

20

21

TOP

10

Tech Cars

THE TREND TOWARD
ALL-ELECTRIC IS
ACCELERATING

BY LAWRENCE ULRICH





THE ELECTRIC HYPERCAR

from Rimac, the C Two, will set you back \$2.4 million but take you from 0 to 60 in under 2 seconds, a production-car first.

RIMAC AUTOMOBILI



The COVID-19 pandemic put the auto industry on its own lockdown in 2020. But the technological upheavals haven't slowed a bit.

The march toward electric propulsion, for example, continued unabated. Nine of our 10 Top Tech Cars this year are electrically powered, either in EV or gas-electric hybrid form. A few critical model introductions were delayed by the virus, including the debut of one of our boldface honorees: the long-awaited 2021 Lucid Air electric sedan [p. 46]. It's expected to hit the market in a few months. But

the constellation of 2021's electric stars covers many categories and budgets, from the ultra-affordable, yet tech-stuffed Hyundai Elantra Hybrid to the US \$2.4 million Rimac C Two hypercar.

The past year brought a reality check for that other relentlessly hyped tech, the self-driving car. In its fully realized form, it will take quite a few years to reach showrooms. Yet behind the smoke and mirrors there's real substance. Several of this year's honorees show the remarkable new capabilities of advanced driver assistance systems (ADAS), which are providing the stepping-stones toward full autonomy. Someday.

Lucid Air

20
—
21
Go fast,
go far,
go green



THE LUCID AIR

packs plenty of raw, all-electric power, but it does so with finesse, setting new standards for efficiency.

BASE
PRICE:
US \$69,900
(AFTER A
\$7,500 U.S.
TAX CREDIT)

PETER RAWLINSON, who'd been the chief engineer for Tesla's Model S, is ready to launch his Lucid Air from a factory in Casa Grande, Ariz., this spring. From a lot that Rawlinson called "bare earth," a US \$700 million factory sprang up in less than a year, with a capacity for 30,000 cars a year. And that's just Phase 1.

Lucid Motor's streamlined luxury sedan has thrown down an electric gauntlet, including a \$139,000 Grand

Touring version with an EPA-rated driving range of 832 kilometers (517 miles). That's a historic high for any electric car, exceeding the Tesla Model S's 402-mile mark by the distance from New York City to Hartford, Conn.

Apparently, it just might take a former leading light at Tesla to leapfrog the electric efficiency of Elon Musk's vaunted vehicles. The Welsh-born engineer and founder of the California-based Lucid is used to comparisons with his former Silicon Valley employer. But he insists the Air has bigger game in mind.

"Please don't describe us as 'Tesla killers,'" Rawlinson pleads in an interview. "We're part of the same movement toward sustainable transportation. But this is a luxury car to compete with a Mercedes-AMG S-Class or a BMW 7 Series. And they can't match our performance. Not even close."

Even though the Grand Touring version had to sacrifice some power to achieve its extraordinary driving range, it still has 596 kilowatts—that's 800 horses—to power dual motors and an all-wheel-drive power train. The top-shelf Dream Edition, at \$169,000, supplies a boggling 805 kW and a claimed 2.5-second surge to 60 miles per hour. Fitted with 21-inch (53-centimeter) wheels, it gives up 8 percent of its range compared to what it would get with standard 19 inchers.

In August, the Dream Edition stunned the auto world with a quarter-mile (0.4-kilometer) drag run at California's Sonoma Raceway, at 9.9 seconds and 144 mph. That's slightly quicker than the magnificent Porsche 911 Turbo S, one of history's fastest gas-powered sports cars. The Air is also imposingly stretched, a full-size luxury sedan with a glass canopy, eucalyptus wood, and platinum trim. Under the long hood is the roomiest front-storage "frunk" of any EV, at

0.28 cubic meters, or 9.9 cubic feet.

By the end of this year, Lucid plans to unveil a \$95,000 Air Touring model with 462 kW (620 hp) and a 653-km range, a bit more than Tesla's 647-km Model S Long Range Plus. A \$77,400 Pure model is slated for early 2022, with 358 kW (480 hp), all from a single rear-axle motor, and a 653-km range target. There's a \$7,500 federal tax credit for all U.S. models, which means the most affordable version will go for \$69,900.

For all the Lucid's accelerative feats, to hear Rawlinson tell it, high performance is just a nice side effect. "Ninety-nine percent of the words I speak are about efficiency," he declares, having long railed against "dumb range" obtained by jamming in ever-heavier batteries.

He's backing those words. The company is squeezing out range via clever battery-thermal management and power trains developed in-house. The 113-kilowatt-hour battery pack stores only 15 kWh more than Tesla's, but it crushes the Tesla's range by giving 4.6 miles of range per kilowatt-hour—10 percent higher than Tesla's best. The compact drive unit, which integrates a motor, transmission, and inverter, weighs a mere 74 kilograms (163 pounds).

A Lucid will leave the factory with 32 sensors, including ultrasonic, external and driver-monitoring cameras, and lidar (take that, Tesla). That's enough to allow Level 2 semiautonomy, akin to the Cadillac Super Cruise or the Tesla Autopilot. The company plans over-the-air updates by roughly 2023 that it claims will bring hands-off, eyes-off driving, also known as Level 3, which is something no showroom car has yet achieved.

Rawlinson says he's also competing on how fast his car can recharge. The Air's class-topping 900-volt-plus architecture allows lightning-fast refills at 300 kW, enough to provide 300 miles (483 km) of range in 20 minutes. Compared with

the 800-V Porsche Taycan, Lucid says its higher-voltage architecture can deliver superior battery-discharge efficiency, and potentially faster recharging as direct-current stations become even more powerful.

"The customer doesn't care about the race of electrons," Rawlinson says. "What you want to know is, how quickly in miles is that car charging?"

Lucid's final challenges include opening a network of 20 North American sales "studios" (that's showrooms to you) by year-end. And also expanding that factory until it can churn out 400,000 cars a year. Throwing a bit of shade at his old boss, Rawlinson expresses confidence.

"I tend to keep my promises," he says with a smile.

"THIS IS A LUXURY CAR TO COMPETE WITH A MERCEDES-AMG S-CLASS OR A BMW 7-SERIES. AND THEY CAN'T MATCH OUR PERFORMANCE. NOT EVEN CLOSE."

—PETER RAWLINSON

FORD F-150 POWERBOOST HYBRID

IT'S A 7.2-KILOWATT
GENERATOR ON WHEELS

BASE PRICE: US \$30,635



America's perennially best-selling vehicle, the Ford F-150 pickup, has gone hybrid, and there's an all-electric version in the works. And aside from showing class-best fuel economy of 9.8 liters per 100 kilometers (24 miles per gallon), the F-150 PowerBoost Hybrid finds a versatile sideline as a megapowered mobile electric generator.

The onboard system cranks out up to 7,200 watts, enough to supply a home during power outages. Ford says the system could power 28 typical home refrigerators. More practically, the Ford could simultaneously power a TiG (tungsten inert gas) welder, air compressor, plasma cutter, chop saw, angle grinder, and work light, all with no need to carry a noisy, bulky gasoline generator in a pickup's bed.

A cargo-box panel, in the bed, has four 120-volt outlets and one 240-V connector. And there's a pair of household outlets in the cab. A touch screen displays power draw in watts for each of two circuits.

The truck's mini power station is fed by a 35-kilowatt (47-horsepower) motor-generator sandwiched between the truck's gasoline engine and its 10-speed transmission. A garden-variety power inverter converts DC power to AC and smooths power spikes so users can plug in laptops and other sensitive electronics.

A 1.5-kilowatt-hour onboard battery supplies power. Once it's depleted, the gasoline engine fires up automatically to keep energy flowing and recharge the battery.

A robust 7.2-kW generator is a US \$750 option for the F-150 PowerBoost Hybrid, which comes standard with a 2.4-kW generator. And there's a 2.0-kW unit on nonhybrid models. The fuel-saving hybrid system itself adds \$2,500 to \$4,495 to the basic truck's price, depending on the model.



POLESTAR 2

VOLVO'S NEW EV BRAND

GOES FULL ANDROID

BASE PRICE: US \$63,000



The Polestar 2, the first offering from Volvo's new electric brand, breaks little ground in electric mobility. But its pioneering infotainment tech will soon become a staple of millions of cars around the globe.

Polestar's milestone is Android Automotive OS, an open-source system that's essentially a declaration of surrender from automakers. Sure, automakers will still put their own spin on this stuff, but they seem to have given up their fierce resistance to the incursion of Google, Apple, or other disrupters into their sacrosanct vehicle interiors.

In its Scandinavian-sleek cabin, the Polestar 2 houses nearly every user control—Android-powered navigation, search, apps, and entertainment—on a tablet-style 11-inch touch screen. The cloud-based interface allows users to safely rely on voice or steering-wheel commands for Google Maps, Assistant, and Play Store while leaving

their smartphone in a pocket or even switched off. It all works beautifully, especially for people whose emails, playlists, address books, and calendars are already bound up in the Google ecosystem and cloud.

Best of all, as cars age, instead of becoming a dinosaur in the dash (eight-track, anyone?) the Android Automotive stays forever young, updating as easily as any phone app. The lure and logic are obvious. That's why General Motors, Stellantis (the newly merged Fiat Chrysler and PSA Group), and the Renault-Nissan-Mitsubishi alliance are all on board, and will bring Android Automotive to their lineups over the next two years. Eventually, it's likely that all new cars will support both Android Auto and Apple's CarPlay, so regardless of which kind of smartphone you have, your car will work with it seamlessly.

LEFT: POLESTAR; RIGHT: HYUNDAI

Rimac C Two

This Croatian car outruns any other EV—for €2 million

BARELY A DECADE ago, Mate Rimac was toiling in an unheated garage in Croatia, converting an old BMW to run on electricity for drag-racing competitions.

Today, the 33-year-old entrepreneur has 900 employees, a headquarters near Zagreb, development deals with Porsche and Hyundai, and a factory about to produce the Rimac C Two, a €2 million, 1,427-kilowatt, 415-kilometer-per-hour electric phantasm. Its projected 1.85-second rip from 0 to 60 miles per hour (97 kilometers per hour) would make it the first production car to break the 2.0-second barrier.

Delayed for a year by the COVID pandemic, Rimac plans to bring the first 150 C Twos to market this year. The model is the follow-up to his notorious Concept One, a hypercar with a mere 913 kW (yes, that's 1,224 horsepower). But to Rimac,

BASE
PRICE:
US \$2.4
MILLION



HYUNDAI ELANTRA

HOW MUCH
TECH CAN \$20K
BUY? PLENTY

BASE PRICE:

US \$20,655 (GAS)

\$24,545 (HYBRID)



the tech is just a means to an end. The point is to win over EV skeptics and bring carbon-neutral mobility.

“Before Tesla, people were building ugly, boxy electric cars, telling a story of saving fuel,” Rimac says in an interview. “That’s relevant, but it only brings in a small percentage of people.”

His company’s multifarious projects include Greyp, the electric bicycle company; an EV he’s developing for Hyundai’s new N Line; batteries for Aston Martin and Jaguar; and technical projects with Porsche, which increased its Rimac stake to 15.5 percent in 2020.

“When Porsche invested, after three years of due diligence, that was like, another level for us,” Rimac says. “Porsche is all-in on electric cars.”

What have these guys got that Porsche hasn’t got? Small size and vertical integration. They let the company focus on high-performance battery, power train, and vehicle design more quickly than can, say, the sprawling Volkswagen Group (Porsche’s parent), whose annual revenues are more than four times the annual gross domestic product of Croatia.

Rimac’s C Two integrates a 120-kilowatt-hour lithium-nickel-manganese-cobalt-oxide battery into an ultralight carbon-fiber frame, to deliver a nominal range of 550 kilometers (342 miles), as measured by Europe’s regulatory

protocol. Electric motors at each wheel allow true torque vectoring: Wheels can be individually powered or braked, delivering otherworldly handling.

Rimac says the system allows near-instant calibrations of dynamic torque.

That wingman philosophy extends to the Rimac’s autonomous Driver Coach, a kind of hyperdriving onboard HAL 9000 based on a GPS database from racetracks all over the world. The scissor-doored Rimac incorporates six driver screens, a lidar unit, 13 onboard cameras, 12 ultrasonic sensors, and an exceptionally precise localization system using multiple stereo cameras and inertial-measurement-unit sensors.

“We’re trying to use autonomous tech to add value to enthusiasts,” he says. “This system will give you autonomous laps to show how a professional driver would do it. Then you take over, and the system gives you onboard coaching, showing where to brake, where to turn in, what you did wrong, and what you can do better.”

Rimac slyly notes that Nikola Tesla was born in Croatia and says that, as a young petrolhead, he was fascinated by the inventor and the possibilities of his “electric machines.” Perhaps future entrepreneurs will remember Rimac as fondly as he remembers his hero.

THE RIMAC C TWO poses in stasis, wings up. Once they’re down again it can rocket to 60 miles per hour in 1.85 seconds on battery power alone.



So, I'm driving the new Hyundai Elantra Hybrid. Rather, it's mostly driving itself, and doing so much better than some luxury cars I've tested. It regulates its speed on a tricky parkway north of Manhattan, on a dark night, even as traffic slows or stops. It steers through curves so confidently that this traffic-clogged escape route becomes almost

meditatively calm. I've got time to ponder the Hyundai's numbers, including the SEL Hybrid model's stellar 54-mile-per-gallon EPA rating (4.36 liters per 100 kilometers) in combined city/highway driving. The US \$24,545 base price reads like a misprint, considering how much sheer *stuff* is aboard, including technology that was a

big deal on \$100,000 cars a decade ago, if it existed at all.

The list includes automated emergency braking with pedestrian detection and lane-departure warning, and adaptive cruise control with automated lane-centering that proved so effective on my evening run. A wireless connection for both Apple CarPlay

and Android Auto is not only a segment exclusive but still hit-or-miss in luxury showrooms. Voice recognition and a phone-based digital key offer more trickle-down tech. My test car with all these goes for upwards of \$26,000, still insanely inexpensive. Did I mention the conjoined display screens, a digital

flourish that recalls a Mercedes-Benz?

The Hybrid integrates a 1.6-liter gas engine with an electric motor and 1.3-kilowatt-hour lithium-ion battery pack, for a total of 104 kilowatts (139 horsepower) and 264 newton-meters (195 pound-feet) of torque. That spin is mediated through a six-speed automatic

transmission with an advanced dual-clutch arrangement—a staple of supercars, and nearly unheard of at these prices. A high-performance Elantra N Line is in the works for later in 2021, perhaps with (pulse quickens here) an increasingly rare manual transmission option. The Elantra seems destined to cover a lot of territory.



FERRARI SF90 STRADALE

THE FASTEST OF ITS BREED,
AND BATTERIES ARE INCLUDED

BASE PRICE: US \$511,250



The late Enzo Ferrari would have been flabbergasted to learn that the fastest road-going car in Ferrari history would have a plug. “*Dai!*,” he might have said.

That cord connection lets the SF90 Stradale and SF90 Spider convertible—the company’s first plug-in hybrids—cruise for 25 kilometers (15.5 miles) on electricity alone, perhaps for a commute through smoggy Rome, where diesel cars have already been banned during pollution emergencies. This voluptuous mid-engine Ferrari also shuts down its twin-turbo, 769-horsepower V-8 whenever it’s in reverse. Let’s face it: If you need the turbo when you’re in reverse, you need to reevaluate some of your life choices.

With its 735-kilowatt (986-horsepower) punch of gasoline and electricity, the Stradale gets from 0 to 100 kilometers per hour (62 miles per hour) in 2.5 seconds, and sets a record 79-second lap around the fabled Fiorano circuit in Maranello, Italy,

where the company is headquartered. Making all that possible is a trio of electric motors, including one for each front wheel, for precise control of all-wheel-drive traction and a combined power boost of 161-kW (217 hp). The third motor is sandwiched between the engine and a spectacular dual-clutch, eight-speed automated gearbox derived from Ferrari’s Formula 1 cars. All of the motors get nourishment from a 6.5 kilowatt-hour lithium-ion battery.

Ferrari’s steering-wheel *manettino* (Italian for “little switch”) summons any one of four driving modes, from an eDrive setting with exclusively front-wheel power and zero tailpipe emissions, to a new Qualify setting that releases the Kraken.

A brake-by-wire unit blends regenerative energy capture with hydraulic force administered through the physical pedal. A new electronic Side Slip Control system brings sensor-based distribution of power to all four wheels, allowing for torque vectoring on the

front electric motors. Think of it as a digital helping hand, a boon to the amateur who might struggle to exit corners at high power without spinning out of control.

All that hybrid gear adds 270 kilograms of weight, but Ferrari engineers lightened the car elsewhere, using an all-carbon-fiber bulkhead, titanium components, and two new aluminum alloys. The resulting weight-to-power ratio of 468 watts per kilogram sets a new company record.

Aerodynamics are another highlight, with Ferrari claiming a class high of 390 kg of downforce at 250 km/h, aided by front-vortex generators, an active rear wing, and “blown geometry” wheels, which use rotor wings to manage the flow of air.

The SF90’s fantastical cabin gets the first all-digital instruments and interfaces in a Ferrari, including a dramatic 16-inch HD screen that curls toward the driver for easier readability.

While the old days are fading, the electric age will surely add some charms of its own.

Land Rover Defender

It tells you when the river’s too deep to ford

THE DEFENDER

shows its off-road powers, which include sensors that make sure the puddle you’re thinking of crossing won’t swallow you whole.



LEFT: FERRARI; RIGHT: JAGUAR LAND ROVER

THE REBORN Land Rover Defender grinds its way up Mount Equinox in Vermont, the tallest peak in the Taconic Range, showing off some techno-wizardry. As the front wheels roll into a stream, a water sensor sounds the depths ahead, assuring me I'm not exceeding the vehicle's 90-centimeter (35.4-inch) wading limit. A waterproof camera feeds imagery of obstacles below the vehicle, with animated overlays tracking the front wheels on the dashboard display. For ultimate, eye-rolling ease, we set our desired speed to 6 kilometers per hour (4 miles per hour), and the Rover's systems—including a height-adjustable air suspension, active electronic rear differential and selectable Terrain Response—sort it all out automatically, walking this stylish beast up and down slopes steep enough to make a 4x4 newbie cringe. A maximum 29-cm (11.5-inch) ground clearance tops even that of the mighty Jeep Wrangler Rubicon.

Honestly? The Rover's off-road chops are impressive yet unsurprising, basically a deluxe, digitized gloss on the abilities that made the post-World War II Defender a globe-trekking legend (those of a certain age may remember the 1966 film *Born Free*). What is surprising is the Defender's on-road comportment and performance. Forget your Wranglers, your Ford Broncos, even a six-figure Mercedes G-Wagen: Nothing in this burly class can match the Defender on a winding stretch of pavement.

Our mountain-man work accomplished, the Rover makes a hot run to a more likely natural habitat: Gather Greene, a rustic glamping spot near New York's Hudson River. Along the way, it takes advantage of a rigid, all-aluminum D7x architecture and 295-kilowatt (395-horsepower)

Ingenium in-line six, a mild hybrid goosed with a 48-volt electric supercharger and a small lithium-ion battery. The sprint from 0-60 mph (97 km/h) is dispatched in 5.8 seconds, besting many comparable SUVs.

A modular, industrial-chic interior flaunts an exposed, powder-coated magnesium alloy beam connecting the dash and an off-road grab handle to keep a shotgun passenger in place. An optional, folding jump seat allows old-school, three-across seating up front. Skylights integrated into roof pillars are a first in a production car, and it was a challenge to engineer them to meet crash standards. Jaguar Land Rover's notoriously behind-the-curve infotainment systems are replaced with Pivi Pro, a smartphone-style touch screen with over-the-air software updates. The exceptional Meridian audio system includes a sparkling 700-watt, 15-speaker unit.

More than 170 adventure-grade accessories include an optional rooftop tent, inflatable waterproof awning, and integrated air compressor. Two seem a must: The Defender's signature, side-mounted gear carrier and Expedition roof rack—the latter ideal for tomb raiding. Or at least antique hauling.

BASE
PRICE:
US \$47,450

TESLA MODEL Y

A LITTLE SMALLER

THAN THE X,

AND A LOT LESS PRICED

BASE PRICE: US \$49,990



To drive any new Tesla is to realize that most of its EV rivals, for all their gains, still have some catching up to do. The Model Y SUV is the latest to raise the bar, including a 525-kilometer (326-mile) range.

I tested the Long Range version in and around Brooklyn, driving nearly 4 miles for every kilowatt-hour stored in its 75-kilowatt-hour battery. That's about 30 percent higher energy efficiency than I achieved in the new Ford Mustang Mach-E and nearly two-thirds better than the Audi E-tron Sportback. The EPA estimates that a Model Y needs US\$550 a year in electricity to cover 15,000 miles, versus \$750 for the Ford's all-wheel-drive version and \$850 for the Audi.

It's a delight to drive. The Model Y's frisky handling and instant-on acceleration makes every time you pass and merge a pleasure. That kind of oomph comes from dual electric motors that combine for 286 kilowatts (384 horsepower) and 510 newton meters (376 pound-feet) of torque. The \$62,900 Performance edition—with a wicked 456 horses and 497 pound-feet—sacrifices 57 km of range but cuts the 0-to-60-mph time to 3.5 seconds, from 4.8.

A 15-inch center touch screen is the altar of the car's Temple of Tech, and its voice controls are among the most natural in the business. Dial up Tesla's sophisticated semiautonomous features, including Navigate on Autopilot, and its situational awareness includes animations in the driver's display of nearby vehicles, bicycles, even orange cones in a parking lot.

Tesla's other big advantage, in North America anyway, remains its proprietary, continent-wide Supercharger network. The company's V3 Superchargers will replenish up to 254 km (158 miles) of range in 15 minutes, enough time for a bathroom break and a snack.



FORD MUSTANG MACH-E

LOTS OF EV MAGIC, FOR LESS THAN A TESLA

BASE PRICE: US \$35,395 (AFTER \$7,500 U.S. TAX CREDIT)



Traditionalists may be shocked to see the Mustang name and galloping-pony badge on an electric SUV. But the moniker is apt. This affordable EV recalls the space-age vibe of the original Mustang's phenomenal 1960s debut.

Start with range. The Mach-E can go 482 kilometers (300 miles) on a charge, which is 42 km short of the Tesla Model Y Long Range but close enough for a little electric rock and roll. And the Ford, with its optional 98.4-kilowatt-hour Extended Range battery (88 kWh is usable, the rest a buffer for long battery life) smacks down the driving range and efficiency of far-pricier electric SUVs from Audi, Jaguar, and Volvo. That includes a solid 100-mpge rating from the EPA (2.35 liters per 100 kilometers).

The Ford drives glued to the pavement, quiet as a glider. It can scamper to 60 miles per hour (97 kilometers per hour) in 4.8 seconds, spurred by dual all-wheel-drive motors with 258 kilowatts (346 horsepower) and 580 newton meters (428 pound-

feet) of torque. A pricier, \$61,000 Mach-E GT (and also a separate GT Performance Edition) arrives later in 2021, promising 0–60 mph in 3.5 seconds.

Regenerative braking is the only performance bummer: It's perfect in the selectable "one-pedal" driving mode that decelerates the car to recapture energy when you lift your foot off the throttle pedal. But the physical brake pedal itself can feel grabby and artificial in spirited driving during the transition from regenerative to mechanical braking. This crossover happens when the car goes from being slowed by the internal, mechanical resistance of electromagnetic generation in the motor/generators, to being slowed by the plain old friction of conventional braking. In the former mode, your foot feels just an artificial electronic cue that the electric motors are slowing the car, but in physical braking, which begins farther along in the pedal's progress toward the floor, there's a more distinct grab. It takes some getting used to.

There seems to be something for everybody with this car, including people

who don't like quiet. The Mach-E's smartly designed touch screen accesses three drive modes—Whisper, Engage, or Unbridled—whose variables include digitized onboard sound that tracks with rising-and-falling acceleration. The synthesized mimicry, the EV equivalent of a laugh track, recalls a Ford V-8 by way of DJ Spock. Just leave it in Whisper and enjoy the silence. The car particularly shines in the passenger compartment, with superior seats, materials, and fit and finish that make the Tesla Y feel bare bones in comparison. It's a looker on the outside, too: The sculpted, wide-hipped body may be the Ford's most visible competitive edge.

Public charging is snappy with 150-kilowatt DC capability, but it's slower than Tesla's fastest Supercharger rate. But Ford claims it will go from a 10 percent charge up to 80 percent in 45 minutes with the extended-range battery.

The Mach-E brings EV ownership within reach of more people, and the raised height, practical SUV layout, and all-wheel-drive option are what Americans, in particular, now want.

Porsche 911 Turbo S

Fast as lightning,
stable
when wet

BASE PRICE:
US \$204,850



LEFT: FORD MOTOR CO.; RIGHT: PORSCHE

AMONG MODERN SPORTS CARS, there's the fast, and then there's the Porsche 911 Turbo. I've driven many generations of this Autobahn brawler, but I still wasn't quite prepared for what Porsche could do with 477 kilowatts—640 horsepower.

I tested the all-new 911 Turbo S at my “neighborhood” track, the Monticello Motor Club in the Catskills region of New York. On Monticello's 4.1-mile tangle of curves, the Porsche showed how 46 years of engineering evolution have transformed a car whose 1975 original was known as the Widowmaker for its twitchy handling. This Turbo dances so lightly around a racetrack, imparting such immediate confidence and security, that I was tempted to fiddle with its Burmester audio system at triple-digit speeds, with more than 1.1 gs of lateral handling grip.

Those digits pile up quickly and with face-searing force. A big reason is the use

of the secret sauce of Launch Control. Dial the Porsche's drive-mode knob into Sport or Sport Plus settings; squeeze the brake, then the accelerator, which makes the twin-turbo, boxer-six engine hum at a steady 5,000 rpm; release the brake pedal, and *shazam!* The 911 pins its driver to the seat back like a moth against a windshield. It goes to 60 miles per hour (97 kilometers per hour) in 2.2 seconds, among the fastest sprints in production-car history. The quarter-mile (0.4 km) takes 10.1 seconds, at which point the vehicle is traveling at 137 mph (220 km/h). A driver could launch the Porsche from a stoplight at 34th Street in Manhattan and hit that speed by 39th Street. (Theoretically, officer).

Getting all that power out of just 3.7 liters of displacement demands a turbocharger that crams in 1.6 kilograms of air per square centimeter (22.5 pounds per square inch).

Fortunately, the Porsche stops as quickly as it starts. Up front are carbon-ceramic brakes and 10-piston calipers, to clamp enormous 42-centimeter rotors. The eight-speed, dual-clutch gearbox remains an industry benchmark for its speed and near-spooky shift logic. Stability is assured with a host of technologies, including four-wheel steering; an all-wheel-drive system that can transfer up to 500 newton meters of torque to the front wheels; and lightning-fast magnetic dampers for its Porsche Active Suspension Management.

Porsche Active Aerodynamics integrates new cooling flaps for a three-section, pneumatic elastomer front spoiler. Together with a lightened and enlarged carbon-fiber rear wing—forever a Turbo design signature—the moving components adjust for a full range of road conditions, speeds, and driving modes. That includes a new Wet mode: If acoustic sensors in the wheel arches detect spray from the road surface, the aerodynamic profile adjusts, a message appears in the instrument cluster, and the driver can activate yet another Wet mode (let's call this one “Wetter” mode) to ensure maximum stability. Under hard, high-speed braking, an air-brake function repositions that front spoiler and rear wing for maximum drag and downforce and shorter stopping distances. The active aero even adjusts in response to the sunroof being open.

Such wind-whipping thrills don't come cheap. The Turbo S coupe starts at \$204,850. My options-stuffed, metallic-blue tester topped \$234,000. It's a lot or a bargain, depending on your perspective. The 911 Turbo is already an Internet-video sensation for out-accelerating pricier McLarens, Ferraris, and other supercars, even Tesla's “cheetah” mode Model S. For the additional price of a GoPro camera, almost any Porscheophile can moonlight as a YouTube influencer.



THE PORSCHE 911 TURBO, the only gasoline-powered car on this year's list, is fast on the draw. It can leap from a dead stop at Manhattan's 34th Street and reach 137 mph (220 km/h) by 39th Street.

POST YOUR COMMENTS AT spectrum.ieee.org/toptechcars-apr2020