# Developing Real-life Driving Simulations for Novice Driver Education

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**Abstract:** This paper will describe the technological aspects of producing live-action videos of real traffic scenarios for a new driver education training CD-ROM (CD-DRIVES) aimed at novice drivers in New Zealand. CD-DRIVES was created in order to help young drivers practise crucial higher level driving skills such as eye scanning, hazard detection and risk management. We will present a roadmap of the technological advances made through hardware, software and processes used in the production and post-production stages of CD-DRIVES.

## Introduction

From May 2003, all novice drivers in New Zealand (approximately 60,000) will have the option to request a free copy of a new driver education training CD-ROM (CD-DRIVES) as part of joint initiative between the Land Transport Safety Authority and the Accident Compensation Corporation promoting the benefits of extensive supervised driving experience for young drivers. CD-DRIVES provides the novice driver the opportunity to practise crucial higher level driving skills such as eye scanning, hazard detection and risk management in circumstances where the only thing they can crash is their computer.

In order to make the learning experience as true to life as possible it was decided that we had to get our cameras out on the road amongst the traffic so that all the videos on the CD-ROM were true representations of real driving situations. It was also important that the videos modeled what the driver sees when sitting in their car. This meant that we needed to provide video with a wide field of view through the front windscreen and also video representing the rear view mirror and two side mirrors. To bring the video together and finish the realistic representation we developed a series of photo-realistic car interiors. What follows is an introduction to the processes used, the full poster details the steps taken to develop these.

## The Hardware

To get our cameras out amongst the traffic it was obvious that we required some form of transportation. The choice of car was quite important and our requirements were a little different than your standard car buyer. The key elements we looked for in a car were interior space (a lot of equipment had to be installed), customizability (had to easily accommodate the changes for our camera mounts) and physical features (a short bonnet/hood and steep angles on windscreen and rear window). The car we found to fit these requirements was a Honda Civic Hatchback (Figure 1 top left).

To provide the same view as the driver sees from their vehicle required installing and operating four cameras. Knowing exactly how we were going to be using the footage from each camera enabled us to make informed decisions in the purchase of the cameras. Our final decision for the drivers view camera, after many trials, was to go for a broadcast quality camera with a high quality wide angle lens. The cameras to represent the mirrors were chosen on a price/performance basis. The cameras and their custom designed and constructed mounts are shown in Figure 1 (top right and bottom row).

The quality of the video that the cameras recorded was obviously also a major factor in our choice. Users of the final CD-ROM ought to be able to pick out hazards and determine potential risk as clearly in our videos as they would if they were driving on the roads themselves. Choosing cameras that recorded in DV format ensured that from capture to CD-ROM we could keep our video footage in the digital domain.
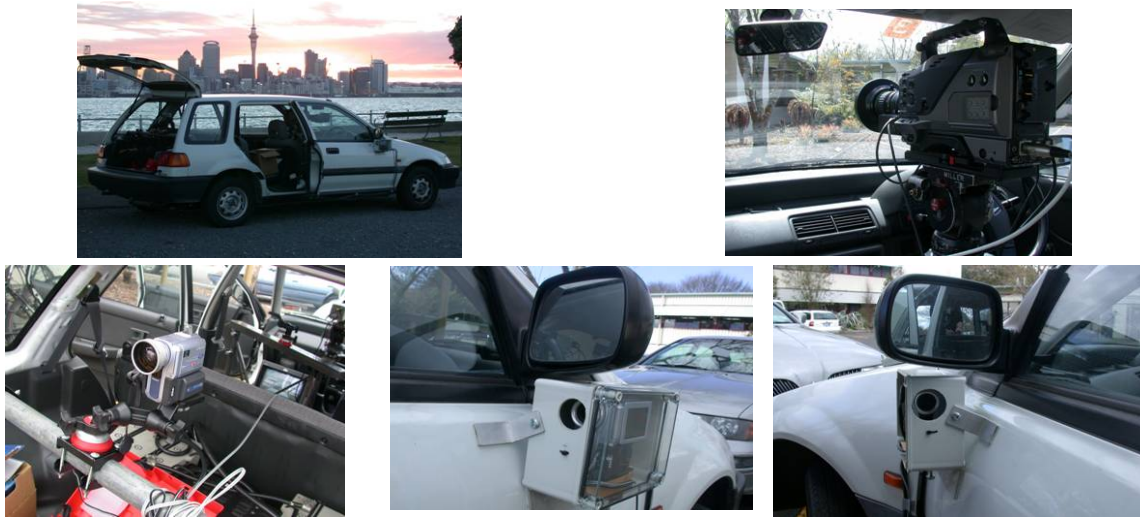


Figure 1: CD-DRIVES car, cameras and their custom designed mounts.

Rounding out the in-car production equipment were a video monitor, a VHS recorder and video QUAD splitter. The QUAD splitter allowed us to display video from all four cameras on the same monitor and also record this to VHS tape. The purpose of the VHS tape was to allow the video from each recording session to easily be logged without having to refer to the digital tapes. The addition of the QUAD splitter was crucial for accurately identifying potential risks and hazards during video logging.

## The Software

To bring all the video footage together required many hours in post production and a core set of four key applications. Final Cut Pro was the choice for the Non-Linear Edit software and provided not only an efficient platform for editing but also provided crucial colour correction tools used to match the colour of the four sets of footage where necessary. Compositing all four cameras and the car interior as well as the animated dash was carried out in Adobe After Effects with its powerful feature set. Perhaps most important to the final quality of the video was the use of Magic Bullet and its simple but powerful video de-interlace tool. Finally the powerful pre-processing and useful batch functionality of Discreet Cleaner 6 provided the final compression for the videos. Figure 2 shows an example screenshot of the final outcome.



Figure 2: Example screenshot from a CD-DRIVES trial.

## References

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