COLLISION DIAGRAM SOFTWARE EVALUATION

FINAL REPORT

PREPARED FOR
IOWA DEPARTMENT OF TRANSPORTATION

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Table of Contents

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Current Situation</td>
<td>1</td>
</tr>
<tr>
<td>Accident Record Database</td>
<td>1</td>
</tr>
<tr>
<td>Scope of Project</td>
<td>2</td>
</tr>
<tr>
<td>Project Objectives</td>
<td>2</td>
</tr>
<tr>
<td>Results of Initial Information Search</td>
<td>4</td>
</tr>
</tbody>
</table>
Abstract

The Iowa DOT contracted with the Center for Transportation Research and Education (CTRE) to conduct a research project that evaluates existing collision diagram software packages as well as any other innovations in the area of collision diagramming. A literature search was conducted along with telephone interviews to evaluate the state of the practice. Over nine different collision diagram software packages were initially investigated. Two collision diagram packages were evaluated in-depth. They were Intersection Magic (developed by Pd’ Programming) and Accident Information Management System: GIS (developed by JMW Engineering, Inc.). Both of these packages were tested with current Iowa DOT accident data. Based on the constraints presented by the Iowa DOT, CTRE recommends Intersection Magic as the collision diagram software package. The major advantages of Intersection Magic are:

- compatibility with existing PC-ALAS structure
- compatibility with a GIS platform
- ability to edit accident records
- requires a PC with a 386 processor or higher, MS Windows 3.1 or later, 4 MB of RAM, VGA or higher resolution monitor, 6 MB of hard disk space, and any compatible printer
- good supporting graphics
- sophisticated internal scripting language for repetitive tasks
- ability to conduct filters and queries
- good support from software developer
- ability to alter intersection alignment and move accidents around within intersection
- and the ability to retrieve accident records by clicking on the accident icon.

Final Report on Collision Diagram Software Evaluation for the Iowa Department of Transportation

Introduction

The growing demand for collision diagrams coupled with a reduced staff has created a desire to automate the collision diagram process. The Iowa Department of Transportation (Iowa DOT) contracted with the Center for Transportation Research and Education (CTRE) to conduct a research project that evaluates existing collision diagram software packages as well as other innovations in the area of collision diagramming. The Iowa DOT is one of the nation’s leaders in accident record management. Incorporating current innovations will ensure this leadership status to continue into the future. In addition, the Iowa DOT plans to convert the existing accident database into a Geographic
Information System (GIS), thus introducing new technologies into accident analysis. CTRE has completed the evaluation of existing collision diagram software packages and the results of our findings are contained in this report.

**Background Information**

**Current Situation**
Currently, the Iowa DOT’s Traffic Safety staff produce collision diagrams that are hand drawn. Technicians must first research accident records by accessing the PC-ALAS (Personal Computer-Accident Location and Analysis System) database and then generate a collision diagram manually which visually displays the accident history. A summary of data, collected by the technician from PC-ALAS, is attached to the collision diagram and groups the accident reports by type of accident (corresponding to the visual display). Because of reduced staffing, collision diagrams are currently drawn only for Hazardous Elimination System (HES) projects and major problem intersections.

**Accident Record Database**
An Iowa electronic accident record database has existed since 1977. Although the format has changed from a mainframe system to a personal computer system, the database has managed the same basic accident record information over the years. The current version, called PC-ALAS, utilizes flat files that are in ASCII text format arranged into “A”, “B”, and “C” records. The “A” record contains the general information about the accident, the “B” record contains driver and vehicle specific information, and the “C” record contains injury information. Every accident record will contain an “A” record and at least one “B” record, but the presence of additional “B” or “C” records varies with each accident.

Upon request for accident information, the Iowa DOT can query PC-ALAS for a 3-5 year period (urban locations) or up to a 10 year period (rural locations) for accident data.

The accident location system is a link-node system utilizing eight-digit node numbers assigned to intersections and other roadway features on a quasi-coordinate system as shown in Figure 1 (located in the appendix).

The Iowa accident system contains 70,000 - 75,000 accidents every year. This mandates that the collision diagram software be sophisticated enough to handle all accident records, including an expanded database, in future years. The Iowa DOT is in the process of converting the PC-ALAS database to Microsoft Access. All of these issues including GIS-ALAS development were considered during the collision diagram software evaluation.

**Scope of Project**
The following is the list of tasks that were identified for this project.

**Phase 1**
1. Review state of the art, commercially available or agency developed, collision diagram software.
2. Characterize the Iowa DOT collision diagram needs and the computer environment.
3. Review the state of the practice of selected agencies with environments similar to Iowa.

**Phase 2**
4. Make recommendations for software selection and training for commercial collision diagram software packages or adaptable software from other state DOTs that match the requirements established.
5. Document the research results along with the software evaluations.
6. Develop implementation strategies and operational procedures for the selected software.

CTRE has completed the tasks listed above and this report documents the results. Phase 3 will be completed in the future and will establish procurement, implementation, and training issues.
Project Objectives
The following list of data fields are in order of priority. The Iowa DOT identified information required in the collision diagram software. These fields are derived from the officer’s accident report and are used in the PC-ALAS database. These data fields are used to conduct filters or queries that help engineers and technicians conduct traffic accident analysis.

Primary Fields
1. Case: year, prefix, and number
2. Date of accident
3. County Number
4. Intersection Identifier (node-based system)
5. Reference node
6. Distance Indicator
7. Direction node
8. Collision type
9. Initial direction of travel
10. Vehicle action (prior to the accident)

Secondary Fields
1. Accident severity code: fatal, injury, property damage
2. Total killed
3. Total injured: by severity level: major, minor, unknown
4. Total vehicles
5. Total property damage, $
6. Day of week
7. Time of day
8. Route number
9. Road class: interstate, US or State highway, county road, city street, etc.
10. Type of accident
11. Character of roadway
12. Roadway geometrics
13. Light conditions
14. Weather conditions
15. Location: on roadway, shoulder, median, etc.
16. Vehicle type
17. Point of initial contact
18. Contributing circumstances
19. Traffic controls
20. Type of roadway: # of lanes, ramp, etc.
21. Traffic flow: 1 way, 2 way
22. Fixed object struck
23. Surface conditions
24. Driver age
25. Driver charged
26. Sobriety test given, and results
27. Driver condition
28. Drive/vehicle contributing factors
29. Vision obscured
30. Injury severity (pedestrian)
31. Protective device
32. Pedestrian action

Tertiary Fields
1. Report Type
2. City
3. Intersection class
4. Locality
5. Special use: police, fire, taxi, etc.
6. Number of occupants
7. Vehicle defects
8. Type of surface
9. Location of fixed object
10. Driver’s sex
11. Position of injured pedestrian
12. Protective devices
13. Sobriety of pedestrian

Results of Initial Information Search

Software Evaluated

*Intersection Magic (Pd’ Programming)*

Intersection Magic is an MS Windows-based graphic display and data summary package designed for use in traffic accident analysis of intersections. Intersection Magic is interactive, offering detailed collision diagrams, data retrieval, accident summaries, statistical output, and user specified graphic displays. Intersection Magic provides users a tool for identifying; accident patterns, high accident locations, and operational/maintenance considerations. Intersection Magic imports ASCII delimited database files and is written for IBM and IBM compatible PC's. Intersection Magic prints to most printers or plotters, and allows the use of a dot matrix printer, laser printer, or full-color plotter. Intersection Magic is interactive and allows the user to point to individual accidents and review the accident record information on the computer screen before plotting.

Intersection Magic provides standard collision diagrams or highlights user specified accident types such as right angle crashes. It can diagram individual intersections of particular interest or can run large numbers of collision diagrams for record keeping or statistical analysis. Each graphic printout includes the collision diagram and an accident summary.

*Accident Information Management System:Geographic Information System (AIMS:GIS)*

AIMS is a GIS based program originally developed for the City of San Francisco by JMW Engineering, Inc. The program runs on Window 95, and uses MapInfo 4.1 to operate the GIS portion of the program. The program allows the user to select intersections or links by manual input or point and click selection from the map. Once an intersection or link is selected, a collision diagram can be generated. Other features of AIMS:GIS are the ability to plot worst accident locations, provide annual reports, and perform queries. AIMS:GIS prints collision diagrams to most printers or plotters.

*Collision Database System (Crossroads Software)*

The Collision Database System software runs under MS Windows and uses city street layout data to verify the location of every collision in the database. The Collision Database System also uses a full relational database engine to store, query and edit collision records and an operational GIS mapping module. The Collision Database System produces reports, collision diagrams and maps of collision information.

Presentation quality color collision diagrams can be created by specifying the location, date range and any other collision parameters desired such as collision type, distances, conditions and primary collision factors. This software also supports color printers and plotters.
A selection of queries and reports are produced to show desired information. By using the query function, one can select data ranges and locations desired. Queries can be as inclusive as all collisions citywide or narrowed to include only collisions with specific attributes of fields such as primary collision factor, collision type, degree of injury, conditions, etc.

**Accident Surveillance & Analysis Program (ASAP) (Hank Mohle & Associates)**
Accident Surveillance & Analysis Program (ASAP) is a relational database tool, developed as an open architecture application module using Microsoft's Windows database program, Access 2.0. Accident information may be imported into ASAP from a variety of sources and file formats and existing traffic accident databases. Manual entry is possible using user-definable custom data-entry screens.

An internal street name dictionary ensures correct intersection and mid-block information which result in an accurate and complete traffic accident database. Traffic accident database information may be output to the program's collision diagrams, statistical analysis reports, accident rate reports and GIS rendering of high accident locations.

ASAP can link to Windows applications such as ESRI's ArcView for spatial analysis and display of high accident locations. AutoDesk's AutoCAD can be used to dynamically query traffic accident databases and produce collision diagrams.

**Collision Plot Program (Illinois DOT)**
The State of Illinois developed an automated intersection collision diagram plotting program that runs on a mainframe and a plotter. This program retrieves data by state route number, mile station and by LARS (Local Accident Reference System) location coding. More recently the program was converted for use with a microcomputer.

The system produces a printout that describes each accident and the conditions associated with it. It also shows information such as direction of travel and type of collision. One symbol for each plot type is shown on the intersection plot along with the plot type and number of occurrences. In addition to the individual printout and plot, a summary of all accidents occurring at the intersection is produced.

**Collision Diagram for Windows 2.1, COLLDIAG (Ohio Department of Public Safety)**
The COLLDIAG software was designed and developed for a large cross section of end users. Users of the software are expected to range from the Department of Transportation to city and county traffic engineers. The MS Windows Operating System was the computer platform chosen for this software. The COLLDIAG software is similar in nature to most Windows programs, which provides a familiar interface for many PC users. The software is stand-alone, thus no CADD software is required. The absence of CADD however, imposes a limit on some users who may need to customize diagrams. The software developers are planning an upgrade which will give the user the ability to draw accidents directly on the diagram.
**TRACPLOT (Ohio DOT)**
TRACPLOT was developed in 1987 by the Ohio Department of Transportation for drawing traffic accident collision diagrams. Since TRACPLOT was developed the Ohio DOT has developed a MS Windows compliant collision diagram software COLLDIAG for Windows. No further information was available for this package.

**Collision Diagrams (Wyoming Highway Department)**
This collision diagram software was developed specifically for the State of Wyoming using the Wyoming Accident Records System (WARS) database. The source code for this software was written in Fortran programming code and has specific plotter requirements. Plots of collision diagrams are in black and white and the program does not support color output. Extensive re-programming would likely be necessary for this software to access PC-ALAS database files.

**Intersection Collision Plot Diagram (Texas Safety and Traffic Operations)**
This intersection collision plotting software is run through the Remote Job Entry Job Control Language system on a mainframe computer and does not have a Windows compatible version. This collision diagram software was developed specifically for the State of Texas traffic accident database. The most recent copy of the literature indicates it was last updated in January of 1990.

**Traffic Operations System Software TOSS (University of Kansas)**
Traffic Operations System Software (TOSS) is a PC based traffic operations management system that can interface with commercially available software such as Lotus 123, Word Perfect, MS Word, etc. TOSS consists of ten modules, each of which can be run separately or together. Only two of the ten modules would be required to perform desired functions for the Iowa DOT and would include the Accident Information System module and the Collision Diagram module.

The Accident Information System module was developed to assist engineering staff in maintaining comprehensive statistical data on motor vehicle accidents. The system is designed to provide managerial information on the frequency of accidents and other contributing factors. It may also be used to identify and correct deficiencies on road systems. This program provides an option to export collision data at a specified location to an ASCII file for AutoCD to plot.

The Collision Diagram module was designed to enhance reports with a diagram that graphically displays all accidents. AutoCD will produce a graphic display that is able to give an overview of the types of collisions at a given location.

**AutoCD** is an AutoCAD third party program that operates within the AutoCAD graphic environment. The program should be used in conjunction with ACCINFO (Accident Information System) in producing a collision diagram. AutoCD may also function independently by entering collision data into an ASCII file for AutoCD to read in.

**Small Computer Accident Records System SCARS (University of Florida)**
Small Computer Accident Records System (SCARS) allows detailed analysis of accidents for any network of routes. It keeps information on each accident and summarizes the
information in a series of reports. SCARS identifies hazardous locations by creating reports based on the type of accidents or the conditions under which the accidents occurred.

SCARS produces collision diagrams automatically from a dBASE III+ compatible database. A separate program is required for graphics routines.

**Small Computer Collision Diagram SCCOLD (University of Florida)**
Small Computer COLlision Diagram (SCCOLD) displays collision diagrams from accident data either entered from the keyboard or from an existing accident records database. The diagrams show basic accident attributes such as direction, type of accident, etc.

**Accident Records, Summary and Diagrams (ACCISUM) (University of Kansas)**
ACCISUM summarizes, stores and manipulates data sets of motor vehicle accident records and provides a simplified collision diagram. The programs are menu driven and provide summary information with frequency and percentage distributions of all input data. All information can be viewed on the screen and printed.

Input data required for each accident are consistent with PC-ALAS data structure. Data from two or more separate files can be combined for analysis of large areas or corridors. Simplified collision diagrams can be created and viewed on screen or printed.

**State of the Practice**
The literature search revealed the following summary of state DOTs and the products they use to generate collision diagrams. This information is located below in Table 1 and was current at the end of 1996.

<table>
<thead>
<tr>
<th>State</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>No current collision software</td>
</tr>
<tr>
<td>Ohio</td>
<td>COLLDIAG for Windows</td>
</tr>
<tr>
<td>Missouri</td>
<td>No current collision software</td>
</tr>
<tr>
<td>Kansas</td>
<td>TOSS and Intersection Magic</td>
</tr>
<tr>
<td>Wyoming</td>
<td>FORTRAN PROGRAM</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>No current collision software</td>
</tr>
<tr>
<td>Connecticut</td>
<td>No current collision software</td>
</tr>
<tr>
<td>Texas</td>
<td>Mainframe program</td>
</tr>
<tr>
<td>California</td>
<td>No current collision software</td>
</tr>
</tbody>
</table>

| **Table 1** |

**Software Considered For Further Analysis**
1) Intersection Magic (Pd’ Programming)
2) Accident Information Management System:GIS (JMW Engineering, Inc.)
3) Collision Database System (Crossroads Software)
4) ASAP Accident Surveillance & Analysis Program (Hank Mohle and Assoc.)
5) Collision Plot Program (Illinois DOT)
6) COLLDIAG for Windows (Ohio DOT)
7) Traffic Operations System Software TOSS (University of Kansas)
8) Small Computer Collision Diagram SCCOLD (University of Florida)
9) Accident Records, Summary and Diagrams ACCISUM (University of Kansas)
A decision matrix was developed that gave a “go” “no go” to the individual software programs that were available. Table 2 indicates some the software package’s individual capabilities along with a notation as to whether the packages were obtained for further testing.

<table>
<thead>
<tr>
<th>Software</th>
<th>PC-ALAS compatible</th>
<th>System Requirements</th>
<th>Graphics quality</th>
<th>Obtained for further analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection Magic</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>AIMS:GIS</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Collision Database</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>ASAP</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Collision Plot Program</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>COLLIDIAG</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>TOSS</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>SCCOLD</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>ACCISUM</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2

The characteristics of the collision diagram software programs that received the most consideration were compatibility with the existing PC-ALAS structure, system requirements such as associated software and hardware, and quality of the collision diagram graphics.

Based on these characteristics the following software packages were obtained for further investigation.

**Software Obtained For Further Analysis**

1) Intersection Magic (Pd’ Programming)
2) AIMS:GIS Accident Software (JMW Engineering)
3) Collision Database System (Crossroads Software)
4) COLLIDIAG for Windows (Ohio DOT)

<table>
<thead>
<tr>
<th>Software</th>
<th>Editing capability</th>
<th>GIS compatible</th>
<th>Graphics quality</th>
<th>Query capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection Magic</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>AIMS:GIS</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Collision Database</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>COLLIDIAG</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Table 3
Demonstration software packages were obtained and investigations of each software package were conducted. Introductory meetings with the Iowa DOT narrowed the focus to two software packages through the use of initial demonstrations. The software packages chosen for in-depth investigation were Intersection Magic and AIMS:GIS. CTRE obtained 1993 Jasper County accident records taken from PC-ALAS data files and sent them to Pd’ Programming and JMW Engineering. CTRE wanted to test the compatibility of the data files with these two programs. It was a good test of the service the Iowa DOT could anticipate from the software distributor in the future. After some minor problems with formatting, both Pd’ Programming and JMW Engineering sent us working copies of their respective software packages. Testing and evaluations were completed within several weeks and a working session with Iowa DOT safety analysis technicians was conducted. A meeting with the Iowa DOT safety engineering staff engineers took place soon after the working session.

A telephone interview was conducted with all the state DOTs listed as users of Intersection Magic. The results of that survey were very positive. A list of the contacts from each state using Intersection Magic is located in Table 4 in the Appendix.

Other Possible Areas of Interest
The Iowa DOT suggested that CTRE contact Cartegraph Systems, located in Dubuque, Iowa, and discuss the possibility of working with the Iowa DOT as a design partner. Cartegraph Systems met with members of the Iowa DOT safety engineering staff, a representative of the FHWA, and CTRE personnel to discuss this topic. Cartegraph Systems submitted a concept proposal that included an Incident Management segment to their existing inventory software packages. The Iowa DOT expressed interest in “off the shelf” type software packages due to the length of time involved in software development. Further consideration of the concept proposal was discontinued.

The traffic engineering section of the North Carolina DOT was contacted by CTRE after being informed that North Carolina DOT was doing work in the area of collision diagramming. A conversation with the North Carolina DOT revealed that North Carolina uses AutoCad to draw the intersection collision and condition diagrams. The diagrams are very complex and thorough. This concept moves away from the automated concept that the Iowa DOT desires, so no further consideration was given to the North Carolina System.

Licensing
The Iowa DOT recognized early on that a statewide license would be desirable. The Geographic Information System - Accident Location and Analysis (GIS-ALAS) project that will convert PC-ALAS to a GIS platform is expected to be available for use to all state municipalities. The collision diagram software package will also require a statewide license.

Conclusions
There were many good collision diagram software programs that CTRE evaluated. But based on the requirements given by the Iowa DOT it is CTRE’s recommendation that Intersection Magic, distributed by Pd' Programming, be utilized as the automated collision diagram software program. The reasons for this recommendation are that Intersection Magic has the following characteristics:

- compatible with existing PC-ALAS structure
- compatible with a GIS platform
- ability to edit accident records
- requires a PC with a 386 processor or higher, MS Windows 3.1 or later, 4 MB of RAM, VGA or higher resolution monitor, 6 MB of hard disk space, and any compatible printer
- supporting graphics
- sophisticated internal scripting language for repetitive tasks
- ability to conduct filters and queries
- support from software developer
- ability to alter intersection alignment and move accidents around within intersection
- ability to retrieve accident record by clicking on accident icon
Recommendations
CTRE recommends that the Iowa DOT acquire Intersection Magic and negotiate a statewide license. Intersection Magic can then be used by all counties and cities in Iowa. It is further recommended that the Iowa DOT purchase a two-day training seminar to be presented by Pd’ Programming staff.

Author’s Note
CTRE would like to thank all the participating vendors and developers for supplying their collision diagram packages for evaluation.
Appendix
List of contacts from each state surveyed.

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky</td>
<td>Boyd Sigler</td>
<td>(502) 564-3020</td>
</tr>
<tr>
<td>Idaho</td>
<td>Gary Sanderson</td>
<td>(208) 334-8487</td>
</tr>
<tr>
<td>South Dakota</td>
<td>Larry Dean</td>
<td>(605) 773-3869</td>
</tr>
<tr>
<td>Alaska</td>
<td>Ron Martindale</td>
<td>(907) 266-1593</td>
</tr>
<tr>
<td>Utah</td>
<td>Eric Chang</td>
<td>(801) 965-4284</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Mike Schadegg</td>
<td>(612) 797-3126</td>
</tr>
<tr>
<td>Connecticut</td>
<td>John Vivari</td>
<td>(860) 594-2712</td>
</tr>
</tbody>
</table>

Table 4

Summary of State DOTs Using Intersection Magic Collision Diagram Software

This telephone survey was conducted in January of 1997. The telephone survey was limited to state DOTs which were all identified by Pd' Programming as current users of Intersection Magic Collision Diagram software. The states called were Minnesota, Kentucky, Idaho, Connecticut, South Dakota, Alaska, and Utah. The telephone interviews were based on the following questionnaire and most lasted less than ten minutes. The individuals that answered the questions were experienced users or supervisors of users. Their names and telephone numbers are listed by state on the previous page.

1. Do you currently use Intersection Magic to generate your collision diagrams?
   a. If not, why?
   b. If yes, how frequently, what uses?

   Minnesota: No, they do not currently use Intersection Magic. They were unsuccessful in their attempts to link Intersection Magic to a GIS and therefore never used it. No further questions were asked.
   Kentucky: Yes, they use it daily.
   Idaho: Yes.
   Connecticut: No, they have purchased Intersection Magic but are in the process of changing their computer environment so they have not installed Intersection Magic. No further questions were asked.
   South Dakota: Yes, they use Intersection Magic normally about 5 times per week. They also use Intersection Magic to conduct a yearly statewide inventory of all high accident locations.
   Alaska: Yes, at least weekly.
   Utah: Yes, normally twice per week, also based on the number of requests.

2. On a scale of 1-10 (10 being the most friendly), how would you rate user friendliness?
   Kentucky: 8
   Idaho: 8
   South Dakota: 9
   Alaska: 7
   Utah: 8
   Average: 8

3. Do the features of Intersection Magic meet your needs?
   If not, what would you want changed or added?
   Kentucky: Yes. No changes.
   Idaho: Yes, they commented on getting better symbols on the diagram. I mentioned the key function under the Tools menu, he said that maybe they had not noticed that feature yet.
   South Dakota: Yes. No changes.
   Alaska: Yes, they would like the ability to generate special reports more easily.
   Utah: Yes. No changes.
4. Have you had any discrepancies between your data and Intersection Magic illustrations? If so, explain.
   Kentucky: Yes, discrepancies were the fault of the data set, not Intersection Magic.
   Idaho: No.
   South Dakota: No, they did some extensive testing when they installed the software to check for discrepancies, none were found.
   Alaska: Yes, there was some problems with left turn movements, he thought that this may be more of a reporting officer problem than an Intersection Magic problem.
   Utah: Yes, he said it was more of a problem with incomplete data than Intersection Magic.

5. What level or qualifications of computer applications do your users have: beginner, intermediate, or advanced?
   Kentucky: Beginner and intermediate.
   Idaho: Intermediate.
   South Dakota: All skill levels are represented.
   Alaska: Intermediate.
   Utah: Intermediate.

6. Have the Intersection Magic users received any training on the software? If so, how much and in what format (individual, group)?
   Kentucky: No training received, staff self-taught.
   Idaho: No training received, staff self-taught.
   South Dakota: No training received, staff self-taught.
   Alaska: Yes, Pd’ Programming gave short introduction when they were on location to configure the system.
   Utah: No training received, staff self-taught.

7. Do you have Intersection Magic linked to a GIS or do you plan to? If so, does it work well, and with what GIS package?
   Kentucky: No, and they have no plans to link to a GIS.
   Idaho: No, and they have no plans to link to a GIS.
   South Dakota: No, however, they would like to someday.
   Alaska: No, however, they would like to once they get the funding.
   Utah: No, however, they plan to in the future.

8. Has Pd’ Programming offered a satisfactory level of support? If so, what support did you need? How did they do considering time and cost?
   Kentucky: Yes, absolutely. Pd’ Programming customized their data set.
   Idaho: Yes, they called about a procedure and Pd’ Programming was responsive to their questions.
   South Dakota: Definitely yes, their questions were mainly startup type questions. Pd’ Programming charged no additional fees and the upgrades come automatically.
   Alaska: Yes, mainly questions were about small items and Pd’ Programming was quick to respond. Alaska also purchased the support contract, no price given.
   Utah: Yes.

9. Would you recommend this package to other DOTs? If not, why? If yes, why?
   Kentucky: Yes.
   Idaho: Yes.
   South Dakota: Definitely yes.
   Alaska: Yes.
   Utah: Yes.

10. How widespread is your usage, is there one central location or do you have regions handle their own requests?
Kentucky: There is only one central location where all requests are forwarded.
Idaho: Each district has a copy of the program, the central office also handles the entire state.
South Dakota: They purchased a statewide license so that all major cities have a copy and all four regions in the state have copies.
Alaska: All three regions in Alaska have a copy and work independent of each other.
Utah: There is only one central location where all requests are forwarded.
General notes from survey concerning collision diagram software experience
Listed below is the length of time the individual states have been using Intersection Magic.
   Kentucky: 5 years
   Idaho: 3 years
   South Dakota: 2 years
   Alaska: 6 years
   Utah: Information not obtained
Contacts

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