



Which emerging vehicle technologies should fleet operators be tracking on their radar screens? A leading tech expert picks a few favorites

**Brad Kelley**

**T**oday's vehicles are technological marvels. They have evolved from being a crude form of transportation used merely to take people from point A to point B into smart transports capable of customization to make the driver and passengers more comfortable, safer and entertained. Indeed, techno-features like global positioning with real-time driving directions, tire pressure monitoring and satellite radio in some cases have become standard vehicle features. And on the horizon is a new generation of vehicles that promises to deliver an unprecedented level of efficiency, safety, automation and integration.

The most pressing advancements in vehicle technology are in the area of efficiency. With the rising cost of fuel, the need for energy independence, a growing world population and the continuing popularity of SUVs and pickup trucks, there is an increased demand for more fuel-efficient vehicles. The obvious short-term solution to this problem is the hybrid-electric vehicle. Hybrids also are an attractive solution because they do not require highly specialized maintenance routines or new fueling infrastructure. They operate and fuel in the same manner as non-hybrid vehicles, which makes for greater market acceptance and resale value, while also offering extended driving range. Thus they answer many of the major drawbacks typically linked to alternative fuel vehicles (AFVs), including their shorter driving range and need for new fueling infrastructure investment.

Yet the long-term outlook for hybrids and other fuel-efficient approaches is in question. Someday a non-petroleum-based power plant likely will be developed and proven commercially worthy to replace today's hybrid technology. However, this isn't expected to happen in the next 15 years.

Among the technological frontrunners in the quest for a zero-pollution, ultra-efficient and domestically fueled propulsion system is the hydrogen-powered fuel cell. To support the advancement in hydrogen technology, President Bush included \$260 million in his fiscal year 2006 budget for the Hydrogen Fuel Initiative. This is an increase of \$35 million over 2005 funding

levels and brings the program's projected five-year financial commitment to an astounding \$1.2 billion. The initiative focuses on the fundamental science and technologies to produce, store and distribute hydrogen for use in fuel cell vehicles and electricity generation.

Areas in which we can expect to see more near-term technological advancements in vehicles include safety, automation and integration. For example, Ford Motor Co. is developing various applications for cameras that provide drivers with a better view inside the driver compartment and outside the vehicle. One of Ford's solutions includes low-light color cameras that are mounted in the side-view mirror housing to produce enhanced visibility in the rearward and forward directions. Ford also is developing a NightEye vision system that uses a low-light color camera to warn the driver of possible threats that cannot be seen with the naked eye. Other manufacturers are developing similar technologies that will allow drivers to see during the rain, fog and other vision-impairing conditions.

Other emerging uses for camera-based technology include side-view mounted units that allow drivers to see pedestrians, bikes and vehicles in their "blind spot," solutions that estimate traffic threats and notify the driver of potential accidents and advanced rear collision warning systems that alert the driver of an impending accident. These advances are expected to significantly reduce the number of avoidable accidents. It's unclear, however, whether these features will be available in every make and model.

Other technologies that are currently under development include personalized ergonomics, in which the driver(s) can configure, reconfigure and save personal vehicle settings for recall at anytime. For example, several automakers are developing e-dashboards that allow the driver to rearrange the location of gauges and add plug-in view for weather and traffic reports. Users can save their personal settings and recall them when using their vehicles. It is even rumored that drivers will be able to carry their own preferences with them and apply them to any model produced by the manufacturer.

While all these technologies hold amazing potential, perhaps the most significant advancements are expected to come in the area of communications. Current communication technologies such as GPS and satellite radio are expected to become standard features in mid- to high-end vehicles and optional features in most economy classes of vehicles.

It's also expected that anyone with an OEM (original equipment manufacturer) GPS-enabled vehicle will be able to pay a low monthly fee for a vehicle tracking and monitoring service. This service is already available from several third-party vendors but not from any OEMs. Some of the vehicle elements that currently can be monitored include vehicle location and speed, speed limit violations, meter readings, accidents, excessive acceleration and braking, idling time and trip duration. Other systems are being developed to allow direct interface with vehicle onboard computers and GPS solutions in order to communicate vehicle error-codes from sensors. This should be of particular interest to fleet operators that can use this information to troubleshoot problems and even notify drivers of a potential issue.

Advances also are coming in the area of wireless car-to-car communications, which will allow short-range wireless connections between vehicles and roadside stations and from one vehicle to another. This peer-to-peer technology, which Ford, DaimlerChrysler and others are pursuing, will make it possible to notify drivers ahead of time about driving conditions—weather, traffic flow, etc.

Vehicle technologies are advancing so fast that it's useless to speculate which ones ultimately will make it to market and when. We can be certain, however, that the vehicles of tomorrow will be safer, more efficient and much smarter. The difficulty for many vehicle owners and fleet managers will be deciding which technologies truly add value and which ones just add cost.

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