**ATRI** American Transportation Research Institute

# A Synthesis of Commercial Motor Vehicle Safety Technology Surveys: What Have We Learned?

## The Problem

At any given time, there are a number of efforts and initiatives underway seeking to identify ways to reduce the number of crashes and fatalities on our nation's highways. It is the primary objective of the Federal Motor Carrier Safety Administration (FMCSA) to reduce the number and severity of crashes involving large trucks. In recent years, FMCSA and the trucking industry have formed partnerships to test and evaluate safety technologies (such as lane departure warning, forward radar, collision warning, and rollover/stability control) which may increase safety on the roadways.



The research efforts evaluating these types of technologies have produced copious amounts of qualitative and quantitative safety technology data that may have broader applicability and benefit to commercial vehicle operations safety and safety research efforts. Until recently, many of these efforts have been conducted independently of each other and with limited coordination of data aggregation and analysis across projects. Synthesis and coordination of the data may lead to stronger findings and recommendations as well as the identification of research gaps, allowing for more targeted future research activities.

## Research Goal

In an effort to accomplish this objective, ATRI undertook a synthesis effort on behalf of FMCSA to unify and consolidate the documentation and analysis of existing surveys, interviews, and focus groups. This synthesis provides a more integrated understanding of the relationships and factors involved in the use, selection, and impact of onboard safety technologies. It also elucidated future research opportunities and reduced the potential for future research redundancy.

## Methodology

The first phase of the synthesis was to identify all existing surveys, interviews, and focus group initiatives that addressed safety technologies in the trucking industry. Extensive research investigations resulted in 17 studies/instruments. The instruments included those focusing on:

- Fleet managers, safety directors, and other carrier management
- Drivers
- Other stakeholders (i.e. insurance companies)

Next, a master database of questions was created from all of the collected surveys and interviews. The research team consolidated clearly redundant questions. Finally, discussions were held among the research team to finalize the remaining data for processing and analysis. Master databases were created for all survey questions and data from each of the instruments, and then analyzed. In addition to basic descriptive statistics, trend analyses were conducted with all of the qualitative data responses.

## Synthesis Findings

Most carriers indicated familiarity with a number of safety technologies including rollover stability and control, lane departure warning, and forward-looking radar. This is not surprising given the increasing focus on safety by government and industry. However, it is interesting to note that the most recognized and researched technologies (lane departure warning, forward radar/collision warning, and roll stability control systems) were not among the most widely installed safety devices (GPS and remote communications). Nevertheless, lane departure warning, forward radar/collision warning, and roll stability control systems were among the fastest growing technology categories for future installation.

**Top 5 Technologies for Future Installation**

| Category | % |
|---|---|
| Automatic collision notification/mayday systems | 26% |
| Remote diagnostic system that senses malfunction and notifies driver, company, and/or repair station | 23% |
| Load stability sensors/Roll over stability | 23% |
| Radar-based collision warning system/Forward radar | 21% |
| Lane departure warning/Lane change aid | 21% |

Consistent throughout all the surveys and question responses was the concern about cost and the desire for additional information regarding demonstrated safety benefits. The findings indicate a need for additional information on financial implications for safety technologies such as insurance costs, crash reduction savings, cost of installation, maintenance, training, and upgrades to safety support systems.

Other key findings from the analysis include the following:

- There is an increasing acceptance and implementation of in-vehicle safety technologies.

- Carriers want more documentation of safety impacts, reliability, and validity of the safety technologies.

- There are serious concerns relating to data privacy and security, including how the data is handled and potential future uses for the resulting data.

- Cost, return on investment and ROI break-even points are among the top priorities for companies when considering investing in safety technologies.

- Acceptance throughout the company, from driver through upper management, is necessary for successful implementation and use of safety technologies.



## Gap Analysis

While seven of the surveys that were identified and examined focused on driver experiences with the technologies, most of these surveys focused on a single technology, and were based on very small sample sizes.

Some of the key areas where additional research is needed include the following:

- Quantitative data on ROI timelines would be beneficial to gain a broader understanding of deployment opportunities.

- More research is needed on training needs and approaches for drivers, maintenance staff, and managers.

- More information from technology vendors would be beneficial to understand the development, evolution and production of safety technology systems.

This type of synthesis is crucial to understanding onboard safety technologies and user issues, and should be expanded to address existing and future research and deployment activities.

For more information about this and other ATRI studies, please visit: WWW.ATRI-ONLINE.ORG



*ATRI's primary mission is to conduct and support research in the transportation field, with an emphasis on the trucking industry's essential role in the U.S. and international marketplace.*