



TRANSPORTATION POOLED FUND  
PROGRAM

## TECHNICAL SUMMARY

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### Principal Investigator:

Daniel McGehee, University of Iowa

### PROJECT COST:

\$160,000

### Mn/DOT CONTRIBUTION:

\$80,000

### PARTICIPATING STATES:

IA, MN



The DriveCam event-triggered video recording system was mounted on the windshield behind the rearview mirror of each participant's vehicle.



## RESEARCH SERVICES

OFFICE OF POLICY ANALYSIS,  
RESEARCH & INNOVATION

# Pooling Our Research: Enhancing Teen Driver Safety with Video Feedback Systems

## What Was the Need?

Motor vehicle crashes have long been the leading cause of death for 16- to 19-year-olds, and fatal crashes are higher for teenagers than for any other segment of the population. These crashes are most frequent in the first six to 12 months of independent driving for newly licensed teens.

Addressing these issues requires obtaining a window into the everyday driving behaviors of these teens, and recent research has focused on doing so by placing event-triggered video systems and other monitoring technologies within their vehicles. These technologies can provide teens with feedback and facilitate parent mentoring of driving beyond the supervised learning phase. Research was needed to evaluate whether using these technologies during the first six months of independent driving would improve the safety of teen drivers by curtailing risk-taking behaviors and improving their awareness of hazards.

The national Transportation Pooled Fund Program, sponsored by the Federal Highway Administration and funded by interested state departments of transportation on a project-by-project basis, offered an opportunity for Mn/DOT to work with the Iowa Department of Transportation to study this issue, saving both agencies money.

## What Was Our Goal?

The objective of this pooled fund study ([TPF-5\(144\)](#)) was to determine whether feedback from an event-triggered video system can reduce the number of safety-relevant driving errors made by newly licensed urban teens.

## What Did We Do?

Study participants included 36 16-year-old Minnesota high school students who had received their driver's licenses within the previous six months and had been driving without supervision from one week to five months.

Researchers equipped participants' vehicles with a DriveCam event-triggered video recording system. This palm-sized device consists of accelerometers linked to two video cameras, one facing the windshield of the car and the other facing its interior. The device records video continuously, temporarily holding 20 seconds of data at a time in a memory buffer. When its accelerometers detect hard cornering, swerving or abrupt changes in speed, the system displays a blinking LED and writes this data permanently to an internal hard drive, including video covering 10 seconds before and after the event.

For the first six weeks of the study, researchers turned off the LED feedback mechanism to collect baseline data concerning driver behavior. During the subsequent 16 weeks, drivers' parents were provided with LED feedback as well as a weekly report card detailing these events and a CD containing the week's video recordings.

*TPF-5(144): Use of Video Feedback in Urban Teen Drivers. Researchers evaluated whether using an event-triggered video system in vehicles could reduce safety-relevant driving errors made by newly licensed teens. Researchers found that video feedback was immediately effective, reducing safety-relevant events by 61 percent.*

*“Minnesota is very interested in these results, which will help Mn/DOT with its ongoing development of feedback solutions for reducing teen driving fatalities.”*

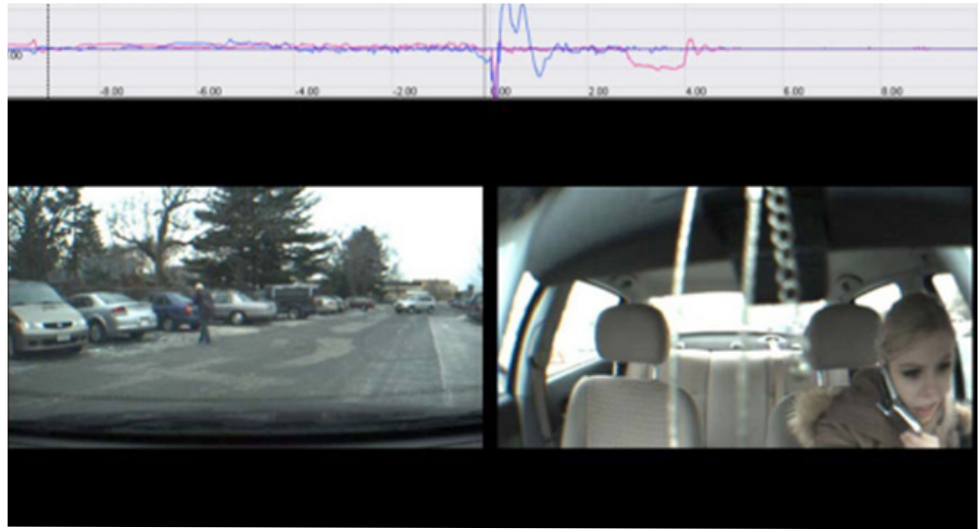
**–Ray Starr,**  
Assistant State Traffic  
Engineer, Mn/DOT ITS

*“This technology has the potential to save lives by reducing crashes involving loss of control during high-speed turns, which are a leading cause of injury and death for teens.”*

**–Daniel McGehee,**  
Director, University of  
Iowa Human Factors and  
Vehicle Safety Research  
Program, Public Policy  
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The DriveCam system uses accelerometers to measure changes in vehicle velocity and lateral forces acting on the vehicle when cornering. If acceleration or deceleration exceeds a threshold value, an event is triggered and a video recording of it is saved.

After 16 weeks, 16 of the original 36 participants remained in the study. Eight of these participated in the feedback phase for a supplementary 24-week period. All 16 teen drivers participated in a final six-week phase without feedback to assess whether feedback-induced changes in behavior persisted.

Finally, researchers analyzed this data by classifying events into several categories describing their characteristics, causes and context.

### What Did We Learn?

Results showed that the video feedback was immediately and extremely effective, reducing the number of safety-relevant events by 61 percent overall, from an average of 21 to eight per 1,000 miles. These reductions continued after the feedback phase ended and were most dramatic in the category of improper turns and curves (the most represented scenarios in fatal car crashes), with a 78 percent decrease in the events between baseline phases. Feedback from the system was shown to increase communication between parents and teens regarding safety. User acceptance of the devices was extremely high, with 100 percent of subjects recommending this program to other teens.

### What's Next?

This study has been published in the [American Journal of Public Health](#), and some states are continuing to fund this line of research through [TPF-5\(207\) Novice Teen Drivers: Million Mile Study](#) by examining other driver populations (drivers younger than those allowed under Minnesota law) and the psychology of driver decisions; Eagan High School in Minnesota has provided support for this project. Researchers are also conducting a follow-up study, “Age Versus Experience in Video Feedback,” to incorporate wireless transmission of data from its video feedback system and to improve on the current study and [its predecessor](#) by employing a control group of drivers that did not receive feedback; this will provide a baseline regarding how new drivers improve over their first six months of driving.

[Some insurance companies](#) are currently offering video feedback systems free to their customers. The results of this study have benefited Minnesota’s teen driving efforts and its larger [Toward Zero Deaths](#) goal to reduce the number of fatalities to fewer than 400 in 2010. Teen driving is one of seven critical emphasis areas identified in [Mn/DOT’s Strategic Highway Safety Plan](#).

*This Technical Summary pertains to the completed Pooled Fund TPF-5(144), “Use of Video Feedback in Urban Teen Drivers.” Details of this effort, including a link to the final report, can be found at <http://pooledfund.org/projectdetails.asp?id=372&status=23>.*