New hardware! The image to the right of this text is of a USB digital microscope with a polarizer. It is designed to be handheld, but I have also purchased a stand for it. It is about 1.5 inches in diameter and a little less than 5 inches long. It operates through the USB port of a Windows computer (XP or later) or a Linux machine. It provides two-megapixel color images in up to 1600 x 1200 image size with magnification of 5x to 200x on a 17-inch screen, the smallest recommended monitor size to be used with it. It takes still images, time-lapse photographs, and video at rates up to 30 frames per second. The focusing range is 0 to 300 mm (11.8 inches). Since the lens is of fixed-focal-length design, the effective magnification is a function of the distance between the image and the lens; the focusing wheel allows for sharp focus over a wide range of magnifications. Illumination is provided by 8 adjustable white LEDs. Gamma correction and color saturation are automatic. The adjustable and removable polarizing filter allows for the blocking of obscuring reflections from objects being viewed. The microscope is fully powered through the USB port, with a maximum power consumption of 0.75 watt. Included with the microscope is a transparent measurement slide; the image below the picture of the microscope was taken with this microscope to show the 0.5 mm line on the measurement slide. Still images can be saved as a bitmap or as a JPEG. Saved images can be enlarged, reduced, or changed in other ways with image-editing software, not included with the microscope. If you are interested in obtaining one for yourself (or for your children), visit www.saelig.com and type "microscope" in the search box.

Underride! I attended the 2012 Southeastern Collision Reconstruction Conference held the last week of July in Charleston, South Carolina. One of the staged collisions conducted on Monday of that week was a Saturn sedan striking the right side of a geriatric Great Dane semi-trailer. The upper photo to the left of this text shows the Saturn just milliseconds after release of the towing cable and before initial contact. The photo at the lower left corner shows the Saturn during well-developed contact. There is debris from the car flying over the trailer from its struck side. Also note that it is the rear undercarriage of the Saturn which is making contact with the pavement to the right of the side of the trailer; this is typical of underride collisions, contrary to what may have been assumed or what may seem logical or likely.

The photo immediately to the left of this text shows the collision in its final stages. This trailer was not connected to a truck tractor, so it twisted as a result of the forces being applied to the underside. And you thought these semi-trailers were rigid! After impact, the trailer returned to its normal shape, with no structural damage as a result of the underride.

The next photo shows the Saturn sedan after it was removed from beneath the semi-trailer. This is quite typical of the results of an underride collision which occurs at a speed near 30 mph. At speeds much over 30 mph in a perpendicular collision, most cars will pass completely through the underside of the trailer, traveling beyond the other side for some distance which depends on the impact speed.

One of the purposes of this staged collision was to demonstrate the validity of an equation for relating side-impact underride damages to impact speed as presented in an SAE paper, 2003-01-0178. The Saturn was heavily instrumented; analysis of the data revealed the overall accuracy of the method and formula presented in that document.

There were also two staged collisions between a car and the rear of the semi-trailer, and there were also two car-to-car collisions. For one of the staged car-to-car collisions, the desired goal was to have the cars stick together at impact, moving to rest essentially as one unit. These cars were also heavily instrumented. Analysis showed that, although they did not separate after impact, there was some restitution (although the amount was small); restitution has typically been assumed to be zero in a stuck-together collision. Although there is some restitution, the assumption of zero restitution when two cars become one will typically only result in a calculation error of one or two mph. Another point of this analysis was to demonstrate the effective rate of post-impact deceleration; there are apparently many misconceptions of what deceleration values to use for post-impact movements, for cars which separate and for those which remain together after impact. This conference included presentations made over the remaining four days, including topics like road conditions as causative factors in vehicle accidents and using data collected by and extracted from Garmin GPS units to assist in evaluating factors involved in collisions.

Version 6.0 of the Bosch CDR software was released in August of 2012. In addition to adding a few Chrysler/Fiat vehicles, a Ford vehicle, and numerous GM vehicles, version 6.0 offers the first-ever Toolkit access to data in Nissan vehicles. To see a complete list of the vehicles covered by version 6.0, go to http://www.ralphcunningham.net/60list.pdf. To learn more about the Nissan coverage, go to http://www.ralphcunningham.net/currfeat.htm. (Yes, believe it or not, I have finally installed a new current feature on my Web site. ☺) Although I haven't downloaded one of the Nissans covered by version 6.0 yet, I did have access to a download from a 2010 Nissan Altima, courtesy of a factory representative who had been allowed to provide that download by Nissan's legal department. The Altima download contained a tremendous amount of data, including a significant amount of pre-crash and post-crash information. One aspect which I found particularly interesting was that the data set included steering angle reported in one-degree increments and one-second intervals for seven seconds before impact to six seconds after. Impressive! (At least to me.) Presently, only a limited number of 2013 vehicles of Nissan manufacture are accessible with version 6.0 of the software; I don't know if there are plans to provide future access to earlier model years, although many earlier models do contain ACM crash data.

As I've written before, and as many of you may know from other sources, United States regulations require that all 2013 and later model-year vehicles whose airbag control modules record some crash data record a certain minimum amount of crash-related information, and the regulation also requires that the data will be accessible by non-proprietary means. Although the regulation does not specifically require that the data be accessible with the Bosch CDR system, the government is pushing for all such manufacturers to work with Bosch, since the NHSTA has approximately 2500 Bosch Toolkits. If some manufacturers establish their own "public" systems to access data, the NHTSA will have to purchase 2500 of those kits for each such manufacturer. The Federal government is strongly suggesting to manufacturers that they work with Bosch, to eliminate the expense of additional systems and the complexity of different hardware and software. So far, Toyota, Honda, and now Nissan are riding the Bosch bandwagon, and I have been told that Bosch is in talks with at least three other manufacturers, but Bosch will not release the names of those manufacturers until after contracts are in force and work has begun on additional hardware and on software modifications which may be required. Unless the regulation has been changed recently, manufacturers have up to six months after the introduction of their 2013-model-year vehicles to be in full compliance. By this time next year, I expect that a significant number of manufacturers will have been added to Bosch Toolkit access.

For many of the crashes I've investigated, neither vehicle had accessible, stored crash data in the airbag control module (ACM). However, with passing time, those vehicles without ACM data will be worn out and scrapped, and more and more collisions will involve one or more vehicles with ACM data. The ACM data set will not stand alone in court, but it can be a powerful augmentation to a thorough reconstruction. There have been a few cases over the years where there was inadequate site data to allow a complete, accurate reconstruction, but examinations of the vehicles and downloading the ACMs allowed information gaps to be filled. And one aspect of the ACM data is that many downloads now show some seconds of pre-crash information; a reconstruction can demonstrate how fast a vehicle was traveling at impact or at the initiation of pre-impact skidding, but a reconstruction can't determine how fast a vehicle was going three seconds earlier. Would you believe 80 mph in a 30 mph zone? It has happened. Please contact me whenever you have need of any of the vehicle-related consulting services I offer.

1804 Thornhill Pass, SE
Conyers, GA 30013
770.918.0973
Fax: 770.918.8076

Ralph Cunningham, Inc.
1804 Thornhill Pass, SE
Conyers, GA 30013