

# From speedometers to modern instrument clusters

**SAE 100** Future look

In celebration of SAE's Centennial in 2005, industry executives discuss the future of mobility technology.



by **Gerhard Wesner**, CEO of Interior & Infotainment, Information Systems, Passenger Cars Division, Siemens VDO Automotive



Old and new



First fully digital driver information system

**O**n October 7, 1902, engineer Otto Schulze received a patent for an eddy-current speedometer. Modern driver information has come a long way since then, encompassing a whole history of automobile instrumentation that would be unimaginable without Schulze's speedometer and its technological successors.

The first automobiles had no "cockpit" as such. And there was simply no need for instruments. Even in motor racing events staged in France around 1895, the maximum speed was roughly 30 km/h (18 mph).

Things started to change around the turn of the century when accidents became a problem. Among the first solutions were speedometers with a small dial for driver use and a much larger display that was legible from a distance so police could enforce speed limits. One of Hasler's (a Swiss manufacturer) systems included a large speedometer indirectly illuminated by an acetylene flame.

The year 1905 saw the first mass-produced speedometers. Temperature sensitivity allowed for 4.3% error for every 10 degrees on the dial. The eddy-current speedometer came of age as early as 1910, and it featured a temperature-compensation system.

VDO was born of the 1928 amalgamation of the Deuta and OTA. By then, instruments were starting to take on a new look. Very soon, alternatives to the familiar round dial-and-pointer design with a concentric or eccentric scale showed up. The speedometer advanced in a number of ways over the following years. Along the way, tachometers and audio systems were introduced, and the idea of instrument clusters grew popular.

The first all-LCD cluster instrument appeared as early as 1986. The first all-electronic speedometer appeared in 1993. The head-up display is a more recent

innovation, as is the electronic display and navigation capability.

Present and future instruments must keep drivers informed about an ever-growing range of vehicle systems and parameters without subjecting drivers to information overload. The challenge is to design a leaner, simplified human/machine interface (HMI) within the driver's visual field that still manages to convey all of this information. Designers have responded by teaming the familiar round-dial instrument with multifunctional displays that make the best use of the limited surface area of the dashboard.

Improvements in instrument clarity and electronic support systems have certainly resulted in a better physical environment and reduced stress, but these same instruments have also created a new challenge: All of those driving aids now have to be started, properly set and monitored—by the driver. Much more than ever before, the field of cluster instrument ergonomics must focus on driver selection capability as part of an overall control concept. The key requirement is for a multifunctional display content to continuously match the driver's input. Speech input is one suitable option, as is the rotary/pressure controller instrument with freely programmable touch feedback. Then there is the important question of which input methods individual drivers actually prefer, so multi-mode interfaces can be featured more prominently in the future.

There is no doubt that, measured against the challenges posed by current and future traffic management requirements, the speedometer from 100 years ago appears antiquated. But it is, and remains, the point of origin of the concept of driver information and the very beginning of traffic management initiatives. Drivers needed to know their speed, and that's where it all started. **aei**