

10 of the Biggest Car Tech Innovations Of the Past 75 Years

The top technological advancements that changed automobiles forever.

The Henry Ford - Writer; Manufacturer - Photographer | Aug 02, 2024



Editor's note: Matt Anderson, who wrote this piece, is the curator of transportation at The Henry Ford museum in Dearborn, Michigan.

By most objective measures, today is the automobile's golden age. Cars are more powerful, more efficient, and more capable than ever. The editors of the first issue of *Motortrend* would certainly marvel at our world of 800-horsepower performance cars, 30-miles-per-gallon SUVs, and vehicles that all but drive themselves on the open highway, let alone the latest electric cars, trucks, and crossovers. Most important, vehicles today are the safest in history, with traffic deaths hovering around 1.35 per 100 million vehicle miles traveled.

What enabled these automotive miracles? Market forces to some extent, but government regulations were even more influential. Most of the technologies

making our modern glory days possible debuted on luxury cars before moving down market, and many appeared in Europe or Japan before coming to the U.S. Here's a look at 10 of the most significant automotive advances of the past 75 years.

CHEVROLET'S POWER LINE-UP FOR '57 OFFERS SENSATIONAL NEW FUEL INJECTION!

... 5 great engines with high-compression power!

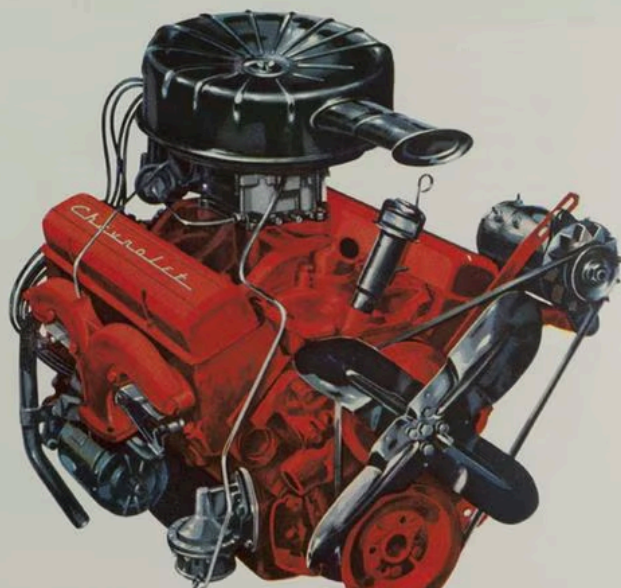
THE "SUPER TURBO-FIRE 283"

A NEW PEAK IN
SMOOTH V8 PERFORMANCE!

In its advanced new short-stroke "Super Turbo-Fire 283,"* Chevrolet announces headline power news for '57! This mighty V8 delivers high-compression horsepower and husky torque. Big-bore 283-cubic-inch displacement and ultra high 9.5 to 1 compression ratio in the "Super Turbo-Fire 283" deliver a new peak in efficiency. Add balanced 4-barrel carburetion ... new high lift camshaft ... Fire Swirl combustion chamber design ... new ram's horn exhaust headers and dual exhausts ... new unitized starter ... plus other advanced features—and you have America's newest and best power buy for 1957. What's more, it is available in all passenger car models and with your choice of four great transmissions.

NEW! "CORVETTE V8" with fuel injection

Here's even greater performance—two powerful versions of the special "Corvette V8" engine, available in all passenger car models for 1957! One version gives you extra power using twin 4-barrel carburetors—the other offers you Chevrolet's trend-starting new fuel injection, most far-reaching engine improvement in the entire industry! With the carburetor completely eliminated, fuel injection results in the most instantaneously responsive power you've ever known ... and a brand new measure of fuel efficiency.



Fuel Injection

Injecting fuel into an engine's intake is an old idea. Henry Ford used a basic mechanical injection system on his 1901 "Sweepstakes" race car, and fuel injection became common on diesel engines in the 1920s. Mercedes-Benz introduced gasoline direct fuel injection on its 300 SL in 1955; Chevrolet unveiled its Ramjet port-injection system in the Bel Air and Corvette for 1957. But these early systems were finicky, expensive, and unusual.

Emissions standards and fuel economy concerns prompted a second look at fuel injection in the 1970s. By that time, new technologies such as Volkswagen's computer-controlled system, introduced in 1968, allowed for more precise metering, delivering just the right amount of gasoline to suit engine temperature and operating conditions. Japanese and European automakers quickly embraced electronic fuel injection. American manufacturers followed suit, and by the early 1990s the carburetor was all but dead.



Cruise Control

Automatic transmissions took a load off the left foot, but the right one still had plenty to do. Holding down the accelerator pedal on a long drive is tiring, and adjusting the pedal to maintain a consistent speed over hilly terrain is a skill unto itself. By the 1950s, aftermarket suppliers offered ratchet mechanisms that clamped the accelerator to the brake pedal to hold it in place, releasing when the brake was touched, but that wasn't the same thing as holding the car at one speed.

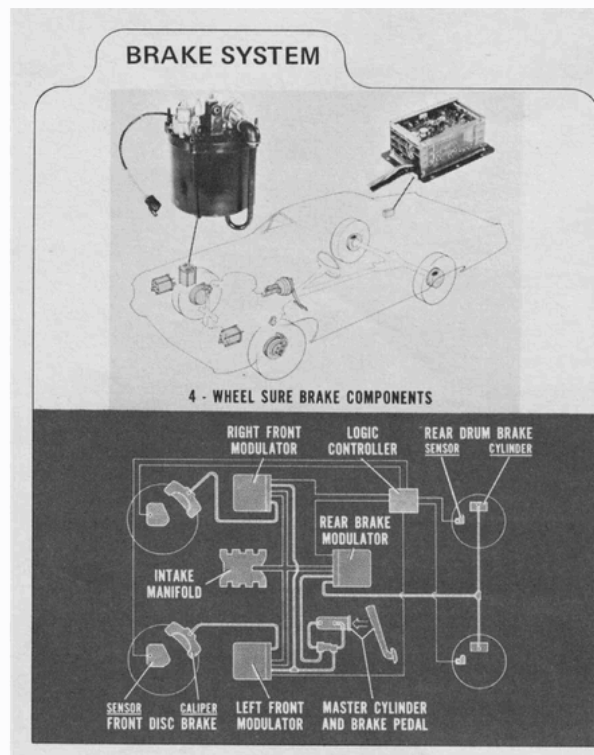
True automatic speed regulators arrived in 1958, when Chrysler offered "auto-pilot" on the Imperial. But Cadillac's version, introduced a year later, had the alliterative name that stuck: "Cruise Control." Economy, more than convenience, took cruise control mainstream in the 1970s. With oil prices high, drivers

appreciated the better gas mileage that came with steady speeds. By the 1990s, cruise control was widely available up and down the price ladder.

Turbochargers

Cram more air into the cylinder, and you can burn more gas, which means more power. Engineers have known this for ages, and crankshaft-driven superchargers were available on cars from Bentley, Mercedes-Benz, Cord, and others by the 1930s. But a supercharger meant parasitic losses. Turbochargers use turbines driven by exhaust gases, compressing air using energy that is otherwise wasted.

Turbochargers proved themselves on World War II aircraft, and automakers began looking at them seriously in the 1940s. GM offered turbochargers on the Corvair Monza and the Oldsmobile Jetfire in 1962. But early automotive versions weren't without problems. At lower engine speeds, it took time for the turbine to spool up, and drivers complained about noticeable "turbo lag." Improved turbochargers found a new purpose in the 1980s, allowing automakers to squeeze more power from the smaller, more efficient engines required under tightening federal regulations—a theme we've seen repeat itself in recent years.



Antilock Brakes

Generations of cold-weather student drivers were taught to pump the brakes when sliding on ice and snow. Slam the pedal and lock up the wheels, and you just keep skidding. But pulse the pedal, and you keep the wheels turning, retaining more control of the car in the process. It's sound advice but not always easy to remember during a panic stop.

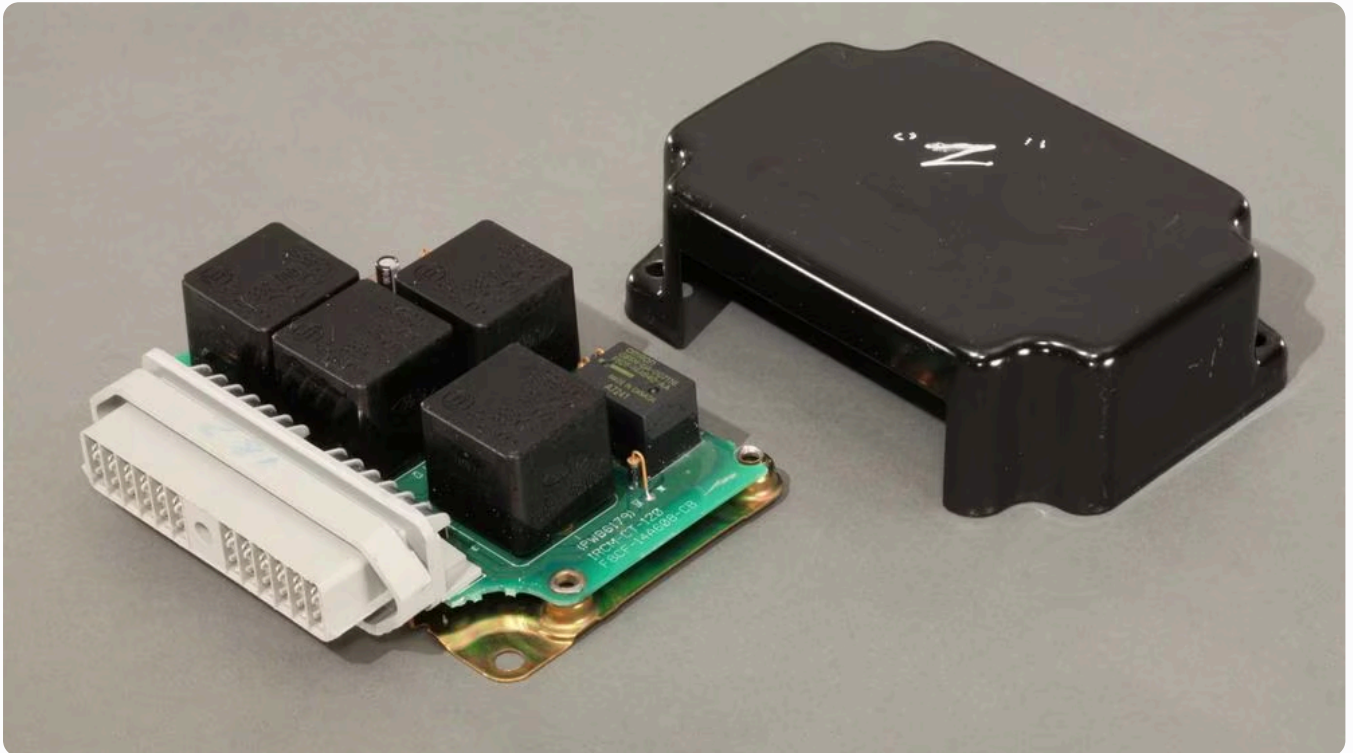
Antilock brakes automated the process and did so at a quicker rate than any human foot could manage. Ford unveiled a rear-wheel system in 1969, and Chrysler offered four-wheel, computer-controlled antilock brakes on its Imperial models for 1971. Mercedes introduced a more sophisticated digital control system, able to adjust brake pressure independently on each wheel, in 1978. Widespread by the 21st century, antilock brakes became mandatory in the U.S. in 2012. Winter driving has been a little less daunting ever since.



Catalytic Converters

By the mid-20th century, an estimated 850 tons of fresh hydrocarbons floated into the air over Los Angeles every day, most of it from motor vehicles. As Americans grew more eco-conscious in the 1970s, belching smokestacks and tailpipes became less a symbol of economic prosperity and more one of ecological catastrophe.

Enter the catalytic converter. Through the magic of chemistry, it converts harmful pollutants into safer carbon dioxide, nitrogen, and water. Most gasoline-powered cars sold in the U.S. employed them to meet emissions standards starting in 1975 (with the notable exception of Honda's Civic CVCC, which met standards without a converter). Alas, there is no free lunch. The catalyst behind the chemical reaction is usually platinum—resistant to corrosion but also rare and expensive. This adds to the cost of a car and makes the catalytic converter a tempting target for thieves.

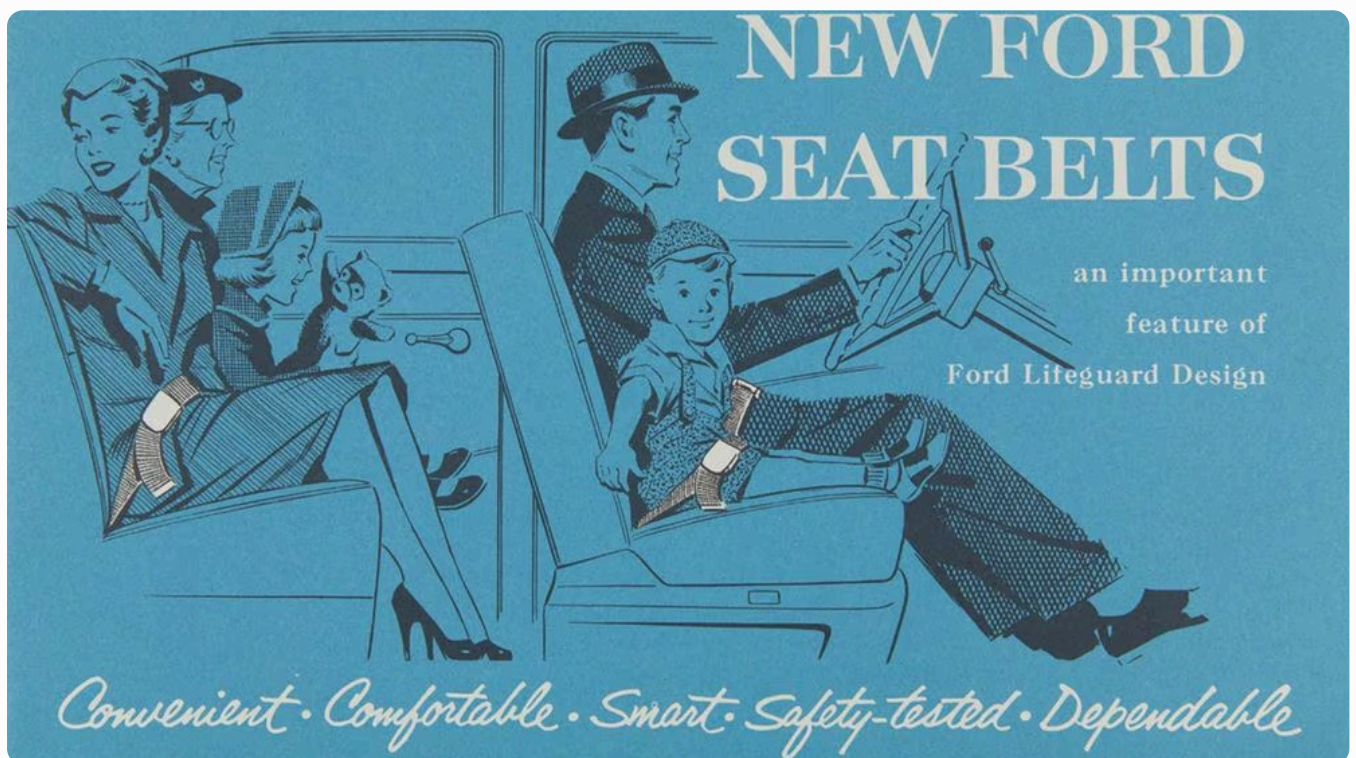


Computer-Controlled Engines

The single most important innovation of the past 75 years may be the marriage of cars and computers. The Clean Air Act of 1970 prompted Ford and Toshiba to partner on electronic engine controls to improve performance and cut emissions. First produced in 1974, their system used a 12-bit microprocessor to control ignition timing and air-fuel mixture, making constant adjustments based on the car's speed, gear, even the blend of gasoline in the tank. As this technology improved, it became less expensive and more common.

Computer controls also paved the way for onboard vehicle diagnostics. Microprocessors collect data, track performance, and document problems through codes. When a car goes in for service, technicians retrieve the codes and pinpoint the trouble spot. California mandated basic onboard diagnostic

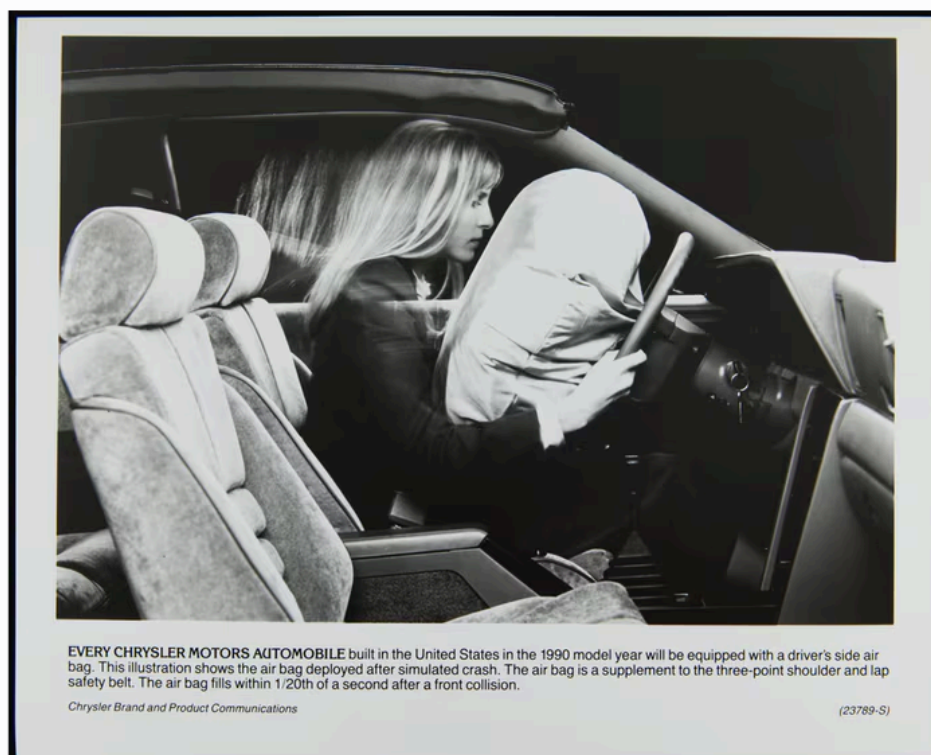
systems in 1988, and the state's economic influence ensured the technology spread everywhere.



Seat Belts

Nash offered optional seat belts in 1949, and Ford followed for 1956, though neither company saw much interest from buyers. Saab made seat belts standard in 1958, but American manufacturers held to the mantra “safety doesn’t sell.” Then came Ralph Nader and *Unsafe at Any Speed*, published in 1965. The book helped bring about the National Traffic and Motor Vehicle Safety Act, mandating seat belts and other safety appliances on all cars sold in the U.S. beginning with the 1968 model year.

Requiring seat belts was one thing. Getting motorists to use them was something else. Mandatory seat belt ignition interlocks that prevented cars from starting until the belts were latched caused such an outcry in the mid-1970s that they lasted only two years. State laws and education programs in the 1980s finally made Americans take seat belts seriously. The National Highway Traffic Safety Administration estimates that, since 1975, some 375,000 lives have been saved as a result.



Airbags

Seat belts brought a significant leap forward in crash protection, but only when properly buckled. Safety advocates called for “passive” safety devices that worked without any action or input from drivers. Airbags, which were patented

for automotive use in 1953, offered a solution. The devices are just what their name implies: inflatable bladders that, in a collision, are filled by a gas propellant to provide a cushion for motorists.

Airbags began to appear in American cars in the early '70s, and Chrysler took the lead by phasing them in to all its cars starting in 1988. Ten years later, airbags for both the driver and front passenger were required on all cars and light-duty trucks sold in the U.S. In the 21st century, automakers introduced rear, side, and knee airbags on some models, as well. Volvo even offered pedestrian airbags, which protected people outside the car. Airbags by themselves are not a cure-all. But when combined with seat belts, they substantially reduce the risk of fatal injury.



GPS/In-Car Navigation

When the U.S. military opened its Global Positioning System to civilians in the 1980s, effective in-car navigation systems became feasible. Mazda introduced the first GPS-based system, in Japan only, in 1990. General Motors added GPS navigation to the Oldsmobile 88's options list for 1995. In 1998, Garmin introduced a portable unit that could turn any car into a GPS-equipped model. But early systems relied on data cartridges or CD-ROMs to supply their maps.

More recently, Wi-Fi, smartphones, and Bluetooth have brought in-car navigation to the next level. Maps are updated over the air, traffic and crash reports appear in real time, and points of interest are preprogrammed to reduce the need for hand- or voice-entered destination addresses. It's hard to imagine a more practical addition to the dashboard. The downside? Map-reading has now joined basic math and cursive handwriting on our collective list of vanishing skills.





Advanced Driver Assistance Systems

Many technologies on this list make cars safer, but advanced driver assistance systems address the root problem: human error. Adaptive cruise control, lane departure warnings, and assisted lane keeping first appeared in premium cars from Cadillac, Lexus, and Audi in the 2000s. Radar and lidar allow vehicles to “see” traffic and obstacles on the outside, while inside sensors monitor a driver’s hands, head, and eyes to check for drowsiness or inattention. Some systems merely warn of potential problems; others step in and take over steering and braking.

Complete automation remains the goal in the eyes of many. Theoretically, fully autonomous vehicles will reduce crashes, enhance efficiency, improve traffic flow, and expand mobility. But the past few years have shown that reliable systems are going to be much more difficult to develop than proponents once thought. We may not see full autonomy soon, but any technology that improves performance, increases safety, and reduces waste is a welcome addition.

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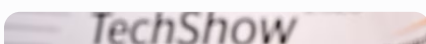
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