I have added a new toy to my accident reconstruction equipment group. The image above shows a Vericom Computers VC3000 performance computer. This piece of equipment contains a two-g, two-axis accelerometer; data processor; and data storage. In addition to the on-board capabilities of recording the dynamics of a motor vehicle in longitudinal and transverse directions, it can accept and record data from a wide variety of optional sensors. I already have an OBD II Vehicle Sensor Interface, which will connect to the OBD II data port of any vehicle which contains such a port and simultaneously record selected data from that sensor with the recordings of the vehicle dynamics.

This accelerometer measures and records the instantaneous values of transverse and longitudinal acceleration (and other data values) at a sample rate of 100 Hertz; i.e., 100 times each second. The longitudinal acceleration can be used for determining rates of acceleration from a stop (or some selected speed) for a given vehicle. Positive values are for acceleration which moves the vehicle forward; negative values are for acceleration which retards the forward motion of a vehicle or which moves it backwards; negative acceleration is called deceleration when it functions to slow or stop a forward-moving vehicle. It is the specific rate of that deceleration which can often be most useful in a reconstruction.

Often, a period of skidding by one or both vehicles will precede a collision. Then, after impact, vehicles typically separate and move to their respective final positions. The equivalent speed value associated with a given distance of skidding, whether related to a collision or not, can be calculated using a well-known, basic formula whose only unknowns are distance and drag factor. Usually, there will be little argument over the distance, but there can be significant disagreements about the drag factor. Where the drag factor is questionable or otherwise an issue, the VC3000 can be used to determine the drag factor at a given location. The accuracy and repeatability of the data from this machine have been demonstrated repeatedly. In my opinion, this is currently the best piece of equipment to use for that application, due in part to its verified accuracy and the long-term use of this equipment by others in many fields; this device has been approved by the FAA for airport runway friction testing.

Whether or not there was pre-impact skidding, most collisions result in post-collision separation and travel to a different final position for each vehicle. This post-impact travel almost never involves application of the brake. (Even if there was pre-collision skidding, drivers' feet are usually dislodged from brake pedals at impact.) Whether a collision is being reconstructed on an energy basis (crush) or by vector analysis (momentum), the post-collision travel is an important aspect of the reconstruction. For a momentum-based reconstruction, the post-impact travel is critical, from both standpoints of distance and direction. The speed loss during the post-impact travel is calculated considering what wheels may have been jammed or impeded by collision damages, possible rotational effects of motion on the effective rate of deceleration (a vehicle traveling sideways has very much greater resistance to motion than one traveling forward, unless the brakes are applied), and the drag factor(s) of the surface(s) over which that post-impact travel occurred. There's our old nemesis (or friend, depending on your outlook), drag factor. The drag factor of the surface, which has nothing to do with how many wheels may have been trapped by collision damages, is a fundamental datum for this part of a reconstruction, also. The VC3000 provides data that can be used to evaluate both the pre-impact speed loss and the post-impact speed loss with a level of accuracy and reliability which can be proven independently.