the need for agency-wide indexes, general document indexing guidelines, and the DOT information systems that could be potentially integrated.

- **Section 4: Computer Infrastructure Development** - Examines the need for developing the Department's Computer Infrastructure to support the needs of an agency-wide DMS. This section includes an analysis where the Department is today with its computing environment and provides recommended guidelines for improving the infrastructure for future DMS development.

- **Section 5: Pilot Development** - Discusses issues related to the identification of pilot DMS environments and issues related to agency-wide expansion. Additionally, topics include DMS life cycle development, identification of pilot candidates, vendor selection criteria, and a pilot implementation plan.

- **Section 6: Human Resource Development** - This section addresses a strategy for human resource development, which refers to issues impacting people. Additionally, this section discusses the development of personnel skills within the DOT to ensure the success of the proposed agency-wide DMS initiative.

- **Appendix A: Glossary of Terms** - Provides a definition of terms related to document management systems. This glossary is an abridged version of a glossary created by the Document Management Alliance (DMA), a recognized leader in standards development for the document management industry. The glossary is provided as a reference for review of the Strategic Plan.

- **Appendix B: Quick Hits** - Quick Hits are areas in which the Department can improve with minimal effort while providing an almost immediate return on investment. A goal of quick hits is to improve internal and external customer satisfaction with minimal impact to cost and resource allocation.

- **Appendix C: Sample Questionnaires** - Provides a sample of the interview and private questionnaires used for the gathering of information in regards to the DOT's business processes and infrastructure.

- **Appendix D: Questionnaire Quotes** - Selected, actual quotes from the DOT personnel obtained from the private questionnaire. This is a sampling of quotes that reflect the overall themes (opinions), whether positive or negative.

- **Appendix E: Roles and Responsibilities** - This section provides a draft copy of the proposed roles and responsibilities developed by USI for the Florida DOT. The DMS Team can review these roles and responsibilities as a starting point for consideration.

1.1.1 Background and Scope

The Iowa DOT recognized the need to initiate a Department-wide study of document management technology, because a number of Divisions were independently seeking the same information. A DMS Team was formalized with the objective of educating themselves about DMS technology and defining the direction the DOT needs to pursue to implement this technology. Additionally, the DMS Team has a requirement to identify the DOT's infrastructure, including computer equipment, resources, and business process, and define how the DOT could benefit from a DMS implementation into this infrastructure—that is, create a Strategic Plan.

1.1.2 Purpose

The purpose of the Strategic Plan is to guide the DOT from the "today state" to the " desired state." The Strategic Plan will create a "compass" to provide an overall direction for the DOT's DMS initiatives. The plan is meant to be a living document, providing direction and guidance for obtaining some long range goals.

An additional purpose served by this document is to provide the DOT background information necessary to better assess, not only the strategic plan, but the entire approach to agency-wide DMS issues. Therefore, allow the DOT to make educated decisions related to document management.

1.2 VISION

DMS Team activities and USI's development of the Strategic Plan have been based on the DOT's direction, as stated in the original "Notice to Consultants" for DMS consulting services:

> *"The Iowa Department of Transportation intends to adopt an agency-wide document management strategy."*

USI interpreted this direction to provide a starting point for defining a vision statement for the Department. While the DOT managers must focus on the bottom line, DOT leaders must keep a clear vision and direction.

1.3 MISSION STATEMENTS

1.3.1 USI Mission Statement

USI has provided the following mission statement to describe our commitment to the success of the agency-wide DMS initiative being pursued by the Iowa DOT. During user interviews, USI solicited input for developing this mission statement.

> *"To provide quality Document Management consulting services by objectively evaluating the DOT's needs and providing guiding principles. These principles will empower the Iowa DOT's Document Management System Team to make informed decisions regarding DMS technology and business initiatives.*
>
> *To educate the Iowa DOT on the DMS business and technology issues that will have an impact on the DOT decisions by providing materials and additional consulting service."*

USI will remain focused on this mission throughout our involvement with the Iowa DOT.

1.3.2 The DOT's DMS Team Mission Statement

In addition to the USI mission statement, USI feels it is important the DMS Team develop its own mission statement. It is their mission that will provide the focus for obtaining the DOT's overall vision. The following is a draft mission statement developed by USI for the DMS Team.

> *"To act as a central knowledge base for the Department's acquired expertise in Document Management technologies and to develop and coordinate the DMS initiatives pursued by various offices within the Department. Secondly, to educate the DOT personnel on document management technology and how this technology will help the DOT meet productivity goals. Additionally, the DMS Team is responsible for the execution and review of the DMS Strategic Plan."*

As time progresses, the DMS Team should continue to enhance their knowledge base to keep up with new technologies, which may in turn require continually revising a "living" mission statement.

1.4 GOALS AND STRATEGIES

1.4.1 Goals

USI is defining the following goals in support of the DMS initiative. These goals have been developed to incorporate considerations across the Department. These goals will assist the DOT in governing the accomplishment of the DMS initiatives.

1. Improve the efficiency of document management operations:

   - Locate and retrieve any document stored and managed by a DMS within the bounds of DOT security
   - Automate manual activities associated with the paper-based environment incorporating re-engineered workflow techniques to improve document review and approval processing and archiving
   - Enhance decision making by improving the accessibility of information
   - Provide for fast, practical response time for document access
   - Provide operating cost alternatives to the DOT: Redirect the amount of paper supplies, photocopying, office space, postage and courier services
   - Manage more information with less resources
   - Increase productivity by eliminating steps that do not add value, enabling faster decisions and communicating information promptly and accurately.
   - Reduce the need for increased off-site paper storage

2. Improve customer service by:

   - Improving document retrieval time
   - Focusing more on customer relationships
   - Decreasing the time required for services requiring document management

These goals will provide the basis for measuring the success of fully implementing DMS technology within the Department.

1.4.2 Strategies

USI defined the following strategies to specifically satisfy the DMS goals. Each strategy is supported by actions required to obtain desired results.

1. Standards Development:
   - Develop Technology and Business Standards
   - Ensure legality and accountability of electronically stored documents through standardized and well documented procedures
   - Standardize filing techniques to withstand the loss of key personnel
   - Adhere to industry and government standards, as well as any State or Federal statutes, policies, and regulations
2. Agency-wide Index Development:
   - Identify and develop agency-wide indexing standards
   - Define a common indexing structure for consistent filing techniques
   - Identify the DOT information systems for DMS integration
   - Development of indexing guidelines
3. Computer Infrastructure Development:
   - Define a computer infrastructure for DMS initiatives
   - Development of a Learning Lab and DMS Pilot Certification Lab
4. DMS Pilot Development:
   - Identify pilot candidates
   - Develop pilot concepts
   - Perform pilot studies
   - Prioritize pilots
   - Define criteria for the DMS Team vendor selection process.
5. Human Resource Development:

- Develop Change Management Concepts
- Communicate initiatives by newsletter and training programs
- Establish DMS Roles and Responsibilities

1.5 AGENCY-WIDE PHASE IMPLEMENTATION PLAN

The implementation of an agency-wide DMS will require long-term commitment by the Department. USI developed this implementation plan, Exhibit 1-2, as a guide to strategically position the department for an agency-wide DMS. For actual implementation, time frames may vary but the sequence of events would remain the same. Details describing the implementation plan are discussed throughout the Strategic Plan.

Task Name	Duration
Iowa DOT DMS Plan	355d
Phase I	75d
Strategic Plan Development / Outbriefing	11w
Strategic Plan Review by Iowa DOT	4w
Phase II	60d
Standards Development	3w
Enterprise Index Development	1w
Learning Center / Lab Development	8w
Indentify Pilot Candidates	3w
Phase III	155d
Pilot Study (6 Pilots)	12w
Pilot Prioritization	2w
Implement Learning Center / Lab	2w
RFI Development/Release	3w
Vendor Response Time	3w
Develop LTD Criteria	3w
Review RFI Responses	2w
Select Top Vendors	1w
Notify Vendors / Vendor Prep Time	4w
Conduct LTD (1w/Vendor)	1w
LTD Evaluation	1w
Phase IV	65d
RFP Development/Release	2w
Vendor Response Time	5w
Develop RFP Criteria	5w
Review RFP Responses	4w
Select Vendor(s)	1w
Award Contract	1w

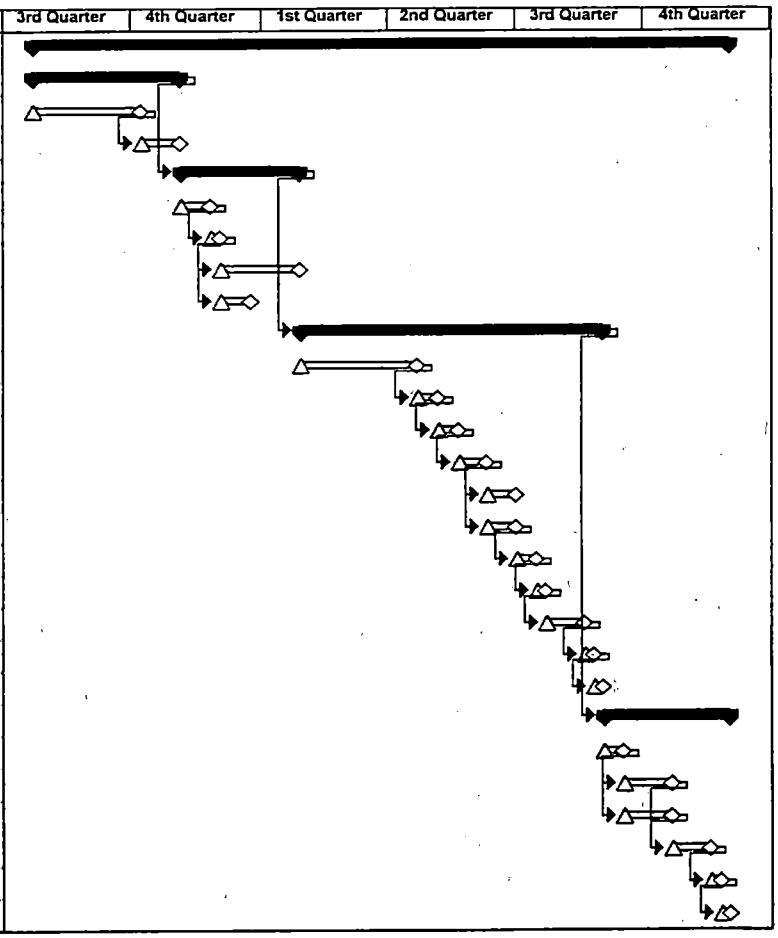


Exhibit 1-2 Agency-wide Phase Implementation Plan

USI believes the plan should be viewed as a living document that is flexible enough to adopt to changing priorities as the Department moves forward in execution of the plan.

1.6 REFERENCES

The USI conducted group interviews with the DOT personnel, as well as reviewing a number of documents to assist in the development of the Strategic Plan. Exhibit 1-3 is a list of all individuals who participated in the formalized interviews conducted during the week of August 12 - 23, 1996. Exhibit 1-4 cites documents that were used as a point of reference for the study.

Exhibit 1-3 The DOT Interviewees

Name	Title	Office	Interview Session
Iowa DOT Headquarters Ames			
1. Burns, Nancy	Application Programs	Project Planning	August 12, 7:30 a.m.
2. Drake, David	Envir. Coordinator	Project Planning	August 12, 7:30 a.m.
3. Funnell, Luella	Program Planner	Project Planning	August 12, 7:30 a.m.
4. Kerper, Mark	Develop. Section Engr.	Project Planning	August 12, 7:30 a.m.
5. Larson, Stephen	Program Planner	Project Planning	August 12, 7:30 a.m.
6. Jackson, Tom	Director of Planning Services	Planning Services	August 12, 9:00 a.m.
7. Johnson, Stan	Tech.	Planning Services	August 12, 9:00 a.m.
8. Marvick, Craig	Transportation Planner	Systems Planning	August 12, 10:30 a.m.
9. Fitzgerald, Julia	Exec. Officer	Policy & Legislative Services	August 12, 12:30 p.m.
10. George, Tracy	Mgmt. Analyst	Policy & Legislative Services	August 12, 12:30 p.m.
11. Parham, Tom	Intermodel Prgm. Engr.	Program Management	August 12, 3:30 p.m.
12. McDaniel, Stu	Data Processing Mgr.	Data Services	August 13, 9:00 a.m.
13. Dickinson, Jerry	Info. Spec. 3	Media & Marketing	August 13, 10:30 a.m.
14. Gray-Fisher, Dena	Supervisor	Media & Marketing	August 13, 10:30 a.m.
15. Wallace, Susan	Info. Spec. 1	Media & Marketing	August 13, 10:30 a.m.
16. Berrett, Deke	Printing Supervisor	Document Services	August 13, 2:00 p.m.
17. Cook, Ralph	Assist. Director of Doc. Serv.	Document Services	August 13, 2:00 p.m.
18. Dutton, Bruce	Director of Doc. Services	Document Services	August 13, 2:00 p.m.
19. Lange, Diane	Graphics Artist	Document Services	August 13, 2:00 p.m.
20. Vincent, Dick	Graphics Supervisor	Document Services	August 13, 2:00 p.m.
21. Wheelock, Mary	Graphics Artist	Document Services	August 13, 2:00 p.m.
22. Sydnes, Paul	Admin. Assistant	Document Services	August 14, 7:30 a.m.
23. Vincent, Dick	Graphics Supervisor	Document Services	August 14, 7:30 a.m.
24. Allie, Merlin	Support Team	Maintenance Op. Committee	August 14, 8:30 a.m.
25. Bennett, Myra	Administrative Assistant	Maintenance Op. Committee	August 14, 8:30 a.m.
26. Brakke, Bruce	Bridge Engr.	Maintenance Op. Committee	August 14, 8:30 a.m.
27. Burkheimer, Dennis	Mgmt. Analyst	Maintenance Op. Committee	August 14, 8:30 a.m.
28. Butz, Rick	EMO	Maintenance Op. Committee	August 14, 8:30 a.m.
29. Callahan, Ray	Utility Permit Adm.	Maintenance Op. Committee	August 14, 8:30 a.m.
30. Jackson, Mike	TCME	Maintenance Op. Committee	August 14, 8:30 a.m.
31. Kammerer, Kim	Mgmt. Analyst	Maintenance Op. Committee	August 14, 8:30 a.m.
32. Key, Mary Jo	MMA	Maintenance Op. Committee	August 14, 8:30 a.m.
33. Kinyon, Mike	MOA	Maintenance Op. Committee	August 14, 8:30 a.m.
34. Loving, Dave	AMM	Maintenance Op. Committee	August 14, 8:30 a.m.
35. Parrish, Cheryl	Secretary	Maintenance Op. Committee	August 14, 8:30 a.m.
36. Peterson, Richard	EMO	Maintenance Op. Committee	August 14, 8:30 a.m.
37. Vannoni, Steven	HMS	Maintenance Op. Committee	August 14, 8:30 a.m.
38. Walton, Marlee	Spec. Proj. Engr.	Maintenance Op. Committee	August 14, 8:30 a.m.
39. Wilson, Steve	MOA	Maintenance Op. Committee	August 14, 8:30 a.m.

Name	Title	Office	Interview Session
40. Witcombe, Howard	MOA	Maintenance Op. Committee	August 14, 8:30 a.m.
41. Wrage, Andrea	Secretary	Maintenance Op. Committee	August 14, 8:30 a.m.
42. Abels, Bev	Director	Employee Services	August 14, 12:00 p.m.
43. Forsyth, George	Agreements Engr.	Development and Support	August 14, 3:00 p.m.
44. Lounsbury, Bill	RR/ Hwy Grants Coord.	Development and Support	August 14, 3:00 p.m.
45. Peperkorn, Dennis	Proj. Dev. Automation Engr.	Development and Support	August 14, 3:00 p.m.
46. Reis, Tom	Specification Engr.	Development and Support	August 14, 3:00 p.m.
47. Rost, Jim	Environmental Engr.	Development and Support	August 14, 3:00 p.m.
48. Coates, Carol	Office Director	Procurement and Distrib.	August 15, 7:30 a.m.
49. Thede, Kay	Exec. Officer	Procurement and Distrib.	August 15, 7:30 a.m.
50. Wells, Tom	Sr. Systems Analyst	Data Services	August 15, 7:30 a.m.
51. Wilson, Kermit	Director of Purchasing	Procurement and Distrib.	August 15, 7:30 a.m.
52. Beary, Dave	Sr. Systems Analyst	Data Services	August 15, 10:30 a.m.
53. Nimmo, John	Director of Data Services	Data Services	August 15, 10:30 a.m.
54. Allie, Merlin	Data Processing Mgr.	Data Services	August 15, 10:30 a.m.
55. Brendeland, Jim	Data Processing Mgr.	Data Services	August 15, 10:30 a.m.
56. Breniman, Don	Supervisor	Finance	August 15, 1:00 p.m.
57. Evans, Myrna	Supervisor	Finance	August 15, 1:00 p.m.
58. Juelfs, Ron	Director of Finance	Finance	August 15, 1:00 p.m.
59. Williams, Cheryl	Supervisor	Finance	August 15, 1:00 p.m.
60. Emery, Joyce	Trans. Safety Engr.	Engineering	August 15, 3:00 p.m.
61. Geer, Phyllis	Secretary	Engineering	August 15, 3:00 p.m.
62. MacGillivray, Ian	Director	Engineering	August 15, 3:00 p.m.
63. Sisson, George	Deputy Director	Engineering	August 15, 3:00 p.m.
64. Stevens, Dwight	State Traffic Engr.	Engineering	August 15, 3:00 p.m.
65. Walker, Fred	Trans Safety Engr.	Engineering	August 15, 3:00 p.m.
66. Welch, Tom	Research Program Engr.	Engineering	August 15, 3:00 p.m.
67. Asklof, Desi	Administrative Asst.	Records Management	August 19, 7:30 a.m.
68. Harris, Sheri	Clerk 3	Records Management	August 19, 7:30 a.m.
69. Koehler, Sam	Supervisor	Records Management	August 19, 7:30 a.m.
70. Stowers, Luann	Microfilm Operator	Records Management	August 19, 7:30 a.m.
71. Belzung, Steve	BAMS Coordinator	Contracts	August 19, 10:30 a.m.
72. Bierbaum, Roger	Contracts Engr.	Contracts	August 19, 10:30 a.m.
73. Houge, Carol	Compliance Officer	Process Review	August 19, 2:00 p.m.
74. Rhoads, Bill	Quality Coordinator	Process Review	August 19, 2:00 p.m.
75. Rout, Fran	Affirm. Actn. Compliance Off.	Process Review	August 19, 2:00 p.m.
76. Burr, Brian	Materials Tech.	Materials	August 20, 7:30 a.m.
77. Heggen, John	Bituminous Engr.	Materials	August 20, 7:30 a.m.
78. Hutchinson, Becky	Engr. Office Asst. 2	Materials	August 20, 7:30 a.m.
79. Jones, Kevin	Spec. Investigation Engr.	Materials	August 20, 7:30 a.m.
80. Marks, Vern	Research Engr.	Materials	August 20, 7:30 a.m.
81. Narotam, Champ	Materials Engr.	Materials	August 20, 7:30 a.m.
82. Berryhill, David	Asst. Urban Section Engr.	Design	August 20, 10:00 a.m.
83. Farthing, Kip	Design Tech. V	Design	August 20, 10:00 a.m.
84. Kretlow, Mona	Secretary	Design	August 20, 10:00 a.m.
85. Little, David	Methods Engr.	Design	August 20, 10:00 a.m.
86. Masteller, Mark	Chief Landscape Architect	Design	August 20, 10:00 a.m.
87. McWaters, Brian	Pavement Engr.	Design	August 20, 10:00 a.m.
88. Narigon, John	Design Project Engr.	Design	August 20, 10:00 a.m.
89. Nutt, Melvin	Asst. Design Engr.	Design	August 20, 10:00 a.m.
90. Schoenrock, Ray	Design Projects Engr.	Design	August 20, 10:00 a.m.
91. Shearer, Bruce	Automation Engr.	Design	August 20, 10:00 a.m.
92. Skogerboe, Dave	Consultant Coord. Engr.	Design	August 20, 10:00 a.m.
93. Welch, Alice	Photogrammetry Engr.	Design	August 20, 10:00 a.m.

Name	Title	Office	Interview Session
94. Cain, Pat	Director	Transportation Data	August 20, 12:30 p.m.
95. Knight, Peggi	System Management Supr.	Transportation Data	August 20, 12:30 p.m.
96. Peterson, Gordon	System Monitoring Supr.	Transportation Data	August 20, 12:30 p.m.
97. Ohorilko, Kathy	Public Service Supr. 3	Driver Services	August 20, 2:30 p.m.
98. Padgett, Carol	Public Service Exec. 2	Driver Services	August 20, 2:30 p.m.
99. Page, Paula	Administrative Asst.	Driver Services	August 20, 2:30 p.m.
100. Schuck, Bruce	Asst. Office Director	Driver Services	August 20, 2:30 p.m.
101. Albright, Sue	Manager - Admin.	ROW	August 21, 7:30 a.m.
102. Bowers, Sharon	ROW Aide	ROW	August 21, 7:30 a.m.
103. Cirksena, Fred	Fiscal & Title Supr.	ROW	August 21, 7:30 a.m.
104. Coney, Hanna	Secretary	ROW	August 21, 7:30 a.m.
105. Olson, Jim	ROW Design Supr.	ROW	August 21, 7:30 a.m.
106. Popp, Deanne	ROW Aide	ROW	August 21, 7:30 a.m.
107. Stumbo, Lance	ROW Agent	ROW	August 21, 7:30 a.m.
108. Taylor, Julie	Secretary	ROW	August 21, 7:30 a.m.
109. Zaletel , Hank	Librarian	Employee Services	August 21, 9:30 a.m.
110. Jeffers, Annette	Automation Engr.	Bridges	August 21, 10:30 a.m.
111. Novey, Gary	Detail Section Manager	Bridges	August 21, 10:30 a.m.
112. Sorenson, Thayne	Design Tech.	Bridges	August 21, 10:30 a.m.
113. Whitney, Judy	Secretary	Bridges	August 21, 10:30 a.m.
114. Chrisinger, Jim	Exec. Asst. to the Dir., Spec. Proj.	Special Assignment	August 21, 12:30 p.m.
115. Apatiga, Daniel	Asst. Director	Facilities	August 21, 2:00 p.m.
116. Hammer, Lee	Director	Facilities	August 21, 2:00 p.m.
117. Kennedy, Jim	Asst. Director	Facilities	August 21, 2:00 p.m.
118. Buchwald, Donna	Field Systems Engr.	Construction	August 22, 7:30 a.m.
119. Christianson, Pat	Secretary	Construction	August 22, 7:30 a.m.
120. Jacobson, Tom	Asst. Construction Engr	Construction	August 22, 7:30 a.m.
121. Bergmann, LeRoy	Sec. Roads Engr.	Local Systems	August 22, 10:30 a.m.
122. Jesse, Jean	Secretary	Local Systems	August 22, 10:30 a.m.
123. Jesse, Larry	Urban Systems Engr.	Local Systems	August 22, 10:30 a.m.
124. Franklin, Dan	Assistant Director	Legislative Services	August 22, 2:00 p.m.
125. Jensen, Mary	Executive Officer	Legislative Services	August 22, 2:00 p.m.
126. Crouse, Carol	Supervisor	Motor Carrier Services	August 23, 8:30 a.m.
127. Skluzacek, Ruth	Director	Motor Carrier Services	August 23, 8:30 a.m.
128. Smith, Karen	Supervisor	Motor Carrier Services	August 23, 8:30 a.m.
129. Ehlert, Dennis	Director	Vehicle Services	August 23, 8:30 a.m.
130. Johnson, Jody	Supervisor	Vehicle Services	August 23, 8:30 a.m.
131. Kilpatrick, Kerry	Commander	Motor Vehicle Enforcement	August 23, 8:30 a.m.
132. Brekke, Sue	Administrative Assistant	Equipment Support	August 23, 12:30 p.m.
133. Jones, Kevon	Director	Equipment Support	August 23, 12:30 p.m.
East Central Iowa Transportation Center			
1. Roger Boulet	T.C. Materials Engr.	Materials	August 16, 7:30 a.m.
2. Ellis, Kent	Resident Construction Engr.	Construction	August 16, 7:30 a.m.
3. Yanna, Ken	Resident Construction Engr.	Construction	August 16, 7:30 a.m.
4. Heeren, Jeanne	District Secretary	Cedar Rapids T.C.	August 16, 7:30 a.m.
5. Leu, Richard	Land Surveyor	ROW	August 16, 9:00 a.m.
6. McGuire, Larry	Land Surveyor	ROW	August 16, 9:00 a.m.
7. Ellis, David	Local Systems Engr.	Local Systems	August 16, 9:00 a.m.
8. Kautz, Dick	Local Systems Engr.	Local Systems	August 16, 9:00 a.m.
9. Bryant, Lawrence	Field Services Coordinator	Field Services	August 16, 10:30 a.m.
10. Benfield, Lee	T.C. Planner	Project & Planning	August 16, 10:30 a.m.

Name	Title	Office	Interview Session
11. Butz, Rick	Executive Officer	Maintenance	August 16, 12:30 p.m.
12. Boysen, Carlos	Sr. Engr. Tech	Maintenance	August 16, 12:30 p.m.
13. Mahoney, Kevin	T.C. Maintenance Engr.	Maintenance	August 16, 12:30 p.m.
14. Pityer, Marliee	MMA	Maintenance	August 16, 12:30 p.m.

Exhibit 1-4 Documentation

Title	Date
1. AASHTO CMS Phase II - Final Application Architecture Detail Design	April 12, 1996
2. AASHTO CMS Phase II - Technical Architecture Blueprint Deliverable	March 1996
3. AASHTO STRATEGIC PLAN	March 1995
4. GIS Strategic Plan for the Iowa Department of Transportation	April 1995
5. The Governor's Blue Ribbon Transportation Task Force: Recommendations for Maximizing the Efficient Use of Iowa's Road Use Tax Fund.	December 1995
6. IBM's Benefit Analysis: Implementation of Document Imaging	May 27, 1993
7. Iowa DOT Records Management Manual	December 1995
8. Iowa State Government Technology Assessment Project (IT Survey)	December 29, 1995
9. User Need Assessment Survey, conducted by JMI Corp. for Records Management Services	1993

2. STANDARDS DEVELOPMENT

This section discusses issues related to standards development that will be important for the development of an agency-wide system. These standards will establish a framework for the strategic direction of the Department related to pursuit of an agency-wide document management system (DMS.) Recommended standards include:

- *Technology Standards*
- *Business Standards*

Both of these areas have implications which affect the Department's strategy for developing an agency-wide vision for a DMS. The following sections examine these issues in more detail.

2.1 STANDARDS DEVELOPMENT PURPOSE

The purpose of standards development is to identify existing document management industry standards and determine which standards will best support the Department's effort in building an agency-wide document management infrastructure. Enterprise document management is a goal of many organizations today. In response, the document management industry is developing standards that allow multi-vendor document management systems to work together and share documents on all levels. Many standards exist, but they are often in transition to keep up with dynamic industry developments. USI's purpose in assisting the Department is to identify standards that will keep the Department strategically positioned to achieve an agency-wide document management infrastructure in a *potentially* multi-system environment.

2.2 TECHNOLOGY STANDARDS

Technology standards focus on the underlying technology components that are part of a DMS hardware, software, and system architecture. These include but are not limited to:

- **Network**—Local area networks (LANs), wide area networks (WANs), network protocols, and third-party network software.
- **Operating System (OS)**—This includes the OS for both client and server components.
- **Application Programming Interface (API)**—Software programming tools that relate to document management applications.

- **File Formats**—File storage formats for storing raster (scanned) images and other file types which may be expected to exist in a DMS environment.

2.2.1 Industry Standards Organizations

The technology industry as a whole has a number of domestic and international standards organizations that contribute directly or indirectly to DMS standards. As a starting point for agency-wide DMS technology standards development, the DOT should examine some of the industry's leading authorities such as the Association for Information and Image Management (AIIM) and the Document Management Alliance (DMA). DMA is a task force of AIIM comprised of product vendors, service providers, and end users. The goals of the DMA organization are to provide enterprise specifications that will allow DMA compliant multi-vendor products to share resources. USI recommends the DMS Team monitor developments in the industry and published standards from these organizations.

2.2.2 The DOT's Technology Standards

The technology standards being pursued and recommended by other sources which may impact the DOT's DMS standards include standards recommended by the Iowa Department of Management, the American Association of Motor Vehicle Administrators (AAMVA) and the American Association of State Highway and Transportation Officials (AASHTO). The standards to be examined by the Department of Management are evolving in response to recommendations made by the Yankee Group's state-wide Information Technology (IT) Survey. AASHTO standards have been published to provide the strategic direction for the Site Manager (formerly Construction Management System). These standards include the hardware and software required to support the Site Manager, which is scheduled for beta testing by the DOT in March of 1997. Other standards to consider are those dealing with engineering functions, Computer Aided Drafting & Design (CADD) or Maintenance Management Systems (MMS). Finally, the Geographic Information System (GIS) initiative being coordinated by the GIS Coordinating Committee is pursuing technology standards which will be formulated in support of a Department GIS. All of these sources will have an impact on the strategic direction for DMS standards.

2.2.3 Action Item - Standards Committee

USI recommends the DMS Team establish a DMS Standards Committee (SC) composed of members of the DOT's Support Teams representing each Division. The Standards Committee should focus on technology standards that establish a frame-work for an agency-wide DMS. Guidance may be required in identifying DMS technology related standards that have an impact on agency-wide DMS components based on industry

trends. The DMS Standards Committee should develop standards that are compatible with other DOT technology initiatives including GIS and Site Manager . The GIS and Site Manager teams should both appoint one of it's members to serve on the DMS Standards Committee as Ex-Officio members. The SC should also monitor development of any state-wide technology standards for inclusion in the Department's technology standards. An elected chair for the SC should be responsible for consolidation of proposed standards and periodic updates based on changes in DMS technology and lessons learned in the development of DMS projects. A first draft of a DMS Technology Standards document should be completed prior to Phase 3 of the Agency-wide Phase Implementation Plan.

2.3 BUSINESS STANDARDS

The Department is in a good position to develop business standards that will avoid the potential pitfalls of the "learn as you go" mentality, which may inhibit the acceptance of DMS technology. With careful planning, the Department can develop business standards which will greatly increase the chances for a successful implementation of an agency-wide DMS. As a starting point for understanding the issues, USI has identified several issues that illustrate the need for business standards. These are:

- Document Custodianship
- Document Classification Schema
- Document Retention

Too often an overly complicated system is the result of undefined business processes. These business standards should be developed further as the Department moves forward with the DMS initiative. The following sections discuss these issues and identify action items proposed by USI.

2.3.1 Document Custodianship

The concept of document custodianship plays an important role in the strategic deployment of agency-wide document management systems. The DOT Records Management Manual provides the following definition for "custodian."

> *"**Custodian** - The head of the organizational unit that is responsible for a particular record, as defined in the Records Management Manual. The rights and duties of a custodian are also extended to the custodian's designees and to those persons above the custodian in the chain of command."*

Occasionally, custodianship of documents changes due to corporate reorganizations or re-evaluations of who has responsibility for a class of document within a functional area of

the Department. An example of this is the management of personnel records, which are physically located in the Office of Finance (Payroll), but accessed frequently by the Office of Employee Services (Human Resources). These offices share custodianship of data that is maintained in the Human Resource Information System (HRIS), but not necessarily the documents maintained in the personnel files. Custodianship of a document may also change based on the life cycle of a project. For example, construction project documents are maintained (or owned) by various offices throughout the life of a construction project. When a construction project is completed, documents are transferred to Records Management.

Many organizations find that pilot systems, deployed at a workgroup level, have overlapping boundaries when the system is expanded into an enterprise-wide system. Within these environments, it is not uncommon to find that workgroups are duplicating effort by scanning in the same documents. This can happen because of the typically decentralized nature of paper-based systems in which convenience copies of documents are maintained by many offices. A prime example within the DOT is the contract. Many offices maintain their own convenience copies of contracts, but only the Office of Contracts is the custodian of the original. In building an agency-wide vision, the Department must draw upon this knowledge base to clearly define the boundaries of potentially separate DMS repositories. By defining custodianship business rules, duplication of effort (and paper) will be avoided.

2.3.1.1 Action Item - Agency-wide Document Custodianship Guidelines

Without a clear understanding of the importance of document custodianship, the Department may face problems when developing an agency-wide DMS. Therefore, USI recommends the DMS Team adopt a strategy for defining document custodianship within the agency-wide document management system. The Records Management Manual developed by the Office of Document Services (Records Management) defines the custodian of documents created and managed by the DOT. The DMS Team should review Chapter 3 of the Records Management Manual and use the custodian as a check list item for what group would be responsible for input of a particular document type into the agency-wide DMS. A new field should be added to identify the document has been incorporated into the agency-wide DMS. This will be an ongoing initiative as the agency-wide DMS evolves.

2.3.2 Document Classification Schema

One question the Department must answer before pursuing an agency-wide document management system is *"What documents should be put into a DMS? Mission critical, vital, high value, all?"* From a records management perspective, the Department has defined documents to be of high value if their record retention period exceeds three years. This is based on a reasonable premise that all documents have a period in which they are

valuable. Documents that are considered high value should be prioritized over documents which have little value outside of an individual workgroup or documents which are infrequently accessed. Documents which fall into this category have been included in Chapter 3 of the Records Management Manual. The same criteria which has helped the Department determine high value documents should be applied to an agency-wide DMS. The Records Management Manual is a good starting point for expanding on this issue.

A new classification issue which has not been addressed is, *"Should e-mail messages be treated as a record ?"* The next logical question would be, *"Should e-mail messages be saved in a DMS ?"* As the Department moves towards a more electronic means of communication, the Department must consider the implications of treating e-mail messages as documents. The Department is currently using a mainframe based e-mail package called OfficeVision for a majority of inter-office communication. Because e-mail has become such a popular way to communicate, the content of some messages has become an important source of information related to projects which is currently not treated as record material. As with paper documents, users should filter out items such as e-mail lunch invitations from information which should be managed by the organization.

The storage and archival of e-mail messages is currently a limiting constraint for some DOT employees. A fixed amount of mainframe storage is assigned for each Office Vision account. When this storage has been filled to capacity by the mail or note logs, entries must be deleted to make space available for more incoming mail. The archival of Office Vision e-mail indiscriminately downloads mail and note logs to the hard drive. A more cost-effective solution is to use the client-server components of a DMS architecture to manage the "valuable" messages that users want to archive. While this is more of a technology issue than a business issue, it does reflect the need to resolve the basic question of treating e-mail messages as documents.

2.3.2.1 Action Item - Agency-wide Document Committee

USI recommends the DMS Team form an Agency-wide Document Committee (ADC) to develop guidelines for determining what documents should be included in the agency-wide DMS. The ADC should also determine a position on treating e-mail messages as record material and develop guidelines for establishing inclusion into a DMS. The ADC should select committee members from central office, regional offices, and others who are responsible for managing large central repositories of documents such as staff from the Department's central library. Qualified committee members should be familiar with what documents are accessed most frequently by the Department and external entities. The ADC should elect a chair to coordinate the development of the Agency-wide Document guidelines. USI recommends the DMS Team consider appointing a member of the Office of Document Services (Records Management) to chair the ADC based on their familiarity with similar issues addressed in the Records Management Manual. A first draft of an Agency-wide Document guideline should be completed prior to Phase 3 of the Agency-wide Phase Implementation Plan.

2.3.3 Document Retention

Document retention periods are important from an end user efficiency perspective as well as a records management perspective. If all documents were retained indefinitely, users would find it increasingly difficult to locate useful information. From a records management point of view, document retention periods must balance usefulness with sound procedures for disposal by the document custodians. USI has identified three types of document retention classifications that must be considered for the Department's approach to developing an agency-wide document management system: administrative, historical, and legal.

The importance of this issue is currently being faced by Driver Services, which has been using the IBM ImagePlus system since 1990. Many documents scanned into the system have reached the end of their retention schedules and are being deleted manually from the system. In the current environment, this is a cumbersome operation. Any future DMS should incorporate some means of managing documents based on the various types of retention. The business rules for automatically purging documents which have reached the end of their retention period will be important to define prior to production use of a system. The following is a discussion of the three document retention classifications identified.

2.3.3.1 Administrative Retention

Administrative retention means documents are retained by end users for as long as an employee needs the document to get their job done. It also includes the retention of supporting documents that might be needed in the future to validate the final product. Draft documents are considered temporary "Working Papers" which support the development of a final document. Some offices dispose of draft documents once a final document is produced, others maintain draft copies as backup. In most situations, draft or support documents are only meaningful to the workgroup that is responsible for producing a final product. One Iowa DOT office expressed concern that users outside their workgroup would not be able to make sense of the "draft" information that went into the production of a final document. The final product is what is most meaningful to agency-wide users. The issue for the Department is, *"Should users who are not members of the custodian's workgroup have access to draft versions of documents in an agency-wide DMS?"*

2.3.3.2 Historical Retention

Documents that are revised frequently are often distributed to contacts on a distribution list. Ideally, outdated documents should be destroyed once a revised document has been published. This is usually outside the control of the office responsible for document creation and distribution. An example are specifications developed by Specification Engineers which are widely distributed throughout the Department and to consultants outside of the DOT. If a workgroup's responsibility requires retention of previous

(historical) revisions of documents, then supporting documents must be maintained. These documents are usually filed in an office's or individual's own filing space, and they are usually the sole custodian of a specific document type.

Outdated documents are seldom accessed from outside an immediate workgroup. If a question arises regarding previous versions of documents, the responsible workgroup typically performs the research. Historical documents are also important for trend analysis and litigation support. The issue for the Department is, *"Should users who are not members of the custodian's workgroup have access to previous versions of documents in an agency-wide DMS?"*

2.3.3.3 Legal Retention

Legal statutes require that documents be retained by the Department for a specified period of time. These documents **must** be maintained in a media that meets Federal requirements or complies with Iowa Code. Approved media is generally paper, microfilm, or optical disks. Legislation also specifies how this media will be maintained. Documents in this category are generally regarded as highly valuable documents to multiple users within the Department and to external agencies or other public entities. Financial documents such as contracts, purchase orders, and agreements are examples of documents which have a high legal value related to auditing activities. Engineering field books are an example of documents that have legal value based on their technical content, which proves compliance to specifications and regulations.

2.3.3.4 Legal Liability Versus Useful Information

Electronic storage of documents offers the Department a means to stabilize storage costs and office space associated with storing paper documents. With paper based storage, there are only two means of managing storage cost: occupy more storage space or destroy paper documents. Because occupying more physical storage space usually is not practical or cost effective, the Office of Document Services developed the Records Management Manual. This manual defines retention requirements for documents created and managed by the DOT in accordance with Iowa Code Chapter 22 and Rules 761 IAC Chapter 4.

As the Department moves toward document management technology, the importance of adhering to the Records Management Manual will become more apparent. One issue that will become more important is the trade-off between *legal liability* and *historical value*. *Legal liability* assumes that a document which may be used as evidence against the state is available to lawyers as the result of legal retention requirements. *Historical value* refers to an attribute of documents in retaining information which may be useful in a constructive manner to people who perform research. A document with *historical value* may relate lessons learned by previous parties that may benefit future reviewers. For example, historical documents may relate important data about a physical structure such as a bridge or roadway which may be useful in determining many construction issues.

Legal liability is reduced by allowing document custodians to dispose of documents which have reached the end of their legal retention requirements. Documents are a valuable legal tool for lawyers because they offer a form of evidence in pursuit of legal claims against the state. In the same manner, documents can protect agencies such as the DOT by proving innocence against false claims filed against the state. The irony is that documents which may have some historical value to DOT employees or other entities are, in some cases, disposed of to comply with legal retention requirements as defined by Iowa Code. A proposed DMS needs to have an automated means of purging documents at predefined intervals. The questions which need to be answered are:

> *"Should documents which offer historical value of a useful technical nature be exempt from purging, even if it is past its legal retention requirement?"*
>
> *"What are the criteria, if any, that measures the legal liability of a document?"*

This is an issue that should be examined and resolved by the DMS Team.

2.3.3.5 Action Item - Document Retention Guidelines

USI recommends the DMS Team develop guidelines to address how administrative, historical, and legal retention will be addressed by an agency-wide DMS. The guidelines should address:

- Access to draft versions of documents;
- Access to historical versions of documents, and;
- Document purging based on legal retention requirements and historical value.

USI recommends that the DMS Team work with the Office of Document Services (Records Management) to resolve these issues because Records Management is responsible for providing guidance to the DOT employees on document retention issues. The General Counsel staff should work in conjunction with the DMS Team to develop guidelines for identifying documents which the DOT is legally liable to retain. A draft *Document Retention Guideline* should be completed prior to the beginning of Phase 3 of the Agency-wide Phase Implementation Plan.

3. AGENCY-WIDE INDEX DEVELOPMENT

This section of the report discusses issues that relate to developing an agency-wide index for the Department. Since the goal of an agency wide DMS is to share information across the Department, value must be placed in the commonality of index structures. If all like documents are filed with a logical number or indexing scheme, both local and remote offices could then retrieve documents logically and readily. The DMS Team should focus on good policies and procedures to ensure a balance between searching efficiency and a good library of information. This is the basic premise for developing an Agency-wide Index for the Department. The following sections provide additional detail on the issues related to this effort.

3.1 IDENTIFYING AGENCY-WIDE INDEXES

Within the DOT, there are two high level classifications of documents: Operational and construction project related. Operational documents are typically those documents associated with the program areas of the Department which are common to most offices. Operational areas may include personnel administration, policy and procedure distribution, and maps and publications for external distribution, to name just a few. Operational documents have a wide variety of indexing structures requiring some level of customization to a particular business process. The logical file folder identifier may be social security number, driver license number, policy or procedure number, or other that makes the folder unique. For construction project related documents, filing is narrowly defined. Construction related project documents are filed by a project number. Project numbers are meaningful to many offices within the Department. With documents that have a unique folder or document identifier, such as a project, permit, or agreement number, filing is straight forward. In other cases, filing parameters may be more open to the preferences of the person responsible for filing the document.

Lack of standard filing procedures leads to problems when individuals cannot retrieve a document from another office's filing cabinet without the involvement of a knowledgeable person within that office. If consistent document filing procedures are not developed and adhered to by the Department and its offices, users of an electronic DMS may experience the same fundamental problem.

The concept of developing an agency-wide index for the Department, prior to full scale agency-wide DMS acquisition, is a good starting point for the DMS Team. An index, by definition, is information that helps a user locate information. An agency-wide index is defined as a standard set of data fields that may be used to reference common document types which might be entered into an agency-wide DMS. Agency-wide index fields should be meaningful and unambiguous to a large audience. An agency-wide index can be thought of as a data dictionary or data model that can be used as a business rule or guideline for indexing any document that would be filed in a DMS for the Department.

When defining what indexes to use, it is important to identify fields that are necessary to uniquely reference a document that is stored in a DMS. The basic criteria that a good document index must satisfy is, *"Does this information help a user find a document?"* When developing an agency-wide DMS, the index must help a user find a document from an agency-wide database. Examples of agency-wide index fields for the Department include:

- Project Number
- Project Name
- Permit Number
- Agreement Number
- Reference Codes
- File Codes
- Subject
- Author
- Document Dates (Date Received, Date of Publish, etc.)

Document indices such as Project Number and Project Name apply to project related documents only. Document indices such as subject, author, and dates apply to both Project and Operational documents. By building and defining these document index models now, the Department will streamline the work that would otherwise have to be done at a later time by a DMS solution provider. In addition, by centralizing this function, the many offices that might participate in the Department's DMS initiatives will not have to re-invent the wheel each time a unique business application is analyzed. Individual offices can concentrate on the index fields that may be unique to the document types with which their office deals.

3.1.1 Action Item - Agency-wide Index Development

Much work can be done by the DMS Team in the assembly and definition of agency-wide index fields. The Records Management Manual has already developed the essential business guidelines (i.e. file codes) for filing documents when no project number, permit number, or agreement number is applicable. The Office of Data Services is one of the best sources for defining the data characteristics of candidate index fields because of the number of information systems which are dependent on their structures. The work done by the Office of Document Services and the Office of Data Services should provide a foundation for developing agency-wide indexing standards. Their involvement would be an asset to the DMS Team in this area. The DMS Team should set reasonable time expectations for providing a framework or guideline on agency-wide indexing structures

prior to the commencement of any pilot system. This ensures that any selected implementation vendor understands the indexing approach required for the pilot system and subsequent expansion. Guidance may be required in developing an agency-wide index document for the DMS Team. A first draft of a DMS Agency-wide Index document should be completed by the DMS Team prior to Phase 3 of the Agency-wide Phase Implementation Plan.

3.2 INDEXING GUIDELINES

In a DMS, the ability to find a document is highly dependent on the training, experience, and preferences of the indexing personnel. The use of data validation checks through good application and database design can help to minimize some problems, but it will not resolve issues where indexing is an ambiguous operation. The solution is to develop good indexing guidelines. Indexing guidelines are sometimes an afterthought, once a DMS has gone into production. Problems occur when the people who perform indexing operations are not cognizant of how the consumers of information actually search for documents. These problems can be minimized by good design and procedural practices of the indexing operation. A good design starts with selecting document identifiers that are well defined. For example, a project number would have the same attributes, meaning, and characteristics in all offices across different business processes. Document indexes such as record series, document type, or custodian can be implemented as lookup tables when there is a finite number of possible choices. Business rules can be enforced at the DMS application level using lookup tables to perform edit validation of these types of data fields.

Free-form fields, such as project name or subject, are open to different indexing conventions, so use of these fields should have guidelines developed for standardization. When ambiguity exists, conventions and guidelines can help to normalize document indexing. For example, if a document related to the "Great River Bridge" project is received and indexed into a DMS by two different people, one person may enter "Great River Bridge" while the other user abbreviates and enters "GREAT RIVER BRDG" as the project name. A user who then wishes to retrieve all documents related to this project may enter "GREAT RIVER BRIDGE" in the project name field as the search criteria. Without intelligence applied to the data field to be searched, the query would only retrieve documents indexed by that exact project name. As far as the user knows, he or she has retrieved all the information there is related to this subject when in fact, other documents exist.

3.2.1 Action Item - Indexing Guideline Development

USI recommends the DMS Team develop guidelines for defining indexing rules, such as what fields are mandatory and what fields are considered optional. These guidelines should be considered a central repository of knowledge and adhered to by all offices

which may deploy a system fitting the agency-wide model. These guidelines should be used to train personnel who will be responsible for entering documents into an agency-wide DMS. A first draft of a DMS Index Guidelines document should be completed by the DMS Team prior to Phase 3 of the Agency-wide Phase Implementation Plan.

3.3 DOCUMENT CROSS-REFERENCING

Today multiple physical copies of documents are made and filed in different filing cabinets to make it easier to find documents. This is how cross referencing is accomplished in a paper-based environment. USI identified several cross-referencing issues within the Department that should be considered for the agency-wide DMS:

- Filing of construction projects which have multiple projects under the same contract number.
- Project names can change over time.
- Project name aliases.
- Projects that are split into several smaller projects.

With a DMS, cross-referencing is accomplished at the database level. The techniques for assigning cross-references are either manual or automated. In a manual mode, the integrity of the cross-reference in the DMS index database is a function of association by an index operator. An automated approach to cross-referencing index records is to integrate the DMS indexing subsystem with an existing DOT information system which already has the cross-reference data relationships defined.

3.3.1 Action Item - Identify Information Systems for DMS integration

The DMS Team should identify the DOT information systems which may be used to perform cross-referencing of document indexes entered into the agency-wide DMS. The Office of Data Services should provide assistance in this effort due to the number of information systems supported by this office. The DMS Team should create a data model which maps agency-wide index fields to the existing DOT information system data where possible. The DMS Team should consider obtaining an agency-wide DMS solution that is flexible enough to integrate with existing information systems.

While USI believes an integrated approach is more desirable because of improved data integrity, it will introduce a level of customization from the DMS solution provider. Customization will increase cost. The DMS Team should consider the cost effectiveness of this issue when pilot systems are defined in Phase 3 during any pilot studies.

3.4 LOCATION SPECIFIC DOCUMENTS

Many offices within the DOT work primarily with construction project related documents. One attribute that gives these documents a unique dimension is that construction projects are associated to a specific location. The location may be a stretch of roadway between two mile posts (nodes), or a point on a map, such as a railroad crossing. In either case, the DOT offices that are consumers of construction project information have expressed a desire to use a geographical referencing application to get to documents associated with a location. This is why GIS and DMS application integration becomes an important issue.

The location component information that makes a location unique is similar to what makes a document unique. Both involve establishing a user definable identifier, made up of one or more components, that make the entity unique. However, when indexing a document into a DMS, the user may know a project number or project name, but may not know or care of the location information associated with the project. In this example, the link between a DMS and a GIS database is the project number. Other documents may use other links. For example, an accident report form may use an accident report number to establish a link between systems. The functional domains of the GIS and DMS applications are separately defined, but these examples illustrate where the two systems may interact.

3.4.1 Action Item - Integration of DMS with GIS

There are several issues related to GIS and DMS integration that the DMS Team must develop a strategy for. These are:

- Hardware/Software standards—the coexistence of systems on the same infrastructure
- Level of integration—seamless to standalone
- Who needs GIS, DMS, and who needs both?—cost-effectiveness
- What system will be deployed first? GIS or DMS?—level of complexity

Pros and cons of various approaches must be considered by the DMS Team prior to the full scale rollout of either system. The DMS Team should work with the GIS Coordinating Committee to develop a plan for integration. The time frame for this activity should be determined by the DMS Team when a pilot system is developed that involves a GIS component.

4. COMPUTER INFRASTRUCTURE

This section of the report examines the need for developing the Department's Computer Infrastructure to support the needs of an agency-wide DMS. In order to develop an effective plan, the USI team analyzed where the Department is today with its computing environment, including the existing system in Driver Services. The second part of the analysis is to provide recommended guidelines for improving the infrastructure for future DMS development. USI's assessment is based on a high level analysis of the technology components of the current environment, as well as issues that may impact the Department's support staff.

4.1 ANALYSIS OF EXISTING COMPUTER INFRASTRUCTURE

The following sections provide a purpose for the analysis, a history of computing at the DOT, and an overview of the Department's current environment.

The purpose of defining the current infrastructure is to understand the direction of technological enhancement necessary to implement a DOT agency-wide DMS. Additionally, a definition of the current and planned infrastructure is necessary when establishing criteria for DMS requirements.

4.1.1 Current Environment

IBM has been a quality part of Iowa DOT for some time. As a result, the DOT is fairly committed to IBM equipment, including a mainframe IDMS database with 3270 monitors or 3270 emulation. The information system applications used in the DOT are mostly IDMS based. There is a current install base of 920 dumb terminals, and approximately 2,250 PCs with an estimated user base of approximately 3,700 DOT employees. There is public access to the DOT's mainframe, but access is limited. These terminals are routinely used for tasks such as timesheets, travel vouchers, inventory requests, and other DOT mainframe based applications. Certain workgroups use other IDMS applications extensively, and because of their high usage they are fairly proficient at using character based interfaces. Many other groups, however, expressed their concern that the usability of the character based 3270 applications were difficult to learn and use.

There are currently 1,000 Graphical User Interface (GUI) enabled PC workstations installed at Iowa DOT, a number that is growing quickly. There is a scheduled phase-in of computer upgrades DOT-wide that should be completed in two to three years. This upgrade will provide most users with a Windows based PC which is required to support the growing number of Windows based office automation products that are being used by the DOT employees. One advantage the mainframe has over a PC based distributed environment is centralized control of computing resources. With the distributed nature of

a client server environment, control of computer resources presents a whole new set of support issues for the Department's IS staff.

One approach the Department can use to offset the complexities of supporting a large install base of PCs is to employ the concept of a "common desktop." A "common desktop" is a standard PC configuration that will be the same from one user to another in the organization, at least in regards to corporate applications and information. Of the current installed base of workstations, there is no "common desktop" approach. The different software and hardware configurations cause support difficulties and interoperability problems. A user bringing a file from one PC to the next may not be able to find the appropriate application or version of software necessary to work with the file. Retrieving information from someone else's computer may also be a problem, as the directory structures from PC to PC may be completely different. There is no problem with capital equipment being customized to a user's preference, but corporate applications and information stored/accessed in a standardized manner would benefit the user community.

Data Services has recently designed the Project Development Division's project directory structure in an effort to standardize electronic filing. The office has created a script file which will build an entire project directory structure automatically for a user, saving time and improving quality by reducing typos when naming directories. However, while a standard directory structure is a good starting point for improving the way users file and search for electronically stored documents, the next evolutionary stage for many DOT users will be the file sharing capabilities provided by LAN based file servers. Many users still use a floppy disk to transfer files between PCs, which is extremely inefficient. Sharing files over a LAN will be a large step forward for offices which have PCs that are not networked to a file server. One group that has taken advantage of this is Project Development, who is moving the management of their project files to a file server. This is an example of what could be accomplished DOT-wide and implemented as "day forward" for all new projects. Conversion of the existing project directory structures could take place as resources permit.

Another problem with supporting a variety of desktop arrangements is complexity. Each customized workstation may have a degree of complexity added for each degree of customization. In other words, support staff will have difficulty in maintaining these systems because of the degree by which they are customized.

There seems to be a real need at the user level for Internet access which does not seem to be supported. For example the Federal Transit Authority (FTA) will, in the near term, force all users of their documentation to request and retrieve it via the Internet. The Internet can be an extremely valuable source of information.

The Iowa Communication Network (ICN) is a Fiber optic network statewide which can provide a backbone for remote access to the Department's DMS. A fiber optic network is an ideal physical layer for wide area network (WAN) access to a DMS.

4.1.2 Recommendations

The following are recommendations for consideration by the DOT as it implements/upgrades to new technology throughout the Department. By identifying hardware and software requirements for the DMS, the Department can use these guidelines to develop the computing infrastructure to support the implementation of an agency-wide DMS.

- ***Monitors - Considerations for resolution, screen size, and graphics acceleration must be considered when choosing a monitor type for a DMS workstation.***

Imaging monitors are critical factors in a user's acceptance or rejection of a computer system providing document image access. As with workstations, the cheapest solution may not be the best. Available monitor resolutions range from 640x480 to 1600x1200+ pixels. Most small 14" monitors operate at either 640x480 or 800x600 resolution. Many users will judge the system on the idea that documents are difficult to read on a small 14" monitor. With advances in display technology, the 19" high resolution monitor has become a standard and is a well received addition to the typical DMS environment. The larger 19" monitors offer a screen resolution of between 1024x768 and 1280x1024, and users are able to see an entire document page at once. CADD or imaging monitors typically have a resolution of 1600x1200. A 20" 1600x1200 resolution monitor can comfortably display two 8½x11" sheets of paper with minimal scaling and optimal quality.

Because these monitors can be expensive, a 1280x1024 resolution 19" monitor may be substituted as a less costly alternative in a pilot environment. If the user will be spending the majority of their time in front of the monitor, the 20" 1600x1200 may be beneficial. All other users who would not need to view images can use their existing monitors. All high-speed scanning, index, and quality control workstations should have the better monitors. Grayscale monitors that support hardware-assisted "scale-to-gray" display capabilities, such as the Cornerstone line of monitors, are highly recommended. These types of monitors are used in the Driver Services area for the IBM system. Studies indicate that these high resolution monitors offer the best display for reducing eye fatigue. For workstations (scanning, indexing, quality control, etc.) that do not deal in color overlays of CADD, the grayscale monitor is perfect for bitonal (black and white) images.

- ***Memory and computing power - There must be a minimum standard workstation configuration to meet the demands of DMS graphics intensive operations.***

Workstation computers can be dedicated imaging workstations, common access workstations, or personal desktop computers. The recommended minimum architecture is a 486 or Pentium computer running Microsoft Windows or another Graphical User Interface (GUI) with the capacity to run Windows based applications. The following

minimum and optimal client workstation configurations are recommended for each of the designated DMS users who will need to view images on screen. As application software grows and technology advances these configurations should be upgraded.

486 Based PC - Minimum

8 MB RAM (16 MB RAM recommended for view stations)
450 MB hard drive
Network interface card (token ring, ethernet)
Windows 3.1, Windows for Workgroups 3.11, IBM OS/2, or Windows NT client

Pentium Pro Based PC - Optimal

16 - 32 MB RAM
1 GB hard drive
Network interface card (token ring, ethernet)
IBM OS/2 or Windows NT client

- ***LAN/WAN - Protocol stacks necessary to run DMS***

The majority of the current install base of document management systems nationwide support TCP/IP as a communications protocol. TCP/IP is also required to support Internet/Intranet enabled DOT users. Today, TCP/IP is used in most large corporate networks to give users access to a wide variety of platforms on different networks. Windows NT and Windows 95 both ship with a TCP/IP stack as part of the operating system. Internet/Intranet technology is a compelling reason for adopting TCP/IP as the preferred networking protocol standard for the Department's agency-wide DMS initiative. Most PC network operating system products support dual protocol stacks running concurrently from client PC workstations. This will give the Department flexibility in selecting a solution that will support more than one standard.

- ***Standards - A standard approach to file system creation and naming, to be consistent with an agreed upon method such as the one employed by Project Development, will lay the foundation for current and future DMS initiatives.***

Standards should include consistent request and definition of user ids and passwords across networks, corporate application software and server operating systems.

4.1.3 Action Item- Implementation/Upgrade Oversight

The DMS Team needs to employ a specific party responsible for ensuring the recommendations, discussed in Section 4.1.2, are considered during infrastructure development and procurement of new technology which may be used in conjunction with DMS initiatives.

4.2 DMS LAB DEVELOPMENT

USI recognizes the Department has limited funds available for allocation to document management pilots. USI believes it would be in the Department's best interest to establish a means by which projects could be developed and simulated in a controlled lab environment. This lab should utilize representative equipment that would be indicative of agency-wide capable components. This should be done before moving pilots into a production prototype phase. USI recommends the DMS team expand the role of the computer training lab for DMS prototype applications. The end result of a prototype implementation would be documentation of actual production process improvements, value added benefits, and lessons learned. This will give the Department invaluable information and knowledge necessary to rapidly move projects into production implementations. It will also promote the cohesiveness and commitment to standards necessary to move towards an agency-wide implementation.

DMS Lab Development Recommendation

USI recommends the Department establish a central DMS production prototype lab. This facility will contain a fully functional, networked DMS infrastructure. The purpose of the controlled development environment is to test document management software, technology concepts, integration, production throughput, response times, standards, and assimilation of DMS into distinct business processes. The controlled development environment would allow proposed pilots to test their system design and technology concepts on a system, before the components are purchased. Multiple projects can share hardware, software, and lessons learned to better prepare themselves for a production prototype implementation. Furthermore, the controlled development environment will allow the team to gather production data to further justify the benefits of document management to individual work processes.

The Lab should include at least:

- One server
- Four workstations equipped with high resolution monitors
- A high speed duplex scanner
- A mid range simple scanner (up to 11" x 17" scanning)
- A high speed printer
- A fax server
- OCR software
- A document management server (more than one is recommended)
- An SQL database server

Consulting and integration services will be necessary to:

- Install the system
- Customize the system for the individual offices
- Perform custom integration
- Train end users
- Establish quantifiable baseline production criteria.

After the testing of all production prototypes, the system components can be used for actual production implementation in select systems. The results of the systems being developed in a controlled environment can be documented in a concise report that addresses:

- Objectives Achieved
- Objectives not Achieved?
- Metrics (Quantifiable results ex: performance data)
- Usability
- Lessons learned
- Hardware Software Requirements
- Recommendations
- Staffing levels expected
- Proven & Disproved assumptions

The benefits of using a Lab are:

- More bang for the buck
- Multiple units can benefit from shared lessons learned
- Technology concepts can be more readily shared between pilot candidates
- More systems can be implemented
- The utility of the system can be measured before procuring hardware and software
- Pilot projects can use higher end hardware and software

It is USI's belief that this approach will be the most beneficial to the Department. There are few in the Department with experience in using DMS in production environments critical to their Offices' operation. This central production prototype environment will give more employees the ability to learn the "ins and outs" of document management before a full production system is procured for their office. USI further recommends that business process re-engineering (BPR) studies be executed in parallel or in conjunction with the prototype installation. This will give employees food for thought in the identification or process improvements using document management and system integration.

4.3 ANALYSIS OF THE DRIVER SERVICES SYSTEM

USI's analysis is high level and based on analysis of the technology components of the Driver Services system and of the business processes that have been automated. The following sections provide a purpose, history, and lessons learned from the analysis of the Driver Services system.

The purpose of this section is to give a brief background of the Imaging system implemented in Driver Services and identify some lessons learned from this experience. Lessons learned by Driver Services may be used to aid in the agency-wide implementation of future DMS initiatives. The following is a summary of the analysis.

4.3.1 Current System

Before the advent of imaging in Driver Services, processing of paper was laborious. Misplaced or unprocessed documents were common. During the month of March 1990, Driver Services began automating the processing of key documents using a combination of mainframe ImagePlus and CICS applications. The Driver Services system is accessed using OS/2 clients which communicate via a token ring LAN. This system was developed in order to improve performance in a group that was encumbered by too much paper. As the imaging system grew, a Reduction in Force was imposed while work loads increased. Still, productivity gains in the group, over time, were tremendous. Productivity was increasing while the cost of doing business was declining. A direct correlation can be made between these results and the implementation of imaging automation tools in the workgroup.

Another automation approach worthy of note is that of the Motor Carrier Services automated permits issuance. This is one area where a simple technology has been shown to have a significant boost in productivity through the use of LAN based FAX servers. Several FAX servers were recently added to expand the functionality of the Driver Services and Motor Carrier Services systems. These FAX servers have allowed users to both receive incoming faxed documents and transmit documents to customers directly from a user's PC. Electronic FAX-out is much more effective than printing and then

faxing through standard office FAX machines. Likewise, receiving incoming faxes electronically reduces inefficiencies in input processing, because the user does not have to scan a paper copy of the document to input it into the system. In addition, the Motor Carrier system has been implemented to allow users through a CICS application to use IBM character based terminals to initiate faxing without having an expensive image enabled PC workstation. This is a very cost-effective way to extend the power of a document management system to users who need limited functional access to the system.

4.3.2 Lessons Learned

The result of having already automated a process successfully give the Department some excellent experience on which to build. The DOT now has a demonstrated success showing how well an imaging system, in a transactions/forms processing environment, can improve productivity quantifiably (see IBM's *Benefit Analysis: Implementation of Document Imaging*). It also shows:

- How technology can be used as the groundwork for better business processing
- The importance of proper training when implementing new technology
- The importance of deploying with proper equipment (e.g., large monitors where necessary)
- The importance of commitment from management
- The importance of committing time and resources
- The importance of having a DMS "champion"

4.3.2.1 Different Models For Different Needs

The Driver Services model demonstrates well how an imaging system may be used in a transactions/forms processing environment. In this model, images (documents) are static and maintained as reference materials to be used during the work process.

It should be stressed, however, that the current driver services system is an image management system and not a document management system. In other words, the current system does not implement the functionality to "manage" files of multiple format and relate them to viewers and/or native applications for modifications. Future DMS implementations should implement a file type independence across all platforms to ensure seamless viewing and/or editing of all file types.

4.3.2.2 Business Process Re-engineering

The implementation of the system at Driver Services shows the benefits of using technology as a groundwork for improving the process life cycle. In other words, the technology laid the foundation for process improvement, but using the automation along with distributed processing and the implementation of self-directed work teams led to even higher productivity (see IBM's *Benefit Analysis: Implementation of Document Imaging*). This demonstrates how automation alone does not supply a complete solution. Advances in technology have created new opportunities for process improvement. Document management is often the catalyst for these re-engineering efforts. The key to re-engineering is to eliminate handling and distribution of paper documents where possible, and to streamline the process.

4.3.2.3 Invest in Proper Equipment

The importance of deploying with the proper equipment is also essential for a successful implementation. For example, large monitors are required to process documents and simultaneously have other critical application components visible also. It would not be effective to implement a DMS using a monitor size that required the user to "jump" from window to window. As data entry must occur while the user is looking at the image, large monitors greatly speed up processing. The *Recommendations* section of the *Current Infrastructure Analysis* addresses the minimally required components necessary for a DMS.

4.3.2.4 Management Support

The management in Driver Services was behind the imaging system effort. Staff may be ineffective with the new technology if their supervisory commitment seems indeterminate. Management must maintain the proper vision and support through the growing pains.

4.3.2.5 No Quick Fix

The implementation of the system in Driver Services took approximately two years to mature. This means that the growing pains of conversion, training, attrition, etc. were overcome. The time must be committed to accomplish the task. None of this will happen overnight and the Department should not expect to plug in the system and go immediately into production.

4.3.2.6 Customization vs. Upgradability

The customization of a purchased DMS will directly affect its upgradability. The IMAGEPlus software installed in Driver Services has been customized and, at this point, is no longer upgradeable to the newer versions of the off the shelf product. When choosing a DMS some considerations are:

- Flexibility - Must be able to meet the DMS needs of a broad range of business processes
- Scalability - The ability to perform well in both large and small scale implementations
- Forward Compatibility - An example of this would be a word processor that allows one to open documents from previous versions. In a DMS, the indexing methods and design may be customized to a certain version and "dumping" the data to a newer version is difficult at best. This is difficult to determine and can only be estimated through a study of the software's history and software producer's plans

4.3.3 Conclusions

It is clear that the Driver Services system yielded significant processing improvements. However, the IMAGEPlus software installed in Driver Services has been customized and, at this point, is no longer compatible with the current market version of the software. It also does not meet the needs of an agency-wide DMS. Currently, all indexing and search screens are character based/function key driven interfaces. The DOT should not implement the current Driver Services system technology for future DMS implementations.

Business applications are not represented in the Driver Services model. These applications include, but are not limited to, WordPerfect, MS Word, MS Excel, and MicroStation. In general, the Department is supporting a large number of office automation products to generate documents in support of internal operations and to generate documents which are distributed to external sources. The source documents generated by these applications must be supported in an agency-wide DMS.

This system has shown how technology can improve efficiency within a workgroup. The technology choices that the Department must pursue in acquisition of an agency-wide solution are very complex. Although the Driver Services model may not be an agency-wide solution, the lessons learned are universal and should be taken into account during future DMS initiatives.

4.3.4 Action Item - Evaluate Lessons Learned

The DMS Team needs to employ a specific party responsible for ensuring the lessons learned, discussed in Section 4.3.2, are used by the Department when considering future DMS acquisitions.

5. PILOT DEVELOPMENT

This section discusses issues related to the identification of pilot DMS environments and issues related to agency-wide expansion. USI is proposing that the Department start with the identification of pilots that will test a number of functional areas within the DOT's business processes. The following issues establish a framework for USI's approach to a pilot development strategy:

- *DMS Development Life Cycle*
- *Workgroup Analysis*
- *Pilot Concept Development*
- *Pilot Candidates*
- *Pilot Prioritization*

This approach to incremental growth expresses USI's belief that agency-wide document management systems are evolutionary, not revolutionary. The following sections examine these issues in more detail.

5.1 DMS DEVELOPMENT LIFE CYCLE

In order to understand the issues related to an effective pilot development program, it is important to define a typical DMS development life cycle. The term "pilot" can mean different things to different people; therefore, USI offers the following definitions for the various phases of DMS development.

> ***Prototype***—*A system designed to test technology within a restricted and well defined business process with potentially throw-away components.*
>
> ***Pilot***—*A system designed to test the application of technology in the automation of a document processing activities in a business process that can be measured and quantified by metrics established for the system. Pilots generally include the purchase of hardware and software that can be reused and expanded. Software layers such as the document management system and the Relational Data Base Management System (RDBMS) can be migrated to a production prototype if required.*
>
> ***Production Prototype***—*A turnkey system designed to test the application of technology in the automation of a business process under full production capacity. A production system that can be measured and quantified by metrics established for the system.*
>
> ***System Roll Out***—*The activity associated with the distribution and implementation of a proven pilot or production prototype to other*

organizations. System roll out typically includes installation, system acceptance, training, and production turnover.

***Enterprise Document Management**—A platform capable of supporting interoperability between physically separate document management systems deployed on various local area networks (LAN). Within an enterprise document management system, client workstations can access remote document repositories over a wide area network (WAN) supported by carrier-provided services, dedicated facilities, or both. Enterprise document management system databases may be distinct localized RDBMS that are accessed manually, or they may be redundant replicated RDBMS structures that are transparently accessed by a client workstation.*

In the context of document management systems, automation of a business process refers to the automation of document processing activities within a business process. These processes include filing, retrieval, workflow, distribution, review, red-lining, and storage of documents. The full automation of any business process within the DOT will not be handled by a document management system alone.

Going after the entire enterprise at once isn't the best strategy for the Department. USI believes the industry model which ensures the greatest chance for success is one of incremental growth. That is, you must learn to walk before you can run. The same is true for using document management technology. By targeting key business processes within distinct workgroups, the DOT can expand successful pilots into an agency-wide DMS solution. Exhibit 5-1 depicts a recommended scenario for a DMS development life cycle.

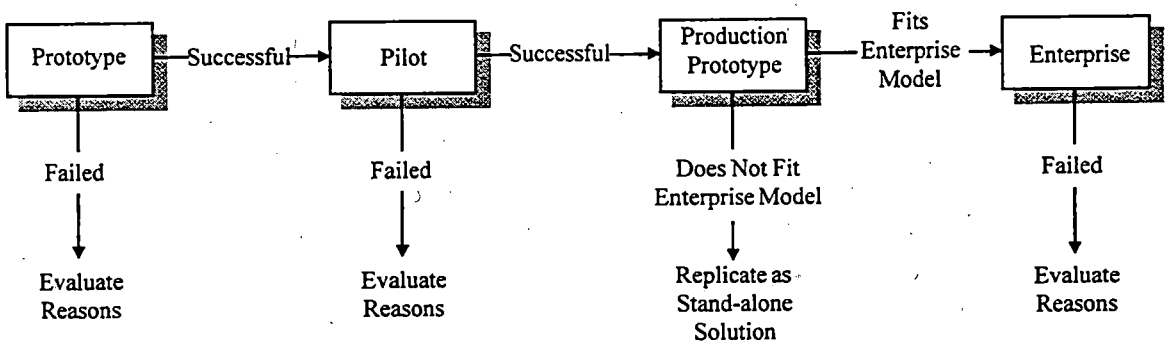


Exhibit 5-1 DMS Development Life Cycle

This life cycle depicts the various stages leading up to a fully functional agency-wide DMS. A prototype system is not required in most situations. Most technology components of a DMS are mainstream enough that testing for technology proof-of-concept is not a primary goal. However, if a business process depends on the success of a key technology component like intelligent character recognition (ICR) for hand writing recognition, then a prototype might be an inexpensive decision tool.

A pilot is the starting point for most systems. If a pilot system fails, the reasons for failure must be evaluated. A course of action depends on the reasons for failure, and the level of difficulty required to solve the problem(s). Was the product not providing the level of functionality needed? Was the scope of the project to big? Was the skill level of the users insufficient? Was there enough technical support for end users? Whatever course is chosen thereafter, the lessons learned from experiencing failure should be shared with others.

If a pilot succeeds, the system may then be expanded to full production capacity. A pilot which proves to be effective in one business process can be rolled out to multiple offices in one of two ways:

1. A small scale functional pilot which is expanded within the office later
2. A fully functional production prototype ready to use in a production mode

From the production prototype stage, there are two choices: the system either does or does not fit the agency-wide model. If it does, meaning it is compatible with the Department's agency-wide DMS standards, it will add a new document repository which is accessible throughout the agency. If it does not fit the agency-wide model, it still may be rolled out to other offices that perform the same or similar business processes, but it will not be an agency-wide resource.

5.2 WORKGROUP ANALYSIS

The purpose of this section is to show that different workgroups have different document management needs based on the mission and business processes within a "workgroup." The term "workgroup" is an industry term used to describe a group of people who perform similar functions along some organizational boundary. For the analysis of the DOT environment, USI classified workgroups at either the office or section level. Many potential pilots can be referenced in terms of workgroup analysis. These groupings can help the DOT recognize where systems designed to automate different business processes involving different workgroups fit into the overall agency-wide vision for the DMS. Examples of these groupings include:

- Services vs. Support
- Business vs. Engineering
- Internal vs. External
- Document User Classifications
- DMS Application Models

An effective pilot development process must evaluate pilots based on where they fit into the DOT's business model. Each of these logical groupings has implications on how to proceed and measure the success of each pilot.

5.2.1 Services vs. Support

The DOT offices either provide services or support. That is, they are either working to provide a service, or performing tasks to support internal/external customers. Some support offices further break work down into small but distinct projects. Service related pilots include those processes which handle documents specifically related to projects, where the document can be indexed by project number. Projects are either construction or non-construction related. Non-construction project documents are usually more specific to a workgroup environment. Construction project files are accessed actively by many DOT offices and external sources.

Service projects have a distinct beginning and an end. On the other hand, support continues indefinitely. Support related pilots are those which are focused on assisting the Department in conducting daily work activities. Support related document management systems are more broad-based to Department employees. Most offices fit either a service or support model; however, some fit both.

Because support work processes often involve a large cross-section of the Department, it is more difficult to pilot some support oriented business models with a DMS. Service oriented business processes may be easier to test as a "day forward" approach as a DMS is implemented, allowing existing projects to complete using established document management methods. In addition, construction project files fit the agency-wide model, where projects specific to individual workgroups may not. USI recommends the Department use this consideration for initially pilot prioritizing construction project business processes over non-construction, or support oriented business processes. As the agency-wide system evolves, other types of business processes can be automated within the agency-wide system infrastructure.

5.2.2 Business vs. Engineering

Computing needs of business and engineering related offices share some common elements. However, the computer platforms and documents which are most critical to each area may be different. Users within business offices are more active users of the mainframe's computing power, while engineering offices have aggressively migrated much of their computing needs to PC workstation applications and workgroup servers. Both areas share the need to access the mainframe for e-mail, scheduling, and IDMS applications, and both areas use PC-based office automation products such as WordPerfect.

In the context of DMS pilots, there is a real difference between the functional needs of an administrative office handling business type documents (e.g., letter and legal sized documents) and that of an office handling documents which are engineering in nature (e.g., 11" x 17" drawings, CADD files, etc.). Each of the offices involved within the

DMS study have distinct business and/or engineering related documents. Some offices need exclusive access to business documents, while others need access to both. The computer equipment and software needed for electronically managing business sized documents is different than what is needed for engineering documents. Large color monitors, CADD viewing software, and engineering scanners are generally more high-end than the grayscale monitors and business document viewers found in a document management system designed for letter and legal sized documents. The Department should consider the higher cost implications for those users who need access to CADD files and maps when procurement of the agency-wide DMS components begin.

5.2.3 Internal vs. External

It is important to distinguish between external and internal access when examining how multiple systems will control documents within their functional domain. Some DMS repositories will be accessed exclusively by Department employees, while others need to consider access by external agencies, contractors, legal offices, and other public entities. This comparison is not intended to show whether documents are created internally or externally, but rather who needs access to documents once they are input into a document management system. USI recommends the Department develop pilots that will test the effectiveness of document management systems for both internal and external access. An Internet home page for Iowa DOT will be a good starting point for testing access to the DOT documents by the general public. USI recommends the DOT Internet home page be given high priority as a pilot program for the DMS initiative.

5.2.4 Document User Categories

USI interviewed a large cross-section of Department employees who work with both electronic and paper documents alike. Not all the DOT employees work with documents in the same manner. From the analysis, USI developed a categorization of document users within the Department. These are:

- Creators of documents
- Reviewers of other people's documents
- Collectors of other people's documents
- Forms processors
- Creators of forms or boilerplate
- Publishers and distributors of documents

- Researchers of documents in various locations (auditors, lawyers, litigation support)

Each of these classifications has functional requirements for a document management system. While some users fit only one category, most users fit a combination of classifications. The following is a description of functional requirements for each classification of users.

5.2.4.1 Creators

Creators of documents are those people who generate the documents which are to be managed by a DMS. Documents are created in two ways: 1) manually, by filling out a paper form, or 2) electronically, using a word processor, spreadsheet, or some other program to create an electronic document. Although some documents are created electronically, the lack of a LAN environment causes most users to print hard copies for most document processing activities. Documents are created both internally by Iowa DOT employees and externally by consultants, contractors, county, State, and Federal agencies, and other public entities.

5.2.4.2 Reviewers

Some users within the Department review documents that are created by another office or section. These people are more users of information than generators of information. Offices perform auditing or review of publications that are generated within the Department before they are distributed externally. Examples include:

- Transportation Finance: This group performs revenue forecasting and statistical analysis by reviewing documents created by various offices in the Department.

- Media and Marketing: This office reviews publications generated by other offices for content, grammar, and political correctness before printing and distribution to the general public.

5.2.4.3 Collectors

Many offices collect document types on a small scale which may not be widely used in most offices. Several offices are chartered with the responsibility to collect and file documents that are generated by both internal and external sources. These offices typically manage a central filing area within an office or Division, or at the Department level. Most of these offices' time is spent filing, sorting, and servicing requests for documents. Although they have a general idea as to the number of documents copied, there is little statistical information maintained as to what users are accessing documents, how many documents are retrieved each time, and for what purposes they are being retrieved. The primary offices that are chartered with this function are the Document

Services (Records Management) and Employee Services (Library) offices, which are under the Operations and Finance division. Offices responsible for the collection of documents have traditionally been an important source of historical information for the Department.

5.2.4.4 Forms Processors

Forms processors are users who extract data from paper documents and perform data entry into an on-line information system. These users generally work in a transaction oriented environment in which data forms are collected and coded by data entry personnel. How much of the form information is input into an on-line information system is a function of the data value and data structure. Data value weighs the percentage of data that is highly valuable versus data that is infrequently accessed, but does relate important information. If 100 percent of the data on the form was extracted and entered into an on-line information system as data, then there should be no informational value to holding on to the paper document. However, some offices do file the original documents after performing data entry. This usually indicates there is either a valid retention requirement for the paper or there is information, such as a hand written signature, that validates the supporting information. Examples of forms processing environments include:

- Driver Services: This office processes a number of applications for Iowa citizens related to operating vehicles within the State.

- Motor Carrier Services: This office processes permit applications for commercial carriers within the state.

- Office of Finance (Payroll): This office manages the DOT Personnel Files which contain a large number of forms related to the DOT employment records.

5.2.4.5 Creators of Forms or Boilerplate

There are two forms of document templates within the Department: forms and boilerplate documents. The Office of Document Services (Graphic Arts/Forms) is responsible for the creation and maintenance of all the DOT forms that are designed to collect data for any office within the Department. While the mission is to keep this a very centralized function within the Department, in practice some offices maintain their own forms which are customized for their needs. Control of boilerplate documents is more dispersed among various offices throughout the Department. Boilerplate documents typically are controlled by the office which is responsible for a specific class of documents such as contracts, specifications, or form letters. WordPerfect word processing documents are the most standard form of boilerplate documents within the DOT. Many offices use the boilerplate documents maintained by other offices to develop custom documents. Examples are the Office of Policy and Legislative Services, which

maintains the standard layout for policies, and the Office of Contracts, which maintains standard contract document boilerplate.

5.2.4.6 Publishers and Distributors of Documents

The Office of Document Services, Printing section is responsible for printing and distributing annually revised publications to both internal and external sources. This Office provides support to many offices within the Department that produce published documents for distribution. Not all documents published by the DOT are handled by Document Services. Many offices produce documents which are distributed to internal users or a small number of external groups. A workgroup that is responsible for a specific document type is often more in touch with who needs access to their product than an office performing a centralized distribution function. Several Iowa DOT offices, involved in the publishing and distribution of documents, indicated that maintaining an up-to-date distribution list is one of their most labor intensive operations.

The Mail Services section is an example of a workgroup that exclusively performs the sorting of documents for distribution. Mail Services is responsible for processing documents that are received by and sent out from the mail room. Mail room staff must sort incoming documents and deliver them to the addressee, and they must send outgoing mail through the regular mail. The current operation is extremely efficient in handling paper, and paper will always exist within this office because of the sheer volume and variety of incoming and outgoing mail. However, the Department does have control over what the DOT offices send internally and the format in which they are sent, paper versus electronic documents, or data. It is this area where the Department can focus on reducing the amount of paperwork that Mail Services processes.

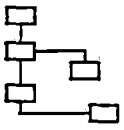
5.2.4.7 Researchers

There are several offices within the DOT that perform a significant amount of research across a large cross-section of the Department's document resources. These offices are more consumers of information than creators of information. Divisions such as Engineering depend on the availability of documents produced by the other DOT offices to do their work. Many offices must research documents to find information to satisfy a request from an external source. The office must first find documents and then copy and distribute documents to the requester, which is a great deal of paperwork. Since most research involves working with documents that are created by other offices, workgroups who perform research are potentially the greatest beneficiaries of an agency-wide DMS. For example, Engineering, Transportation Data, Auditing, and Field Services.

5.2.5 DMS Application Model

The application models for DMS environments are: Transaction Processing, File Folder, Archival, Document Generation (Publications), Technical, and Workflow. An application type describes a category of applications that share common attributes. Some of the offices interviewed contain elements of more than one application type. In order to pick an appropriate DMS solution, the Department should understand the different application types or models defined for the DMS, and which of these models best fits the needs of each workgroup. The major features of each application model are shown in Exhibit 5-2

Exhibit 5-2 Application Model

	Application Type	*Document Organization*	*Focus of Performance*	*Functional Example*	*Specialized Technologies*
	**Transaction Processing**	Single Transactions	End User Customer	Accounts Payable Driver Services	MiniCartridge Jukeboxes
	**File Folder**	Documents within File Folder	Customer	Project Files	N/A
	**Archival/ Repository**	Individual Documents	Application Dependent	Engineering Records Archive Agreements	WORM
	**Document Generation**	Application Dependent	Application Dependent	Specifications Iowa Codes	CD-ROM High Speed Printers
	**Engineering**	File Folder	Generally End User	Engineering Drawings System ROW Maps As-Built Plans	Large Size Scanners and Printer/Plotters, Specialized Processing Boards, Editing Software
	**Workflow**	Work Package	End User	Agreement Development Policy & Procedures Development	Workflow Processing Software, Electronic Signatures

The application model which best describes the attributes required by the document processes within an office can vary. The various models provide a foundation for the functional requirements necessary for a DMS implementation. The documents, offices, and processes can be managed by using a combination of the application models. In conducting the user interviews with various offices, USI developed a functional matrix which illustrates what each office's general document processing needs are. These functional needs are based on USI's high-level assessment of each office's most significant business processes discussed during the interviews.

5.3 PILOT CANDIDATES

The purpose of this section is to identify issues involved with pilot selection and implementation. The DOT personnel communicated some pessimism regarding the success of a DMS implementation. Knowing this, a pilot should be chosen that has a low degree of risk, but still maintains the integrity of representing a complete process. A successful pilot will promote a "belief" in the DMS thereby eliminating some of the pessimism.

Previous pilots involving the driver services imaging system provided some lessons learned. Some of the feedback garnered from the previous pilots aided in the creation of the items identified below.

5.3.1 Pilot Key Points

The following list provides some key characteristics to consider when identifying potential pilot projects. It also identifies some important issues to help plan for success.

- **Willing Target Group** - The targeted workgroup should be a willing participant.
- **Enthusiastic Target Group** - The targeted workgroup should be enthusiastic about being involved in the advent of new technology.
- **Identifiable Process** - There first must be an identifiable process. A beginning and end definition of expectations, who has access needs, routing needs, update needs. What goes in and what comes out.
- **Simplicity** - An automated complex process is still a complex process. Depending on the workgroup sophistication and other complementary training issues, the level of complexity should be kept low.
- **Process Redesign** - Automating a bad process produces a bad automated process. There may be cases where a re-engineering of the process is in order.
- **Available Resources** - A time commitment from participants AND support staff is required.
- **Need** - Implementing a pilot in an area where need is apparent will give a higher possibility of success.
- **Small Scope** - The scope, initially, should be contained within a definable work process. Expansion to other processes can occur at some point later.
- **Growth Potential** - Possibility of growth within and external to the workgroup for follow-on process implementation.
- **DMS Education** - Some familiarity with DMS concepts is required so training for the pilot would be minimal. Pilot users should not have to learn "on the job."
- **GUI Familiarity** - Target group somewhat familiar with Graphical User Interface concepts and environment. Minimize amounts of new technology introduced at one time.

- **Moral Support and Commitment from Management** - The user community should know that management is involved and supports the DMS initiatives.

- **Cost** - A less complex, low-risk pilot will be less costly. This is measured in full time equivalent commitment and support staff.

- **Day Forward vs. Backfile Conversion** - A pilot that would provide for a "day forward" approach is usually more cost and time effective than pilots involving a backfile conversion of existing/historical documents.

5.3.2 Possible Pilot Identification

USI used the following definition from Webster's Dictionary: *Candidate: One apt to gain a certain position or come to a certain fate,* as a starting point in selecting the DMS pilot candidates from those workgroups interviewed. Unwilling participants are less likely to pursue a successful conclusion to a pilot, therefore, USI looked for **willingness** as the number one criteria for consideration for DMS pilot candidates. This characteristic was determined through analysis of interviews. The analysis was to determine simply whether or not the workgroup responded positively to the question "Should your group become a document management pilot project?", refer to Appendix C - question 22. **Identifiable** processes listed were determined through analysis of the interview responses and USI's discussion notes. **Enthusiasm** was subjectively determined through USI's involvement in the interviews. It is noteworthy that the list of potential pilot processes should not be limited to those shown. Additional potential pilot processes may be determined during the Phase 2 analysis.

Exhibit 5-3 Pilot Candidates

Workgroup	Process
Design	Hearing Transcripts Standard Road Plans - Red Book Plans Review Plans Preparation
East Central Iowa Transportation Center	Project Files As-Built plans
Document Services (Records Management)	Permits - Subset
Employee Services	Grievances/Disciplinary Rules and Regulations
Engineering (Safety)	Accident Reports
Engineering (Traffic)	As-Built plans
Library Services	Professional Magazines/Publications on-line
Local Systems - East Central	Agreements

Iowa Transportation Center	Project files
Maintenance Division	Adopt a Highway. Utility Agreements Utility Permits As-Built plans or As-Maintained plans
Maintenance Field Office - East Central Iowa Transportation Center	830-435 Form filled out at end of each projects completion Cost memos Accident forms Personal injury forms Traffic pattern maps
Materials	Instructional Memorandums (IM) As-Built plans Specifications Research abstracts
Media and Marketing	News Clippings Photographs
Motor Carrier Services	Interstate Registration Plan (IRP)
Policy and Legislative Services	Federal Issues Handbook - produced internally U.S. Code and Federal Registry on-line
Procurement and Distributions	Material Safety Data Sheets (MSDS)
Vehicle Services	Dealers on-line registration Official state vehicle titling On site dealer inspections/investigation Daily activity reports - possibly electronic form
Project Planning (Public Hearings)	Public Hearing files
Right of Way - East Central Iowa Transportation Center	Maps - Survey, Cornerstone, Strip
Right of Way - Ames	Workflow tracking Deeds Conveyances Contracts
Transportation Data	Maps - On-line CADD files
Motor Vehicle Enforcement	Officer daily report - submitted weekly

The DMS Team may want to develop a matrix which list Pilot Key Points and other pilot processes which can be further defined in a more detailed analysis efforts.

5.3.3 Additional Pilot Themes:

5.3.3.1 On-line Publications

Iowa Code, Administrative Rules, Transportation Laws, DOT Policies and Procedures, Specifications or other manuals required by each office could be centralized on-line. A possible pilot might be to put some of these on CD-ROM for on-line access. A DMS client could then be installed on few workstations dispersed throughout the Department (i.e. one in each defined workgroup).

5.3.3.2 Internet / Intranet

Another scenario might be to create a server based interface to a DOT Internet home page and allow the user base of this reference to grow as user community Internet access grows. A day forward approach to Internet/Intranet access can promote incremental growth of the agency-wide DMS. Posting of State Transportation Improvement Program (STIP), 5 Year Plan, Bid Letting announcements, etc., on the Iowa DOT home page would be a good way to promote the Department's customer service.

5.4 PILOT CONCEPT DEVELOPMENT

The automation of any complex business process as a long-term goal is good, but the scope may be too much for a pilot project. The reason for a pilot is to validate a concept. USI recommends that the DMS team identify pilots with a conservative scope. A pilot with a scope that deals only with a portion of a complex business process will have benefit to a distinct workgroup. By controlling the scope of a pilot to a manageable level, the Department can be more effective at implementing, managing, and proving the technology. This approach will give the Department a chance to develop a fully functional production system by incremental expansion of proven pilot systems.

As a first step for this initiative, USI recommends the DMS Team pursue the development of pilot concepts for key businesses processes involving heavy paperwork or electronic file management within several workgroups in the Department. The pilots should be targeted towards DMS environments for a number of functional areas within the Department. The DMS Team should solicit workgroups interested in a DMS pilot to submit a "DMS Pilot Fact Sheet" document which describes the business process to automate and perceived resources required. The purpose of developing the fact sheet is to give the team a standard way to compare the pilots with a short two- to three-page summary. Suggested contents for the fact sheet include:

1. **Project Contact**: Name, office, phone #
2. **Project Description**: A brief description of the project and process to be automated

3. **Project Staffing**: Identification of potential end users, system administrators, or document input personnel within the office

4. **Project Benefits**: A list of expected benefits for the office or for other customers of a production system

5. **Inventory and Status of Files**: A brief description of the documents involved, paper or electronic, and a description of how these are currently managed

6. **Potential Funding Sources**: List any potential funding sources, including outside grants

The fact sheet is a starting point for the DMS Team's pilot concept development. The Team may wish to add to or modify this information as needed. End user involvement in the DMS program at a workgroup level will promote a commitment to the success of the overall agency-wide DMS program. The Team should provide guidelines for this pilot concept development initiative to selected participants. The Team should then select the top candidates (e.g. five to ten) based on the criteria in the following section, and pursue a more detailed functional analysis for each potential pilot.

5.5 PILOT STUDIES

After the DMS Team has collected and reviewed a number of "DMS Pilot Fact Sheets," detailed functional reports can be developed for each of the top candidate pilots selected. Pilot studies are an effective way to clarify the functional needs of individual business processes within the Department. The following is a recommended structure for defining a pilot study.

1. **Workflow Analysis.** Define an inventory of the document types that are associated with one or several of an office's most document intensive business processes (whether paper or electronic files). From the documents identified, develop present state workflows to analyze how technology can be applied to the process or processes within the office. Workflows should identify the life cycle of documents from origination to disposal.

2. **Hardware, Software, and Staffing Requirements.** Review existing hardware, software and staffing being utilized by the office(s) and make recommendations as to requirements if a pilot is to be fully implemented within the Department's Agency-wide DMS. In addition, the DOT should document requirements for training and staffing for the implementation of each pilot project. Further, the analysis can depict how to bridge the gap between the present and desired technical state. This will permit the Department to formulate short- and long-term human resource requirements based on the differences between present and future states.

3. **Agency-wide Implementation Recommendation.** Make recommendations for the "agency-wide" implementation of each pilot project. Potential Agency-wide Index fields should be identified as well as any additional indexes that are unique to the office.

4. **Costs/Benefit Analysis.** Identify costs and benefits of using automation techniques. In addition, the cost/benefit analysis should note additional benefits (if any) when an "agency-wide" implementation is accomplished. The calculated costs/benefits can later be compared to results as demonstrated in a pilot project to measure the relative cost-effectiveness of the system.

The Department can use a more detailed functional and cost/benefit analysis to prioritize the projects based on their contribution to the Department's Agency-wide document management mission.

5.6 PILOT PRIORITIZATION

Once all reports are developed, the Department should develop criteria to objectively examine the priority in which the pilots should be initiated. This effort will be the final stage before selecting the initial pilot. USI has developed a method to prioritize the value of pilot projects for other customers, described below:

- A weighting factor is assigned to the criteria so the sum of the weights equals one hundred percent
- For each project and each criterion, a score from one to five is assigned
- The sum of the criteria score times the weight was calculated for each project to establish a final score. This final score is used to prioritize the pilots

Exhibit 5-4 is an example of how USI derived these priorities for the Florida DOT's pilots.

Exhibit 5-4 Pilot Priority Matrix

Pilot Name	Enterprise Savings	Utilization of Existing Funds	Complexity	Document Capture	Scalability	Importance to Department Mission	Integration with Department Applications	Total
	50%	10%	10%	10%	10%	5%	5%	100%
CMIS	5	5	5	4	5	5	2	4.75
EPPS	5	4	4	4	5	4	3	4.55
CIPS	4	4	1	5	4	5	5	3.90
CCFS	4	3	1	5	5	4	3	3.75
PRMS	4	3	1	5	4	2	5	3.65
BISP	3	4	4	5	3	2	5	3.45
SO	3	2	4	2	2	1	3	2.70
DC/SS	3	3	5	1	2	1	1	2.70
DC/Rail	1	1	5	1	1	1	2	1.45

USI recommends using similar criteria to determine the order in which pilot systems are developed for the Iowa DOT.

5.7 ACQUISITION PROCESS PLAN

Implementing an agency-wide DMS will require planning and carefully derived milestones to measure project status. Once an organization has decided to proceed with an agency-wide system, proposals are usually distributed for pilot systems. After a pilot system has proven its advertised capabilities, the DOT can move forward with enhancements and agency-wide installation.

There are usually three major steps in selecting a vendor that can provide the desired services and a viable solution: the Request for Information (RFI), the Request for Proposal (RFP), and the Live Test Demo (LTD). Alternate steps in the vendor selection process are: RFI, LTD, and then select a vendor(s) for the pilot(s) phase, excluding the RFP process. These activities help to formulate a logical and sequential method in choosing an appropriate vendor. The documents must accurately describe, represent, and prioritize the DMS needs of the Department.

- An RFI, Request for Information, is usually a prototype specification for the desired system. An RFI will set the tone and define the scope of effort to the vendor. Included in the RFI should be some background information about Iowa DOT, the desired results of the system, and pointed questions about a vendor's product capabilities and unit costs for DMS components.

- After the DOT has selected a "short list" of contenders, usually about one month is given to the vendors to prepare for a Live Test Demo. On-site activities will occur for one week, beginning with process identification and culminating with the actual LTD. DOT may consider having the vendor provide installation procedures so that the Department's Support Teams can evaluate the effectiveness of the vendor's installation procedures.

- LTD evaluation period. After the LTDs are completed, the DMS Team should summarize the results and compare the vendor solutions. As the selection process moves forward, the DOT should obtain clarifications and answers to its questions.

- Based on the information gained and the perceived feasibility of the demonstrated solutions, the DOT can develop a RFP or Request for Proposal. This details the scope of the pilot and requires specific solution and implementation costs.

- After the final prices have been received, the Department will have the means to select a vendor with the most efficient solution. Once a vendor has been selected, the contract award can be made.

- The Department must first understand the phases involved with an DMS implementation through both a pilot and agency-wide perspective. Once all phases of an implementation have been defined by the Department, a specific schedule of events associated with an implementation plan can be provided.

There a number of tools (approaches) available to the DOT in selecting possible DMS solutions. A plan is a guideline and at any given time should be flexible enough to incorporate new approaches. Iowa DOT should research the DMS acquisition approaches used by other DOT agencies. The Highway Engineering Exchange Program (HEEP) is one example of an organization that provides sharing of technology initiatives between DOTs.

6. HUMAN RESOURCE DEVELOPMENT

The Department must be committed to developing person skills within the DOT to ensure the success of the proposed agency-wide document management system (DMS) initiative. This section addresses a strategy for human resource development, which refers to issues impacting people. The DOT employees have experienced a great deal of change over the past several years. They are expected to provide the same level of service even though staff level have decreased in many areas of the Department. These business realities must be balanced with a need to invest in the development of skills for those employees who will be expected to use new technologies. USI proposes the following to aid in the development of the human resources necessary for an agency-wide DMS.

- *Change Management Concepts*
- *Communication*
- *Training*
- *Roles and Responsibilities*

These issues are discussed in the following section.

6.1 CHANGE MANAGEMENT CONCEPTS

Change management entails developing strategies to bring about change to an organization. The ability to adapt to changes in the way the DOT will perform work with the aid of document management technology is critical to the success of the DMS initiative. It is important that this be communicated throughout the Department. USI has also identified several issues related to change management that must be communicated to the Department employees who will be involved in the development of the agency-wide DMS.

6.1.1 Less Paper versus Paperless

The introduction of document management technologies into the DOT business processes will bring change to many offices. The term "the paperless office" is often synonymous with document management systems. However, it often concerns those people who fear losing the paper copies of documents to which they are accustomed.

It is important that the term "paperless" is not used loosely to describe the DMS solution envisioned for the Department. As DMS comes on-line, users gradually should become more comfortable with the technology and should use electronic versions of documents as much as possible. While DMS technology does bring change to office culture, the goal should be to move towards *less* paper and recognize that paper documents will continue to exist where needed.

6.1.2 Internal Iowa DOT Customer Service

The major beneficiaries of an agency-wide DMS will be the consumers of information, which include many DOT workgroups. The Maintenance Division is an example of a group that might realize productivity improvements through basic archival capabilities. Their productivity gains would, in some cases, be a direct result of the efforts of other offices who put their end products (published documents) into an agency-wide DMS. This illustrates how workgroups will contribute to improved customer service within the DOT. There are many offices within the DOT who are direct customers of other DOT offices. The offices who produce and manage documents for the Department will be the offices which will build the Department's corporate knowledge base in an agency-wide DMS.

6.1.3 Commitment to Quality

Currently, if a user wants to see all documents related to a particular project, the user needs to get documents from many offices. This is a difficult proposition at best. The alternative is to request documents from the central files maintained by Records Management. These files may be the best resource the Department has to offer in any one location, but these files contain only those documents which Records Management receives. The quality and completeness of the central files is only as good as the quality and procedures of the various offices that contribute to Records Management. Perceptions of quality and completeness are also important issues from an end user's perspective. If the perception is that the most complete information is spread out to several offices, users will tend to spend valuable time searching for documents in many locations.

An agency-wide DMS will allow for the creation of logical file structures made up of a collection of documents from various offices. The primary goal of an agency-wide DMS is to create the most complete document resources possible. ***The quality and completeness of information in an electronic document management system is only as good as the participating offices' commitment level to the success of the system.*** The DMS Team should obtain the involvement and input of as many potential end users of an agency-wide system as possible. Involvement fosters commitment.

6.2 COMMUNICATIONS

An important part of change management is to inform the participating community of activities currently under development and of long range plans. USI recommends the following approach for communicating the Department's efforts in developing agency-wide information resources:

- *DMS Newsletter:* Distribute a newsletter including the status of current DMS related activities. The frequency of distribution should be determined by the responsible publishers. Additionally, the newsletter might discuss concepts, project background, who is heading up each initiative, proposed schedules, DMS education, and the impact on the DOT personnel. If the level of effort to develop a new newsletter is restrictive, the Department may wish to consider other possible sources of distribution, such as the DOT's *INSIDE Magazine.*

- *DMS User Group:* A DMS User Group meeting can also expose the user community to issues, but carries the communications effort one step further. User Group meetings allow visual and sometimes hands-on connection with DMS initiatives. Suggested activities include vendor demos, questions and answers sessions, open discussions, and surveys, etc. Results from the User Group meetings are beneficial to both the presenters and the attendees as concerns and issues are discussed and attendees feel they have contributed.

The development of communication programs will involve the participation of several Department Committees including, but not limited to, the IP Steering Committee, the DMS Team, the Site Manager Team and the GIS Coordinating Committee.

6.3 TRAINING PROGRAMS

USI proposes two types of training for the Department's document management initiative. First, the Department should develop training suited for a Training Center environment, where users can learn the basic concepts of document management technology. Secondly, the Department should formulate training oriented towards the production use of a document management system. These training programs can then be replicated to the DOT offices when systems are rolled-out. The DMS Team should solicit the involvement of the Office of Employee Service (Training) group to provide guidance in developing training material that conforms to the DOT standards.

6.3.1 Learning Center

USI recommends the DMS Team establish a Learning Center within the Department to provide those who are interested in document management a means to be exposed to DMS technology. To accommodate this desire, the following training course will provide the DOT personnel with hands-on experience in order to gain a general understanding of DMS. Please see Section 4 for more information on the Learning Center/Lab.

Fundamentals of DMS Training—This training course provides a system and functional overview of DMS technology and shows how such a system can benefit business processes. The training will provide hands-on experience on Lab

equipement and include discussions of the DMS life cycle. This course is designed for individuals who are new to DMS technology and its concepts. Additionally, this course is recommended as a prerequisite to the production training courses describe in the next section.

Course Duration: 2 hours/ 2 sessions

The DMS Team may wish to consider other training media, such as video taped training programs developed by professional organizations like AIIM. Use of the Internet may be another source of information for users to improve their basic exposure to document management technologies. The DOT could provide a generic account to show Internet sites that may provide invaluable information to those users who don't currently have access to the Internet.

6.3.2 Pilot "Production" Training

As part of the implementation effort of a DMS, production system training must be provided in order for the Department to operate the system to its fullest capacity. Since training is generally the user's first view of the system, it is imperative that the training provided be tailored to the user and the system. Course outlines and training manuals specific to each course should be provided. These manuals are used to supplement both the lecture and hands-on portions of each training session. When applicable, training exercises should be developed to be used as part of hands-on training to ensure the most effective learning experience. All other documentation, including commercial off-the-shelf User's and Operations Manuals, on-line help, and DMS user documentation should be available at the time of training.

There are various costs to consider in the development and distribution of training materials, besides the costs of actually conducting training sessions. The total cost will vary depending on the number of training sessions required to accommodate the total number of students. Course sizes should be limited in order to ensure each student the proper level of attention. In order to diminish the costs of training all potential DMS users, an alternative is to have the DMS vendor train key Iowa DOT personnel only. Those who are trained by the vendor would in turn train all other personnel. This technique is known as "Train the Trainer."

6.3.3 Training Prerequisites

Before training proceeds, it is important that each individual is adequately proficient in the use of the Windows and GUI (graphical user interface) environment. If there are users who are not experienced in Windows, the Department should provide an in-house training course prior to DMS training. Experience in Windows is an essential prerequisite for anyone planning on attending the training sessions. One of the questions posed during the user interviews was related to determining the relative Windows

experience at the office level. While this experience varied from proficient to no experience, it is USI's opinion that most offices are at a sufficient level of experience for the introduction of DMS into various workgroups. USI bases this opinion in part on the Department's plan to install Windows enabled PCs throughout the Department and the expected time frame for implementation of the DMS.

Additionally, the Department may require the "Fundamentals of DMS" training course described earlier as a prerequisite.

6.3.4 Training Curriculum

Training should be broken down into separate curriculums to address specific functions and aspects of the DMS. The following paragraphs contain an overview of the standard training courses usually provided for a DMS, the recommended course size, and the time required for each course. If more than the recommended number of students is required for a particular training course, additional sessions of the course may be required. The actual courses, size, and timing issues will ultimately be decided by the solution provider implementing the DMS.

Estimated course durations and the number of training sessions that would be feasible with 2 trainers operating in parallel are made in the following section. The following types of training are recommended as the minimum required for a pilot DMS are:

Document Input Training—Document Input Training provides detailed instructions and exercises to instruct the user on how to scan, index, and perform quality control (QC) on documents. Users are instructed on how to use the various scanners and document feeders required by scanning, the specific index criteria, the indexing function, and the techniques used to successfully QC a document. This course is designed for personnel responsible for document input, indexing, and quality control and not general users of the system.

Course Duration: 20 hours/2 sessions

Document Retrieval Training—Document Retrieval Training (intended for the general user) will instruct users on the various search and retrieval methods available within the system. This course will focus on document viewing and editing functions, such as paging, image rotation, panning, zooming, workflow processing, and document printing. This course is geared specifically to the everyday user who will be retrieving and viewing documents as part of their daily workflow.

Course Duration: 8 hours/2 sessions

System Administrator Training—The System Administrator Training course is designed specifically for the user(s) responsible for maintaining the daily operations of the system. This course provides in-depth instruction for both the

hardware and software components of the system; the procedures required to maintain the system; the techniques necessary to provide user assistance; and day-to-day troubleshooting.

Course Duration: 8 hours/1 session, 2 trainers

Training schedules should be established also for all subsequent pilot roll-outs. Once the DOT personnel are trained, the DOT can become self-sufficient by assuming the role of trainer with minimal support required from the solution provider.

6.4 ROLES AND RESPONSIBILITIES

USI believes it is important to identify the roles and responsibilities of personnel who will be involved in the development of the Department's agency-wide document management system. The DMS Team should formulate their own structure for these roles and responsibilities prior to moving forward with a full scale program. USI has worked with the Florida Department of Transportation (FDOT) in this area for their enterprise Electronic Document Management System (EDMS) initiative. USI has provided a draft copy of the proposed roles and responsibilities for this project in Appendix E, *Roles and Responsibilities*. FDOT has made the decision to outsource the development of document management applications within certain areas. Iowa DOT may choose to develop these skills internally instead; however, the level of commitment for these roles is potentially full-time. The Iowa DOT DMS Team can review this document as a starting point for consideration.

APPENDIX A. GLOSSARY OF TERMS

This Glossary of Terms provides a definition of terms related to document management systems. The Document Management Alliance (DMA) created this glossary and USI customized the glossary to coincide with the Strategic Plan. The glossary is provided as a reference for the Strategic Plan.

- A -	
Access	The ability to view document-based information after passing existing authorization and authentication tests.
Architecture	The specifications that detail the system design and components used to implement applications, providing a blueprint to assist developers during design and construction. The specifications that detail all of the technologies utilized in the delivery of solutions.
Archive (1)	A feature of Document Management systems, in which infrequently accessed documents are moved to off-line or near-line storage areas.
Archive (2)	A copy of data on disks, CD-ROM, magnetic tape, etc., for long term storage and later possible access.
Attributes	The descriptive information about a document; depending on the Document Management system, it mat or may not include document content.
Authentication	Refers to determining the identity of the user attempting the access.
Authoring	The process of creating content that may be managed by a Document Management system.
Authorization	Refers to determining the set of privileges available to the user.
- B -	
Backup	A process, either scheduled or ad hoc, to copy data and files to another storage subsystem, usually optical or tape. Either all files or recently modified files are marked for backup.
- C -	
Capture	The acquisition of documents through conversion of hard-copy formats, such as paper, microfilm, and microfiche, into an electronic format.
CD-ROM	Compact Disc Read-Only Memory. An optical technology for storing data. CD-ROMs currently hold more than 600 megabytes of data. Their low cost enables mass distribution of data.

Check-in / Check-out	An EDM feature that coordinates document updates among multiple users. Check-in and check-out functions can be de fined to support a wide range of versioning and collaborative authoring schemes.
(COLD) Computer Output to Laser Disk	A means of converting report data on legacy mainframe systems to text documents on a client-server system.
Conversion	To change the format of a document, or a component within a document. The act of conversion may be further classified into types of conversion - conversion between character sets, con version between word processor formats, or conversion between different page description languages. Conversions that actually change the logical structure of a document are frequently referred to as document transformations. This distinction is used to indicate that changes in the logical structure of a document may result in the addition, deletion, or reordering of document components; e.g., adding required elements to create a parsable instance of an SGML document.
Creation	The function of adding content and attribute information, either in the form of an original document, or as one derived from an existing document.
- D -	
Database	A collection of data with a given structure for accepting, storing, and providing data on demand. Typically, databases provide a more robust environment for the storage of persistent data than that provided by OS file systems. Characteristics of databases include multi-user concurrence controls, journaling, data dictionaries for modeling meta-data, user de finable schema, strong data typing, and sophisticated query languages.
Digital Signature	A mark, encrypted or unencrypted, used in the approval process for a document.
Distribution Media	Output media for storage and replication of documents.
DMA	Document Management Alliance.
Document	A collection of information that pertains to a particular subject or related subjects.
Document Interchange Format	The rules for representing documents for the purpose of inter change.
Document Management	The total set of processes, people, standards, tools, and systems to make effective use of documents.

Document Management Alliance	(DMA) Formed from the merger of two previous standards groups (Shamrock and DEN), the Document Management Alliance is an AIIM task force, consisting of users, platform providers, and document management service vendors, dedicated to developing a specification for the universal interoperability of all document management applications and repositories.
Document Retrieval	The ability to search for, select, and use a document from a storage repository.
Dynamic Data Exchange	(DDE) Dynamic Data Exchange. A single-node, inter-process messaging protocol developed by Microsoft for use in the Microsoft Windows family of operating systems.
- E -	
EDI	Electronic Data Interchange.
EDM (1)	Engineering Document Management.
EDM (2)	Enterprise Document Management.
Electronic Data Interchange	(EDI) The exchange of data and documents between different users according to standardized (ANSI X.12, EDIFACT) rules.
Engineering Document Management	(EDM 1) The management of engineering-related data and documents.
Enterprise	A corporate user base, typically operating within a LAN/WAN environment and encompassing an entire organization, therefore containing multiple diverse groups that may have different and potentially incompatible computer systems.
Enterprise Document Management	(EDM 2) The management of document-based information across an enterprise.
- F -	
FAX	The use of a telephone system for the electronic transmission and receipt of hard copy images, utilizing CCITT Group 3 or 4 compression.
Forms Processing	A type of data entry facilitated by forms.
Full-Text Retrieval	A document search method based on document text content.
- G -	
Groupware	Software that allows people on the network to participate in a joint project.
- I -	

Image Management	A system designed to handle the requirements of image-based documents.
Indexing	The process of associating attributes with a document for retrieval purposes. The process of creating data structures to speed the searching of attributes; e.g., "create an index on the title field".
- R -	
Retrieval	The process of copying documents or portions of documents from a Document Management system.
- S -	
Scanning	The process of converting paper or other hard copy into digital format.
Security	The rules that restrict access to documents: authentication refers to determining the identity of the user attempting the access; authorization refers to determining the set of privileges available to the user.
Storage Management	A system implemented to allow users to gather and search large numbers of documents.
- T -	
Transmission Control Procedure /Internet Protocol	TCP/IP is used in most large corporate networks to give users access to a wide variety of platforms on different networks. It is also the protocol of the Internet
- V -	
Version Control	An Document Management feature, whereby multiple versions of a document (which can be created after repeated check-ins) are managed.
View	The process of displaying the contents of a document in human-readable form.
- WXYZ -	
Workflow	Refers to automating group business processes by sequencing tasks and routing information based on business rules and the roles people play in the process.
Workgroup	The term "workgroup" is an industry term used to describe a group of people who perform similar functions along some organizational boundary. For the analysis of the DOT environment, USI classified workgroups at either the office or section level.

World-Wide Web	(WWW) An Internet service that enables users to read and fetch documents from around the world.
WWW	World-Wide Web .

APPENDIX B. QUICK HITS

Quick Hits are areas in which the Department can improve with minimal effort while providing an almost immediate return on investment. The ultimate goal of quick hits is to improve internal and external customer satisfaction with minimal impact to cost and resource allocation. USI identified a few quick hits during the interview process as Iowa DOT's needs were matched against the present-state technical architecture. The following subsections describe the areas which require improvement and USI's quick hit suggestions.

Quick Hit 1: Word Processing Revision Control

Most offices within the Department currently use WordPerfect (WP) as the standard word processor for PC workstations running DOS, Windows, or OS/2. It is possible for some offices to take advantage of these revision control features, namely redline and strikeout. However, the functionality is not as automated as it is in some other word processing software packages, such as Microsoft Word. WordPerfect version 6.1 is necessary to provide the level of revision control which would most benefit the Department. Most WordPerfect users interviewed were not aware of WP's revision control features, so additional education and training is required.

Electronic distribution of documents is an issue related to revision control. Distribution to all parties responsible for document revision can be problematic unless all parties in the distribution loop have the same word processor with the same configuration. The Department currently has a mixed environment of WordPerfect version levels. Most users are running WordPerfect 5.1, which operates under DOS. However, a growing number of users with Windows workstations are running WP version 6.1. A migration to a homogeneous environment for all users to the Windows WP version 6.1 is the optimal solution.

Naturally, it will take time, training, and upgrade funds to complete the migration to version 6.1.

Part of the training effort includes convincing users to make the switch to the Windows version of WordPerfect. Some users are using Windows or OS/2 configured PCs, but are running the DOS version of WordPerfect because they are not comfortable with the Windows WP version. Users indicated they can work more efficiently with key strokes than with mouse cursor control in the Windows environment. One way to ease the transition is to first access the **Preferences** dialog box under the **Edit** menu, Exhibit B-1, then use the **WPDOS Compatible** keyboard map option, Exhibit B-2.

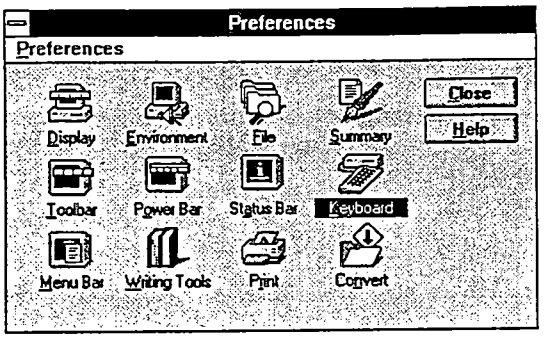


Exhibit B-1 Preferences

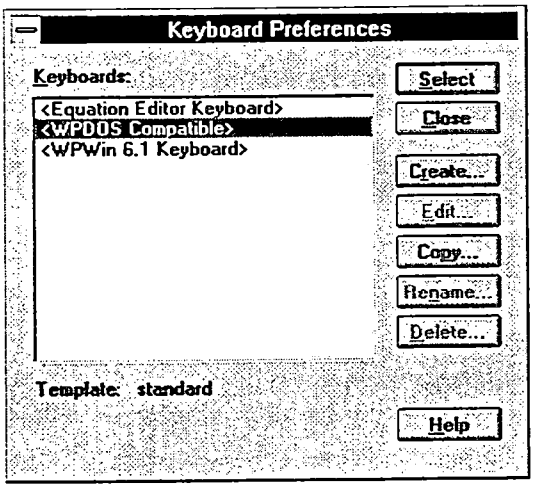


Exhibit B-2 Keyboard Preferences Window

This will allow the Windows version to emulate the DOS version of WP, thus easing the transition.

The IS support staff needs to develop a basic training guide for WP version 6.1 enablement of the DOS keyboard mapping option. User training guides should also be developed for the use of revision control features. Department users will obtain the most benefit when PCs are attached to a LAN on which the WP source files are accessed from a shared network drive.

In summary, USI recommends the IS support staff develop a procedure which details an internal process for using the revision control features of WP. Procedures will assist in documents which are reviewed within the scope of an individual workgroup, such as

reviews by the Marketing and Media office, and those that involve interoffice reviews and processing.

Quick Hit 2: Office Vision (O/V) Education

There are users within the DOT who do not use or know the abilities, however cumbersome, of Office Vision. Given some additional information on Office Vision (such as the Internet mail and file attachment features), users will become more productive in their use of interoffice and external electronic mail.

Another issue to monitor is the acquisition of Lotus by IBM, which may mean an integration between Office Vision and Lotus cc:Mail. This would provide an easier transition to LAN based e-mail, which could be more tightly integrated with DMS technology.

Quick Hit 3: DMS Education

Some early phase education concerning document management systems (DMS) will enable the individuals involved in the DMS Team to have some document management "*know how*" going into later phases. This will empower individuals to form more educated opinions regarding strategy, planning, and requirements analysis issues. USI has used this technique frequently and finds that user education early in the DMS analysis process brings greater user acceptance of the system. Training materials may also be offered to the eventual DMS users to inform them of DMS issues and functionality. Please refer to Section 6, Human Resource Development--Communications for additional information.

Quick Hit 4: Fax Server

A FAX server allows a user to electronically send and receive a document without having to generate a paper copy. Commercial-off-the-shelf (COTS) products currently provide FAX solutions where the FAX/modem appears as an additional printer to the user. The following is a recommended platform for a FAX server:

486 Based FAX server
8 MB RAM
500 MB hard drive
2 28.8 modems
2 dedicated phone lines
Network interface card (token-ring)
Windows 3.1, Windows for Workgroups 3.11, or Windows NT client
DOS 5.x or 6.x
FAX software

Quick Hit 5: Internet Access Guidelines

Developing guidelines for requesting Internet access will aid in determining a user's need and also determine usage rules. A portion of DOT personnel obviously have a need, in some cases bordering on critical, for access to Internet information. Currently, many users feel this need is not being met, for reasons ranging from no network connectivity to requests being refused or delayed.

Quick Hit 6: Know the Market

What are other State Departments of Transportation doing? Research on other transportation-centric businesses may provide lessons learned and lower the Iowa DOT learning curve. The Internet is a powerful tool for such research and information sharing. California (www.dot.ca.com), Virginia (pratt/vtrc.virginia.edu/vdot.html), and Ohio (www.dot.state.oh.us), among others, have Internet home pages which describe their activities. These can be found by performing a search on "department transportation" with a World Wide Web browser such as Netscape. Another valuable home page is the *Independent Forum for Intelligent Transportation Systems — On-Line* (www.itsonline.com).

Quick Hit 7: Business Process Analysis/Re-engineering (BPA/BPR)

Identification of problem areas in current business processes would prove beneficial when implementing a DMS; automation of a faulty process produces a faulty automated process. BPR can be costly in terms of both time and money, but there are some problems which are common knowledge and could be addressed in a quick hit manner. One example of this is the story of the manager who signed for something, sent the paperwork on to be endorsed by another manager, who in turn sent it back to the original manager to sign a second time. Based on recommendations by the Blue Ribbon Task Force, Appendix Recommendation #2 - Streamline and automate paperwork processes, the DOT has received direction addressing this issue.

Quick Hit 8: CD-ROM Server/Jukebox

A centralized CD-ROM server or jukebox containing commonly used manuals and information would be useful in eliminating the numerous copies currently circulated. These include Iowa DOT Policies and Procedures, Iowa Code, Materials Specifications, etc. If this information is available on CD-ROM and users have easy access to the LAN where the CD resides, paper distribution could be completely eliminated. The DMS Team may wish to get a jump start on CD-ROM technology by obtaining CD-ROM Authoring software such as Alchemy, required to copy files to CD-ROM media. The purchase price for some CD-ROM Authoring software is relatively inexpensive and evaluation copies of this software can usually be obtained for free. Alternatively, some CD-R devices come bundled with CD-ROM authoring software; prices range from $1300.00 to $3500.00.

(*Imaging Magazine*, June 1996). The implementation of this technology should be "day forward." That is, new documents only should be placed on-line as they are published.

Quick Hit 9: File and Directory Naming Standards

Mechanisms used to intelligently organize electronic documents are often defined by a user through the use of directory and file naming conventions. Users are often constrained by the operating system which they are using to create a personalized electronic filing structure. An eight-character file name limit in DOS requires a level of ingenuity, and file names are often cryptic to others who need to search for files created by other users. Document management systems have evolved from a necessity to provide greater flexibility in referencing and finding electronic documents than can be achieved by the file management features inherent in many computer operating systems.

Setting standards for file naming, directory structures, and desktops could be an area where improvements in access and support could be seen in the short-term. Also, setting a directory and file naming standard is a "first step" approach to document indexing.

APPENDIX C.
SAMPLE QUESTIONNAIRES

This section provides a sample of the interview and the private questionnaires used for the gathering of information in regards to the DOT's business processes and infrastructure. Section 1, Interview Questionnaire, is the complete package sent to the DOT prior to the scheduled interviews and used in each of the interviews. Section 2, Private Questionnaire, is the anonymous questionnaire that was distributed to each interview participant. USI asked each recipient to answer the questions and return their responses to USI with name optional. The purpose of the private questionnaire was to gain feedback that may not be volunteered otherwise; employees are usually more apt to discuss issues without providing their names.

Section 1. Interview Questionnaire

Iowa Department of Transportation (DOT)
Document Management System (DMS)

INTERVIEW GUIDE

Date: _____ **Time:** _____

Interview Site:

- ❑ Central Office - Ames
- ❑ Driver Services
- ❑ Other, Please Specify:

_____

Attendees:

Name	Office*	Job Title
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

** Please note district, if other than the above interview site.*

Interviewer(s):

_____ _____

Scribe(s):

_____ _____

Attachments obtained during interview:

_____

_____

1. Project Background

The purpose of the Iowa Department of Transportation (DOT) Document Management System (DMS) Strategic Plan is to create a "road map" to provide an overall direction for DMS initiatives, taking into consideration both short- and long-term Department goals. However, before these future goals can be established, the current state must be understood. USI is conducting a current state analysis that will focus on the Iowa DOT's existing document management operations and recommend strategies for automating those operations to the greatest extent possible by means of a DMS. A critical component of this analysis is to conduct interviews with personnel identified as representatives of the major administrative and operational areas of the Department which have a significant potential for benefit from automation of existing document management processes. In preparation for the interview process which will commence on August 12, 1996, USI has prepared a preliminary questionnaire which will be used to gather information pertaining to the Department's existing document management processes and the Department's goals for reduced paper processing. This preliminary questionnaire will allow participants to prepare for the actual interviews which will be conducted at the Central Office and the Cedar Rapids Transportation Center.

In addition to the preliminary questionnaire, USI has provided two attachments which serve to clarify terms used in the questionnaire. The first attachment is entitled "Document Management Philosophy," which provides high-level definitions of a document, document management, and enterprise document management. Based on early conversations with Iowa DOT staff, there is clearly a need to explain the difference between data and documents, and between information management systems and document management systems. In its simplest form, *data* is what is stored in an on-line application database such as IDMS or DB2. A *document* is most often in the form of paper, which can then be archived to microform (i.e. microfiche or microfilm). Data is typically dynamic whereas documents are more typically static.

The second attachment, entitled "Document Management Glossary," provides a definition of terms related to document management systems. This glossary is an abridged version of a glossary created by the Document Management Alliance (DMA), a recognized leader in standards development for the document management industry. The glossary is provided as a reference during review of the questionnaire.

2. Interview Methodology

USI will conduct group interviews with Iowa DOT personnel. Follow-up phone interviews may be required by USI to obtain additional details or to clarify information.

While the majority of the strategic plan will address high level goals and objectives for the DMS, the USI team will also ask for some specific information to gain insight into the Department's functional needs across multiple divisions, offices, and sections. Subsequent phases of the project will involve a more detailed functional requirements analysis, in which a new questionnaire will be used. During the interview process, the study team plans to obtain the following information in order to develop a strategic plan:

- An understanding of each group's mission and organizational responsibilities
- Workflow processes and how they relate to the documents
- Volume of documents accessed or processed
- Current search and retrieval methods
- Document quality and format
- Difficulties encountered in the paper process

The interview questionnaire is designed to provide a thorough and systematic framework for obtaining relevant information regarding existing system operations of Iowa DOT personnel, and to facilitate the interview process. Some questions posed during the kickoff phase of the project during the week of July 22-26, 1996 are repeated in the questionnaire. However, USI is meeting with new groups in order to broaden the analysis to derive more detailed needs. In addition to the questionnaire, USI requests that interview participants notify the interviewer of any pertinent software, documentation, and forms used in the current environment. Relevant information may include studies, policies and procedures, user manuals, design documents, etc..

USI feels that sending this questionnaire in advance will prepare interviewees to address specific issues. Preparation is necessary due to the limited time available for conducting interviews. Please review the following questions and optionally jot down ideas or answers as a method of interview preparation. It is not necessary to write detailed written responses; notes and/or reference documents will be sufficient.

Although all questions may not relate to your specific job function, please provide answers to those sections which are pertinent to your area. It would also be beneficial to bring examples of the documents and forms used in your office with you. Please provide copies that can be turned over to USI; no confidential or original documents should be brought into interviews.

If you have any questions concerning the attached questionnaire, please call Jeff Simpson, USI Project Manager, at (703) 803-2232.

3. Interview

1.	**What is the mission of your group?**

2.	**Where does your group fit into the Department's organizational structure?**

3.	**What paper processing activities have an impact on achievement of your mission? (e.g., Our group spends a great deal of time processing permit applications which are entered into the *xyz* CICS application, a mission critical application.)**

4.	**What policies, procedures, or other mandates have an impact on your office's paper processes? (e.g., Records Retention Schedule, FHWA regulations, EPA regulations, etc.)**

5.	**How does your group share information with other organizations within and external to the Department? (e.g., Through an on-line information system which other offices can access; By providing access to paper documents or microfiche stored in filing cabinets which reside in your office space, etc.)**

Internal (other Iowa DOT offices or districts)

External (contractors, Iowa State agencies, Federal agencies, etc.)

6a.	**What data entry/data updates does your group perform, and what documents do you use to accomplish this? What on-line system(s), if any, do you use to maintain this data?**

6b.	**What other on-line system(s) does your group access in daily activities and why?**

7.	What groups require access to paper, microfiche, or electronically stored (e.g. CD-ROM) documents maintained in your office?

8.	What percentage of your group's paperwork is considered administrative vs. project oriented? (Where administrative includes timesheets, employee action forms, etc. and project includes documents created internally or received from a contractor related to a project.)

9.	What work processes within your group involve the greatest amount of paper handling?

10.	What are the typical types of documents (i.e., memos, letters, forms, engineering plans, etc.) that your group deals with? Give examples.

11.	Is there a set of documents that your group accesses exclusively? (Documents which typically have no value to other groups.)

12.	What percentage of the documents you work with are created internally vs. received from another group or vendor?

13.	How many documents do you work with in a given time period (day, week, month, or year)?

14.	How do you locate the information or documents you wish to access, both manually or by automated means? (Do you locate files by a project number, contract number, date, contractor name, etc.?)

15a. Are you usually able to find documents you are looking for? Describe any problems with the current search methods. How often are documents misfiled or missing?

15b. How often, on average, do you retrieve documents in a set period of time (day, week, etc.)? How often are archived documents retrieved from the Records Management office?

16. How often do you retrieve paper documents from other sources (e.g. sections, offices, divisions, or external groups)? Name the group(s) from which you must request documents.

17. What are the current areas within any of your paperwork processes that are bottlenecks or are inefficient?

18. What paper processes have obvious need for improvement? Do you have any suggestions for this improvement?

19. What is your group's skill level with a graphical user interface (GUI) environment such as OS/2 or Microsoft Windows? Check one of the following.

- ❑ Our group primarily works with character based, non-graphical applications.
- ❑ Our group works in a graphical environment on a casual basis.
- ❑ Our group is proficient working in a graphical environment.

20. What other groups do you feel would be able to make better decisions if they had on-line access to documents maintained by your office?

21. What types of documents are processed by your organization? If various, please specify percentage estimates of each type:

Characteristic	%	Characteristic	%
Media		*Paper Color (Background)*	
Paper		White	
Electronic files		Various Colors	
Color Photographs			100%
B& W Photographs		*Sides*	
Blueprints		Single-sided	
Other Engineering*		Double-sided	
Microfilm			100%
Aperture card		*Composition*	
Other _____		Typewritten	
	100%	Handwritten	
Document Size			100%
Smaller than A-sized		*Weights*	
A-sized (Letter)		Standard	
Legal		Onion skin	
B-sized (11x17)		Heavy stock	
C-sized			100%
D-sized		*Binding*	
E-sized		Bound	
Larger than E-sized		Unbound	
Other _____			100%
	100%	*Orientation*	
Document Condition		Portrait	
Good		Landscape	
Fair			100%
Poor			
	100%	* e.g. Sepia, Mylar, Vellum, Linen	

22. Should your group become a document management pilot project? If yes, why?

Section 2. Private Questionnaire

Iowa Department of Transportation (DOT)
Document Management System (DMS)

Private Questionnaire

Please send to: **Jeff Simpson**
Project Manager
Universal Systems Inc.
3675 Concorde Parkway Ste. 800A
Chantilly, Va. 22021
or Fax Number: **703-803-2280**

1. What are your feelings regarding the success or failure of a DMS implementation at DOT?

2. How well do you feel you know/understand the issues involved in implementing a DMS? What can be done to improve your understanding?

3. How do you think a DMS implementation will affect your job? Your group?

4. Please give any general comments regarding your thoughts on the issues discussed (or left out of) during the interview process.

APPENDIX D. QUESTIONNAIRE QUOTES

The following are selected, actual quotes from the DOT personnel obtained from the private questionnaire. Due to the volume of questionnaires received, USI implemented a quote selection process. This is a sampling of quotes that reflect the overall themes (opinions), whether positive or negative. These quotes helped USI understand the issues and feelings of the DOT personnel towards a document management system initiative. USI feels this information will benefit the DMS Team in understanding issues and concerns brought forth by the DOT employees.

1. What are your feelings regarding the success or failure of a DMS implementation at DOT?

- I want it to be successful.
- It will only become a success if a full commitment is made. People with foresight need to have a hold of the purse strings. I wish us luck. We'll need it.
- This is one of several issues that the Iowa DOT discussed every couple of years. We do a lot of talking, have a lot of meetings, but never implement anything.
- In some ways, I feel that we've been down this road before and nothing has come of it. However, with new management in key positions, we may get the job done this time. Cost will, however, be a big factor (I think) in implementation. Ultimate success of the system will be largely dependent on users and their ability to learn the concepts and put them into practice. We create many of our documents electronically already, however, so archiving them electronically shouldn't be that big a leap.
- I would like to see a successful DMS implementation at the DOT. It would be helpful to have information linked between offices for better accessibility. There is a need to reduce some of the document forms.
- DMS would be quite an asset for us. Maintenance has to head in this direction due to the enormous volume of paper work. Our archive files are very huge and necessary. Retrieval of our records is a continuous operation performed by everyone in Maintenance. This would affect and benefit all of us.
- I think it is extremely important that it not fail. I have lots of doubts, however, based on past experiences with studies, consultants and other issues associated

with similar endeavors in Iowa DOT. In my opinion, a "system" should include an electronic document filing and retrieval module along with GIS and tied databases module. One without the other will not satisfy our needs.

- I feel implementation of a DMS at the Iowa DOT could work. Iowa DOT personnel have a reputation and a way of making things work. The real question is whether the Department will commit the resources to allow it to work and be successful. Resources include equipment, support personnel, training, etc..

- If a DMS were to reduce paper processes by replacing them with automated processes, then failure to implement a DMS would be a loss.

- I believe we need to get a handle on the amount of paper that flows through this Department. What I see is this is another effort the Department takes on and doesn't follow through. This has happened with a number of initiatives. We spend a lot of time and money and nothing ever happens.

2. How well do you feel you know/understand the issues involved in implementing a DMS? What can be done to improve your understanding?

- I have been advocating " a system" since 1986, and think I have a fairly good, and fairly realistic understanding of the issues. What hardware/software was/is of no importance, as long as it can accomplish what we need, is readily supported, and highly reliable.

- We would like to see and talk to someone from other state DOT's that are already on a system to see how things are done and how it is working for them.

- Have a general understanding. Down the road specific training will be needed.

- I understand it. However, do we have a mission? Do we understand that these tools will satisfy our goals?

- This definition of what a document is has had a tendency to confuse which information should be included for the analysis.

- I have a poor understanding of the issues involved. I am not sure what can be done other than to provide information as the study progresses.

- Not well at all. Crawl before you run. Setup small scale DMS's in certain offices, identify the issues, illustrate the issues to persons within the DOT, then tackle the entire agency.

- Very limited knowledge. Need a session explaining exactly what a DMS is, what the goals and objectives might be and time frame for implementation.

- We have such a large variety of "documents" that the capability to provide an answer locally soon outstripped perceived resources. We plan on a long range program that will "pick-up" new material and allow archived material to be added as time and other resources allow.

3. How do you think that a DMS implementation will affect your job? Your group?

- It will be another challenge among many others now occurring. We've already learned to live with a constantly changing work environment. We use to do " more with less" years before it became fashionable. Now, a steep upward increase in productivity is demanded from everyone. People need to feel in control of as many elements in their workplace as possible, or stress will become unbearable for some.

- I think a DMS would assist in the functions for my job. I believe it would force the different divisions/offices to become more compatible. It also could help in reducing duplication of information gathering and processing.

- This type of system would greatly affect our office and my job. First of all, in some areas it would make it quicker and easier to retrieve certain data. Secondly, my job is dealing with all the testing/project documents, so it would be possible to make this info more accessible to our staff, producers and contractors.

- It would have a great impact on my job and my work unit's job. The benefits to all of us would be great.

- It will greatly speed the location and distribution of information. It should cut that time in half. Someday, this will be cut totally by on-line access to these records. This alone will save us 2 days per week. The public would be greatly served by this access, day or night, 7 days a week. Reduced travel time and postage, phone calls, etc..

- Could free us up to perform more concrete analysis/auditing for substance on vouchers. Enable us to manage the information more efficiently.

- DMS implementation could help me and my office achieve goals and time frame in a more efficient time frame.

- Our office will be able to work with our customers rather than spending hours looking for the applicable paperwork. We sometimes spend the better part of the day trying to re-locate a critical project agreement to determine cost sharing.

4. Please give any general comments regarding your thoughts on the issues discussed (or left out of) during the interview process?

- If DMS is implemented in such a way that people see there will be benefits to them as individual workers (in terms of stress reduction, or just having room for a potted plant) then they can get through the transition.

- Would definitely like to see the MSD sheets in a system that all DOT users could have easy access to. Since each one is formatted differently, is different length, trying to put these in an on-line system as part of the inventory would be difficult. But the document system may be the answer. This is something that affects every DOT garage and office in the state.

- The interview process was very thorough and provided considerable information.

- If we know that we need to prepare for the next century, and we live in an information age, we probably will be motivated.

- We were concerned about not talking about retention periods. How will short term retention's be handled as compared to long term (permanent) retention.

- We also have a wealth of material filed away that is needed by many that do not know where to look. Having an electronic filing system with a fast search engine will enable all staff to do a better job. We also need to look at de-centralization of files. Keeping one set of documents on the mainframe is unacceptable. ....We looked at CD-ROM jukebox to hold high volume data. It may be possible to archive plans in such a fashion but, it will be infinitely better than waiting for a data pack to be mounted at a central computer lab.

APPENDIX E
ROLES & RESPONSIBILITIES

This section provides a draft copy of the proposed roles and responsibilities developed by USI for Florida Department of Transportation (FDOT). The DMS Team should formulate their own structure for these roles and responsibilities prior to moving forward with a full scale program. The DMS Team can review the following roles and responsibilities as a starting point for consideration. Additionally, further discussion involving this effort is discussed in Section 6.

Electronic Document Management System (EDMS) Roles and Responsibilities

A. PURPOSE

This document defines the accepted roles and responsibilities for the individuals and committees involved in the Department's EDMS initiative.

B. ROLES AND RESPONSIBILITIES

Roles and Responsibilities are documented for the following EDMS operational requirements:

1. Central Infrastructure Development Facility
2. Central Infrastructure Development Facility Manager
3. EDMS Project Manager
4. Executive Committee
5. Executive Sponsor
6. Executive Steering Committee
7. Functional Consultants
8. Functional Steering Committee
9. Functional Steering Committee Board
10. Functional Steering Committee Chair

11. Implementation Project Manager

12. Implementation Team

13. Pilot Project Manager

14. Technical Consultants

15. Vendor Integrator

1. Central Infrastructure Development Facility (CIDF) - The CIDF is a centralized location where the hardware and software that is used to develop EDMS pilot applications is installed. A Manager for the CIDF will be assigned by the Executive Sponsor.

   Responsibilities:

   a. All EDMS Pilot Projects are developed in the CIDF.

   b. The CIDF will be used to test new EDMS technology.

   c. The CIDF will be used to maintain EDMS projects that have been implemented statewide.

   d. The CIDF may be used in the evaluation of Monitor Only Projects to determine if the projects meet the EDMS standards. The maintenance of Monitor Only Projects will not be handled in the CIDF.

2. Central Infrastructure Development Facility (CIDF) Manager - The CIDF Manager is appointed by the Executive Sponsor to run the CIDF.

   Responsibilities:

   a. The CIDF Manager reports directly to the EDMS Project Manager.

   b. The CIDF Manager directs the daily activities of the CIDF, which include but are not limited to: performance of prioritized work activities, scheduling, issue resolution, and overall monitoring activities.

   c. The CIDF Manager works with the EDMS Project Manager to assist the Functional Steering Committee (FSC) in prioritizing the work to be done in the CIDF.

   d. The CIDF Manager monitors the Technical Consultant deliverables and requests for payment, and processes the invoices.

e. The CIDF Manager directs the activities of the Implementation Project Managers.

3. EDMS Project Manager (PM) - The EDMS Project Manager is appointed by the Executive Sponsor to work with the Functional Steering Committee and Functional Steering Committee Chair to coordinate and manage the EDMS effort.

Responsibilities:

a. The PM develops the budget issues related to EDMS.

b. The PM develops the scope of services and task assignments for the Functional and Technical Consultants.

c. The PM monitors the consultant deliverables and requests for payment and processes the invoices.

d. The PM manages the contracts for EDMS consultants which includes processing change orders, supplemental agreements, and encumbrances.

e. The PM provides daily direction to the consultants involving schedules, deliverables, task completion, new assignments, etc.

f. The PM coordinates the review of contract deliverables by the Functional Steering Committee Board.

g. The PM provides a report to the Functional Steering Committee at each meeting regarding the progress of the consultants, budget issues, and yearly budget expenditures.

h. The PM manages the EDMS budget for the Executive Sponsor.

i. The PM with the Functional Steering Committee Chair appoint Functional Steering Committee members to the Board.

j. The PM supervises the CIDF Manager.

k. The PM assists in the resolution of issues that could not be resolved by the CIDF Manager.

l. The PM facilities the creation and coordinates the activities of the Implementation Project Team(s).

4. Executive Committee - The Executive Committee provides direction and support to the Department's EDMS effort.

Responsibilities:

a. The Executive Committee provides final budget approval.

b. The Executive Committee approves policies and procedures.

5. Executive Sponsor - The Sponsor provides executive level support to individuals involved in the day to day EDMS development activities. The Sponsor holds the EDMS budget in their cost center and can delegate authority to use the budget to the EDMS Project Manager.

Responsibilities:

a. The Sponsor is designated as Chairman of the Executive Steering Committee.

b. The Sponsor is responsible for the EDMS budget including; review of budget requests, supporting the budget request within the Department and to the Governor's office and Legislature.

c. The Sponsor provides initial approval to the plan for expenditure of current year EDMS dollars.

d. The Sponsor provides Executive level support to the Functional Steering Committee Chairman and EDMS Project Manager.

e. The Sponsor assists in making presentations relative to the EDMS effort when appropriate.

f. The Sponsor has direct authority over the EDMS Project Manager regarding the EDMS effort.

6. Executive Steering Committee (ESC)- The Executive Steering Committee provides functional management oversight for the EDMS effort.

Responsibilities:

a. The ESC has responsibility for providing approval or denial to recommendations made by the Functional Steering Committee.

b. The ESC members have responsibility for providing personnel resources to work on the development of the pilot projects

c. The ESC approves project schedules and work plans.

d. The ESC provides final resolution to business issues that cannot be resolved by the Functional Steering Committee.

e. The ESC recommends final approval of all EDMS budget issues.

f. The ESC appoints the members of the Functional Steering Committee.

7. Functional Consultants (FC) - The Functional Consultants receive day to day direction from the EDMS Project Manager. Tasks are assigned by the EDMS Project Manager and additional responsibilities could be added as necessary.

Responsibilities:

a. The FC provides proactive monitoring and advisory services for the EDMS Central Infrastructure Development Facility and the pilots being developed.

b. The FC assists in the writing of standards, guidelines, procedures, etc. that are needed to guide the development of a enterprise-wide EDMS.

c. The FC updates EDMS documentation when appropriate.

d. The FC conducts Pilot project studies for new proposals.

e. The FC provides education on EDMS concepts and applications.

f. The FC assists in the development of EDMS application documentation standards in conjunction with the Data Base Administration section of the Office of Information Systems.

g. The FC assists the Implementation Project Team in the development of the Implementation Project Plan.

8. Functional Steering Committee (FSC) - The FSC is composed of members appointed by the ESC and provides cross functional representation and district representation. (The membership of the FSC must be adjusted to provide more consistent representation). Ex-Officio members of the FSC include the District Data Processing Managers, the District Directors of Administration, the EDMS

Project Manager, the CIDF Manager, the Pilot Project Managers, and the Implementation Project Managers. The Florida Institute of Consultant Engineers (FICE) appoints one of it's members to serve on the FSC as an Ex-Officio member. The FSC provides guidance to the individuals responsible for developing the EDMS applications, provides recommendations to the Executive Steering Committee, and insures department-wide compatibility of all EDMS solutions.

Responsibilities:

a. The FSC provides direction in the development of the enterprise-wide EDMS to the individuals responsible for the applications.

b. The FSC develops alternatives and recommendations for technical and business issues which must be resolved at the Executive Steering Committee level.

c. The FSC assigns task groups to study specific business or technical issues.

d. The FSC prioritizes the pilot project development and submits a recommendation to the Executive Steering Committee.

e. The FSC develops, reviews and recommends approval of procedures, guidelines, standards, etc.

f. The FSC coordinates the development of an EDMS training program.

g. The FSC assures that Department personnel are informed about EDMS technology.

h. The FSC reviews new technology in order to determine applicability to the enterprise EDMS.

i. The FSC recommends to the Executive Steering Committee whether pilot projects should be implemented at a statewide level.

j. The FSC approves additions of software and hardware to the CIDF.

k. The FSC nominates a FSC Chair to be approved by the Executive Steering Committee.

l. The FSC provides guidance to the EDMS Project Manager with regards to the work to be assigned to the Functional Consultant.

m. The FSC provides regular status reports to the Executive Steering Committee members.

9. Functional Steering Committee (FSC) Board - The Board consists of FSC members appointed by the FSC Chair and the EDMS Project Manager to provide additional services in the development of an enterprise EDMS.

Responsibilities:

a. The Board reviews all consultant deliverables and recommends payment.

b. The Board members participate in the initial development and review of procedures, guidelines, standards, etc. which affect the development of the enterprise EDMS.

c. The Board provides initial review of the scope of services or task requirements for consultant services.

d. The Board provides direction to the Project Manager on day to day questions and issues, when it is not feasible for the FSC to meet to make the decision. Decisions made in this manner will be presented to the FSC at the next meeting as part of the EDMS Project Manager report.

10. Functional Steering Committee Chair - The FSC Chair is elected by and serves at the discretion of the Functional Steering Committee.

Responsibilities:

a. The FSC Chair is responsible for the development of the agenda for the Functional Steering Committee Meetings.

b. The FSC Chair conducts the Functional Steering Committee Meetings.

c. The FSC Chair represents the FSC with other Department information technology initiatives.

d. The FSC Chair functions as the contact between the FSC and the ESC and is responsible for keeping them updated on the progress of ongoing EDMS activities.

e. The FSC Chair is responsible for preparing a yearly written report to the ESC.

f. The FSC Chair will make presentations to the ESC as required.

11. Implementation Project Manager (IPM) - The Implementation Project Manager is appointed by the Executive Steering Committee. The IPM reports to the CIDF Manager.

Responsibilities:

a. The IPM manages the Implementation Project Team.

b. The IPM coordinates the development of the Implementation Project Plan.

c. The IPM reports the project status to the Functional Steering Committee.

d. The IPM assures that all offices affected by the implementation project are informed and trained.

12. Implementation Project Team (IPT) - The Implementation Project Team is established by the EDMS Project Manager.

Responsibilities:

a. The IPT is responsible for the statewide implementation of an EDMS pilot project.

b. The IPT develops the Implementation Project Plan.

c. The IPT is responsible for carrying out the tasks associated with the Implementation Project.

d. The IPT trains and provides assistance to the new users of the system.

13. Pilot Project Manager (PPM) - The Pilot Project Manager is the employee from the pilot project user office(s) who is assigned to be the liaison between the consultants developing the pilot application and the user office(s).

Responsibilities:

a. The PPM provides daily guidance to the Technical Consultants developing the pilot application.

b. The PPM identifies the individuals who will assist in the development of the application specifications and system design.

c. The PPM arranges meetings and interviews with the business users.

d. The PPM resolves issues that arise during the development of the pilot application.

e. The PPM develops the business case for expanding the pilot to a Department implementation.

f. The PPM does the initial user testing and schedules other personnel from the user office to test the pilot application.

g. The PPM assists in the development of the training materials.

h. The PPM provides a status report to the Functional Steering Committee for each meeting.

i. The PPM reviews and approves all analysis and design specifications for the pilot application.

14. Technical Consultants (TC) - The Technical Consultants develop EDMS pilot project applications according to FDOT standards.

Responsibilities:

a. The TC analyze the requirements of the pilot project with the users and develop the application specifications for approval by the users.

b. The TC develop the application design with the users and develop a detailed design for the pilot application for approval by the users.

c. The TC write and test the pilot application programs.

d. The TC develops the system and user documentation.

e. The TC develops the testing plans which are reviewed by the users and Functional Consultants.

f. The TC must follow FDOT standards in developing pilot projects.

15. Vendor Integrator (VI) - The Vendor Integrator is selected by the FSC and approved by the ESC to provide hardware, Technical Consultant resources, and software to be used in the development of EDMS applications.

Responsibilities:

a. The VI develops a proposal (including hardware, software, consultant hourly rate) to develop applications, based on a scope of work provided by the Department.

b. The VI secures Technical Consultant resources to develop EDMS pilot applications and to assist the Implementation Project Teams with the implementation of the EDMS pilots on a statewide basis.

c. The VI installs equipment and software and tests to assure that the components are functioning properly.

d. The VI monitors the pilot project development efforts.

e. The VI recommends hardware and software to be used to meet the functional requirements of the Department.