Association of Transportation Safety Information Professionals

Application for Best Practices Recognition
2004

Part One: Project Summary

Project Title: *CARE* (Critical Analysis Reporting Environment)

Project Description:
***CARE* (Critical Analysis Reporting Environment)** is a data analysis software package designed for problem identification, countermeasure development and evaluation purposes. *CARE* uses unique advanced analytical and statistical techniques to generate valuable information directly from the data with minimal user intervention.

Nominating Person Contact Information:

Name: Dr. Allen Parrish
Title: Director, *CARE* Research & Development Laboratory
Agency and Office: University of Alabama, Computer Science Department
Address with City, State, ZIP: Box 870290, Tuscaloosa, AL 35487-0290
Telephone: 205-348-3749
FAX: 205-348-0219
E-Mail: parrish@cs.ua.edu

Project Manager Contact Information: (if different from above)

Name: Dr. David Brown
Title: Director of Development, *CARE* Research & Development Laboratory
Agency and Office: The University of Alabama, Computer Science Department
Address with City, State, ZIP: Box 870290, Tuscaloosa, AL 35487-0290
Telephone: 334-514-7230
FAX: 205-348-0219
E-Mail: brown@cs.ua.edu

Lead Agency for Project: *CARE* Research & Development Laboratory (CRDL) at the University of Alabama

Participating/Cooperating Agencies (if any):

Current and past Sponsors include various agencies from the states of Alabama, Delaware, Florida, Georgia, Iowa, Michigan, North Carolina, Rhode Island and Tennessee.

Which National Agenda goals apply? Numbers 1,2, 3 and 5 apply.

Which steps in the management process does the project support?
(1) Establish Safety Goals, (2) Identify Problems, (3) Plan Programs/Countermeasures and (6) Evaluate Effectiveness.

Reference the priority in your traffic records strategic plan to which this project applies:
CARE has always been given the highest priority for funding within Alabama's traffic records strategic plan for maintenance and development since it is recognized that *CARE* is instrumental in intelligently prioritizing countermeasure activities.

Project Cost: Planned $: *CARE* software evolved over a long period of time, and was funded as part of the HSP process. The software is now free and in the public domain. **Actual $:** the actual cost to implement *CARE* within a new state is between $40,000 and $100,000 depending on the middleware and customization required.

Extent of Project Implementation:
CARE has been in use in the state of Alabama for over 20 years by many state agencies such as the Law Enforcement/Traffic Safety Division of ADECA (Alabama Department of Economic and Community Affairs) and the Alabama Department of Transportation. It is used by city and county engineers and by the Community Traffic Safety Professionals (CTSPs) regionally; over 300 law enforcement and engineering personnel have been trained in its use in Alabama. *CARE* has also been implemented in the states of Florida, Iowa, Michigan, North Carolina, Georgia, Delaware, Rhode Island and Tennessee.

Summary of Project Benefits: What was improved, who benefited, and how?

The ultimate goal of *CARE* is saving lives. Reducing the number of crashes and resulting injuries is a close second in importance. We can not cite concrete numbers as proof but *CARE* has the capacity to support accomplishment of these goals by providing the potential impact of countermeasures and providing guidance on the implementation. The IMPACT feature of *CARE* gives actual numbers of crashes that will be reduced if particular over-representations are reduced to the normal expected values. This provides general visualization of countermeasure potential and greatly assists the prioritization process.

Part Two: Project Detail

Project Description:

***CARE* (Critical Analysis Reporting Environment)** is a data analysis software package designed for problem identification, countermeasure development and evaluation purposes. *CARE* uses advanced information discovery techniques to generate valuable information directly from the data with minimum user intervention. Some of the features of *CARE* are the ability to get valuable statistics, analyze data, high-crash location capability, generate reports, easily create collision diagrams (by opening Intersection Magic directly), information discovery, and web-enablement. The *CARE* software exists in both a desktop Windows version and a Web version. *CARE* has been applied to the field of traffic safety for many years. This software is under constant development and enhancement by the staff of the *CARE* Research & Development Laboratory (CRDL) at the University of Alabama in the Computer Science Department.

Referring to the National Agenda Goals, tell how your project relates to each one you listed in Part One of this application:

1. ***Yes**, CARE involves leaders who promote the importance of highway safety information systems, used for safety policy and program decision-making.*

On the primary level, the leaders of *CARE* are Dr. David Brown and Dr. Allen Parrish. Both of these men have put much time and effort into promoting highway safety information systems and trying to emphasis the critical role these systems can provide. On the secondary level, many *CARE* users are leaders in their own right who promote the importance of highway safety information systems and feel *CARE* plays a vital role in this arena.

2. ***Yes**, CARE involves the coordination of the collection, management, and use of highway safety information among various organizations responsible for highway transportation policy.*

The *CARE* process involves this type of coordination. The starting point is the crash database that contains the collected crash records for the state. This database is converted for use with *CARE* and distributed to staff of these various organizations responsible for highway transportation policy. *CARE* is even available over the web for anyone who has an interest to use. *CARE* has led to data enhancement in dozens of known cases as a result of local officials recognizing and correcting deficiencies in the data that they submit.

3. ***Yes**, CARE is an example of integrating the planning of highway safety programs with highway safety information systems.*

CARE is a perfect example of this goal. A primary function of *CARE* is to be able to mine information out of the database to identify problem areas in order to help you set your goals and plan your programs. The state of Alabama has used *CARE* to develop their Highway Safety Plan (HSP) for the past 15 years. In addition, ALDOT has used it for over five years in the allocation of Hazard Elimination for Safety (HES) funds. North Carolina used *CARE* last year for the same purpose. As one example, it is used widely in Alabama by all of the Community Traffic Safety Professionals to shape programs such as selective enforcement times and locations.

4. ***Yes**, CARE represents examples of highway safety professionals being trained in the analytic methods appropriate for evaluation of highway safety information.*

CARE personnel perform one day hands-on training so that *CARE* will be used properly and to its full potential. There is also a user's manual and other written and on-line documentation to help train highway safety professionals on how to interpret the results obtained from *CARE* so that the information can produce results that can be put into action.

Referring to the management approach to highway safety, tell how your project supports the management steps you listed in Part One:

(1) Establish Safety Goals - The problem identification process performed by *CARE* lends itself to the establishment of goals by defining the maximum expected reduction of crashes that might be expected from a given countermeasure. *CARE* quantifies this (in potential crashes reduced) by determining how many crashes might be reduced if a given over-representation could be reduced. This information is invaluable in establishing realistic and attainable safety goals.
(2) Identify Problems – This is also one of the primary functions of *CARE*. The **IMPACT** feature of *CARE* is an information discovery tool. This process provides the user with the ability to obtain crucial information from the database without having to generate endless queries. Latent information is mined out of the database, analyzed, and instantly presented in both graphical and tabular charts. The results are prioritized indicating areas where countermeasures will provide maximum gain. The information discovery potential is limited only by the data itself. If there is relevant information in the data, *CARE* will identify it.
(3) Plan Programs/Countermeasures – *CARE* has played a major role in the development of the Highway Safety Plan in Alabama every year since 1977. It was used to develop the North Carolina HSP in 2003. It can be used for this purpose in any state that uses *CARE*. It is used widely in Alabama by all of the Community Traffic Safety Professionals to shape programs. For example, *CARE* identifies high-crash/rate locations and then generates standardized reports to support the investigation process. This has been used for the past five years to allocate FHWA HES funds. Most recently *CARE* performed special studies on four-lane cross-over crashes and single vehicle run-off-the-road crashes for ALDOT.
(6) Evaluate Effectiveness - *CARE* has a special before/after feature that allows you to look at the data before a specific countermeasure was enacted and compare it to the data after the countermeasure was enacted. This tool makes it very simple to evaluate how effective the countermeasure was. Similar countermeasures can be aggregated over different types of roadways and over different time spans (before and after) to provide a very flexible capability. This is just one of the ways *CARE* accomplishes this goal. *CARE* can very quickly handle very large datasets containing several years' worth of data. It is easy to compare the corresponding numbers from year to year and see where improvements have been made.

Describe the major process steps for your project, including any unique aspects that enhanced success:
CARE software was originally developed over 20 years ago but *CARE* is a constantly evolving product. Each new version of *CARE* is improved with additional functionality for the users and the latest technological advances in programming and processing data. Any crash database can be converted to work with the *CARE* software. *CARE* has also been applied to traffic citations, medical records and other criminal justice databases.

Provide the evidence and reasoning used to determine the success of the project:

Evidence of the success of *CARE* is feedback from *CARE* users. The fact that our users continue to use *CARE* proves that they find it to be a valuable product. *CARE* produces immediate results that the user didn't even know to ask for. It mines the database to determine the problem areas and instantaneously displays the results graphically and with tabular charts. The fact that other states have evaluated alternatives and selected *CARE* as their main crash records processing system is ample evidence of its success.

CARE won the NHTSA 1995 Administrator's Public Service Award.

CARE was the major analytical tool used to illustrate problem identification and planning methods recommended in NCHRP 17-18(5), which has been published in NCHRP Report 501.

Why should this project be recognized as a best practice in traffic records?
We feel that *CARE* should be recognized as a best practice in traffic records because it has a proven track record, it supports the major steps for a Traffic Records Systems and it follows the ATSIP National Agenda Goals. Further, *CARE* is one of the few state-developed software systems that has ever been transported to other states.